Specifying Your Instrument or Accessory

You can easily specify many instruments and accessories described in this catalog. Sections covering our most popular items include all the technical data you need to know for most applications. To specify the appropriate item, simply follow the step-by-step procedure at the end of each description. Your Foxboro representative can help also.

For Example:

Choose the product code.
Itemize the information needed to complete the specification.

Ordering

To order, just contact your Foxboro representative, or call, in North America:

1-866-746-6477, or International: 001-508-549-2424.
www.buyautomation.com/officelocator

Give us the ordering information using this catalog. Then tell us where you want the order shipped and when you need it delivered. We'll do the rest.

Need Help?

If you have questions, let us know. We’re ready — and eager — to assist you. Applications are a Foxboro specialty. We can help you figure out the best instrument for your purpose.

Pneumatic catalog available — ask your Foxboro representative for catalog FX-0180.

<table>
<thead>
<tr>
<th>Flow</th>
<th>CFT51</th>
</tr>
</thead>
<tbody>
<tr>
<td>How to Order—Specify model number CFT51 followed by order code for each selection</td>
<td></td>
</tr>
<tr>
<td>Mass Flowtube Interface</td>
<td></td>
</tr>
<tr>
<td>Foxboro CFS10 and CFS20 Series Flowtubes</td>
<td>-B</td>
</tr>
<tr>
<td>Transmitter Mounting</td>
<td></td>
</tr>
<tr>
<td>Remote Mounted Transmitter</td>
<td>1</td>
</tr>
<tr>
<td>Language</td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>E</td>
</tr>
<tr>
<td>Nominal Supply Voltage</td>
<td></td>
</tr>
<tr>
<td>120 to 240 V ac, 50 or 60 Hz</td>
<td>A</td>
</tr>
<tr>
<td>10 to 36 V dc</td>
<td>B</td>
</tr>
</tbody>
</table>
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
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<td>Pressure and Differential Pressure</td>
<td>1</td>
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<tr>
<td>Flow — DP Primary Elements (Integral and Compact Orifice)</td>
<td>2</td>
</tr>
<tr>
<td>Flow — In-Line Flow Meters (Coriolis, Vortex, Mag Flow)</td>
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<td>Temperature and Humidity</td>
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<td>Liquid Level, Density, or Interface</td>
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</tr>
</tbody>
</table>
The following chapters contain Product Specifications of the Instruments:

**IAP10** Absolute Pressure Transmitters – Direct Mount
**IAP20** Absolute Pressure Transmitters – Bracket Mount
**IGP10** Gauge Pressure Transmitters – Direct Mount
**IGP20** Gauge Pressure Transmitters – Bracket Mount
**IGP25** Gauge Pressure Transmitters – Multirange for Wide Adjustment (400:1 Turndown)
**IGP50** Gauge Pressure Transmitters – Premium Performance
**IGP60** Gauge Pressure Transmitters – Premium Performance
**IDP10** Differential Pressure
**IDP15** Differential Pressure - Draft Range
**IDP25** Differential Pressure – Multirange for Wide Adjustment Capability (400:1 Turndown)
**IDP31** Differential Pressure – 100 msec Response Time
**IDP32** Differential Pressure – High Static Pressure
**IDP50** Differential Pressure – Premium Performance
**IMV25** Multivariable Transmitter – AP, DP, T
**IMV30** Multivariable Transmitter – AP, DP, T, with Flow Calculations
**IMV31** Multivariable Transmitter – AP, DP, T, with Level Calculations
**IPI10** P to I (Pneumatic-to-Current) Converter

**Pressure Seals** Remote and Direct-Connect Seals, including Flange Mount for Level, and Both Sanitary and Pulp & Paper Industry Connections
This transmitter measures absolute pressure and transmits a 4-20 mA, 1 to 5 Vdc, or digital output signal over a pair of wires.

For complete specifications, refer to Product Specification Sheets PSS 2A-1C13 A, B, C, D, E, J, K, and L.

### Output signal and configuration:

<table>
<thead>
<tr>
<th>Version</th>
<th>Output Choices</th>
<th>Configure From</th>
</tr>
</thead>
<tbody>
<tr>
<td>-D</td>
<td>✓ FoxCom Digital ✓ FoxCom/4 to 20 mA</td>
<td>✓ I/A Series Workstation ✓ Hand-Held Terminal ✓ Personal Computer ✓ Optional Pushbuttons</td>
</tr>
<tr>
<td>-T</td>
<td>✓ HART/ 4 to 20mA</td>
<td>✓ HART Communicator ✓ Workstation ✓ Personal Computer</td>
</tr>
<tr>
<td>-F</td>
<td>✓ Foundation Fieldbus</td>
<td>✓ Workstation</td>
</tr>
<tr>
<td>-A</td>
<td>✓ 4 to 20mA</td>
<td>✓ Standard Pushbuttons</td>
</tr>
<tr>
<td>-V</td>
<td>✓ 1-5 Vdc</td>
<td>✓ Standard Pushbuttons</td>
</tr>
</tbody>
</table>

### Span, range and overrange limits:

**Direct Connected Absolute Press. IAP10**

<table>
<thead>
<tr>
<th>Span Limits Code</th>
<th>Span Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.007 &amp; 0.21 MPa 1 &amp; 30 psi 0.07 &amp; 2.1 bar or kg/cm²</td>
</tr>
<tr>
<td>D</td>
<td>0.07 &amp; 2.1 MPa 10 &amp; 300 psi 0.70 &amp; 21 bar or kg/cm²</td>
</tr>
<tr>
<td>E</td>
<td>0.70 &amp; 21 MPa 100 &amp; 3000 psi 7.0 &amp; 210 bar or kg/cm²</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range Limits (absolute)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
</tr>
<tr>
<td>D</td>
</tr>
<tr>
<td>E</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum Overrange (absolute)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
</tr>
<tr>
<td>D</td>
</tr>
<tr>
<td>E</td>
</tr>
</tbody>
</table>

**Functional Specifications**

- **Sensor Temperature Limits:**
  - DC200: -46 & +121°C (-50°C + 250°F) FC77: -29 & +85°C (-20°C + 185°F)

- **Ambient Temperature Limits:**
  - DC200: -40 & +85°C (-40°C + 185°F) FC77: -29 & +85°C (-20°C + 185°F)

- **Electrical Classification:**
  - Various agency certifications for Zone and Division hazardous locations. Refer to Product Specification sheets for complete specifications.
**Digital 61**

**TA**

**32**

**4 to 20 mA**

**M1**

**V**

**22**

**T2**

**T3**

**30**

**F**

**TB**

**Sensor**

**31**

**M6**

**Transmitter with Sanitary Connection**

**63**

**...........................**

**20**

**62**

**PX**

**54x702**

Accuracy (Includes Linearity, Hysteresis, and Repeatability):

<table>
<thead>
<tr>
<th>Version</th>
<th>Output</th>
<th>Signal Accuracy in % of Calib. Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>-D or T</td>
<td>Digital</td>
<td>±0.05</td>
</tr>
<tr>
<td>-F</td>
<td>Digital</td>
<td>±0.05</td>
</tr>
<tr>
<td>-A</td>
<td>4 to 20 mA</td>
<td>±0.20</td>
</tr>
<tr>
<td>-V</td>
<td>1 to 5 Vdc</td>
<td>±0.10</td>
</tr>
</tbody>
</table>

Refer to Product Specification Sheets for accuracies at small spans (less than 10% of URL).

**Performance Specifications**

**How to Order – Specify model number IAP10**

Electronic Versions and Output Signals

- 4-20 mA/FoxCom ................................................................. D
- 4 to 20 mA/HART ............................................................... T
- Foundation Fieldbus .......................................................... F
- 4 to 20 mA ................................................................. A
- 1 to 5 V dc ............................................................... V

Structure Code – Select from one of the following eight groups:

1. **Transmitter Only (no seals)**

<table>
<thead>
<tr>
<th>Process</th>
<th>Sensor</th>
<th>Fill Fluid</th>
<th>Connection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>316L ss</td>
<td>Co-Ni-Cr</td>
<td>Silicone</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread. ............................................. 20</td>
</tr>
<tr>
<td>316L ss</td>
<td>Co-Ni-Cr</td>
<td>Fluorinert</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread. ............................................. 21</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread. ............................................. 22</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Fluorinert</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread. ............................................. 23</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C</td>
<td>Silicone</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread. ............................................. 30</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C</td>
<td>Fluorinert</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread. ............................................. 31</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>Hastelloy C</td>
<td>Silicone</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread. ............................................. 32</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>Hastelloy C</td>
<td>Fluorinert</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread. ............................................. 33</td>
</tr>
</tbody>
</table>

2. **Flameproof Transmitter Only (no seals)**

<table>
<thead>
<tr>
<th>Process</th>
<th>Sensor</th>
<th>Fill Fluid</th>
<th>Connection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread. ............................................. 52</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Fluorinert</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread. ............................................. 53</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C</td>
<td>Silicone</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread. ............................................. 60</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C</td>
<td>Fluorinert</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread. ............................................. 61</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>Hastelloy C</td>
<td>Silicone</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread. ............................................. 62</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>Hastelloy C</td>
<td>Fluorinert</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread. ............................................. 63</td>
</tr>
</tbody>
</table>

3. **Transmitter with Sanitary Connection**

<table>
<thead>
<tr>
<th>Process</th>
<th>Sensor</th>
<th>Fill Fluid</th>
<th>Connection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20 1.5 in Tri-Clamp</td>
<td>TA</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20 2.0 in Tri-Clamp</td>
<td>T2</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20 3.0 in Tri-Clamp</td>
<td>T3</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>NEOBEE M-20 1.5 in Tri-Clamp</td>
<td>TB</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>NEOBEE M-20 2.0 in Tri-Clamp</td>
<td>T4</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>NEOBEE M-20 3.0 in Tri-Clamp</td>
<td>T5</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20 Mini Tank Spud Type, 1½ in extension.</td>
<td>M1</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20 Mini Tank Spud Type, 6 in extension.</td>
<td>M6</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20 Mini Tank Spud Type, 9 in extension.</td>
<td>M9</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20 1 in Threaded Spud Type.</td>
<td>PX</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20 1.5 in Threaded Spud Type.</td>
<td>PZ</td>
</tr>
</tbody>
</table>

**Physical Specifications**

**Material Combinations and Value Package:** Refer to “How to Order” for material versions available. For exceptional value and corrosion resistance, the standard material combination with the lowest price is 316L ss Process Connection with 316L ss Sensor.

**Sensor Fill Fluid:** Dow Corning dimethylsiloxane (DC 200) or fluorinated hydrocarbon (3M Fluorinert FC77), as specified.

**Enclosure Classification:** Meets IEC IP66 & NEMA Type 4X.
4. Transmitter with Pulp & Paper Connection

<table>
<thead>
<tr>
<th>Process Connection</th>
<th>Sensor Material</th>
<th>Fill Fluid</th>
<th>Connection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>Sleeve Type, 1 inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>Threaded Type, 1 inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>Sleeve Type, 1½ inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>Threaded Type, 1½ inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>Silicone</td>
<td>Sleeve Type, 1 inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>Silicone</td>
<td>Threaded Type, 1 inch nominal</td>
</tr>
</tbody>
</table>

5. Transmitter Prepared for Foxboro Model Coded Seals

Transmitter Prepared for Foxboro Direct Connect Seal; Silicone Fill in Sensor

Transmitter Prepared for Remote Mount Seal; Silicone Fill in Sensor

Transmitter Prepared for Remote Seal; Fluorinert Fill in Sensor

6. Transmitters Prepared for non-Foxboro Seals

Transmitter Prepared for Remote Seal; Silicone Fill in Sensor

Transmitter Prepared for Remote Seal; Fluorinert Fill in Sensor

7. Flameproof Transmitter Prepared for Foxboro Model Coded Seals

Flameproof Transmitter Prepared for Direct Connect Seal; Silicone Fill in Sensor

Flameproof Transmitter Prepared for Remote Mount Seal; Silicone Fill in Sensor

8. Flameproof Transmitter Prepared for non-Foxboro Seals

Flameproof Transmitter Prepared for Remote Seal; Silicone Fill in Sensor

Flameproof Transmitter Prepared for Remote Seal; Fluorinert Fill in Sensor

Span Limits

<table>
<thead>
<tr>
<th>MPa</th>
<th>psi</th>
<th>bar or kg/cm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.07 and 0.21</td>
<td>1 and 30</td>
<td>0.07 and 2.1</td>
</tr>
<tr>
<td>0.07 and 2.1</td>
<td>10 and 300</td>
<td>0.70 and 21.</td>
</tr>
<tr>
<td>0.7 and 21</td>
<td>100 and 3000</td>
<td>7.0 and 210.</td>
</tr>
</tbody>
</table>

Conduit Connection and Housing Material

<table>
<thead>
<tr>
<th>Conduit Connection</th>
<th>Housing Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>½ NPT Conduit Connections, Aluminum Housing</td>
<td>1</td>
</tr>
<tr>
<td>PG 13.5 Conduit Connections, Aluminum Housing</td>
<td>2</td>
</tr>
<tr>
<td>PG 13.5 Conduit Connections, 316 ss Housing</td>
<td>3</td>
</tr>
<tr>
<td>PG 13.5 Conduit Connections, 316 ss Housing</td>
<td>4</td>
</tr>
<tr>
<td>M20 Conduit Connection, Both Sides, Aluminum Housing</td>
<td>5</td>
</tr>
<tr>
<td>M20 Conduit Connection, Both Sides, 316 ss Housing</td>
<td>6</td>
</tr>
</tbody>
</table>

Electrical Safety (See PSS for Description and Restrictions)

<table>
<thead>
<tr>
<th>Electrical Safety Marking</th>
<th>PSS Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX II GD, Ex e IIC, or II 1/2 GD, Ex d IIC</td>
<td>E</td>
</tr>
<tr>
<td>ATEX Flameproof, II 2 GD, Ex d IIC, Zone 1</td>
<td>D</td>
</tr>
<tr>
<td>ATEX II 3 GD, Ex nL IIC</td>
<td>N</td>
</tr>
<tr>
<td>ATEX Multiple Certifications (E and N)</td>
<td>M</td>
</tr>
<tr>
<td>ATEX Multiple Certifications (E, D, and N)</td>
<td>P</td>
</tr>
<tr>
<td>CSA Certified</td>
<td>C</td>
</tr>
<tr>
<td>CSA Certified (including Flameproof Zones)</td>
<td>B</td>
</tr>
<tr>
<td>FM Approved</td>
<td>F</td>
</tr>
<tr>
<td>FM Approved (including Flameproof Zones)</td>
<td>G</td>
</tr>
<tr>
<td>IECEx Intrinsically Safe, FISCO Ex ia IIC T4</td>
<td>T</td>
</tr>
<tr>
<td>IECEx Intrinsically Safe, Protection n; FNICO Ex</td>
<td>U</td>
</tr>
<tr>
<td>IECEx Flameproof, Ex d IIC T6</td>
<td>V</td>
</tr>
</tbody>
</table>

Optional Selections

Mounting Bracket Set – Specify Only One

Painted Steel Bracket with Plated Steel Bolts (for Conduit Connection Codes 1 and 3)

Stainless Steel Bracket with Stainless Steel Bolts (for Conduit Connection Codes 1 and 3)

Painted Steel Bracket with Plated Steel Bolts (for Conduit Connection Codes 2 and 4)

Stainless Steel Bracket with Stainless Steel Bolts (for Conduit Connection Codes 2 and 4)

Painted Steel Bracket with Plated Steel Bolts for use with M20 (for Conduit Connection Codes 5 & 6)

Stainless Steel Bracket with Stainless Steel Bolts for use with M20 (for Conduit Connection Codes 5 & 6)
Digital Indicator with Pushbuttons – Specify Only One
- Digital Indicator, Pushbuttons, and Window Cover for IAP10-D, -T, and -F only(5) .................................................. -L1
- Blind (solid) cover over the std. LCD on -A, or -V .................................................................................. -L2

Conduit Thread Adapters – Specify Only One
- Hawk-Type ½ NPT Cable Gland for use with Conduit Connection Codes 1 & 3 .......................................................... -A1
- Plastic PG 13.5 Connector for use with Conduit Connection Codes 2 & 4 .......................................................... -A2
- M20 Connector for use with Conduit Connection Codes 1 & 3 ........................................................................ -A3
- Trumpet shaped PG 13.5 Cable Gland (Nickel Plated Brass) for use with Conduit Connection Codes 2 & 4 ........ -A4

Vent Screw and Block & Bleed Valve – Specify Only One
- Vent screw in process connection ......................................................................................................................... -V1
- Block and Bleed Valve -carbon steel ..................................................................................................................... -V2
- Block and Bleed Valve -316 ss ............................................................................................................................... -V3
- Block and Bleed Valve -316 ss body w/Monel trim ............................................................................................... -V4

Electronic Housing Features
- External Zero Adjustment ................................................................................................................................. -Z1
- Custody Transfer Lock and Seal ....................................................................................................................... -Z2
- External Zero Adjustment and Custody Transfer Lock & Seal ........................................................................... -Z3

Factory Configuration—Specify Only One
- Digital Output (FoxCom only) ........................................................................................................................... -C1
- Full Factory Configuration (Requires configuration form) .................................................................................. -C2

Instruction Book Options
- Without Instruction Book & CD ......................................................................................................................... -K1

Cleaning and Preparation
- Unit Degreased – for Silicone Filled Sensors Only
  - Not for Oxygen/Chlorine Service, Option -V1, or Pressure Seals ................................................................. -X1
- Cleaned and Prepared for Oxygen Service – for Fluorinert Filled Sensors Only
  - Not with Option -V1, or Pressure Seals ........................................................................................................... -X2
- Cleaned and Prepared for Chlorine Service – with Structure Code 33 or 63 Only
  - Not with Option -V1, or Pressure Seals ........................................................................................................... -X3

Miscellaneous Optional Selections
- G ½ B Manometer Process Connection ........................................................................................................... -G
- R ½ Process Connection (½ NPT to R ½ Adapter) ................................................................................................. -R
- Five-Year Warranty ............................................................................................................................................. -W
- Supplemental Customer Tag .............................................................................................................................. -T
- Low Temperature Operative Limit of -50°C (-58°F) for Entire Transmitter ............................................................. -J

Specify calibrated range

Specify information for instrument tag

Notes

1. Refer to Section "Pressure Seals and Industry-Specific Connections" for additional information.
2. Both transmitter and pressure seal model codes are required.
3. Direct Connect Seal models that may be specified are PSTAD, PSFAD, and PSISD.
4. Remote Mount Seal models that may be specified are PSFPS, PSFES, PSFAR, PSTAR, PSISR, PSSCR and PSSSR.
5. Standard equipment on IAP10, -A, and -V.
IAP20 I/A Series®
Intelligent Absolute Pressure Transmitters

This transmitter measures absolute pressure and transmits a 4-20 mA, 1 to 5 Vdc, or digital output signal over a pair of wires.

For complete specifications, refer to Product Specification Sheets PSS 2A-1C13 A, B, C, D, E, and J.

Output, signal and configuration:

<table>
<thead>
<tr>
<th>Version</th>
<th>Output Choices</th>
<th>Configure From</th>
</tr>
</thead>
</table>
| -D      | ✓ FoxCom Digital  
          | ✓ FoxCom/4 to 20mA | ✓ I/A Series Workstation  
          |                   | ✓ Hand-Held Terminal  
          |                   | ✓ Personal Computer  
          |                   | ✓ Optional Pushbuttons |
| -T      | ✓ HART/4 to 20mA  | ✓ HART Communicator  
          |                   | ✓ Personal Computer |
| -F      | ✓ Foundation Fieldbus | ✓ Workstation |
| -A      | ✓ 4 to 20 mA  | ✓ Standard Pushbuttons |
| -V      | ✓ 1 to 5 Vdc  | ✓ Standard Pushbuttons |

Span and range limits:

<table>
<thead>
<tr>
<th>Span Limits Code</th>
<th>Span Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>0.87 &amp; 50 kPa, 0.125 &amp; 7 psi, 8.7 &amp; 500 mbar</td>
</tr>
<tr>
<td>C</td>
<td>7.0 &amp; 210 kPa, 1.0 &amp; 30 psi, 70 &amp; 2100 mbar</td>
</tr>
<tr>
<td>D</td>
<td>0.07 &amp; 2.1 MPa, 10 &amp; 300 psi, 0.7 &amp; 21 bar</td>
</tr>
<tr>
<td>E</td>
<td>0.70 &amp; 21 MPa, 100 &amp; 3000 psi, 7.0 &amp; 210 bar</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Span Limits Code</th>
<th>Range Limits (absolute)(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>0 &amp; +50 kPa, 0 &amp; 7 psi, 0 &amp; 0.5 bar or kg/cm²</td>
</tr>
<tr>
<td>C</td>
<td>0 &amp; 210 kPa, 0 &amp; 30 psi, 0 &amp; 2.1 bar or kg/cm²</td>
</tr>
<tr>
<td>D</td>
<td>0 &amp; 2.1 MPa, 0 &amp; 300 psi, 0 &amp; 21 bar or kg/cm²</td>
</tr>
<tr>
<td>E</td>
<td>0 &amp; 21 MPa, 0 &amp; 3000 psi, 0 &amp; 210 bar or kg/cm²</td>
</tr>
</tbody>
</table>

Maximum Overrange (absolute)

<table>
<thead>
<tr>
<th>Transmitter Configuration (See Model Code for Description of Options)</th>
<th>Overrange Pressure Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard or with Option -B2, -D3, or -D7</td>
<td>25 3625 250</td>
</tr>
<tr>
<td>With Option -B3</td>
<td>20 2900 200</td>
</tr>
<tr>
<td>With Option -D1</td>
<td>16 2320 160</td>
</tr>
<tr>
<td>With Option -B1 or -D5</td>
<td>15 2175 150</td>
</tr>
<tr>
<td>With Option -D2, -D4, -D6, or -D8</td>
<td>10 1500 100</td>
</tr>
<tr>
<td>With Structure Codes 78 and 79 (pvdf insert)</td>
<td>2.1 300 21</td>
</tr>
</tbody>
</table>

**Functional Specifications**

Sensor Temperature Limits:
DC200: -46 & +121°C (-50° + 250°F)  
FC77: -29 & +85°C (-20 & +185°F)

Ambient Temperature Limits:
DC200: -40 & +85°C (-40 & +185°F)  
FC77: -29 & +85°C (-20 & +185°F)

Electrical Classification: Various agency certifications for Zone and Division hazardous locations. Refer to Product Specification sheets for complete specifications.
Pressure

Performance Specifications
Accuracy (Includes Linearity, Hysteresis, and Repeatability):

<table>
<thead>
<tr>
<th>Version</th>
<th>Output</th>
<th>Signal Accuracy in % of Calib. Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>-D or -T</td>
<td>Digital</td>
<td>±0.05</td>
</tr>
<tr>
<td>-F</td>
<td>Digital</td>
<td>±0.05</td>
</tr>
<tr>
<td>-A</td>
<td>4 to 20 mA</td>
<td>±0.20</td>
</tr>
<tr>
<td>-V</td>
<td>1 to 5 Vdc</td>
<td>±0.10</td>
</tr>
</tbody>
</table>

Refer to PSSs for accuracies at small spans (less than 10% of URL).

How to Order – Specify model number IAP20 followed by order code for each selection

Electronic Versions and Output Signals
- 4-20 mA/FoxCom ......................................................... D
- 4 to 20 mA/HART ......................................................... T
- Foundation Fieldbus ...................................................... F
- 4 to 20 mA ................................................................. A
- 1 to 5 Vdc ................................................................. V

Structure Code – Select from one of the following three groups:
1. Transmitter
   - Hi-Side
     - Process Cover
     - Sensor
     - Sensor Fill Fluid
   - Steel
     - Co-Ni-Cr
     - Silicone .......................................................... 10
   -Steel
     - Co-Ni-Cr
     - Fluorinert ......................................................... 11
   - Steel
     - 316L ss
     - Silicone .......................................................... 12
   - Steel
     - 316L ss
     - Fluorinert ......................................................... 13
   - Steel
     - Hastelloy C
     - Silicone .......................................................... 16
   - Steel
     - Hastelloy C
     - Fluorinert ......................................................... 17
   - 316 ss
     - Co-Ni-Cr
     - Silicone .......................................................... 20
   - 316 ss
     - Co-Ni-Cr
     - Fluorinert ......................................................... 21
   - 316 ss
     - 316L ss
     - Silicone .......................................................... 22
   - 316 ss
     - 316L ss
     - Fluorinert ......................................................... 23
   - 316 ss
     - 316L ss, Gold Plated
     - Silicone .......................................................... 2G
   - 316 ss
     - Monel
     - Silicone .......................................................... 24
   - 316 ss
     - Monel
     - Fluorinert ......................................................... 25
   - 316 ss
     - Hastelloy C
     - Silicone .......................................................... 26
   - 316 ss
     - Hastelloy C
     - Fluorinert ......................................................... 27
   - Monel
     - Monel
     - Silicone .......................................................... 34
   - Monel
     - Monel
     - Fluorinert ......................................................... 35
   - Hastelloy C
     - Hastelloy C
     - Silicone .......................................................... 46
   - Hastelloy C
     - Hastelloy C
     - Fluorinert ......................................................... 47
   - Hastelloy C
     - Tantalum
     - Silicone .......................................................... 48
   - Hastelloy C
     - Tantalum
     - Fluorinert ......................................................... 49
   - pvdf Insert (Kynar®)
     - Tantalum
     - Silicone (Used with Process Connector Type 7 below) ....... 78
   - pvdf Insert (Kynar®)
     - Tantalum
     - Fluorinert (Used with Process Connector Type 7 below) ....... 79

2. Transmitter Prepared for Foxboro Model Coded Seals(2)
   Transmitter Prepared for Remote Seal on Hi Side; Silicone fill in sensor ........................................... S3

3. Transmitter Prepared for non-Foxboro Seals
   Transmitter Prepared for Remote Seal; Silicone Fill in Sensor ......................................................... S5C

Physical Specifications
Material Combination & Value Package: Refer to “How To Order” for material versions available. For exceptional value and corrosion resistance, the standard material combination with the lowest price is 316 ss Hi-Side Process Cover with 316L ss Sensor.

Sensor Fill Fluid: Dow Corning dimethylsiloxane (DC 200) or fluorinated hydrocarbon (3M Fluorinert FC 77), as specified.

Enclosure Classification: Meets IEC IP66 and NEMA Type 4X.
<table>
<thead>
<tr>
<th>Span Limits</th>
<th>kPa</th>
<th>psi</th>
<th>mbar</th>
<th>in H₂O</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.87 and 50</td>
<td>0.125 and 7</td>
<td>8.7 and 500</td>
<td>3.5 and 200</td>
<td>B</td>
</tr>
<tr>
<td>7 and 210</td>
<td>1 and 30</td>
<td>70 and 2100</td>
<td>28 and 840</td>
<td>C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MPa</th>
<th>psi</th>
<th>bar or kg/cm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.07 and 2.1</td>
<td>10 and 300</td>
<td>0.70 and 21</td>
</tr>
<tr>
<td>0.7 and 21</td>
<td>100 and 3000</td>
<td>7.0 and 210</td>
</tr>
</tbody>
</table>

**Process Connector Type (Material Same as Process Cover Material)**
- None, Covers Tapped for ¼ NPT ........... 0
- ¼ NPT ........................................... 1
- ½ NPT ........................................... 2
- Rc ¼ ............................................. 3
- Rc ½ ............................................. 4
- ½ Schedule 80 Welding Neck .................. 6
- None, pvdf (Kynar) insert tapped for ½ NPT (used with Structure Codes 78 & 79) .......... 7

**Conduit Connection and Housing Material**
- ½ NPT Conduit Connections, Aluminum Housing ........................................... 1
- PG 13.5 Conduit Connections, Aluminum Housing ........................................... 2
- ½ NPT Conduit Connections, 316 ss Housing ........................................... 3
- PG 13.5 Conduit Connections, 316 ss Housing ........................................... 4
- M20 Conduit Connection, Both Sides, Aluminum Housing .............. 5
- M20 Conduit Connection, Both Sides, 316 ss Housing .................. 6

**Electrical Safety (See PSS for Description and Restrictions)**
- ATEX II GD, Ex ia IIC, or II ½ GD, Ex ib IIC ........................................... E
- ATEX Flameproof; II 2 GD, Ex d IIC, Zone 1 ........................................... D
- ATEX II 3 GD, Ex nL IIC ........................................... N
- ATEX Multiple Certifications (E, D, and N) ........................................... M
- CSA Certified ........................................... C
- CSA Certified (including Flameproof Zones) ........................................... B
- FM approved ........................................... F
- FM approved (including Flameproof Zones) ........................................... G
- IECEX Intrinsicly Safe, Ex ia IIC T4 ........................................... T
- IECEX Intrinsicly Safe, Protection n; Ex nL IIC T4 ........................................... U
- IECEX Flameproof, Ex d IIC T6 ........................................... V

**Optional Selections**
- Mounting Bracket Set—Specify Only One
  - Painted Steel Bracket with Plated Steel Bolts ........................................... M1
  - Stainless Steel Bracket with Stainless Steel Bolts ........................................... M2
  - Universal style Stainless Steel Bracket with Stainless Steel Bolts .................. M3

- Indicator with Internal Pushbuttons
  - Digital Indicator, Pushbuttons, and Window Cover for IAP20-D, -T, and -F only(3) ........................................... L1
  - Blind (solid) cover over the std. LCD on -A or -V ........................................... L2

**DIN 19213 Construction**
- (Specify Only One and Specify Process Connector Code 0)
  - Single Ended Process Cover with M10 Bolting ........................................... D1
  - Double Ended Process Cover with M10 Bolting (Blind Kidney Range on Back) ........................................... D2
  - Single Ended Process Cover with 7/16-inch Bolting ........................................... D3
  - Double Ended Process Cover with 7/16-inch Bolting (Blind Kidney Flange on Back) ........................................... D4
  - Single Ended Process Covers with 316 ss 7/16-inch Bolting ........................................... D5
  - Double Ended Process Covers with 316 ss 7/16-inch Bolting (Blind Kidney Flange on Back) ........................................... D6
  - Single Ended Process Covers with 17-4 ss 7/16-inch Bolting ........................................... D7
  - Double Ended Process Covers with 17-4 ss 7/16-inch Bolting (Blind Kidney Flange on Back) ........................................... D8

- Cleaning and Preparation—Specify Only One
  - Unit Degreased (not for Oxygen/Chlorine Service)(4) ........................................... X1
  - Cleaned and Prepared for Oxygen Service(5) ........................................... X2
  - Cleaned and Prepared for Chlorine Service(5) ........................................... X3

- Bolting for Process Covers and Process Connectors—Specify Only One
  - 316 ss Bolts and Nuts (Maximum Static Pressure 150 bar or kg/cm², 2175 psi) ........................................... B1
  - 17-4 ss Bolts and Nuts ........................................... B2
  - B7M Bolts and Nuts (NACE)(Pressure de-rated for Span Code E) ........................................... B3
Conduit Thread Adapters – Specify Only One
Hawk-Type ½ NPT Cable Gland for use with Conduit Connection Codes 1 & 3 .................................................. -A1
Plastic PG 13.5 Connector for use with Conduit Connection Codes 2 & 4 ........................................................... -A2
M20 Connector for use with Conduit Connection Codes 1 & 3 ................................................................. -A3
Trumpet shaped PG 13.5 Cable Gland (Nickel Plated Brass) for use with Conduit Connection Codes 2 & 4 ... -A4

Electronic Housing Features – Specify Only One
External Zero Adjustment ............................................................................................................. -Z1
Custody Transfer Lock & Seal ................................................................................................... -Z2
External Zero Adjustment and Custody Transfer Lock & Seal ................................................... -Z3

Ermeto Connectors – Specify Only One
Steel, Connecting 6 mm Tubing to ¼ NPT Process Connector ...................................................... -E1
Steel, Connecting 12 mm Tubing to ½ NPT Process Connector .................................................... -E2
316 ss, Connecting 6 mm Tubing to ¼ NPT Process Connector ..................................................... -E3
316 ss, Connecting 12 mm Tubing to ½ NPT Process Connector .................................................. -E4

Factory Configuration – Specify Only One
Digital Output (FoxCom only) ........................................................................................................ -C1
Full Factory Configuration (Requires Configuration Form) .......................................................... -C2

Instruction Book Options
Without Instruction Book & CD ................................................................................................. -K1

Miscellaneous Optional Selections
Vent Screw In Side of Process Cover ........................................................................................... -V
Five-Year Warranty ..................................................................................................................... -W
Supplemental Customer Tag ....................................................................................................... -T
Low Temperature Operative Limit of -50°C (-58°F) for Entire Transmitter ..................................... -J

Specify calibrated range
Specify information for instrument tag

Notes
1. Upper Range Limit is the lower of the values in this table and in the Maximum Overrange Table which lists the
de-rated pressures associated with various options.
2. Both transmitter and pressure seal model codes are required. Pressure seal models that may be specified are
PSFPS, PSFES, PSFAR, PSTAR, PSISR, PSSCR, and PSSSR.
3. Standard equipment on, IAP20 -A and -V
4. Available only with Structure Codes having Silicone
5. Available only with Structure Codes having Fluorinert and not available with carbon steel process covers
IGP10 I/A Series®
Intelligent Gauge Pressure Transmitters

This transmitter measures gauge pressure and transmits a 4-20 mA, 1 to 5 Vdc, or digital output signal over a pair of wires.

For complete specifications, refer to Product Specification Sheets PSS 2A-1C13 A, B, C, D, E, F, K, and L.

Output Signal and Configuration:

<table>
<thead>
<tr>
<th>Version</th>
<th>Output Choices</th>
<th>Configure From</th>
</tr>
</thead>
<tbody>
<tr>
<td>-D</td>
<td>✓ FoxCom Digital, ✓ FoxCom/4 to 20 mA</td>
<td>✓ I/A Series Workstation, ✓ Hand-Held Terminal, ✓ Personal Computer, ✓ Optional Pushbuttons</td>
</tr>
<tr>
<td>-T</td>
<td>✓ HART/ 4 to 20mA</td>
<td>✓ HART Communicator, ✓ Workstation, ✓ Personal Computer</td>
</tr>
<tr>
<td>-F</td>
<td>✓ Foundation Fieldbus</td>
<td>✓ Workstation</td>
</tr>
<tr>
<td>-A</td>
<td>✓ 4 to 20mA</td>
<td>✓ Standard Pushbuttons</td>
</tr>
<tr>
<td>-V</td>
<td>✓ 1-5 Vdc</td>
<td>✓ Standard Pushbuttons</td>
</tr>
</tbody>
</table>

Span, Range and Overrange Limits:

<table>
<thead>
<tr>
<th>Span Limits Code</th>
<th>Span Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>0.87 &amp; 50 kPa, 3.5 &amp; 200 in H₂O, 8.7 &amp; 500 mbar</td>
</tr>
<tr>
<td>C</td>
<td>0.007 &amp; 0.21 MPa, 0.07 &amp; 2.1 bar or kg/cm²</td>
</tr>
<tr>
<td>D</td>
<td>0.07 &amp; 2.1 MPa, 0.70 &amp; 21 bar or kg/cm²</td>
</tr>
<tr>
<td>E</td>
<td>0.70 &amp; 21 MPa, 7.0 &amp; 210 bar or kg/cm²</td>
</tr>
<tr>
<td>F</td>
<td>14 &amp; 42 MPa, 140 &amp; 420 bar or kg/cm²</td>
</tr>
<tr>
<td>K</td>
<td>17 &amp; 52, 175 &amp; 525 bar or kg/cm²</td>
</tr>
<tr>
<td>G</td>
<td>35 &amp; 105, 350 &amp; 1050 bar or kg/cm²</td>
</tr>
<tr>
<td>H</td>
<td>70 &amp; 210, 700 &amp; 2100 bar or kg/cm²</td>
</tr>
<tr>
<td>C</td>
<td>0 &amp; 0.21 MPa, 0 &amp; 30 psi, 0 &amp; 2.1 bar or kg/cm²</td>
</tr>
<tr>
<td>D</td>
<td>0 &amp; 2.1 MPa, 0 &amp; 300 psi, 0 &amp; 21 bar or kg/cm²</td>
</tr>
<tr>
<td>E</td>
<td>0 &amp; 21 MPa, 0 &amp; 3000 psi, 0 &amp; 210 bar or kg/cm²</td>
</tr>
<tr>
<td>F</td>
<td>0 &amp; 42 MPa, 0 &amp; 6000 psi, 0 &amp; 420 bar or kg/cm²</td>
</tr>
<tr>
<td>K</td>
<td>0 &amp; 52 MPa, 0 &amp; 7500 psi, 0 &amp; 525 bar or kg/cm²</td>
</tr>
<tr>
<td>G</td>
<td>0 &amp; 105 MPa, 0 &amp; 15000 psi, 0 &amp; 1050 bar or kg/cm²</td>
</tr>
<tr>
<td>H</td>
<td>0 &amp; 210 MPa, 0 &amp; 30000 psi, 0 &amp; 2100 bar or kg/cm²</td>
</tr>
<tr>
<td>C</td>
<td>0.31 MPa, 45 psi, 3.15 bar or kg/cm²</td>
</tr>
<tr>
<td>D</td>
<td>3.1 MPa, 450 psi, 31.5 bar or kg/cm²</td>
</tr>
<tr>
<td>E</td>
<td>31 MPa, 4500 psi, 315 bar or kg/cm²</td>
</tr>
<tr>
<td>F</td>
<td>63 MPa, 9000 psi, 630 bar or kg/cm²</td>
</tr>
<tr>
<td>K</td>
<td>79 MPa, 11250 psi, 775 bar or kg/cm²</td>
</tr>
<tr>
<td>G</td>
<td>137 MPa, 19500 psi, 1365 bar or kg/cm²</td>
</tr>
<tr>
<td>H</td>
<td>231 MPa, 33000 psi, 2310 bar or kg/cm²</td>
</tr>
</tbody>
</table>

Note: Span Limit Code B only available with Sanitary and Pulp and Paper Structures.

Choice of Mounting Styles
✓ IGP10 for compact light weight and direct-to-process mounting (bracket optionally available)

Rugged & Dependable
✓ Field-proven silicon strain gauge technology
✓ Corrosion-resistant epoxy finish

Superior Performance
✓ Accuracy to ±0.05% of span
✓ Ambient temperature effects to ±(0.03% URL+0.06%) span per 28°C (50°F)

Choice of Electronics Modules
✓ Intelligent HART, Foundation Fieldbus, FoxCom, and 4-20 mA versions
✓ Economical 4-20 mA and 1 to 5 Vdc versions

LCD Indicator/Pushbutton Configurator
✓ Optional on Foundation Fieldbus, FoxCom/4-20 mA, and HART/4-20 versions; Standard on 4-20 mA and 1 to 5 Vdc versions

Standard Warranty 5 Years

Functional Specifications
Sensor Temperature Limits:
DC200: -46 & +121°C (-50° + 250°F) FC77: -29 & +85°C (-20 & +185°F)

Ambient Temperature Limits:
DC200: -40 & +85°C (-40 & +185°F) FC77: -29 & +85°C (-20 & +185°F)

Electrical Classification: Various agency certifications for Zone and Division hazardous locations. Refer to Product Specification sheets for complete specifications.
Performance Specifications

Accuracy (Includes Linearity, Hysteresis, and Repeatability):

<table>
<thead>
<tr>
<th>Version</th>
<th>Output</th>
<th>Signal Accuracy in % of Calib. Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>-D or -T</td>
<td>Digital</td>
<td>±0.05</td>
</tr>
<tr>
<td></td>
<td>4 to 20 mA</td>
<td>±0.075</td>
</tr>
<tr>
<td>-F</td>
<td>Digital</td>
<td>±0.05</td>
</tr>
<tr>
<td>-A</td>
<td>4 to 20 mA</td>
<td>±0.20</td>
</tr>
<tr>
<td>-V</td>
<td>1 to 5 Vdc</td>
<td>±0.10</td>
</tr>
</tbody>
</table>

Refer to PSSs for accuracies at small spans (less than 10% of URL) and Span Codes K, G, and H.

Physical Specifications

Material Combinations and Value Package: Refer to “How to Order” for material versions available. For exceptional value and corrosion resistance, standard material combination with the lowest price is 316 ss Process Connection and 316L ss or Sensor.

Sensor Fill Fluid: Dow Corning dimethylsiloxane (DC 200) or fluorinated hydrocarbon (3M Fluorinert FC77), as specified.

Enclosure Classification: Meets IEC IP66 & NEMA Type 4X.

How to Order – Specify Model IGP10

Electronics Versions and Output Signal

<table>
<thead>
<tr>
<th>Output</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-20 mA/FoxCom</td>
<td>D</td>
</tr>
<tr>
<td>4 to 20 mA/HART</td>
<td>T</td>
</tr>
<tr>
<td>Foundation Fieldbus</td>
<td>F</td>
</tr>
<tr>
<td>4 to 20 mA</td>
<td>A</td>
</tr>
<tr>
<td>1 to 5 Vdc</td>
<td>V</td>
</tr>
</tbody>
</table>

Structure Code – Select from one of the following eight groups:

1. Transmitter Only (no seals)

<table>
<thead>
<tr>
<th>Process Connection</th>
<th>Sensor</th>
<th>Sensor Fill Fluid</th>
<th>Connection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>316L ss</td>
<td>Co-Ni-C</td>
<td>Silicone</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
<tr>
<td>316L ss</td>
<td>Co-Ni-Cr</td>
<td>Fluorinert</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Fluorinert</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C</td>
<td>Silicone</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C</td>
<td>Fluorinert</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>Hastelloy C</td>
<td>Silicone</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>Hastelloy C</td>
<td>Fluorinert</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
<tr>
<td>15-5 ss</td>
<td>15-5 ss</td>
<td>None</td>
<td>¼ NPT, Internal (available with Span Limit Code G &amp; K only)</td>
</tr>
<tr>
<td>Inconel X-750</td>
<td>Inconel X-750</td>
<td>None</td>
<td>¼ NPT, Internal (available with Span Limit Code G &amp; K only)</td>
</tr>
<tr>
<td>13-8 Mo ss</td>
<td>13-8 Mo ss</td>
<td>None</td>
<td>Autoclave F-250-C (c) Available with Span Limit Code H only</td>
</tr>
</tbody>
</table>

2. Flameproof Transmitter Only (no seals)

<table>
<thead>
<tr>
<th>Process Connection</th>
<th>Sensor</th>
<th>Sensor Fill Fluid</th>
<th>Connection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Fluorinert</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C</td>
<td>Silicone</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C</td>
<td>Fluorinert</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>Hastelloy C</td>
<td>Silicone</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>Hastelloy C</td>
<td>Fluorinert</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
</tbody>
</table>

3. Transmitter with Sanitary Connection

<table>
<thead>
<tr>
<th>Process Connection</th>
<th>Sensor</th>
<th>Sensor Fill Fluid</th>
<th>Connection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>1.5-in Tri-Clamp</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>2.0-in Tri-Clamp</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>3.0-in Tri-Clamp</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>NEOBEE M-20</td>
<td>1.5-in Tri-Clamp</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>NEOBEE M-20</td>
<td>2.0-in Tri-Clamp</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>NEOBEE M-20</td>
<td>3.0-in Tri-Clamp</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>Mini Tank Spud Type, 1½ in extension</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>Mini Tank Spud Type, 6-in extension</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>Mini Tank Spud Type, 9-in extension</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>1-in Threaded Spud Type</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>1.5-in Threaded Spud Type</td>
</tr>
</tbody>
</table>
4. Transmitter with Pulp & Paper Connection

<table>
<thead>
<tr>
<th>Process Connection</th>
<th>Sensor Material</th>
<th>Sensor Fill Fluid</th>
<th>Connection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>Sleeve Type, 1 inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>Threaded Type, 1 inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>Sleeve Type, 1½ inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>Threaded Type, 1½ inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>Silicone</td>
<td>Sleeve Type, 1 inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>Silicone</td>
<td>Threaded Type, 1 inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>Silicone</td>
<td>Sleeve Type, 1½ inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>Silicone</td>
<td>Threaded Type, 1½ inch nominal</td>
</tr>
</tbody>
</table>

5. Transmitter Prepared for Foxboro Model Coded Seals

- Transmitter Prepared for Foxboro Direct Connect Seal; Silicone Fill in Sensor
- Transmitter Prepared for Foxboro Direct Connect Seal; Fluorinert Fill in Sensor
- Transmitter Prepared for Foxboro Remote Mount Seal; Silicone Fill in Sensor
- Transmitter Prepared for Foxboro Remote Mount Seal; Fluorinert Fill in Sensor

6. Transmitters Prepared for non-Foxboro Seals

- Transmitter Prepared for Remote Seal; Silicone Fill in Sensor
- Transmitter Prepared for Remote Seal; Fluorinert Fill in Sensor

7. Flameproof Transmitter Prepared for Foxboro Model Coded Seals

- Flameproof Transmitter Prepared for Direct Connect Seal; Silicone Fill in Sensor
- Flameproof Transmitter Prepared for Direct Connect Seal; Fluorinert Fill in Sensor
- Flameproof Transmitter Prepared for Remote Mount Seal; Silicone Fill in Sensor
- Flameproof Transmitter Prepared for Remote Mount Seal; Fluorinert Fill in Sensor

8. Flameproof Transmitter Prepared for non-Foxboro Seals

- Flameproof Transmitter Prepared for Remote Seal; Silicone Fill in Sensor
- Flameproof Transmitter Prepared for Remote Seal; Fluorinert Fill in Sensor

Span Limits

<table>
<thead>
<tr>
<th>KPa</th>
<th>inH₂O</th>
<th>mbar</th>
<th>psi</th>
<th>bar or kg/cm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.87</td>
<td>3.5</td>
<td>200</td>
<td>0.07</td>
<td>0.21</td>
</tr>
<tr>
<td>0.7</td>
<td>1</td>
<td>30</td>
<td>0.07</td>
<td>2.1</td>
</tr>
<tr>
<td>0.7</td>
<td>10</td>
<td>300</td>
<td>0.7</td>
<td>21</td>
</tr>
<tr>
<td>14</td>
<td>2000</td>
<td>6000</td>
<td>7</td>
<td>210</td>
</tr>
<tr>
<td>17</td>
<td>2500</td>
<td>7500</td>
<td>140</td>
<td>420</td>
</tr>
<tr>
<td>35</td>
<td>5000</td>
<td>15000</td>
<td>175</td>
<td>525</td>
</tr>
<tr>
<td>70</td>
<td>10000</td>
<td>30000</td>
<td>350</td>
<td>1050</td>
</tr>
<tr>
<td>700</td>
<td>2100</td>
<td>2100</td>
<td>700</td>
<td>1200</td>
</tr>
</tbody>
</table>

Conduit Connection and Housing Material

- 1/2 NPT Conduit Connections, Aluminum Housing
- PG 13.5 Conduit Connections, Aluminum Housing
- 1/2 NPT Conduit Connections, 316L ss Housing
- PG 13.5 Conduit Connections, 316L ss Housing
- M20 Conduit Connection, Both Sides, Aluminum Housing
- M20 Conduit Connection, Both Sides, 316L ss Housing

Electrical Safety (See PSS for Description and Restrictions)

- ATEX II GD, EEEx ia IIC, or II ½ GD, EEEx ib IIC
- ATEX Flameproof; II 2 GD, EEEx d IIC, Zone 1
- ATEX II 3 GD, EEEx nL IIC
- ATEX Multiple Certifications (E and N)
- ATEX Multiple Certifications (E, D, and N)
- CSA Certified
- CSA Certified (including Flameproof Zones)
- FM Approved
- FM Approved (including Flameproof Zones)
**Pressure**

IGP10

IECEEx Intrinsically Safe, EX ia IIC T4  
IECEEx Intrinsically Safe, Protection n; EX nL IIC T4

**Optional Selections**

**Mounting Bracket Set—Specify Only One**
- Painted Steel Bracket with Plated Steel Bolts (for Conduit Connection Codes 1 and 3)
- Stainless Steel Bracket with Stainless Steel Bolts (for Conduit Connection Codes 1 and 3)
- Painted Steel Bracket with Plated Steel Bolts (for Conduit Connection Codes 2 and 4)
- Stainless Steel Bracket with Stainless Steel Bolts (for Conduit Connection Codes 2 and 4)
- Painted Steel Bracket with Plated Steel Bolts for use with M20 (for Conduit Connection Codes 5 & 6)
- Stainless Steel Bracket with Stainless Steel Bolts for use with M20 (for Conduit Connection Codes 5 & 6)

**Digital Indicator with Pushbuttons—Specify Only One**
- Digital Indicator, Pushbuttons, and Window Cover for IGP10-D, -T, and -F only
- Blind (solid) cover over the std. LCD on -A or -V

**Conduit Thread Adapters – Specify Only One**
- Hawk-Type ½ NPT Cable Gland for use with Conduit Connection Codes 1 & 3
- Plastic PG 13.5 Connector for use with Conduit Connection Codes 2 & 4
- M20 Connector for use with Conduit Connection Codes 1 & 3
- Trumpet shaped PG 13.5 Cable Gland (Nickel Plated Brass) for use with Conduit Connection Codes 2 & 4

**Vent Screw and Block & Bleed Valve – Specify Only One**
- Vent screw in process connection
- Block and Bleed Valve—carbon steel
- Block and Bleed Valve—316 ss
- Block and Bleed Valve—316 ss body w/Monel trim

**Electronic Housing Features – Specify Only One**
- External Zero Adjustment
- Custody Transfer Lock & Seal
- External Zero Adjustment and Custody Transfer Lock & Seal

**Factory Configuration – Specify Only One**
- Digital Output (FoxCom only)
- Full Factory Configuration (Requires configuration form)

**Instruction Book Options**
- Without Instruction Book & CD

**Process Connection**
- G ½ Form B, External Thread
- Autoclave F-250-C (with Span Limit Codes G & K only, standard with Span Code H)
- ½ NPT External Thread (with Span Codes G & K)

**Cleaning and Preparation**
- Unit Degreased – for Silicone Filled Sensors Only
- Not for Oxygen/Chlorine Service, Option -V1, or Pressure Seals
- Not for Oxygent/Chlorine Service, Option -V1, or Pressure Seals
- Cleaned and Prepared for Oxygen Service – for Fluorinert Filled Sensors Only
- Not with Option -V1, or Pressure Seals
- Cleaned and Prepared for Chlorine Service – with Structure Code 33 or 63 Only
- Not with Option -V1, or Pressure Seals

**Miscellaneous Optional Selections**
- G ½ B Manometer Process Connection
- R ½ Process Connection (½ NPT to R ½ Adapter)
- Five-Year Warranty
- Supplemental Customer Tag
- Low Temperature Operative Limit of -50°C (-58°F) for Entire Transmitter

Specify calibrated range.

Specify information for instrument tag.

**Notes:**
1. Refer to Section “Pressure Seals and Industry-Specific Connections” for additional information.
2. Both transmitters and pressure seal model codes are required.
3. Direct connect seal models that may be specified are PSTAD, PSFAD, and PSISD.
4. Remote mount seal models that may be specified are PSFPS, PSFES, PSFAR, PSTAR, PSISR, PSSCR, and PSSSR.
5. Standard equipment in IGP10, -A, and -V.
6. Not available with Span Code H.
IGP20 I/A Series®
Intelligent Gauge Pressure Transmitters

This transmitter measures gauge pressure and transmits a 4-20 mA, 1 to 5 Vdc, or digital output signal over a pair of wires.
For complete specifications, refer to Product Specification Sheets PSS 2A-1C13 A, B, C, D, E, and J.

Output signal and configuration:

<table>
<thead>
<tr>
<th>Version</th>
<th>Output Choices</th>
<th>Configure From</th>
</tr>
</thead>
</table>
| -D      | ✓ FoxCom Digital  
          ✓ FoxCom/4 to 20 mA | ✓ I/A Series Workstation  
          ✓ Hand-Held Terminal  
          ✓ Personal Computer  
          ✓ Optional Pushbuttons |
| -T      | ✓ HART/4 to 20 mA | ✓ Communicator  
          ✓ Workstation  
          ✓ Personal Computer |
| -F      | ✓ Foundation Fieldbus | ✓ Workstation |
| -A      | ✓ 4 to 20 mA | ✓ Standard Pushbuttons |
| -V      | ✓ 1-5 Vdc | ✓ Standard Pushbuttons |

Span, Range and Overrange Limits:
Bracket Mounted Gauge Pressure IGP20

<table>
<thead>
<tr>
<th>Span Limits Code</th>
<th>Span Limits</th>
<th>Range Limits(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.12 &amp; 7.5 kPa</td>
<td>0.5 &amp; 30 H20 -30 &amp; +30 H2O</td>
</tr>
<tr>
<td>B</td>
<td>0.07 &amp; 50 kPa</td>
<td>0.125 &amp; 7 psi 8.7 &amp; 500 mbar</td>
</tr>
<tr>
<td>C</td>
<td>7.0 &amp; 210 kPa</td>
<td>1.0 &amp; 30 psi 70 &amp; 2100 mbar</td>
</tr>
<tr>
<td>D</td>
<td>0.07 &amp; 2.1 MPa</td>
<td>10 &amp; 300 psi 0.7 &amp; 21 bar</td>
</tr>
<tr>
<td>E</td>
<td>0.70 &amp; 21 MPa</td>
<td>100 &amp; 3000 psi 7 &amp; 210 bar</td>
</tr>
</tbody>
</table>

Maximum Overrange (absolute)

<table>
<thead>
<tr>
<th>Transmitter Configuration (See Model Code for Description of Options)</th>
<th>Overrange Pressure Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPa</td>
<td>psi</td>
</tr>
<tr>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Standard or with Option -B2, -D3, or -D7</td>
<td>25</td>
</tr>
<tr>
<td>With Option -B3</td>
<td>20</td>
</tr>
<tr>
<td>With Option -D1</td>
<td>16</td>
</tr>
<tr>
<td>With Option -B1 or -D5</td>
<td>15</td>
</tr>
<tr>
<td>With Option -D2, -D4, -D6, or -D8</td>
<td>10</td>
</tr>
<tr>
<td>With Structure Codes 78 and 79 (pvdf insert)</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Functional Specifications
Sensor Temperature Limits:
DC200: -46 & +121°C (-50° + 250°F)
FC77: -29 & +85°C (-20° + 185°F)

Ambient Temperature Limits:
DC200: -40 & +85°C (-40° + 185°F)
FC77: -29 & +85°C (-20° + 185°F)

Electrical Classification: Various agency certifications for Zone and Division hazardous locations. Refer to Product Specification sheets for complete specifications.
**Performance Specifications**

**Accuracy (Includes Linearity, Hysteresis, and Repeatability):**

<table>
<thead>
<tr>
<th>Version</th>
<th>Output</th>
<th>Signal Accuracy in % of Calib. Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>-D or -T</td>
<td>Digital 4 to 20 mA</td>
<td>±0.05 ±0.075</td>
</tr>
<tr>
<td>-F</td>
<td>Digital</td>
<td>±0.05</td>
</tr>
<tr>
<td>-A</td>
<td>4 to 20 mA</td>
<td>±0.20</td>
</tr>
<tr>
<td>-V</td>
<td>1 to 5 Vdc</td>
<td>±0.10</td>
</tr>
</tbody>
</table>

Refer to PSSs for accuracies at small spans (less than 10% of URL).

**Physical Specifications**

**Material Combination & Value Package:** Refer to “How To Order” for material versions available. For exceptional value and corrosion resistance, the standard material combination with the lowest price is 316 ss Hi-Side Process Cover with 316L ss Sensor.

**Sensor Fill Fluid:** Dow Corning dimethylsiloxane (DC 200) or fluorinated hydrocarbon (3M Fluorinert FC77), as specified.

**Enclosure Classification:** Meets IEC IP66 & NEMA Type 4X.

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### How to Order – Specify Model IGP20

**Electronics Versions and Output Signal**

- 4-20 mA/FoxCom
- 4 to 20 mA/HART
- Foundation Fieldbus
- 4 to 20 mA
- 1 to 5 V dc

**Structure Code – Select from one of the following three groups**

1. **Transmitter**
   - **Hi-Side**
   - **Process Cover**
     - Steel
     - 316 ss
     - Monel
   - **Sensor**
     - Co-Ni-Cr
     - 316L ss
     - Monel
   - **Sensor Fill Fluid**
     - Dow Corning dimethylsiloxane (DC 200)
     - Fluorinert

2. **Transmitter Prepared for Foxboro Model Coded Seals**
   - Transmitter Prepared for Foxboro Direct Connect Seal; Silicone Fill in Sensor
   - Transmitter Prepared for Foxboro Direct Connect Seal; Fluorinert Fill in Sensor
   - Transmitter Prepared for Foxboro Remote Mount Seal; Silicone Fill in Sensor
   - Transmitter Prepared for Foxboro Remote Mount Seal; Fluorinert Fill in Sensor

3. **Transmitter Prepared for non-Foxboro Seals**
   - Transmitter Prepared for Remote Seal; Silicone Fill in Sensor
   - Transmitter Prepared for Remote Seal; Fluorinert Fill in Sensor
Pressure

Span Limits

<table>
<thead>
<tr>
<th>kPa</th>
<th>psi</th>
<th>mbar</th>
<th>inH2O</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.12 and 7.5</td>
<td>–</td>
<td>1.2 and 75</td>
<td>0.5 and 30</td>
</tr>
<tr>
<td>0.87 and 50</td>
<td>0.125 and 7</td>
<td>8.7 and 500</td>
<td>3.5 and 200</td>
</tr>
<tr>
<td>7 and 210</td>
<td>1 and 30</td>
<td>70 and 2100</td>
<td>28 and 840</td>
</tr>
</tbody>
</table>

MPa        | psi   | bar or kg/cm² |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0.07 and 2.1</td>
<td>10 and 300</td>
<td>0.70 and 21</td>
</tr>
<tr>
<td>0.70 and 21</td>
<td>100 and 3000</td>
<td>7.0 and 2100</td>
</tr>
</tbody>
</table>

Process Connector Type (Material Same as Process Cover Material)

- None, Covers Tapped for 1/4 NPT .................................................. 0
- ¼ NPT ................................................................................. 1
- ½ NPT .............................................................................. 2
- Rc ¼ .................................................................................. 3
- Rc ½ .................................................................................. 4
- ½ Schedule 80 Welding Neck ......................................................... 6
- None, pvdf (Kynar) insert tapped for ½ NPT (used with Structure Codes 78 & 79) .................. 7

Conduit Connection and Housing Material

- ½ NPT Conduit Connections, Aluminum Housing ............................................... 1
- PG 13.5 Conduit Connections, Aluminum Housing ............................................... 2
- ½ NPT Conduit Connections, 316 ss Housing ......................................................... 3
- PG 13.5 Conduit Connections, 316 ss Housing ......................................................... 4
- M20 Conduit Connection, Both Sides, Aluminum Housing ................................... 5
- M20 Conduit Connection, Both Sides, 316 ss Housing ............................................ 6

Electrical Safety (See PSS for Description and Restrictions)

- ATEX II GD, EEx ia IIC, or II 1/2 GD, EEx ib IIC .................................................. E
- ATEX Flameproof; II 2 GD, EEx d IIC, Zone 1 ......................................................... D
- ATEX II 3 GD, EEx nL IIC ................................................................................. N
- ATEX Multiple Certifications (E, D, and N) ............................................................. M
- CSA Certified ................................................................................................. C
- CSA Certified (including Flameproof Zones) ......................................................... B
- FM approved ................................................................................................. F
- FM approved (including Flameproof Zones) ......................................................... G
- IECEx Intrinsically Safe, Ex ia IIC T4 ................................................................. T
- IECEx Intrinsically Safe, Protection n; Ex nL IIC T4 ............................................... U

Optional Selections

Mounting Bracket Set—Specify Only One

- Painted Steel Bracket with Plated Steel Bolts ...................................................... -M1
- Stainless Steel Bracket with Stainless Steel Bolts .............................................. -M2
- Universal Stainless Steel Bracket with Stainless Steel Bolts .............................. -M3

Indicator with Internal Pushbuttons

- Digital Indicator, Pushbuttons, and Window Cover for IGP20-D, -T, -P, and -F only(5) ........................................................................ -L1
- Blind (solid) cover over the std. LCD on -A, or -V ............................................ -L2

DIN 19213 Construction—Specify Only One and

Specify Process Connector Code 0

- Single Ended Process Cover with M10 Bolting ................................................... -D1
- Double Ended Process Cover with M10 Bolting (Blind Kidney Range on Back) ........................................................................ -D2
- Single Ended Process Cover with ½ inch Bolting ............................................... -D3
- Double Ended Process Cover with ½ inch Bolting (Blind Kidney Flange on Back) ........................................................................ -D4
- Single Ended Process Covers with 316 ss ½ inch Bolting ................................... -D5
- Double Ended Process Covers with 316 ss ½ inch Bolting (Blind Kidney Flange on Back) ........................................................................ -D6
- Single Ended Process Covers with 17-4 ss ½ inch Bolting ................................... -D7
- Double Ended Process Covers with 17-4 ss ½ inch Bolting (Blind Kidney Flange on Back) ........................................................................ -D8

Cleaning and Preparation—Specify Only One

- Unit Degreased (not for Oxygen/Chlorine Service)(6) .......................................... X1
- Cleaned and Prepared for Oxygen Service(7) ....................................................... X2
- Cleaned and Prepared for Chlorine Service(7) ...................................................... X3
Bolting for Process Covers and Process Connectors – Specify Only One

- 316 ss Bolts and Nuts (Maximum Static Pressure 150 bar or kg/cm², 2175psi) ....................................................... -B1
- 17-4 ss Bolts and Nuts .............................................................................................................................................. -B2
- B7M Bolts and Nuts (NACE) (Pressure de-rated, refer to table) .......................................................... -B3

Conduit Thread Adapters – Specify Only One

- Hawk-Type ½ NPT Cable Gland for use with Conduit Connection Codes 1 & 3 ................................................................. -A1
- Plastic PG 13.5 Connector for use with Conduit Connection Codes 2 & 4 .................................................. -A2
- M20 Connector for use with Conduit Connection Codes 1 & 3 ............................................................................ -A3
- Trumpet shaped PG 13.5 Cable Gland (Nickel Plated Brass) for use with Conduit Connection Codes 2 & 4 ............................................................................................................................................... -A4

Electronic Housing Features—Specify Only One

- External Zero Adjustment ........................................................................................................................................ -Z1
- Custody Transfer Lock & Seal ....................................................................................................................................... -Z2
- External Zero Adjustment and Custody Transfer Lock & Seal .................................................................................. -Z3

Ermeto Connectors—Specify Only One

- Steel, Connecting 6 mm Tubing to ¼ NPT Process Connector .................................................................................. -E1
- Steel, Connecting 12 mm Tubing to ½ NPT Process Connector .................................................................................. -E2
- 316 ss, Connecting 6 mm Tubing to ¼ NPT Process Connector .................................................................................. -E3
- 316 ss, Connecting 12 mm Tubing to ½ NPT Process Connector .................................................................................. -E4

Factory Configuration—Specify Only One

- Digital Output (FoxCom only) ........................................................................................................................................ -C1
- Full Factory Configuration (Requires Configuration Form) ......................................................................................... -C2

Instruction Book Options

- Without Instruction Book & CD ........................................................................................................................................ -K1

Miscellaneous Optional Selections

- Vent Screw In Side of Process Cover ...................................................................................................................... -V
- Five-Year Warranty .................................................................................................................................................... -W
- Supplemental Customer Tag ........................................................................................................................................ -T
- Low Temperature Operative Limit of -50°C (-58°F) for Entire Transmitter .................................................................... -J

Specify calibrated range

Specify information for instrument tag

Notes
1. Upper Range Limit is the lower of the values in this table and in the Maximum Overrange Table, which lists the de-rated pressures associated with various options.
2. Refer to Section “Pressure Seals and Industry-Specific Connections" for additional information.
3. Direct Mount seals that may be specified are models PSFLT, PSSCT, and PSSST.
4. Remote Mount seals that may be specified are models PSFPS, PSFES, PSTAR, PSTAR, PSISR, PSSCR, and PSSSR.
5. Standard equipment on IGP20-A, and -V.
6. Available only with Structure Codes having Silicone Fill Fluid.
7. Available only with Structure Codes having Fluorinert Fill Fluid and not available with carbon steel Process Cover.
8. Option -G1 is required when pressure seal (Structure Codes S3, S4, F1, F2, SC, or SD) will be used on vacuum applications. This option substitutes a vacuum service gasket for the standard ptfe Process Cover gasket.
IGP25 I/A Series® Multirange Pressure Transmitter
for Gauge Pressure Transmitters

This intelligent two-wire transmitter provides precise, reliable measurement of
gauge pressure providing the adjustment range of “two transmitters in one.”
For complete specifications refer to product specification sheet PSS 2A-1C13G,
M, and N.

Features:
- 400:1 turndown span adjustment
- Wide measurement ranges from
  0-3.5 kPa to 0-14 MPa (0-0.5 to
  0-2000 psi) with just two sensor
  selections
- Process wetted parts all 316L ss
- Available with 4-20 mA output
  and, HART, or Foundation
  Fieldbus digital communications

Benefits:
- Multirange transmitter simplifies
  planning, ordering and spares
  procurement and stocking
- High reliability
- All welded sensor, no gaskets
  — minimized chance of fugitive
  emissions

Standard Warranty 5 Years

Performance Specs:
- Accuracy: ±0.075% of span for
  120:1 turndown
- Small span accuracy: ±(0.000625)
  (URL/span)% span for
  turndowns >120:1
- Temperature effects: ±(0.03% URL
  + 0.06% span)/28°C (50°F)

Electrical Classification:
- Various agency certifications
  for Zone and Division hazardous
  locations. Refer to Product
  Specification Sheets for complete
  specifications.

### Functional Specifications

Span and Range Limits

<table>
<thead>
<tr>
<th>Span Limits Code</th>
<th>Span Limits</th>
<th>Range Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MPa</td>
<td>psi</td>
</tr>
<tr>
<td>D</td>
<td>0.0035 and 1.4</td>
<td>0.5 and 200</td>
</tr>
<tr>
<td>E</td>
<td>0.035 and 14</td>
<td>5 and 2000</td>
</tr>
</tbody>
</table>

How to Order – Specify Model Number IGP25

Electronics Version and Output Signal
4 to 20 mA/HART ................................................................. -T
Foundation Fieldbus ................................................................. -F

Structure Code – Select from one of the following eight groups:
1. Transmitter Only (no seals)

<table>
<thead>
<tr>
<th>Process Connection</th>
<th>Sensor</th>
<th>Fill Fluid</th>
<th>Connection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Fluorinert</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
</tbody>
</table>

2. Flameproof Transmitter Only (no seals)

<table>
<thead>
<tr>
<th>Process Connection</th>
<th>Sensor</th>
<th>Sensor</th>
<th>Fill Fluid</th>
<th>Connection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>316L ss</td>
<td>Fluorinert</td>
<td>½ NPT External Thread, ¼ NPT Internal Thread</td>
</tr>
</tbody>
</table>

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
### 3. Transmitter with Sanitary Connection

<table>
<thead>
<tr>
<th>Process Connection</th>
<th>Sensor</th>
<th>Sensor</th>
<th>Sensor</th>
<th>Connection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>1.5-in Tri-Clamp</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>2.0-in Tri-Clamp</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>3.0-in Tri-Clamp</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>NEOBEE M-20</td>
<td>1.5-in Tri-Clamp</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>NEOBEE M-20</td>
<td>2.0-in Tri-Clamp</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>NEOBEE M-20</td>
<td>3.0-in Tri-Clamp</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>Mini Tank Spud Type, 1½ in extension</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>Mini Tank Spud Type, 6 in extension</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>Mini Tank Spud Type, 9 in extension</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>1 in Threaded Spud Type</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>1.5 in Threaded Spud Type</td>
<td></td>
</tr>
</tbody>
</table>

### 4. Transmitter with Pulp & Paper Connection

<table>
<thead>
<tr>
<th>Process Connection</th>
<th>Sensor</th>
<th>Sensor</th>
<th>Sensor</th>
<th>Connection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>Sleeve Type, 1 inch nominal</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>Threaded Type, 1 inch nominal</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>Sleeve Type, 1½ inch nominal</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>Threaded Type, 1½ inch nominal</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>Silicone</td>
<td>Sleeve Type, 1 inch nominal</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>Silicone</td>
<td>Threaded Type, 1 inch nominal</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>Silicone</td>
<td>Threaded Type, 1½ inch nominal</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>Silicone</td>
<td>Threaded Type, 1½ inch nominal</td>
<td></td>
</tr>
</tbody>
</table>

### 5. Transmitter Prepared for Foxboro Model Coded Seals

- Transmitter Prepared for Foxboro Direct Connect Seal; Silicone Fill in Sensor
- Transmitter Prepared for Foxboro Direct Connect Seal; Fluorinert Fill in Sensor
- Transmitter Prepared for Foxboro Remote Mount Seal; Silicone Fill in Sensor
- Transmitter Prepared for Foxboro Remote Mount Seal; Fluorinert Fill in Sensor

### 6. Transmitters Prepared for non-Foxboro Seals

- Transmitter Prepared for Remote Seal; Silicone Fill in Sensor
- Transmitter Prepared for Remote Seal; Fluorinert Fill in Sensor

### 7. Flameproof Transmitter Prepared for Foxboro Model Coded Seals

- Flameproof Transmitter Prepared for Direct Connect Seal; Silicone Fill in Sensor
- Flameproof Transmitter Prepared for Direct Connect Seal; Fluorinert Fill in Sensor
- Flameproof Transmitter Prepared for Remote Mount Seal; Silicone Fill in Sensor
- Flameproof Transmitter Prepared for Remote Mount Seal; Fluorinert Fill in Sensor

### 8. Flameproof Transmitter Prepared for non-Foxboro Seals

- Flameproof Transmitter Prepared for Remote Seal; Silicone Fill in Sensor
- Flameproof Transmitter Prepared for Remote Seal; Fluorinert Fill in Sensor

### Span Limits

<table>
<thead>
<tr>
<th>MPa</th>
<th>psi</th>
<th>bar or kg/cm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0035 and 1.4</td>
<td>0.5 and 200</td>
<td>0.035 and 14</td>
</tr>
<tr>
<td>0.035 and 14</td>
<td>5 and 2000</td>
<td>0.35 and 140</td>
</tr>
</tbody>
</table>

### Conduit Connections and Housing Material

- ½ NPT Conduit Connections, Aluminum Housing
- PG 13.5 Conduit Connections, Aluminum Housing
- ½ NPT Conduit Connections, 316 ss Housing
- PG 13.5 Conduit Connections, 316 ss Housing
- M20 Conduit Connection, Both Sides, Aluminum Housing
- M20 Conduit Connection, Both Sides, 316 ss Housing
**Pressure**

**Electrical Safety (See PSS for Description and Restrictions)**
- ATEX II GD, EEex ia IIC, or II ½ GD, EEex lb IIC .......................................................... E
- ATEX Flameproof; II 2 GD, EEex d IIC, Zone 1 .......................................................... D
- ATEX II 3 GD, EEex nL IIC .................................................................................................. N
- ATEX Multiple Certifications (E and N) .................................................................. M
- ATEX Multiple Certifications (E, D, and N) ............................................................. P
- CSA Certified ........................................................................................................... C
- CSA Certified (including Flameproof Zones) ........................................................ B
- FM Approved ............................................................................................................. F
- FM Approved (including Flameproof Zones) .......................................................... G
- IECEx Intrinsically Safe, Ex ia IIC T4 ........................................................................ T
- IECEx Intrinsically Safe, Protection n; Ex nL IIC T4 ................................................ U

**Optional Selections**

**Mounting Bracket Set – Specify Only One**
- Painted Steel Bracket with Plated Steel Bolts (for Conduit Connection Codes 1 and 3) ........................................................................................................... -M1
- Stainless Steel Bracket with Stainless Steel Bolts (for Conduit Connection Codes 1 and 3) ........................................................................................................... -M2
- Painted Steel Bracket with Plated Steel Bolts (for Conduit Connection Codes 2 and 4) ........................................................................................................... -M3
- Stainless Steel Bracket with Stainless Steel Bolts (for Conduit Connection Codes 2 and 4) ........................................................................................................... -M4
- Painted Steel Bracket with Plated Steel Bolts for use with M20 (for Conduit Connection Codes 5 & 6) .............................................................................. -M5
- Stainless Steel Bracket with Stainless Steel Bolts for use with M20 (for Conduit Connection Codes 5 and 6) .............................................................................. -M6

**Cleaning and Preparation - Specify Only One**
- Unit Degreased (Silicone filled sensor-not for Oxygen, Chlorine, or other fluids that react with silicone) ............................................................... -X1
- Cleaned and prepared for Oxygen service (available only with structure codes having Fluorinert fill fluid) ................................................................. -X2

**Digital Indicator with Pushbuttons**
- Digital Indicator, Pushbuttons, and Window Cover .................................................. -L1

**Block & Bleed Valve - Specify Only One**
- Block and Bleed Valve, Carbon Steel ..................................................................... -V2
- Block and Bleed Valve, 316 ss .................................................................................. -V3
- Block and Bleed Valve, 316 ss Body w/Monel Trim .................................................. -V4

**Conduit Thread Adapters – Specify Only One**
- Hawk-Type ½ NPT Cable Gland for use with Conduit Connection Codes 1 & 3 ...................................................................................................................... -A1
- Plastic PG 13.5 Connector for use with Conduit Connection Codes 2 & 4 .............. -A2
- M20 Connector for use with Conduit Connection Codes 1 & 3 ......................... -A3
- Trumpet shaped PG 13.5 Cable Gland (Nickel Plated Brass) for use with Conduit Connection Codes 2 & 4 .............................................................. -A4

**Electronics Housing Features - Specify Only One**
- External Zero Adjustment ...................................................................................... -Z1
- Custody Transfer Lock and Seal ............................................................................. -Z2
- External Zero Adjustment and Custody Transfer Lock and Seal .......................... -Z3

**Custom Factory Configuration**
- Full Factory Configuration (Requires Configuration Form to be filled out) ............ -C2

**Instruction Book Options**
- Without Instruction Book & CD ............................................................................. -K1

**Miscellaneous Optional Selections**
- R ½ Process Connection (½ NPT to R ½ Adapter) ...................................................... -R
- Five-Year Warranty .............................................................................................. -W
- Supplemental Customer Tag .............................................................................. -T
- Low Temperature Operative Limit of -50°C (-58°F) for Entire Transmitter ............. -J

**Notes**
1. Refer to Section “Pressure Seals and Industry-Specific Connections” for additional information.
2. Direct Mount seals that may be specified are models PSTAD, PSFAD, and PSISD.
3. Remote Mount seals that may be specified are models PSFPS, PSFES, PSFAR, PSTAR, PSISR, PSSCR, and PSSSR.
IGP50 I/A Series® Premium Performance Transmitter for Gauge Pressure Measurement

This intelligent, premium performance, two-wire transmitter provides precise, reliable measurement of gauge pressure with extremely low total probable error (TPE).

For complete specifications refer to product specification sheet PSS 2A-1C13 H.

Features:
- Wide measurement range from 0-0.017 to 0-14 MPa (0-2.5 to 0-2000 psi) with just two sensor selections
- High accuracy and low total probable error
- Available with 4-20 mA output and HART, or Foundation Fieldbus digital communications

Benefits:
- High reliability
- Improved process control
- Meets most high performance application requirements
- All welded sensor, no gaskets — minimized chance of fugitive emissions

Standard Warranty 5 Years

Premium Performance
- Accuracy ±0.05% of span over full 80:1 span turndown
- Long term drift ±0.02% URL per year over a 5 year period
- Temperature effect ±(0.015% URL + 0.03% span)/28°C (50°F)

Functional Specifications

Span and Range Limits

<table>
<thead>
<tr>
<th>Span Limit Code</th>
<th>Span Limits</th>
<th>Range Limits (a)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MPa</td>
<td>psi</td>
</tr>
<tr>
<td>D</td>
<td>0.017 and 1.4</td>
<td>2.5 and 200</td>
</tr>
<tr>
<td>E</td>
<td>0.17 and 14</td>
<td>25 and 2000</td>
</tr>
</tbody>
</table>

Electrical Classification:
Various agency certifications for Zone and Division hazardous locations. Refer to Product Specification sheets for complete specifications.

Maximum Overrange and Proof Pressure Ratings

<table>
<thead>
<tr>
<th>Span Limit Code</th>
<th>Maximum Overrange Pressure Rating (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MPa</td>
</tr>
<tr>
<td>D</td>
<td>2.1</td>
</tr>
<tr>
<td>E</td>
<td>21</td>
</tr>
</tbody>
</table>

(a) For high performance vacuum applications, refer to IDP50 which is rated for negative range values.
(b) Maximum overrange pressure is the maximum pressure that may be applied without causing damage to the transmitter.
How to Order – Specify Model Number IGP50

Electronics Versions and Output Signal

- 4 to 20 mA/HART
- Foundation Fieldbus

Structure Code – Process Connection, Sensor, and Fill fluid

<table>
<thead>
<tr>
<th>Process Connection</th>
<th>Sensor</th>
<th>Fill Fluid</th>
</tr>
</thead>
<tbody>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
</tr>
</tbody>
</table>

Span Limits

<table>
<thead>
<tr>
<th>MPa</th>
<th>psi</th>
<th>bar or kg/cm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.017 and 1.4</td>
<td>2.5 and 200</td>
<td>0.17 and 14</td>
</tr>
<tr>
<td>0.17 and 14</td>
<td>25 and 2000</td>
<td>1.7 and 140</td>
</tr>
</tbody>
</table>

Conduit Connection and Housing Material

- ½ NPT Conduit Connections, Aluminum Housing
- PG 13.5 Conduit Connections, Aluminum Housing
- ½ NPT Conduit Connections, 316 ss Housing
- PG 13.5 Conduit Connections, 316 ss Housing
- M20 Conduit Connection, Both Sides, Aluminum Housing
- M20 Conduit Connection, Both Sides, 316 ss Housing

Electrical Safety (See PSS for Description and Restrictions)

- ATEX II GD, EEx ia IIC, or II ½ GD, EEx ib IIC
- ATEX Flameproof; II 2 GD, EEx d IIC, Zone 1
- ATEX II 3 GD, EEx nL IIC
- ATEX Multiple Certifications (E and N)
- ATEX Multiple Certifications (E, D, and N)
- CSA Certified
- CSA Certified (including Flameproof Zones)
- FM Approved
- FM Approved (including Flameproof Zones)
- IECEx Intrinsically Safe, Ex ia IIC T4
- IECEx Intrinsically Safe, Protection n; Ex nL IIC T4

Optional Selections

Mounting Bracket Set – Specify Only One

- Painted Steel Bracket with Plated Steel Bolts (for Conduit Connection Codes 1 and 3)
- Stainless Steel Bracket with Stainless Steel Bolts (for Conduit Connection Codes 1 and 3)
- Painted Steel Bracket with Plated Steel Bolts (for Conduit Connection Codes 2 and 4)
- Stainless Steel Bracket with Stainless Steel Bolts (for Conduit Connection Codes 2 and 4)
- Painted Steel Bracket with Plated Steel Bolts for use with M20 (for Conduit Connection Codes 5 & 6)
- Stainless Steel Bracket with Stainless Steel Bolts for use with M20 (for Conduit Connection Codes 5 and 6)

Cleaning and Preparation

- Unit Degreased (Silicone filled sensor – not for Oxygen, Chlorine, or other fluids that may react with silicone)
- Digital Indicator with Pushbuttons
  - Digital Indicator, Pushbuttons, and Window Cover
- Block & Bleed valve – Specify Only One
  - Block and Bleed Valve, Carbon Steel
  - Block and Bleed Valve, 316 ss
  - Block and Bleed Valve, 316 ss Body w/Monel Trim
- Conduit Connectors (Threaded Adapters) – Specify Only One
  - Hawke-Type 1/2 NPT Cable Gland for use with Conduit Connection Codes 1 and 3
  - Plastic PG 13.5 Cable Gland for use with Conduit Connection Codes 2 and 4
  - M20 Connector for use with Conduit Connection Codes 1 and 3
  - Trumpet-Shaped Nickel-plated Brass PG 13.5 Cable Gland for use with Conduit Connection Codes 2 and 4
Pressure

Electronics Housing Features - Specify Only One
  External Zero Adjustment ............................................................... -Z1
  Custody Transfer Lock and Seal .................................................. -Z2
  External Zero Adjustment and Custody Transfer Lock and Seal ................. -Z3

Custom Factory Configuration
  Full Factory Configuration (Requires Configuration Form to be filled out) ................................................. -C2

Instruction Book Options
  Without Instruction Book & CD .................................................. -K1

Miscellaneous Optional Selections
  R ½ Process Connection (½ NPT to R ½ Adapter) ............................. -R
  17 Year Extended Warranty ..................................................... -W
  Supplemental Customer Tag (Stainless Steel Tag wired onto Transmitter) ......................................................... -T
  Low Temperature Operative Limit of -50°C (-58°F) for Entire Transmitter .................................................. -J

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
The Foxboro IGP60G Gauge Pressure Transmitter is a microprocessor-based smart transmitter that provides precise, reliable, measurement of gauge pressure and features high performance and excellent stability. Capable of measuring gas, liquid, vapor, and liquid levels, it transmits 4 to 20 mA dc analog and digital signals according to the measured pressure. It can also execute two-way communications using HART protocol, thus facilitating self-diagnosis, range resetting, and automatic zero adjustment. For complete specifications, refer to Product Specification Sheet PSS 2A-1C18 B.

- Unique characterization and composite semiconductor sensors realize high accuracy up to 0.04% F.S.
- Proven Sensor technology enables Long-term stability up to 0.1% of URL per 1-year period.
- A wide measuring range is available from a single model. This feature is highly effective in taking measurement over a wide range and reducing the need for inventory.
- Measuring Span: 2.5 to 500 psi
- Rangeability 200 to 1 (17.5 to 3500kPa).
- Two-way communication using HART protocol facilitates self-diagnosis, range resetting, automatic zero adjustment, and other operations.
- HART communication protocol.

### Functional Specifications

#### Measuring Span Limits

<table>
<thead>
<tr>
<th>kPa</th>
<th>Psi</th>
<th>bar</th>
<th>mmHg</th>
<th>mmH20</th>
<th>lnH20</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.5 and 3500</td>
<td>2.5 and 507.6</td>
<td>0.175 and 35</td>
<td>131 and 26252</td>
<td>1784 and 356900</td>
<td>70 and 14051</td>
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</tbody>
</table>

#### Setting Range Limits

<table>
<thead>
<tr>
<th>kPa</th>
<th>Psi</th>
<th>bar</th>
<th>mmHg</th>
<th>mmH20</th>
<th>lnH20</th>
</tr>
</thead>
<tbody>
<tr>
<td>-100 and 3500</td>
<td>-14.5 and 507</td>
<td>-7510 and 35</td>
<td>-750 and 26252</td>
<td>-10,197 and 356900</td>
<td>-401 and 14501</td>
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</table>

#### Working Pressure Limits

<table>
<thead>
<tr>
<th>kPa</th>
<th>Psi</th>
<th>bar</th>
<th>mmHg</th>
<th>mmH20</th>
<th>lnH20</th>
</tr>
</thead>
<tbody>
<tr>
<td>2(abs) and 5250</td>
<td>0.29(abs) and 761</td>
<td>0.02 and 52.5</td>
<td>15 and 39378</td>
<td>204 and 535351</td>
<td>8 and 21077</td>
</tr>
</tbody>
</table>

### How to Order

Specify model number IGP60 followed by order code for each selection configuration.

#### Communications

4 to 20 mA with HART Communications

| Communications | | B

#### Fill Fluid

Silicone

| Fill Fluid | | A

Fluorine (for Oxygen Service)

| Fill Fluid | | H

#### Material Covers

Meterbody Covers: SCS14A, Vent/Drain Plugs 316SST

| Material Covers | | A

#### Material Body

Meterbody: 316SST, Process Diaphragms: 316LSST

| Material Body | | A

Meterbody, Diaphragms: ASTM B575 (Eqv. to Hastalloy C)

| Material Body | | B
### Pressure

#### Process Connections
- 1/4 in NPT Internal Thread with 1/2 in NPT Adapter Flange ................................. D
- 1/4 in NPT Internal Thread with Adapter Flange ................................................... E
- 1/4 in NPT Internal Thread w/o Adapter Flange ..................................................... F
- Mounting (Process Installation)
- Horizontal Piping, Top Connection ................................................................. C

#### Bolting
- 304SST ................................................................. B

#### Electrical Connection
- 1/2 in NPT, Watertight .............................................................................. A
- M20, Watertight ...................................................................................... B

#### Electrical Safety
- None ........................................................................................................ XX
- FM Explosionproof ................................................................. F1
- FM Intrinsically Safe ........................................................................ F2
- FM Nonincendive ............................................................................... F5
- FM EX, IS, and NII .......................................................................... F6
- ATEX Explosionproof ..................................................................... A1
- ATEX Intrinsically Safe .................................................................. A2
- ATEX Energy Limited .................................................................... A5
- In Metro Flameproof .......................................................... B1
- In Metro Intrinsically Safe ...................................................... B2
- In Metro Type N ........................................................................... B3
- CSA Explosionproof ..................................................................... C1
- CSA Intrinsically Safe .................................................................. C2

#### Indicator
- None ........................................................................................................ X
- With Indicator ..................................................................................... A

#### Paint
- Corrosion Proof .................................................................................. B

#### Failure Alarm Configuration
- Upper Limit of Output at Abnormal Condition ............................................. A
- Lower Limit of Output at Abnormal Condition ............................................ B

#### Mounting Bracket
- None ........................................................................................................ X
- 304 SST (Universal) ........................................................................... 1

#### Optional Selections
- No Options .......................................................................................... XX
- Pitch Adjusting Adapter .................................................................. A1
- With External Zero Adjustment .......................................................... A2
- Long Vent / Drain Plug ...................................................................... G4
- Side Vent / Drain Plug (Top) .............................................................. G6
- Side Vent / Drain Plug (Bottom) .......................................................... G7
- Oil/ Water Free Finish ...................................................................... K1
- Oil Free Finish .................................................................................. K3
- Safety Transmitter ........................................................................... Q1
- NAMUR NE43 Compliant ................................................................. Q2
- Alarm Output (Contact utput) ......................................................... Q7
- Custom Calibration ........................................................................... R1
- Test Report ......................................................................................... T1
- Mill Certificate .................................................................................. T2
- Traceability Certificate ..................................................................... T4
- NACE Certificate ............................................................................. T5
- Non SI Unit ........................................................................................ W1
This transmitter measures the difference between two pressures and transmits a proportional or square root (flow) 4-20mA, 1-5Vdc, or digital output signal over a pair of wires.

For complete specifications, refer to Product Specification Sheet PSS 2A-1C14 A, B, & C, and PSS 2A-1C13 D, E, and J.

**Output signal and configuration:**

<table>
<thead>
<tr>
<th>Version</th>
<th>Output Choices</th>
<th>Configure From</th>
</tr>
</thead>
<tbody>
<tr>
<td>-D</td>
<td>✅ FoxCom Digital ✅ FoxCom/4 to 20 mA</td>
<td>I/A Series Workstation Hand-Held Terminal Personal Computer Optional Pushbuttons</td>
</tr>
<tr>
<td>-T</td>
<td>✅ HART/4 to 20mA</td>
<td>Communicator Workstation Personal Computer</td>
</tr>
<tr>
<td>-F</td>
<td>✅ Foundation Fieldbus</td>
<td>Workstation</td>
</tr>
<tr>
<td>-A,</td>
<td>4 to 20mA</td>
<td>Standard Pushbuttons</td>
</tr>
<tr>
<td>-V</td>
<td>1-5 Vdc</td>
<td>Standard Pushbuttons</td>
</tr>
</tbody>
</table>

**Span and Range Limits:**

<table>
<thead>
<tr>
<th>Span Limits Code</th>
<th>Span Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.12 &amp; 7.5 kPa 0.5 &amp; 30 inH2O 1.2 &amp; 75 mbar</td>
</tr>
<tr>
<td>B</td>
<td>0.87 &amp; 50 kPa 3.5 &amp; 200 inH2O 8.7 &amp; 500 mbar</td>
</tr>
<tr>
<td>C</td>
<td>7 &amp; 210 kPa 28 &amp; 840 inH2O 70 &amp; 2100 mbar</td>
</tr>
<tr>
<td>D</td>
<td>0.07 &amp; 2.1 MPa 10 &amp; 300 psi 0.7 &amp; 21 bar or kg/cm²</td>
</tr>
<tr>
<td>E</td>
<td>0.7 &amp; 21 MPa 100 &amp; 3000 psi 7 &amp; 210 bar or kg/cm²</td>
</tr>
</tbody>
</table>

**Range Limits(1):**

<table>
<thead>
<tr>
<th>Range Limits(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>D</td>
</tr>
<tr>
<td>E</td>
</tr>
</tbody>
</table>

**Maximum Static and Overrange Pressures**

<table>
<thead>
<tr>
<th>Transmitter Configuration (See Model Code for Description of Options)</th>
<th>Pressure Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Rating bar or kg/cm²</td>
<td></td>
</tr>
<tr>
<td>Standard or with Option -B2, -D3, or -D7</td>
<td>25</td>
</tr>
<tr>
<td>With Option -B3</td>
<td>20</td>
</tr>
<tr>
<td>With Option -D1</td>
<td>16</td>
</tr>
<tr>
<td>With Option -B1 or -D5</td>
<td>15</td>
</tr>
<tr>
<td>With Option -D2, -D4, -D6, or -D8</td>
<td>10</td>
</tr>
<tr>
<td>With Structure Codes 78 and 79 (pvdf insert)</td>
<td>2.1</td>
</tr>
<tr>
<td>With Option -D9 or -Y</td>
<td>40</td>
</tr>
</tbody>
</table>

**Application Versatility**

- 316 ss Process Covers and 316L ss Sensor materials standard
- Choice of Traditional or Low Profile Process Cover/Sensor Structures
- Static Pressure Rating of 25 MPa, 3625 psi, 250 bar or kg/cm²; Options to 40 MPa, 5800 psi, 400 bar or kg/cm²

**Installation Versatility**

- Traditional “right angle” structure with process connections in horizontal plane
- Low Profile “in line” structures with process connections in vertical plane

**Two Low Profile Structures**

- LP1 Structure — economical, small, light weight for direct manifold mounting in vertical or horizontal positions
- LP2 Structure — designed for bracket or manifold mounting in vertical position

**Superior Performance**

- Accuracy to ±0.05% of span

**Choice of Electronics Modules**

- Intelligent HART, Foundation Fieldbus, FoxCom and 4 to 20 mA versions
- Economical 4 to 20 mA and 1 to 5 Vdc versions

**LCD Indicator/Pushbutton Configurator**

- Optional on Foundation Fieldbus, FoxCom/4-20 mA, and HART/4-20 mA versions
- Standard on 4-20 mA and 1-5 Vdc version

**Electrical Classification:**

- Various agency certifications for Zone and Division hazardous locations. Refer to Product Specification sheets for complete specifications.
- Standard Warranty 5 Years
Performance Specifications
Accuracy (Includes Linearity, Hysteresis, and Repeatability):

<table>
<thead>
<tr>
<th>Version</th>
<th>Output</th>
<th>Signal Accuracy in % of Calib. Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>-D or -T</td>
<td>Digital</td>
<td>±0.05</td>
</tr>
<tr>
<td></td>
<td>4 to 20 mA</td>
<td>±0.075</td>
</tr>
<tr>
<td>-F</td>
<td>Digital</td>
<td>±0.05</td>
</tr>
<tr>
<td>-A</td>
<td>4 to 20 mA</td>
<td>±0.20</td>
</tr>
<tr>
<td>-V</td>
<td>1 to 5 Vdc</td>
<td>±0.10</td>
</tr>
</tbody>
</table>

Refer to PSSs for accuracies at small spans (less than 10% of URL) and with square root output.

Electronic Versions and Output Signals
- 4-20 mA/FoxCom .......................... D
- 4 to 20 mA/HART ........................ T
- Foundation Fieldbus ..................... F
- 4 to 20 mA .............................. A
- 1 to 5 Vdc .............................. V

Structure Code – Select from one of the following five groups:
1. Transmitter With Traditional Structure

<table>
<thead>
<tr>
<th>Process Covers</th>
<th>Sensor</th>
<th>Fill Fluid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>Co-Ni-Cr</td>
<td>Silicone</td>
</tr>
<tr>
<td>Steel</td>
<td>Co-Ni-Cr</td>
<td>Fluorinert</td>
</tr>
<tr>
<td>Steel</td>
<td>316L ss</td>
<td>Silicone</td>
</tr>
<tr>
<td>Steel</td>
<td>316L ss</td>
<td>Fluorinert</td>
</tr>
<tr>
<td>Steel</td>
<td>Hastelloy C</td>
<td>Silicone</td>
</tr>
<tr>
<td>Steel</td>
<td>Hastelloy C</td>
<td>Fluorinert</td>
</tr>
<tr>
<td>316 ss</td>
<td>Co-Ni-Cr</td>
<td>Silicone</td>
</tr>
<tr>
<td>316 ss</td>
<td>Co-Ni-Cr</td>
<td>Fluorinert</td>
</tr>
<tr>
<td>316 ss</td>
<td>316L ss</td>
<td>Silicone</td>
</tr>
<tr>
<td>316 ss</td>
<td>316L ss</td>
<td>Fluorinert</td>
</tr>
<tr>
<td>316 ss</td>
<td>316L ss, Gold Plated</td>
<td>Silicone</td>
</tr>
<tr>
<td>316 ss</td>
<td>Monel</td>
<td>Silicone</td>
</tr>
<tr>
<td>316 ss</td>
<td>Monel</td>
<td>Fluorinert</td>
</tr>
<tr>
<td>316 ss</td>
<td>Hastelloy C</td>
<td>Silicone</td>
</tr>
<tr>
<td>316 ss</td>
<td>Hastelloy C</td>
<td>Fluorinert</td>
</tr>
<tr>
<td>Monel</td>
<td>Monel</td>
<td>Silicone</td>
</tr>
<tr>
<td>Monel</td>
<td>Monel</td>
<td>Fluorinert</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>Hastelloy C</td>
<td>Silicone</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>Hastelloy C</td>
<td>Fluorinert</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>Tantalum</td>
<td>Silicone</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>Tantalum</td>
<td>Fluorinert</td>
</tr>
<tr>
<td>pvsf Insert (Kynar)</td>
<td>Tantalum</td>
<td>Silicone (Used w/Process Connector Type 7)</td>
</tr>
<tr>
<td>pvsf Insert (Kynar)</td>
<td>Tantalum</td>
<td>Fluorinert (Used w/Process Connector Type 7)</td>
</tr>
</tbody>
</table>

2. Transmitter With Low Profile Structure LP1 (No Seals)

<table>
<thead>
<tr>
<th>Process Covers</th>
<th>Sensor</th>
<th>Fill Fluid</th>
</tr>
</thead>
<tbody>
<tr>
<td>316 ss</td>
<td>316L ss</td>
<td>Silicone</td>
</tr>
<tr>
<td>316 ss</td>
<td>316L ss</td>
<td>Fluorinert</td>
</tr>
<tr>
<td>316 ss</td>
<td>Hastelloy C</td>
<td>Silicone</td>
</tr>
<tr>
<td>316 ss</td>
<td>Hastelloy C</td>
<td>Fluorinert</td>
</tr>
</tbody>
</table>

Physical Specifications
Material Combination & Value Package: Refer to How To Order for material versions available. For exceptional value and corrosion resistance, the standard material combination with the lowest price is 316 ss Process Covers with 316L ss Sensor.

Enclosure Classification: Meets IEC IP66 and NEMA Type 4X.

Sensor Fill Fluid: Dow Corning dimethylsiloxane (DC 200) or fluorinated hydrocarbon (3M Fluorinert FC 77), as specified.
3. Transmitter With Low Profile Structure LP2 (No Seals)

<table>
<thead>
<tr>
<th>Process Covers</th>
<th>Sensor</th>
<th>Fill Fluid</th>
</tr>
</thead>
<tbody>
<tr>
<td>316 ss</td>
<td>316L ss</td>
<td>Silicone</td>
</tr>
<tr>
<td>316 ss</td>
<td>316L ss</td>
<td>Fluorinert</td>
</tr>
<tr>
<td>316 ss</td>
<td>Hastelloy C</td>
<td>Silicone</td>
</tr>
<tr>
<td>316 ss</td>
<td>Hastelloy C</td>
<td>Fluorinert</td>
</tr>
</tbody>
</table>

4. Transmitter (Traditional Structure) Prepared for Foxboro Model Coded Seals

Direct Connect Seal on HI Side; 1/2 NPT Process Connector LO Side; Silicone Fill in Sensor
Direct Connect Seal on HI Side; 1/2 NPT Process Connector LO Side; Fluorinert Fill in Sensor
Direct Connect Seal on HI Side; Remote Seal with Capillary LO Side; Silicone Fill in Sensor
Direct Connect Seal on HI Side; Remote Seal with Capillary LO Side; Fluorinert Fill in Sensor
Remote Seals on Both HI and LO Sides, Silicone Fill in Sensor
Remote Seals on Both HI and LO Sides, Fluorinert Fill in Sensor
Remote Seal HI Side, 1/2 NPT Connector LO Side, Silicone Fill in Sensor
Remote Seal HI Side, 1/2 NPT Connector LO Side, Fluorinert Fill in Sensor
Remote Seal LO Side, 1/2 NPT Connector HI Side, Silicone Fill in Sensor
Remote Seal LO Side, 1/2 NPT Connector HI Side, Fluorinert Fill in Sensor

5. Transmitter (Traditional Structure) Prepared for non-Foxboro Seals

Remote Seal on High and Low Sides; Silicone Fill in Sensor
Remote Seal on High and Low Sides; Inert Fill in Sensor
Remote Seal on High Side and 1/2 NPT Connector on Low Side, Silicone Fill in Sensor
Remote Seal on High Side and 1/2 NPT Connector on Low Side, Inert Fill in Sensor
Remote Seal on Low Side and 1/2 NPT Connector on High Side, Silicone Fill in Sensor
Remote Seal on Low Side and 1/2 NPT Connector on High Side, Inert Fill in Sensor

Span Limits – Differential Pressure Units

<table>
<thead>
<tr>
<th>kPa</th>
<th>inH₂O</th>
<th>mbar</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.12</td>
<td>0.5 and 30</td>
<td>1.2 and 75</td>
</tr>
<tr>
<td>0.87</td>
<td>3.5 and 200</td>
<td>8.7 and 500</td>
</tr>
<tr>
<td>7</td>
<td>28 and 840</td>
<td>70 and 2100</td>
</tr>
<tr>
<td>MPa</td>
<td>psi</td>
<td>bar or kg/cm²</td>
</tr>
<tr>
<td>0.07</td>
<td>10 and 300</td>
<td>0.7 and 21</td>
</tr>
<tr>
<td>0.7</td>
<td>100 and 3000</td>
<td>7 and 210</td>
</tr>
</tbody>
</table>

Process Connector Type (Material Same as Process Cover Material)

None, Covers Tapped for 1/4 NPT
1/4 NPT
1/2 NPT
Rc 1/4
Rc 1/2
1/2 Schedule 80 Welding Neck
None, pvdf (Kynar) insert tapped for 1/2 NPT (used with Structure Codes 78 & 79)

Conduit Connection and Housing Material

1/2 NPT Conduit Connections, Aluminum Housing
PG 13.5 Conduit Connections, Aluminum Housing
1/2 NPT Conduit Connections, 316 ss Housing
PG 13.5 Conduit Connections, 316 ss Housing
M20 Conduit Connection, Both Sides, Aluminum Housing
M20 Conduit Connection, Both Sides, 316 ss Housing
Pressure

IDP10

- Electrical Safety (See PSS for Description and Restrictions)
  - ATEX II GD, EEEx ia IIC, or II ½ GD, EEEx ib IIC
  - ATEX Flameproof; II 2 GD, EEEx d IIC, Zone 1
  - ATEX II 3 GD, EEEx nL IIC
  - ATEX Multiple Certifications (E, D, and N)
  - CSA Certified (including Flameproof Zones)
  - FM approved
  - FM approved (including Flameproof Zones)
  - IECEx Intrinsically Safe, Ex ia IIC T4
  - IECEx Intrinsically Safe, Protection n; Ex nL IIC T4

- Optional Selections
  - Mounting Bracket Set—Specify Only One
    - Painted Steel Bracket with Plated Steel Bolts
    - Stainless Steel Bracket with Stainless Steel Bolts
    - Universal Stainless Steel Bracket with Stainless Steel Bolts
  - Indicator with Internal Pushbuttons
    - Digital Indicator, Pushbuttons, and Window Cover for IDP10, -T, and -F only
    - Blind (solid) cover over the std. LCD on -A, or -V
  - DIN 19213 Construction – Specify Only One and
    Specify Process Connector Code 0
    - Single Ended Process Cover with M10 Bolting
    - Double Ended Process Cover with M10 Bolting (Blind Kidney Range on Back)
    - Single Ended Process Cover with ¾ inch Bolting
    - Double Ended Process Cover with ¾ inch Bolting (Blind Kidney Flange on Back)
    - Single Ended Process Covers with 316 ss ½ inch Bolting
    - Double Ended Process Covers with 316 ss ½ inch Bolting (Blind Kidney Flange on Back)
    - Single Ended Process Covers with 17-4 ss ½ inch Bolting
    - Double Ended Process Covers with 17-4 ss ½ inch Bolting (Blind Kidney Flange on Back)
    - Single Ended Process Covers with 17-4 ss ¾ inch Bolting an 40 MPa
      (400 bar or kg/cm², 5800 psi) static pressure rating

- Cleaning and Preparation—Specify Only One
  - Unit Degreased (not for Oxygen/Chlorine Service)
  - Cleaned and Prepared for Oxygen Service
  - Cleaned and Prepared for Chlorine Service

- Bolting for Process Covers and Process Connectors – Specify Only One
  - 316 ss Bolts and Nuts (Maximum Static Pressure 150 bar or kg/cm², 2175psi)
  - 17-4 ss Bolts and Nuts
  - B7M Bolts and Nuts (NACE)

- Conduit Thread Adapters – Specify Only One
  - Hawk-Type ½ NPT Cable Gland for use with Conduit Connection Codes 1 & 3
  - Plastic PG 13.5 Connector for use with Conduit Connection Codes 2 & 4
  - M20 Connector for use with Conduit Connection Codes 1 & 3
  - Trumpet shaped PG 13.5 Cable Gland (Nickel Plated Brass) for use

- Electronic Housing Features—Specify Only One
  - External Zero Adjustment
  - Custody Transfer Lock & Seal

- Ermeto Connectors—Specify Only One
  - Steel, Connecting 6 mm Tubing to ¼ NPT Process Connector
  - Steel, Connecting 12 mm Tubing to ½ NPT Process Connector
  - 316 ss, Connecting 6 mm Tubing to ¼ NPT Process Connector
  - 316 ss, Connecting 12 mm Tubing to ½ NPT Process Connector
Factory Configuration—Specify Only One
- Digital Output (FoxCom only) .......................................................... -C1
- Full Factory Configuration (Requires Configuration Form) ................. -C2

Instruction Book Options
- Without Instruction Book & CD .................................................. -K1

Vent Screw in Process Cover
- Supply Vent Screw in Side of Each Process Cover
  (Available only on Traditional Process Cover Structure Codes 22 to 47) ...... -V
- Omit Vent Screw in Side of Each Process Cover
  (Available only on Type LP1 Low Profile Process Cover Structures Codes LL, LM, LC, and LD) ........................................ -V1

Adapters for Direct Mount to Competitive Manifolds (See Product Specification Sheet for manifold compatibility)
- Adapter plate, Bolts, and Gaskets for Coplanar Manifolds .................... -P1
  Not available with:
  - Bolting Options -B1, -B2, and -B3;
  - DIN 19213 Construction Options -D1, -D2, -D4, -D5, -D6, -D7, and -D8

Miscellaneous Optional Selections
- Five-Year Warranty .................................................................. -W
- Supplemental Customer Tag ...................................................... -T
- High Static Pressure Rating (40 MPa, 5800 psi, 400 bar or kg/cm²) ........ -Y
- Low Temperature Operative Limit of -50°C (-58°F) for Entire Transmitter .................. -J
- Gasket for Vacuum Service with Pressure Seals(8) ......................... -G1

Specify calibrated differential pressure range

Specify information for instrument tag

Notes
1. Upper Range Limit is the lower of the values in this table and in the Maximum static and Overrange Table, which lists the derated pressures associated with various options.
2. Refer to Section “Pressure Seals and Industry-Specific Sonnection” for additional information.
3. Direct Mount seals that may be specified are models PSFLT, PSSCT, and PSSST.
4. Remote Mount seals that may be specified are models PSFPS, PSFES, PSFAR, PSTAR, PSISR, PSSCR, and PSSSR.
5. Standard equipment on IGP20-A, and -V.
6. Available only with Structure Codes having Fluorinert Fill Fluid.
7. Available only with Structure Codes having Fluorinert Fill Fluid and not available with carbon steel Process Cover.
8. Option -G1 is required when pressure seal (Structure Codes F1-F4, S1-S6, or SA-SF) will be used on vacuum applications. This option substitutes vacuum service metal gaskets for the standard ptfe Process Cover Gasket.
The Foxboro IDP15D Differential Pressure Transmitter is a microprocessor-based smart transmitter that provides precise, reliable, measurement of differential pressure, and features high performance and excellent stability. Capable of measuring gas, liquid, vapor, and liquid levels, it transmits 4 to 20mA dc analog and digital signals according to the measured differential pressure. It can also execute two-way communications using HART protocol, thus facilitating self-diagnosis, range resetting, and automatic zero adjustment. For complete specifications, refer to Product Specification Sheet PSS 2A-1C17 A.

- Unique characterization and composite semiconductor sensors realize high accuracy up to 0.04% F.S.
- Proven Sensor technology enables Long-term stability up to 0.1% of URL per 10-year period.
- A wide measuring range is available from a single model. This feature is highly effective in taking measurement over a wide range and reducing the need for inventory.
- Draft Range (-4” H20 to +4” H20)
- 0.5 to 100kPa (rangeability: 200 to 1).
- Two-way communication using HART protocol facilitates self-diagnosis, range resetting, automatic zero adjustment, and other operations.
- HART communication protocol.

**Functional Specifications**

**Measuring Span Limits**

<table>
<thead>
<tr>
<th>kPa</th>
<th>Psi</th>
<th>bar</th>
<th>mmHg</th>
<th>mmH20</th>
<th>lnH20</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 and 2</td>
<td>0.015 and 0.29</td>
<td>0.001 and 0.2</td>
<td>0.75 and 15</td>
<td>10.20 and 203.94</td>
<td>0.4 and 8</td>
</tr>
</tbody>
</table>

**Setting Range Limits**

<table>
<thead>
<tr>
<th>kPa</th>
<th>Psi</th>
<th>bar</th>
<th>mmHg</th>
<th>mmH20</th>
<th>lnH20</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1 and +1</td>
<td>0.145 and +0.145</td>
<td>-0.01 and +0.01</td>
<td>-7.5 and +7.5</td>
<td>-102 and +102</td>
<td>-4 and +4</td>
</tr>
</tbody>
</table>

**Working Pressure Limits**

<table>
<thead>
<tr>
<th>kPa</th>
<th>Psi</th>
<th>bar</th>
<th>mmHg</th>
<th>mmH20</th>
<th>lnH20</th>
</tr>
</thead>
<tbody>
<tr>
<td>-70 and +210</td>
<td>-10 and +30</td>
<td>0.7 and +2.1</td>
<td>-525 and +1575</td>
<td>-7130 and +21,400</td>
<td>-280 and +840</td>
</tr>
</tbody>
</table>

How to Order—Specify model number IDP15 followed by order code for each selection configuration

**Communications**

- 4 to 20 mA with HART Communications

**Fill Fluid**

- Silicone
- Fluorine (for Oxygen Service)

**Material Covers**

- Meterbody Covers: SCS14A, Vent/Drain Plugs 316SST

**Material Body**

- Meterbody: 316SST, Process Diaphragms: 316LSST.
<table>
<thead>
<tr>
<th>Process Connections</th>
<th>1/4 in NPT Internal Thread w/ Adapter Flange</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4 in NPT Internal Thread No Adapter Flange and w/o Adapter Flange</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>1/4 in NPT Internal Thread with 1/2 NPT Adapter Flange</td>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>

| Mounting (Process Installation) | Horizontal Piping, Front Connection | C |

| Bolting | 304SST | B |

<table>
<thead>
<tr>
<th>Electrical Connection</th>
<th>1/2 in NPT, Watertight</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>M20, Watertight</td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical Safety</th>
<th>None</th>
<th>XX</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM Explosionproof</td>
<td>F1</td>
<td></td>
</tr>
<tr>
<td>FM Intrinsically Safe</td>
<td>F2</td>
<td></td>
</tr>
<tr>
<td>FM Nonincendive</td>
<td>F5</td>
<td></td>
</tr>
<tr>
<td>FM EX, IS, and NI</td>
<td>F6</td>
<td></td>
</tr>
<tr>
<td>ATEX Flameproof</td>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>ATEX Intrinsically Safe</td>
<td>A2</td>
<td></td>
</tr>
<tr>
<td>ATEX Energy Limited</td>
<td>A5</td>
<td></td>
</tr>
<tr>
<td>In Metro Flameproof</td>
<td>B1</td>
<td></td>
</tr>
<tr>
<td>In Metro Intrinsically Safe</td>
<td>B2</td>
<td></td>
</tr>
<tr>
<td>In Metro Type N</td>
<td>B3</td>
<td></td>
</tr>
<tr>
<td>CSA Explosionproof</td>
<td>C1</td>
<td></td>
</tr>
<tr>
<td>CSA Intrinsically Safe</td>
<td>C2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicator</th>
<th>None</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>With Indicator</td>
<td>A</td>
<td></td>
</tr>
</tbody>
</table>

| Paint | Corrosion Proof | B |

<table>
<thead>
<tr>
<th>Failure Alarm Configuration</th>
<th>Upper Limit of Output at Abnormal Condition</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Limit of Output at Abnormal Condition</td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mounting Bracket</th>
<th>None</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>304 SST (Universal)</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Optional Selections</th>
<th>No Options</th>
<th>XX</th>
</tr>
</thead>
<tbody>
<tr>
<td>With External Zero Adjustment</td>
<td>A2</td>
<td></td>
</tr>
<tr>
<td>Long Vent / Drain Plug</td>
<td>G4</td>
<td></td>
</tr>
<tr>
<td>Side Vent / Drain Plug (Top)</td>
<td>G6</td>
<td></td>
</tr>
<tr>
<td>Side Vent / Drain Plug (Bottom)</td>
<td>G7</td>
<td></td>
</tr>
<tr>
<td>Oil/ Water Free Finish</td>
<td>K1</td>
<td></td>
</tr>
<tr>
<td>Oil Free Finish</td>
<td>K3</td>
<td></td>
</tr>
<tr>
<td>Safety Transmitter</td>
<td>Q1</td>
<td></td>
</tr>
<tr>
<td>NAMUR NE43 Compliant</td>
<td>Q2</td>
<td></td>
</tr>
<tr>
<td>Alarm Output (Contact utput)</td>
<td>Q7</td>
<td></td>
</tr>
<tr>
<td>Custom Calibration</td>
<td>R1</td>
<td></td>
</tr>
<tr>
<td>Test Report</td>
<td>T1</td>
<td></td>
</tr>
<tr>
<td>Mill Certificate</td>
<td>T2</td>
<td></td>
</tr>
<tr>
<td>Traceability Certificate</td>
<td>T4</td>
<td></td>
</tr>
<tr>
<td>Non SI Unit</td>
<td>W1</td>
<td></td>
</tr>
</tbody>
</table>
IDP25 I/A Series® Multirange Pressure Transmitters for Differential Pressure Measurement

This intelligent, multirange, two-wire d/p Cell transmitter provides precise, reliable, measurement of differential pressure providing the adjustment range of “two transmitters in one.”

For complete specifications refer to product specification sheet PSS 2A-1C14 K.

### Features:
- 400:1 turndown span adjustment available with 4-20 mA output, HART, or Foundation Fieldbus digital communications
- Wide measurement ranges from 0-0.12 to 0-250 kPa (0-0.5 to 0-1000 inH₂O) with just two sensor selections
- Process wetted parts all 316 ss and 316L ss with ptfe gaskets; Hastelloy C optional

### Benefits:
- Multirange transmitter simplifies planning, ordering and spares procurement and stocking.
- High reliability.

### Performance Specifications
- Accuracy ±0.075% of span for 120:1 turndown
- Small span accuracy ±(0.00625)(URL/Span)% span for turndowns >120:1
- Long term drift: < ±0.02% of URL per year over 5 year period
- Temperature effect ±(0.03% URL + 0.06% span)/28°C (50°F)

### Electrical Classification:
- Various agency certifications for Zone and Division hazardous locations. Refer to Product Specification sheets for complete specifications.

### Standard Warranty 5 Years

### Functional Specifications

#### Span Limits for IDP25 Multirange Differential Pressure Transmitters

<table>
<thead>
<tr>
<th>Span Limit Code</th>
<th>kPa</th>
<th>psi</th>
<th>mbar</th>
<th>mmHg</th>
<th>inH₂O</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>0.12 and 50</td>
<td>0.017 and 7.2</td>
<td>1.2 and 500</td>
<td>0.93 and 375</td>
<td>0.5 and 200</td>
</tr>
<tr>
<td>C</td>
<td>0.625 and 250</td>
<td>0.09 and 36</td>
<td>6.25 and 2500</td>
<td>4.68 and 1870</td>
<td>2.5 and 1000</td>
</tr>
</tbody>
</table>

#### Range Limits for IDP25 Multirange Differential Pressure Transmitters

<table>
<thead>
<tr>
<th>Span Limit Code</th>
<th>kPa</th>
<th>psi</th>
<th>mbar</th>
<th>mmHg</th>
<th>inH₂O</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>-50 and +50</td>
<td>-7.2 and +7.2</td>
<td>-500 and +500</td>
<td>-375 and +375</td>
<td>-200 and +200</td>
</tr>
<tr>
<td>C</td>
<td>-250 and +250</td>
<td>-36 and +36</td>
<td>2500 and +2500</td>
<td>-1870 and +1870</td>
<td>-1000 and +1000</td>
</tr>
</tbody>
</table>

### Maximum Static and Overrange Pressures

#### Transmitter Configuration

<table>
<thead>
<tr>
<th>Transmitter Configuration (See Model Code for Description of Options)</th>
<th>Overrange Pressure Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard or with Option -B2, -D3, or -D7</td>
<td>25</td>
</tr>
<tr>
<td>With Option -B3</td>
<td>20</td>
</tr>
<tr>
<td>With Option -D1</td>
<td>16</td>
</tr>
<tr>
<td>With Option -B1 or -D5</td>
<td>15</td>
</tr>
<tr>
<td>With Option -D2, -D4, -D6, or -D8</td>
<td>10</td>
</tr>
<tr>
<td>With Structure Codes 78 and 79</td>
<td>2.1</td>
</tr>
<tr>
<td>With Option -D9 or -Y</td>
<td>40</td>
</tr>
</tbody>
</table>
How to Order – Specify Model Number IDP25

Electronics Versions and Output Signal
- 4 to 20 mA/HART
- Foundation Fieldbus

Structure Code – Select from one of the following three groups:

1. Transmitter With Traditional Structure

<table>
<thead>
<tr>
<th>Process Covers</th>
<th>Sensor</th>
<th>Fill Fluid</th>
</tr>
</thead>
<tbody>
<tr>
<td>316 ss</td>
<td>316L ss</td>
<td>Silicone</td>
</tr>
<tr>
<td>316 ss</td>
<td>316L ss</td>
<td>Fluorinert</td>
</tr>
<tr>
<td>316 ss</td>
<td>Hastelloy C</td>
<td>Silicone</td>
</tr>
<tr>
<td>316 ss</td>
<td>Hastelloy C</td>
<td>Fluorinert</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>Hastelloy C</td>
<td>Silicone</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>Hastelloy C</td>
<td>Fluorinert</td>
</tr>
</tbody>
</table>

2. Transmitter Prepared for Foxboro Model Coded Seals

| Direct Connect Seal on HI Side; ½ NPT Process Connector LO Side; Silicone Fill in Sensor | F1 |
| Direct Connect Seal on HI Side; ½ NPT Process Connector LO Side; Fluorinert Fill in Sensor | F2 |
| Direct Connect Seal on HI Side; Remote Seal with Capillary LO Side; Silicone Fill in Sensor | F3 |
| Direct Connect Seal on HI Side; Remote Seal with Capillary LO Side; Fluorinert Fill in Sensor | F4 |
| Remote Seals on Both HI and LO Sides, Silicone Fill in Sensor | S1 |
| Remote Seals on Both HI and LO Sides, Fluorinert Fill in Sensor | S2 |
| Remote Seal HI Side, ½ NPT Connector LO Side, Silicone Fill in Sensor | S3 |
| Remote Seal HI Side, ½ NPT Connector LO Side, Fluorinert Fill in Sensor | S4 |
| Remote Seal LO Side, ½ NPT Connector HI Side, Silicone Fill in Sensor | S5 |
| Remote Seal LO Side, ½ NPT Connector HI Side, Fluorinert Fill in Sensor | S6 |

3. Transmitter Prepared for non-Foxboro Seals

| Remote Seal on High and Low Sides; Silicone Fill in Sensor | SA |
| Remote Seal on High and Low Sides; Inert Fill in Sensor | SB |
| Remote Seal on High Side and ½ NPT Connector on Low Side, Silicone Fill in Sensor | SC |
| Remote Seal on High Side and ½ NPT Connector on Low Side, Inert Fill in Sensor | SD |
| Remote Seal on Low Side and ½ NPT Connector on High Side, Silicone Fill in Sensor | SE |
| Remote Seal on Low Side and ½ NPT Connector on High Side, Inert Fill in Sensor | SF |

Span Limits (Differential Pressure Units)

<table>
<thead>
<tr>
<th>kPa</th>
<th>psi</th>
<th>mbar</th>
<th>mmHg</th>
<th>inH2O</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.12 and 50</td>
<td>0.017</td>
<td>1.2 and 50</td>
<td>0.93 and 375</td>
<td>0.5 and 200</td>
</tr>
<tr>
<td>0.625 and 250</td>
<td>0.09</td>
<td>6.25 and 2500</td>
<td>4.68 and 1870</td>
<td>2.5 and 1000</td>
</tr>
</tbody>
</table>

Process Connector (Removable) – Supplied in same material as process cover

| None; Process Covers have ¼ NPT Internal Thread | 0 |
| ¼ NPT (Not Available in Hastelloy C Material) | 1 |
| ½ NPT | 2 |
| Rc ¼ (Not Available in Hastelloy C Material) | 3 |
| Rc ½ | 4 |
| ½ Schedule 80 Welding Neck (Not Available in Hastelloy C Material) | 6 |

Conduit Connection and Housing Material

| ½ NPT Conduit Connections, Aluminum Housing | 1 |
| PG 13.5 Conduit Connections, Aluminum Housing | 2 |
| ½ NPT Conduit Connections, 316 ss Housing | 3 |
| PG 13.5 Conduit Connections, 316 ss Housing | 4 |
| M20 Conduit Connection, Both Sides, Aluminum Housing | 5 |
| M20 Conduit Connection, Both Sides, 316 ss Housing | 6 |
**Pressure**

<table>
<thead>
<tr>
<th>Identification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical Safety (See PSS for Description and Restrictions)</strong></td>
<td>ATEX II GD, EEx ia IIC, or II ½ GD, EEx ib IIC</td>
</tr>
<tr>
<td></td>
<td>ATEX Flameproof; II 2 GD, EEx d IIC, Zone 1</td>
</tr>
<tr>
<td></td>
<td>ATEX II 3 GD, EEx nL IIC</td>
</tr>
<tr>
<td></td>
<td>ATEX Multiple Certifications (E, D, and N)</td>
</tr>
<tr>
<td></td>
<td>CSA Certified (including Flameproof Zones)</td>
</tr>
<tr>
<td></td>
<td>FM approved (including Flameproof Zones)</td>
</tr>
<tr>
<td></td>
<td>IECEx Intrinsically Safe, Ex ia IIC T4</td>
</tr>
<tr>
<td></td>
<td>IECEx Intrinsically Safe, Protection n; Ex nL IIC T4</td>
</tr>
</tbody>
</table>

**Optional Selections**

Refer to Optional Selection descriptions that follow.

**Mounting Bracket Set - Specify Only One**

- Painted Steel Bracket with Plated Steel Bolts | M1 |
- Stainless Steel Bracket with Stainless Steel Bolts | M2 |

**Digital Indicator with Pushbuttons**

- Digital Indicator, Pushbuttons, and Window Cover | L1 |

**DIN 19213 Construction used with Process Connector Code “0” and 316 ss process Covers Only (b)**

- Single Ended Process Cover with M10 Bolting | D1 |
- Double Ended Process Cover with M10 Bolting (Blind Kidney Range on Back) | D2 |
- Single Ended Process Cover with ⅜ inch Bolting | D3 |
- Double Ended Process Cover with ⅜ inch Bolting (Blind Kidney Flange on Back) | D4 |
- Single Ended Process Covers with 316 ss ⅜ inch Bolting | D5 |
- Double Ended Process Covers with 316 ss ⅜ inch Bolting (Blind Kidney Flange on Back) | D6 |
- Single Ended Process Covers with 17-4 ss ⅜ inch Bolting | D7 |
- Double Ended Process Covers with 17-4 ss ⅜ inch Bolting (Blind Kidney Flange on Back) | D8 |
- Single Ended Process Covers with 17-4 ss ⅜ inch Bolting and 40 MPa (400 bar or kg/cm², 5800 psi) static pressure rating | D9 |

**Cleaning and Preparation - Specify Only One**

- Unit Degreased – for Silicone Filled Sensors Only (Not for Oxygen/Chlorine/Other Fluids that may react with Silicone) | X1 |
- Cleaned and Prepared for Oxygen Service – for Fluorinert Filled Sensors Only (Not Available with Silicone Filled Sensors) | X2 |
- Cleaned and Prepared for Chlorine Service – for Fluorinert Filled Sensors Only (Not Available with Silicone Filled Sensors) | X3 |

**Bolting for Process Covers/Connectors – Specify Only One**

- 316 ss Bolts and Nuts (Pressure Derated, to 15 MPa (2175 psi)) | B1 |
- 17-4 ss Bolts and Nuts | B2 |
- B7M Bolts and Nuts (NACE) (Pressure de-rated, refer to table) | B3 |

**Conduit Thread Adapters – Specify Only One**

- Hawk-Type ½ NPT Cable Gland for use with Conduit Connection Codes 1 & 3 | A1 |
- Plastic PG 13.5 Connector for use with Conduit Connection Codes 2 & 4 | A2 |
- M20 Connector for use with Conduit Connection Codes 1 & 3 | A3 |
- Trumpet shaped PG 13.5 Cable Gland (Nickel Plated Brass) for use with Conduit Connection Codes 2 & 4 | A4 |

**Electronics Housing Features – Specify Only One**

- External Zero Adjustment | Z1 |
- Custody Transfer Lock and Seal | Z2 |
- External Zero Adjustment and Custody Transfer Lock/Seal | Z3 |

**Custom Factory Configuration – Specify Only One**

- Digital Output (FoxCom Only) | C1 |
- Full Factory Configuration (Requires Configuration Form to be Filled Out) | C2 |
<table>
<thead>
<tr>
<th>IDP25</th>
<th>Ermeto Connectors – Specify Only One</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Steel, Connecting 6 mm Tubing to ¼ NPT Process Connector</td>
</tr>
<tr>
<td></td>
<td>Steel, Connecting 12 mm Tubing to ½ NPT Process Connector</td>
</tr>
<tr>
<td></td>
<td>316 ss, Connecting 6 mm Tubing to ¼ NPT Process Connector</td>
</tr>
<tr>
<td></td>
<td>316 ss, Connecting 12 mm Tubing to ½ NPT Process Connector</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Instruction Books (Paper instruction book and Brochure plus Full Documentation Set on CD-ROM is Standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without Instruction Book and CD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Miscellaneous Optional Selections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplemental Customer Tag (Stainless Steel Tag wired onto Transmitter)</td>
</tr>
<tr>
<td>Vent Screw in Side of Each Process Cover (Vent screws in cover ends are standard)</td>
</tr>
<tr>
<td>Five-Year Warranty</td>
</tr>
<tr>
<td>High Static Pressure Rating (40 MPa, 5800 psi, 400 bar or kg/cm²)</td>
</tr>
<tr>
<td>Low Temperature Operative Limit of -50°C (-58°F) for Entire Transmitter</td>
</tr>
<tr>
<td>Gasket for Vacuum Service with Pressure Seals</td>
</tr>
</tbody>
</table>

Notes:
1. Upper Range Limit is the lower of the values in this table and in the Maximum static and Overrange Table, which lists the derated pressures associated with various options.
2. Refer to Section “Pressure Seals and Industry-Specific Sonnection” for additional information.
3. Direct Mount seals that may be specified are models PSFLT, PSSCT, and PSSST.
4. Remote Mount seals that may be specified are models PSFPS, PSFES, PSFAR, PSTAR, PSISR, PSSCR, and PSSSR.
5. Option -G1 is required when pressure seal (Structure Codes F1-F4, S1-S6, or SA-SF) will be used on vacuum applications. This option substitutes vacuum service metal gaskets for the standard ptfe Process Cover Gasket.
The Foxboro IDP31D Differential Pressure Transmitter is a microprocessor-based smart transmitter that provides precise, reliable, measurement of differential pressure, and features high performance and excellent stability. Capable of measuring gas, liquid, vapor, and liquid levels, it transmits 4 to 20mA dc analog and digital signals according to the measured differential pressure. It can also execute two-way communications using HART protocol, thus facilitating self-diagnosis, range resetting, and automatic zero adjustment. For complete specifications, refer to Product Specification Sheet PSS 2A-1C17 A

- Unique characterization and composite semiconductor sensors realize high accuracy up to 0.04% F.S.
- Proven Sensor technology enables Long-term stability up to 0.1% of URL per 10-year period.
- A wide measuring range is available from a single model. This feature is highly effective in taking measurement over a wide range and reducing the need for inventory.
- 100 msec response time
- 0.5 to 100kPa (rangeability: 200 to 1).
- Two-way communication using HART protocol facilitates self-diagnosis, range resetting, automatic zero adjustment, and other operations.
- HART communication protocol.

### Functional Specifications

#### Measuring Span Limits

<table>
<thead>
<tr>
<th>kPa</th>
<th>Psi</th>
<th>bar</th>
<th>mmHg</th>
<th>mmH20</th>
<th>lnH20</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 and 100</td>
<td>0.007 and 14.5</td>
<td>0.005 and 1</td>
<td>3.75 and 750</td>
<td>50 and 10,160</td>
<td>2 and 400</td>
</tr>
</tbody>
</table>

#### Setting Range Limits

<table>
<thead>
<tr>
<th>kPa</th>
<th>Psi</th>
<th>bar</th>
<th>mmHg</th>
<th>mmH20</th>
<th>lnH20</th>
</tr>
</thead>
<tbody>
<tr>
<td>-100 and 100</td>
<td>-14.5 and +14.5</td>
<td>-1 and +1</td>
<td>-750 and +750</td>
<td>-10,160 and +10,160</td>
<td>-400 and +400</td>
</tr>
</tbody>
</table>

#### Working Pressure Limits

<table>
<thead>
<tr>
<th>kPa</th>
<th>Psi</th>
<th>bar</th>
<th>mmHg</th>
<th>mmH20</th>
<th>lnH20</th>
</tr>
</thead>
<tbody>
<tr>
<td>2(abs) and 21,000</td>
<td>0.29(abs) and 3045</td>
<td>0.02(abs) and 210</td>
<td>15(abs) and 157,500</td>
<td>204(abs) and 2MM</td>
<td>8(abs) and 84,300</td>
</tr>
</tbody>
</table>

### How to Order—Specify model number IDP31 followed by order code for each selection configuration

**Communications**
4 to 20 mA with HART Communications

**Fill Fluid**
Silicone
Fluorine (for Oxygen Service)

**Material Covers**
Meterbody Covers: SCS14A, Vent/Drain Plugs 316SST

**Material Body**
Meterbody: 316SST, Process Diaphragms: 316LSST.
Meterbody, Diaphragms: ASTM B575 (Equiv. to Hastelloy C)
## Pressure

### Process Connections
- 1/4 in NPT Internal Thread w/ Adapter Flange .............................................. E
- 1/4 in NPT Internal Thread No Adapter Flange and w/o Adapter Flange ........... F
- 1/4 in NPT Internal Thread with 1/2 NPT Adapter Flange .............................. D

### Mounting (Process Installation)
- Horizontal Piping, Front Connection .......................................................... C

### Bolting
- Carbon Steel ................................................................. A
- 304SST ........................................................................ B
- 630SST ........................................................................ C

### Electrical Connection
- 1/2 in NPT, Watertight ........................................................................... A
- M20, Watertight .................................................................................... B

### Electrical Safety
- None.................................................................................................. XX
- FM Explosionproof (a) ......................................................................... F1
- FM Intrinsically Safe (a) ....................................................................... F2
- FM Nonincendive (a) ................................................................. F5
- FM EX, IS, and NI (a) ....................................................................... F6
- ATEX Flameproof ............................................................................... A1
- ATEX Intrinsically Safe ........................................................................ A2
- ATEX Energy Limited ......................................................................... A5
- In Metro Flameproof ........................................................................... B1
- In Metro Intrinsically Safe .................................................................... B2
- In Metro Type N .................................................................................. B3
- CSA Explosionproof (a) ...................................................................... C1
- CSA Intrinsically Safe (a) .................................................................... C2

### Indicator
- None. ............................................................................................... X
- With Indicator ......................................................................................

### Paint
- Corrosion Proof ................................................................................... B

### Failure Alarm Configuration
- Upper Limit of Output at Abnormal Condition ......................................... A
- Lower Limit of Output at Abnormal Condition ......................................... B

### Mounting Bracket
- None. ............................................................................................... X
- 304 SST (Universal) ............................................................................... 1

### Optional Selections
- No Options ........................................................................................ XX
- Pitch Adjusting Adapter ....................................................................... A1
- With External Zero Adjustment ........................................................... A2
- Long Vent / Drain Plug ....................................................................... A4
- Side Vent / Drain Plug (Top) ............................................................... G4
- Side Vent / Drain Plug (Bottom) .......................................................... G6
- Oil/ Water Free Finish .......................................................................... G7
- Oil Free Finish ..................................................................................... K1
- Safety Transmitter ................................................................................
- NAMUR NE43 Compliant .................................................................... Q1
- Alarm Output (Contact utput) .............................................................. Q2
- Custom Calibration .............................................................................. Q7
- Test Report .......................................................................................... R1
- Mill Certificate ..................................................................................... T1
- Traceability Certificate ....................................................................... T2
- Non SI Unit ......................................................................................... T4

### Notes
(a) Max working pressure is restricted to 10MPa when 304SST bolt/nut is selected.
The Foxboro IDP32D Differential Pressure Transmitter is a microprocessor-based smart transmitter that provides precise, reliable, measurement of differential pressure, and features high performance and excellent stability. Capable of measuring gas, liquid, vapor, and liquid levels, it transmits 4 to 20mA dc analog and digital signals according to the measured differential pressure. It can also execute two-way communications using HART protocol, thus facilitating self-diagnosis, range resetting, and automatic zero adjustment. For complete specifications, refer to Product Specification Sheet PSS 2A-1C17 A

- Unique characterization and composite semiconductor sensors realize high accuracy up to 0.04% F.S.
- Proven Sensor technology enables Long-term stability up to 0.1% of URL per 10-year period.
- A wide measuring range is available from a single model. This feature is highly effective in taking measurement over a wide range and reducing the need for inventory.
- High static pressure
- 100 msec response time
- 0.5 to 100kPa (rangeability: 200 to 1).
- Two-way communication using HART protocol facilitates self-diagnosis, range resetting, automatic zero adjustment, and other operations.
- HART communication protocol.

### Functional Specifications
#### Measuring Span Limits

<table>
<thead>
<tr>
<th>kPa</th>
<th>Psi</th>
<th>bar</th>
<th>mmHg</th>
<th>mmH20</th>
<th>lnH20</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 and 100</td>
<td>0.007 and 14.5</td>
<td>0.005 and 1</td>
<td>3.75 and 750</td>
<td>50 and 10,160</td>
<td>2 and 400</td>
</tr>
</tbody>
</table>

#### Setting Range Limits

<table>
<thead>
<tr>
<th>kPa</th>
<th>Psi</th>
<th>bar</th>
<th>mmHg</th>
<th>mmH20</th>
<th>lnH20</th>
</tr>
</thead>
<tbody>
<tr>
<td>-100 and +100</td>
<td>-14.5 and +14.5</td>
<td>-1 and +1</td>
<td>-750 and +750</td>
<td>-10,160 and +10,160</td>
<td>-400 and +400</td>
</tr>
</tbody>
</table>

#### Working Pressure Limits

<table>
<thead>
<tr>
<th>kPa</th>
<th>Psi</th>
<th>bar</th>
<th>mmHg</th>
<th>mmH20</th>
<th>lnH20</th>
</tr>
</thead>
<tbody>
<tr>
<td>2(abs) and 42,000</td>
<td>0.29(abs) and 6090</td>
<td>0.02(abs) and 420</td>
<td>15(abs) and 315,000</td>
<td>204(abs) and 4MM</td>
<td>8(abs) and 168,600</td>
</tr>
</tbody>
</table>

### How to Order
Specify model number IDP32 followed by order code for each selection configuration

#### Communications
- 4 to 20 mA with HART Communications

#### Fill Fluid
- Silicone
- Fluorine (for Oxygen Service)

#### Material Covers
- Meterbody Covers: SCS14A, Vent/Drain Plugs 316SST

#### Material Body
- Meterbody: 316SST, Process Diaphragms: 316LSST.
### Pressure

#### Process Connections
- 1/4 in NPT Internal Thread w/o Adapter Flange

#### Mounting (Process Installation)
- Vertical Piping, Top Connection

#### Bolting
- Carbon Steel
- 304SST(a).
- 630SST

#### Electrical Connection
- 1/2 in NPT, Watertight
- M20, Watertight

#### Electrical Safety
- None
- FM Explosionproof
- FM Intrinsically Safe
- FM Nonincendive
- FM EX, IS, and NI
- ATEX Flameproof
- ATEX Intrinsically Safe
- ATEX Energy Limited
- In Metro Flameproof
- In Metro Intrinsically Safe
- In Metro Type N
- CSA Explosionproof
- CSA Intrinsically Safe

#### Indicator
- None
- With Indicator

#### Paint
- Corrosion Proof

#### Failure Alarm Configuration
- Upper Limit of Output at Abnormal Condition
- Lower Limit of Output at Abnormal Condition

#### Mounting Bracket
- None
- Carbon Steel (Flat shape)
- 304 SST (Universal)

#### Optional Selections
- No Options
- With External Zero Adjustment
- Long Vent / Drain Plug
- Oil/ Water Free Finish
- Oil Free Finish
- Safety Transmitter
- NAMUR NE43 Compliant
- Alarm Output (Contact utput)
- Custom Calibration
- Test Report
- Mill Certificate
- Traceability Certificate
- Non SI Unit

#### Notes
- (a) Max working pressure is restricted to 10MPa when 304SST bolt/nut is selected.
IDP50 I/A Series® Premium Performance Transmitters for Differential Pressure Measurement

This intelligent, premium performance two-wire d/p Cell transmitter provides precise, reliable measurement of differential pressure with extremely low total probable error (TPE).

For complete specifications refer to product specifications sheet PSS 2A-1C14 L

Features:
- Wide measurement range from 0-0.63 to 0-250 kPa (0-2.5 to 0-1000 inH2O) with just two sensor selections
- High accuracy and low total probable error
- Process wetted parts all 316 ss and 316L ss with ptfe gaskets
- Available with 4-20 mA output and HART, or Foundation Fieldbus digital communications

Benefits:
- High reliability
- Improved process control; ideal for wide rangeability flow applications
- Meets most high performance application requirements to 25 MPa (3625 psi)

Standard Warranty 5 Years
Performance Specifications
- Accuracy ±0.05% of span over full 80:1 turndown
- Long term drift is <±0.02% of URL per year over 5 year period
- Temperature effect ±(0.015% URL + 0.03% span)/28°C (50°F)

Electrical Classification:
- Various agency certifications for Zone and Division hazardous locations. Refer to Product Specification sheets for complete specifications.

Functional Specifications
Span Limits

<table>
<thead>
<tr>
<th>Span Limit Code</th>
<th>kPa</th>
<th>MPa</th>
<th>psi</th>
<th>mbar</th>
<th>bar of kg/cm2</th>
<th>mmHg</th>
<th>inH2O</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>0.63</td>
<td>0.091</td>
<td>2.5</td>
<td>4.7</td>
<td>2.5</td>
<td>0.091</td>
<td>0.091</td>
</tr>
<tr>
<td>C</td>
<td>3.1</td>
<td>0.45</td>
<td>3.6</td>
<td>31.3</td>
<td>12.5</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td>M (b)</td>
<td>0.017</td>
<td>2.5</td>
<td>14</td>
<td>23.4</td>
<td>12.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>D (b)</td>
<td>0.17</td>
<td>25</td>
<td>190</td>
<td>1.7</td>
<td>12.5</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>

(b) Span Limit Codes M and D are only available in a gauge pressure configuration (only available with Option Code -G2).

Range Limits

<table>
<thead>
<tr>
<th>Span Limit Code</th>
<th>kPa</th>
<th>MPa</th>
<th>psi</th>
<th>mbar</th>
<th>bar of kg/cm2</th>
<th>mmHg</th>
<th>inH2O</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>-50</td>
<td>-7.2</td>
<td>-1.4</td>
<td>-375</td>
<td>-200</td>
<td>-7.2</td>
<td>-7.2</td>
</tr>
<tr>
<td>C</td>
<td>-250</td>
<td>-36</td>
<td>-1.4</td>
<td>-1870</td>
<td>-1000</td>
<td>-36</td>
<td>-36</td>
</tr>
<tr>
<td>M (b)</td>
<td>-0.1</td>
<td>-1.4</td>
<td>-1.4</td>
<td>-1 and</td>
<td>-21</td>
<td>-1.4</td>
<td>-1.4</td>
</tr>
<tr>
<td>D (b)</td>
<td>-0.21</td>
<td>-30</td>
<td>-30</td>
<td>-2.1</td>
<td>-21</td>
<td>-30</td>
<td>-30</td>
</tr>
</tbody>
</table>

(b) Span Limit Codes M and D are only available in a gauge pressure configuration (only available with Option Code -G2).

Maximum Static and Overrange Pressures

<table>
<thead>
<tr>
<th>Transmitter Configuration (See Model Code for Description of Options)</th>
<th>Over Range Pressure Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MPa</td>
</tr>
<tr>
<td>Standard or with Option -B2, -D3, or -D7</td>
<td>25</td>
</tr>
<tr>
<td>With Option -B3</td>
<td>20</td>
</tr>
<tr>
<td>With Option -D1</td>
<td>16</td>
</tr>
<tr>
<td>With Option -B1 or -D5</td>
<td>15</td>
</tr>
<tr>
<td>With Option -D2, -D4, -D6, or -D8</td>
<td>10</td>
</tr>
<tr>
<td>With Structure Codes 78 and 79</td>
<td>2.1</td>
</tr>
<tr>
<td>With Option -D9 or -Y</td>
<td>40</td>
</tr>
</tbody>
</table>
How to Order – Specify Model Number IDP50

Electronics Versions and Output Signal
- 4 to 20 mA/HART
- Foundation Fieldbus
- 4 to 20 mA/HART Foundation Fieldbus

Structure Code - Select from one of the following groups:

Transmitter with Traditional Structure

<table>
<thead>
<tr>
<th>Process Cover</th>
<th>Sensor Material</th>
<th>Fill Fluid</th>
</tr>
</thead>
<tbody>
<tr>
<td>316 ss</td>
<td>316L ss</td>
<td>Silicone</td>
</tr>
<tr>
<td>316 ss</td>
<td>Hastelloy C</td>
<td>Silicone</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>Hastelloy C</td>
<td>Silicone</td>
</tr>
</tbody>
</table>

Transmitter with Low Profile Structure LP1 (Not available with Pressure Seals)

<table>
<thead>
<tr>
<th>Process Cover</th>
<th>Sensor Material</th>
<th>Fill Fluid</th>
</tr>
</thead>
<tbody>
<tr>
<td>316 ss</td>
<td>316L ss</td>
<td>Silicone</td>
</tr>
<tr>
<td>316 ss</td>
<td>Hastelloy C</td>
<td>Silicone</td>
</tr>
</tbody>
</table>

Transmitter with Low Profile Structure LP2 (Not available with Pressure Seals)

<table>
<thead>
<tr>
<th>Process Cover</th>
<th>Sensor Material</th>
<th>Fill Fluid</th>
</tr>
</thead>
<tbody>
<tr>
<td>316 ss</td>
<td>316L ss</td>
<td>Silicone</td>
</tr>
<tr>
<td>316 ss</td>
<td>Hastelloy C</td>
<td>Silicone</td>
</tr>
</tbody>
</table>

Structure code prepared for Foxboro Model Coded Seals – requires specification of linked seal model codes (ref. PS2A-1Z11)

- Direct Connect Seal on High Side (Flanged PSFLT or Sanitary PSSCT or PSSST) and 1/2 NPT Connector on Low Side; Silicone Fill in Sensor
  - Direct Connect Seal on High Side (Flanged PSFLT or Sanitary PSSCT or PSSST) and Remote Seal on Low Side; Silicone Fill in Sensor
  - Remote Seals on High & Low Sides; Silicone Fill in Sensor
  - Remote Seal on High Side & 1/2 NPT Connector on Low Side; Silicone Fill in Sensor
  - Remote Seal on Low Side & 1/2 NPT Connector on High Side; Silicone Fill in Sensor

Structure code prepared for Other Seals – Do not specify Foxboro Model Coded Seals

- Remote Seals on High & Low Sides; Silicone Fill in Sensor
- Remote Seal on High Side & 1/2 NPT Connector on Low Side; Silicone Fill in Sensor
- Remote Seal on Low Side & 1/2 NPT Connector on High Side; Silicone Fill in Sensor

Span Limits – Differential Pressure Units:

<table>
<thead>
<tr>
<th>Unit</th>
<th>kPa</th>
<th>inH2O</th>
<th>mbar</th>
<th>bar or kg/cm²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.63 and 50</td>
<td>2.5 and 200</td>
<td>6.3 and 500</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>3.1 and 250</td>
<td>12.5 and 1000</td>
<td>31.3 and 2500</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>0.017 and 1.4</td>
<td>2.5 and 200</td>
<td>0.17 and 14</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>0.17 and 14</td>
<td>25 and 2000</td>
<td>1.7 and 140</td>
<td>D</td>
</tr>
</tbody>
</table>

Electrical Safety (See PSS for Description and Restrictions)

<table>
<thead>
<tr>
<th>Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX II 1 GD, Ex ia IIC</td>
</tr>
<tr>
<td>ATEX II 2 GD, Ex d IIC</td>
</tr>
<tr>
<td>ATEX II 3 GD, Ex nL IIC</td>
</tr>
<tr>
<td>Multiple ATEX Certifications (Customer Marks Plate Data)</td>
</tr>
<tr>
<td>CSA Certified</td>
</tr>
<tr>
<td>CSA Certified (Including Flameproof Zone)</td>
</tr>
<tr>
<td>FM Approved</td>
</tr>
<tr>
<td>FM Approved (Including Flameproof Zone)</td>
</tr>
<tr>
<td>IECEx Ex d IIC T6</td>
</tr>
</tbody>
</table>

Optional Selections

Mounting Bracket Set – Specify Only One

- Mounting Bracket Set, Painted Steel Bracket with Plated Steel Bolts
- Mounting Bracket Set, 304 ss Bracket with 316 ss Bolts
- Mounting Bracket Set, Universal, ss Bracket with ss Bolts

Indicator Pushbuttons

- Digital Indicator, Internal Pushbuttons and Window Cover
- With Aluminum Housing – Conduit & Housing Material Codes 1, 2 & 5
- With 316 ss Housing – Conduit & Housing Material Codes 3, 4 & 6
DIN 19213 Construction – Specify Only One and
Specify Process Connector Code 0
- Single Ended Process Cover with M10 Bolting .......................................................... D1
- Double Ended Process Cover with M10 Bolting (Blind Kidney Range on Back) ............... D2
- Single Ended Process Cover with \( \frac{3}{16} \) inch Bolting ................................................................. D3
- Double Ended Process Cover with \( \frac{3}{16} \) inch Bolting (Blind Kidney Flange on Back) ............. D4
- Single Ended Process Covers with 316 ss \( \frac{3}{16} \) inch Bolting .................................................. D5
- Double Ended Process Covers with 316 ss \( \frac{3}{16} \) inch Bolting (Blind Kidney Flange on Back) ... D6
- Single Ended Process Covers with 17-4 ss 7/16-inch Bolting .............................................. D7
- Double Ended Process Covers with 17-4 ss 7/16-inch Bolting (Blind Kidney Flange on Back) .. D8
- Single Ended Process Covers with 17-4 ss 7/16-inch Bolting an 40 mPa (400 bar or kg/cm\(^2\), 5800 psi) static pressure rating ................................................................. D9

Cleaning and Preparation
Unit Degreased – (Silicone Filled Sensors – Not for Oxygen, Chlorine, or Other Fluids that may react with Silicone). .................................................................................. X1

Bolting for Process Covers/Connectors – Specify Only One
- 316 ss Bolts and Nuts (Pressure Derated, to 15 MPa (2175 psi) ............................................. B1
- 17-4 ss Bolts and Nuts ........................................................................................................ B2
- B7M Bolts and Nuts (NACE) (Pressure de-rated, refer to table) ........................................... B3

Conduit Thread Adapters – Specify Only One
- Hawk-Type ½ NPT Cable Gland for use with Conduit Connection Codes 1 & 3 ................... A1
- Plastic PG 13.5 Connector for use with Conduit Connection Codes 2 & 4 ............................ A2
- M20 Connector for use with Conduit Connection Codes 1 & 3 ............................................ A3
- Trumpet shaped PG 13.5 Cable Gland (Nickel Plated Brass) for use with Conduit Connection Codes 2 & 4 ................................................................. A4

Electronics Housing Features – Specify Only One
- External Zero Adjustment .................................................................................................. Z1
- Custody Transfer Lock and Seal ....................................................................................... Z2
- External Zero Adjustment and Custody Transfer Lock/Seal .................................................. Z3

Custom Factory Configuration – Specify Only One
- Digital Output (FoxCom Only) ........................................................................................ C1
- Full Factory Configuration (Requires Configuration Form to be Filled Out) ......................... C2

Ermeto Connectors – Specify Only One
- Steel, Connecting 6 mm Tubing to ¼ NPT Process Connector ............................................ E1
- Steel, Connecting 12 mm Tubing to ½ NPT Process Connector ............................................ E2
- 316 ss, Connecting 6 mm Tubing to ¼ NPT Process Connector ............................................ E3
- 316 ss, Connecting 12 mm Tubing to ½ NPT Process Connector ............................................ E4

Instruction Books (Paper Instruction Book, Brochure plus Full Documentation Set on CD-ROM is Standard)
Without Instruction Book and CD ...................................................................................... K1

Miscellaneous Optional Selections
- Supplemental Customer Tag (Stainless Steel Tag wired onto Transmitter) .......................... T
- Vent Screw in Side of Each Process Cover (Vent screws in cover ends are standard) ............ V
- Five-Year Warranty. ............................................................................................................ W
- High Static Pressure Rating (40 MPa, 5800 psi, 400 bar or kg/cm\(^2\)) ................................. Y
- Low Temperature Operative Limit of -50°C (-58°F) for Entire Transmitter ......................... J

Note: 1 Upper Range Limit is the lower of the values in this table and in the Maximum static and Overrange Table, which lists the derated pressures associated with various options.
IMV25 I/A Series® Multivariable Transmitter for Pressure, Differential Pressure and Temperature

This intelligent two-wire multivariable transmitter provides precise and reliable measurement of pressure, differential pressure, sensor and electronics temperatures, and process temperature (from an external RTD).

For complete specifications refer to product specification sheet PSS 2A-1C15B and D.

<table>
<thead>
<tr>
<th>Span Code</th>
<th>Span Limits</th>
<th>Range Limits(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kPa</td>
<td>inH₂O</td>
</tr>
<tr>
<td>L</td>
<td>0.12 and 2.5</td>
<td>0.5 and 10</td>
</tr>
<tr>
<td>A</td>
<td>0.75 and 7.5</td>
<td>3 and 30</td>
</tr>
<tr>
<td>B</td>
<td>0.5 and 50</td>
<td>2 and 200</td>
</tr>
<tr>
<td>G</td>
<td>0.5 and 100</td>
<td>2 and 400</td>
</tr>
<tr>
<td>C</td>
<td>2.5 and 210</td>
<td>10 and 840</td>
</tr>
</tbody>
</table>

1 Positive values indicate HI side of sensor at the high pressure, and negative values indicate LO side of sensor at the high pressure.

Functional Specifications
Span and Range Limits for Differential Pressure Measurement

<table>
<thead>
<tr>
<th>Span Code</th>
<th>Span Limits</th>
<th>Range Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MPa</td>
<td>psi</td>
</tr>
<tr>
<td>D</td>
<td>0.02 and 2.1</td>
<td>3 and 300</td>
</tr>
<tr>
<td>G</td>
<td>0.07 and 3.4</td>
<td>10 and 500</td>
</tr>
<tr>
<td>E</td>
<td>0.21 and 10</td>
<td>30 and 1500</td>
</tr>
</tbody>
</table>

Application Versatility:
- Choice of Traditional or Low Profile Process Cover/Sensor Structures

Installation Versatility:
- Traditional “right angle” structure with process connections in horizontal plane
- Low Profile “in line” structures with process connections in vertical plane

Two Low Profile Structures
- LP1 Structure — economical, small, light weight for direct manifold mounting in vertical or horizontal positions
- LP2 Structure — designed for bracket or manifold mounting in vertical positions

Electrical Classification:
- Electrical Classification: Various Agency certification for Zone and Division hazardous Locations. Refer to Product Specification Sheets for complete specifications.
Available Combinations of DP and AP Span Codes, and their Upper Range Limits (URLs), and Maximum Static and Maximum Working Pressure (MWPs), and Maximum Overrange Pressure

<table>
<thead>
<tr>
<th>Span Code</th>
<th>Sensor URL (DP and AP)</th>
<th>Maximum Static and Maximum Working Pressure</th>
<th>Maximum Overrange Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DP</td>
<td>AP</td>
<td>MPaa</td>
</tr>
<tr>
<td>LG</td>
<td>10 inH₂O 500 psia</td>
<td>2.5 kPa</td>
<td>3.4 MPaa</td>
</tr>
<tr>
<td>AG</td>
<td>30 inH₂O 500 psia</td>
<td>7.5 kPa</td>
<td>3.4 MPaa</td>
</tr>
<tr>
<td>BD</td>
<td>200 inH₂O 300 psia</td>
<td>50 kPa</td>
<td>2.1 MPaa</td>
</tr>
<tr>
<td>BE</td>
<td>200 inH₂O 1500 psia</td>
<td>50 kPa</td>
<td>10 MPaa</td>
</tr>
<tr>
<td>GG</td>
<td>400 inH₂O 500 psia</td>
<td>100 kPa</td>
<td>3.4 MPaa</td>
</tr>
<tr>
<td>GE</td>
<td>400 inH₂O 1500 psia</td>
<td>100 kPa</td>
<td>10 MPaa</td>
</tr>
<tr>
<td>CD</td>
<td>840 inH₂O 300 psia</td>
<td>210 kPa</td>
<td>2.1 MPaa</td>
</tr>
<tr>
<td>CE</td>
<td>840 inH₂O 1500 psia</td>
<td>210 kPa</td>
<td>10 MPaa</td>
</tr>
</tbody>
</table>

2 Codes GG and GE only available with Modbus electronics.

How to Order — Specify Model Number IMV25
Electronics Versions and Output Signal
4 to 20 mA/HART .......................................................... -T
FOUNDATION Fieldbus .................................................. -F
Modbus ................................................................. -M

Structure Code — Select one from the following three groups:
1. With Traditional Structure
   Covers | Sensor | Fill Fluid
   316 ss  | 316L ss | Silicone ........................................ 22
   316 ss  | 316L ss | Fluorinert ..................................... 23
   316 ss  | Hastelloy C | Silicone ..................................... 26
   316 ss  | Hastelloy C | Fluorinert ..................................... 27
   Hastelloy C | Hastelloy C | Silicone ..................................... 46
   Hastelloy C | Hastelloy C | Fluorinert ..................................... 47

2. With Low Profile Structure LP1
   Covers | Sensor | Fill Fluid
   316 ss  | 316L ss | Silicone ........................................ LL
   316 ss  | 316L ss | Fluorinert ..................................... LM
   316 ss  | Hastelloy C | Silicone ..................................... LC
   316 ss  | Hastelloy C | Fluorinert ..................................... LD

3. With Low Profile Structure LP2
   Covers | Sensor | Fill Fluid
   316 ss  | 316L ss | Silicone ........................................ 52
   316 ss  | 316L ss | Fluorinert ..................................... 53
   316 ss  | Hastelloy C | Silicone ..................................... 56
   316 ss  | Hastelloy C | Fluorinert ..................................... 57

Span Limits – Differential Pressure (DP) Measurement
<table>
<thead>
<tr>
<th>kPa</th>
<th>inH₂O</th>
<th>mbar</th>
<th>Available with:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.12 and 2.5</td>
<td>0.5 and 10</td>
<td>1.2 and 25</td>
<td>AP Span Limit Code G only  ............... L</td>
</tr>
<tr>
<td>0.75 and 7.5</td>
<td>3 and 30</td>
<td>7.5 and 75</td>
<td>AP Span Limit Code G only  ............... A</td>
</tr>
<tr>
<td>0.5 and 50</td>
<td>2 and 200</td>
<td>5 and 500</td>
<td>AP Span Limit Codes D and E only  ......... B</td>
</tr>
<tr>
<td>0.5 and 100</td>
<td>2 and 400</td>
<td>5 and 1000</td>
<td>AP Span Limit Codes G and E only  .......... G</td>
</tr>
<tr>
<td>2.5 and 210</td>
<td>10 and 840</td>
<td>25 and 2100</td>
<td>AP Span Limit Codes D and E only  ......... C</td>
</tr>
</tbody>
</table>

Span Limits – Absolute Pressure (AP) Measurement (Absolute Measured;Gauge Calculated)
<table>
<thead>
<tr>
<th>MPa</th>
<th>psi</th>
<th>bar or kg/cm</th>
<th>Available with:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.02 and 2.1</td>
<td>3 and 300</td>
<td>0.21 and 21</td>
<td>DP Span Limit Codes B and C only  .......... D</td>
</tr>
<tr>
<td>0.07 and 3.4</td>
<td>10 and 500</td>
<td>0.7 and 34</td>
<td>DP Span Limit Codes L, A, and G only  .......... G</td>
</tr>
<tr>
<td>0.21 and 10</td>
<td>30 and 1500</td>
<td>2.1 and 100</td>
<td>DP Span Limit Codes B, G, and C only  .......... E</td>
</tr>
</tbody>
</table>

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
Other Measurements
Temperature – Terminal Block supports Connection of External, 100 ohm Platinum RTD (DIN/IEC).

Process Connector Type (Material Same as Process Cover Material)
None, Covers tapped for ¼ NPT ............................................................... 0
¼ NPT (Not Available with Hastelloy C Structure Codes 46 and 47) .......... 1
½ NPT .................................................................................................. 2
Re ¼ (Not Available with Hastelloy C Structure Codes 46 and 47) ....... 3
Re ½ ....................................................................................................... 4
½ Schedule 80 Welding Neck (Not Available with Hastelloy C Structure Codes 46 and 47) .................................................. 6

Conduit Connection and Housing Material
½ NPT, Aluminum Housing ................................................................ 1
PG 13.5, Aluminum Housing ................................................................. 2
½ NPT, 316 ss Housing .......................................................................... 3
PG 13.5, 316 ss Housing ...................................................................... 4
M20 Connection, Aluminum Housing .................................................. 5
M20 Connection, 316 ss Housing .......................................................... 6

Electrical Safety (See PSS for Description and Restrictions)
ATEX II GD, EEx ia IIC, or II ½ GD, EEx ib IIC ...................................... E
ATEX Flameproof; II 2 GD, EEx d IIC, Zone 1 ........................................ D
ATEX II 3 GD, EEx nl IIC ..................................................................... N
ATEX Multiple Certifications (E, D, and N) ........................................... M
CSA Certified ......................................................................................... C
CSA Certified (including Flameproof Zones) ......................................... B
FM approved ......................................................................................... F
FM approved (including Flameproof Zones) ......................................... G
IECEX Flameproof, Ex d IIC T6 ............................................................ V

Optional Selections
Mounting Bracket Set
Standard Style Painted Steel Bracket with Plated Steel Bolts .................. M1
Standard Style Stainless Steel Bracket with Stainless Steel Bolts .......... M2
Universal Style Stainless Steel Bracket with Stainless Steel Bolts .......... M3

Digital Indicator with Pushbuttons
Digital Indicator, Pushbuttons, and Window Cover ................................ L1

DIN 19213 Construction used with Process Connector Code “0” and 316 ss Covers Only(b)
Single Ended Process Cover with M10, B7 Steel Bolting .......................... D1
Double Ended Process Cover with M10, B7 Steel Bolting (Blind Kidney Flange on Back) .... D2
Single Ended Process Cover with ¼ in, B7 Steel Bolting .......................... D3
Double Ended Process Cover with ¼ in, B7 Steel Bolting (Blind Kidney Flange on Back) .... D4
Single Ended Process Cover with ¾ in, 316 ss Bolting ............................ D5
Double Ended Process Cover with ¾ in, 316 ss Bolting (Blind Kidney Flange on Back) .... D6
Single Ended Process Cover with ¾ in, 17-4 ss Bolting .......................... D7
Double Ended Process Cover with ¾ in, 17-4 ss Bolting (Blind Kidney Flange on Back) .... D8

Cleaning and Preparation
Unit Degreased - for Silicone Filled Sensors Only .......................................................... X1
(Not for Oxygen/Chlorine/Other Fluids that may react with Silicone)
Cleaned and Prepared for Oxygen Service – for Fluorinert Filled Sensors Only ........... X2
Cleaned and Prepared for Chlorine Service – for Fluorinert Filled Sensors Only (includes 17-4 ss bolting; therefore do not also specify Option -B2) ...... X3

Bolting for Process Covers – Not Available with DIN 19213 Construction
316 ss Bolts and Nuts .............................................................................. 81
17-4 ss Bolts and Nuts ............................................................................ 82
B7M Bolts and Nuts ................................................................................ 83

Conduit Connectors
Hawke-Type ½ NPT Cable Gland for use with Conduit Connection Codes 1 and 3 ........... A1
M20 Conduit Thread Adapter for use with Conduit Connection Codes 1 and 3 .............. A3
Electronics Housing Features
    Custody Transfer Lock and Seal ................................................................. -Z2
Tubing Connectors
    316 ss, Connecting 6 mm Tubing to ¼ NPT Process Connector ........................................ -E3
    316 ss, Connecting 12 mm Tubing to ½ NPT Process Connector ...................................... -E4
Vent Screw in Process Cover
    Supply Vent Screw in Side of Each Process Cover ................................................ -V
    (Available only on Traditional Process Cover Structure Codes 22 to 47)
    Omit Vent Screw in Side of Each Process Cover ................................................... -V1
    (Available only on Type LP1 Low Profile Process Cover Structures Codes LL, LM, LC, and LD)
Adapters for Direct Mount to Competitive Manifolds
    Adapter plate, Bolts, and Gaskets for Coplanar Manifolds ....................................... -P1
    Not Available with:
        Bolting Options -B1, -B2, and -B3;
        DIN 19213 Construction Options -D1, -D2, -D4, -D5, -D6, -D7, and -D8
Instruction Books (Common MI, Brochure, and Full Documentation Set on CD-ROM is Standard)
    Without Instruction Book and CD ...................................................................... -K1
Custom Factory Configuration
    Digital Output (FoxCom Only) ............................................................................ -C1
    Full Factory Configuration (Requires Configuration Form to be Filled Out) ....................... -C2
Miscellaneous Optional Selections
    Low Temperature Operative Limits of Electronics Housing Extended down to -50°C (-58°F) . -J
    Supplemental Customer Tag (Stainless Steel Tag wired onto Transmitter) ......................... -T
    Five-Year Warranty. ....................................................................................... -W
IMV30 I/A Series® Multivariable Transmitter with Flow Rate Calculations

IMV30 MultiVariable Transmitter measures differential pressure and pressure and can transmit these measurements along with process temperature using an external RTD. Also calculates and transmits flow rate when so configured.

For complete specifications, refer to Product Specification Sheets PSS 2A-1C15 A and PSS 2A-1Z3 F.

**Functional Specifications**

**Span and Range Limits for Differential Pressure Measurement:**

<table>
<thead>
<tr>
<th>Span Limits Code</th>
<th>kPa</th>
<th>inH₂O</th>
<th>mbar</th>
</tr>
</thead>
<tbody>
<tr>
<td>L*</td>
<td>0.12</td>
<td>0.5</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td>2.5</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>A*</td>
<td>0.75</td>
<td>3</td>
<td>7.5</td>
</tr>
<tr>
<td></td>
<td>7.5</td>
<td>30</td>
<td>75</td>
</tr>
<tr>
<td>B</td>
<td>0.5</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>200</td>
<td>500</td>
</tr>
<tr>
<td>C</td>
<td>2.5</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>210</td>
<td>840</td>
<td>2100</td>
</tr>
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</table>

**Span and Range Limits for Absolute Pressure Measurement:**

<table>
<thead>
<tr>
<th>Span Limits Code</th>
<th>MPa</th>
<th>psia</th>
<th>bar or kg/cm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>0.02</td>
<td>3</td>
<td>0.21</td>
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<tr>
<td></td>
<td>2.1</td>
<td>300</td>
<td>21</td>
</tr>
<tr>
<td>G**</td>
<td>0.07</td>
<td>10</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td>3.5</td>
<td>500</td>
<td>35</td>
</tr>
<tr>
<td>E</td>
<td>0.21</td>
<td>30</td>
<td>2.1</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>1500</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Span Limits Code</th>
<th>MPa</th>
<th>psia</th>
<th>bar or kg/cm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>0</td>
<td>300</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2.1</td>
<td>0</td>
<td>21</td>
</tr>
<tr>
<td>G**</td>
<td>0</td>
<td>500</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3.5</td>
<td>0</td>
<td>35</td>
</tr>
<tr>
<td>E</td>
<td>0</td>
<td>1500</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

* L and A only available with Absolute Pressure Span Code G.
** G Only available with Differential Pressure Span Codes A and L.

**Outputs:**

- Differential Pressure, Pressure, Pressure, Process Temperature, Electronics Temperature, Sensor Temperature, Flow Rate, and Density can be read from remote configurator.
- Measurements can be continually transmitted digitally to I/A Series systems using applicable FBMs.
- Any one measurement can be assigned to the 4 to 20 mA output signal.
- Up to four 4-20 mA output signals when used with HART Interface Module.
- Absolute Pressure for accurate flow rate calculations; transmit & display either absolute or gauge pressure.
- Calculates mass and volumetric flowrate, when used with primary flow elements.
- Flowrate values from the transmitter eliminate allocation of system resources for flowrate calculations, reducing system costs.
- Communicates all variables digitally.
- Provides assignable 4 to 20 mA output signal.

**Standard Warranty 5 Years**
Pressure

Performance Specifications

Performance: (See Product Specification Sheet PSS 2A 1C15A for complete specifications)
Accuracy: DP & AP ±0.05% span
Flowrate: ±1.0% of flow rate for typical differential head applications

How to Order — Specify IMV30

Electronic Versions and Output Signals
Digital HART and 4 to 20 mA dc

Structure Code — Process Covers, Sensors, Fill Fluids,

<table>
<thead>
<tr>
<th>Cover Material</th>
<th>Sensor-Material</th>
<th>Fill Fluids</th>
</tr>
</thead>
<tbody>
<tr>
<td>316 ss</td>
<td>316L ss</td>
<td>Silicone</td>
</tr>
<tr>
<td>316 ss</td>
<td>316L ss</td>
<td>Fluorinert</td>
</tr>
<tr>
<td>316 ss</td>
<td>Hastelloy C</td>
<td>Silicone</td>
</tr>
<tr>
<td>316 ss</td>
<td>Hastelloy C</td>
<td>Fluorinert</td>
</tr>
<tr>
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<td>Hastelloy C</td>
<td>Silicone</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>Hastelloy C</td>
<td>Fluorinert</td>
</tr>
</tbody>
</table>

Span Limits — Differential Pressure

<table>
<thead>
<tr>
<th>kPa</th>
<th>Differential Pressure</th>
<th>mbar</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.12 and 2.5</td>
<td>0.5 and 10</td>
<td>1.2 and 25</td>
</tr>
<tr>
<td>0.75 and 7.5</td>
<td>3 and 30</td>
<td>7.5 and 75</td>
</tr>
<tr>
<td>0.50 and 50</td>
<td>2 and 200</td>
<td>5 and 500</td>
</tr>
<tr>
<td>2.5 and 210</td>
<td>10 and 840</td>
<td>25 and 2100</td>
</tr>
</tbody>
</table>

Span Limits — Pressure

<table>
<thead>
<tr>
<th>MPa</th>
<th>psia</th>
<th>bar or kg/cm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.02 and 2.1</td>
<td>3 and 300</td>
<td>0.21 and 21 N/A with DP Codes B and C</td>
</tr>
<tr>
<td>0.07 and 3.5</td>
<td>10 and 500</td>
<td>0.07 and 35 N/A with DP Codes L and A</td>
</tr>
<tr>
<td>0.21 and 10</td>
<td>30 and 1500</td>
<td>2.1 and 100 N/A with DP Codes B and C</td>
</tr>
</tbody>
</table>

Process Connector Type (Material Same as Process Cover Material)

| None, Covers Tapped for ¼ NPT |
| ¼ NPT |
| ½ NPT |
| Rc ¼ |
| Rc ½ |
| ½ Schedule 80 Welding Neck |

Conduit Connection and Housing Material

| ½ NPT, Aluminum Housing |
| PG 13.5, Aluminum Housing |
| ½ NPT, 316 ss Housing |
| PG 13.5, 316 ss Housing |
| M20 Connection, Aluminum Housing |
| M20 Connection, 316 ss Housing |

Electrical Safety (See PSS for Description and Restrictions)

ATEX II GD, EEx ia IIC, or II ½ GD, EEx ib IIC
ATEX Flameproof; II 2 GD, EEx d IIC, Zone 1
ATEX II 3 GD, EEx nL IIC
ATEX Multiple Certifications (E, D, and N)
CSA Certified
CSA Certified (including Flameproof Zones)
FM approved
FM approved (including Flameproof Zones)

Physical Specifications

Enclosure Classification: Meets IEC IP66 and NEMA Type 4X.
Sensor Fill Fluid: Dow Corning dimethylsiloxane (DC 200) or fluorinated hydrocarbon (3M Fluorinert FC 77), as specified.
Optional Selections
Mounting Bracket Set – Specify Only One
Mounting Bracket Set, Painted Steel Bracket with Plated Steel Bolts ........................................... -M1
Mounting Bracket Set, 316 ss Bracket with 316 ss Bolts ................................................................. -M2

Digital Indicator with Pushbuttons
Digital Indicator, Pushbuttons, and Window Cover .......................................................... -L1

DIN 19213 Construction used with Process Connector Code “0” Only—Specify Only One
Single Ended Process Cover with M10 Bolting .......................................................... -D1
Double Ended Process Cover with M10 Bolting (Blind Kidney Range on Back) .......... -D2
Single Ended Process Cover with ¾ inch Bolting ................................................................ -D3
Double Ended Process Cover with ¾ inch Bolting (Blind Kidney Flange on Back) .... -D4
Single Ended Process Covers with 316 ss ¾ inch Bolting .................................................. -D5
Double Ended Process Covers with 316 ss ¾ inch Bolting (Blind Kidney Flange on Back) .... -D6
Single Ended Process Covers with 17-4 ss ¾ inch Bolting .................................................. -D7
Double Ended Process Covers with 17-4 ss ¾ inch Bolting (Blind Kidney Flange on Back) .... -D8

Cleaning and Preparation – Specify Only One
Unit Degreased (not for Oxygen/Chlorine Service) .......................................................... -X1
Cleaned and Prepared for Oxygen Service (Available only with Structure Codes having Fluorinert) -X2
Cleaned and Prepared for Chlorine Service (Available only with Structure Codes having Fluorinert) (Includes 17-4 ss bolts; do not specify Option B2) ............................................... -X3

Bolting for Process Covers/Connectors – Specify Only One
316 ss Bolts and Nuts .............................................................................................................. -B1
17-4 ss Bolts and Nuts ............................................................................................................ -B2
B7M Bolts and Nuts ................................................................................................................. -B3

Conduit Thread Adapters – Specify Only One
Hawk-Type ½ NPT Cable Gland for use with Conduit Connection Code 1 & 3 ................................................................................................................................. -A1
Plastic PG 13.5 Connector for use with Conduit Connection Codes 2 & 4 .................. -A2
M20 Connector for use with Conduit Connection Codes 1 & 3 ........................................ -A3
Trumpet shaped PG 13.5 Cable Gland (Nickel Plated Brass) for use with Conduit Connection Codes 2 & 4 ................................................................. -A4

Electronics Housing Features
Custody Transfer Lock and Seal ............................................................................................ -Z2

Custom Configuration – Specify Only One
Digital Output (4 to 20 mA Default if not selected) .......................................................... -C1
Full Factory Configuration .................................................................................................... -C2

Ermeto Connectors—Specify Only One
316 ss, Connecting 6 mm Tubing to ¼ NPT Process Connector ........................................ -E3
316 ss, Connecting 12 mm Tubing to ½ NPT Process Connector ........................................ -E4

Miscellaneous Optional Selections
Low Temperature Operative Limits of Electronics Housing Extended down to -50°C (-58°F) .................................................................................................................. -J
Supplemental Customer Tag ................................................................................................. -T
Vent Screw in Side of Each Process Cover (Not available with DIN 19213 Construction) .... -V
Five-Year Warranty ............................................................................................................... -W

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
IMV31 MultiVariable Transmitter measures differential pressure and pressure and can transmit these measurements along with process temperature using an external RTD. Also calculates and transmits tank level when so configured.

For complete specifications, refer to Product Specification Sheets PSS 2A-1C15 C and PSS 2A-1Z3 F.

Functional Specifications
Span and Range Limits for Differential Pressure Measurement:

<table>
<thead>
<tr>
<th>Span Limits Code</th>
<th>kPa</th>
<th>inH₂O</th>
<th>mbar</th>
</tr>
</thead>
<tbody>
<tr>
<td>A*</td>
<td>0.75 and 7.5</td>
<td>3 and 30</td>
<td>7.5 and 75</td>
</tr>
<tr>
<td>B</td>
<td>0.5 and 50</td>
<td>2 and 200</td>
<td>5 and 500</td>
</tr>
<tr>
<td>C</td>
<td>2.5 and 210</td>
<td>10 and 840</td>
<td>25 and 2100</td>
</tr>
</tbody>
</table>

Span and Range Limits for Absolute Pressure Measurement:

<table>
<thead>
<tr>
<th>Span Limits Code</th>
<th>kPa</th>
<th>inH₂O</th>
<th>mbar</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>0.02 and 2.1</td>
<td>3 and 300</td>
<td>0.21 and 21</td>
</tr>
<tr>
<td>G**</td>
<td>0.07 and 3.5</td>
<td>10 and 500</td>
<td>0.7 and 35</td>
</tr>
<tr>
<td>E</td>
<td>0.21 and 10</td>
<td>30 and 1500</td>
<td>2.1 and 100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Span Limits Code</th>
<th>MPa</th>
<th>psia</th>
<th>bar or kg/cm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>0 and 2.1</td>
<td>0 and 300</td>
<td>0 and 21</td>
</tr>
<tr>
<td>G**</td>
<td>0 and 3.5</td>
<td>0 and 500</td>
<td>0 and 35</td>
</tr>
<tr>
<td>E</td>
<td>0 and 10</td>
<td>0 and 1500</td>
<td>0 and 100</td>
</tr>
</tbody>
</table>

* A only available with Absolute Pressure Span Code G.
** G only available with Differential Pressure Span Code A.

IMV31 Benefits:
- One transmitter replaces three separate transmitters, saving on initial purchase costs
- Reduced process penetrations save money and reduce chance of fugitive emissions
- Fewer transmitters, less wiring, and fewer shut off valves reduce installation costs
- Greater reliability due to fewer devices and less wiring means less chance of losses from down time or process upsets
- Calculates tank level, compensated for varying density. Requires a liquid whose density is a known function of pressure and temperature.
- Communicates all variables digitally
- Provides assignable 4 to 20 mA output signal

Standard Warranty 5 Years

IMV31 I/A Series® Multivariable Transmitter with Tank Level Calculations
**Pressure**

**Performance Specifications**

*Performance:* (See Product Specification Sheet PSS 2A 1C15C for complete specifications).

*Accuracy:* DP & AP ±0.05% span

*Level:* ±0.3% of maximum level (conditions in PSS).

**Physical Specifications**

*Enclosure Classification:* Meets IEC IP66 and NEMA Type 4X.

*Sensor Fill Fluid:* Dow Corning dimethylsiloxane (DC 200) or fluorinated hydrocarbon (3M Fluorinert FC 77), as specified.

---

### How to Order – Specify IMV31

**Electronic Versions and Output Signals**

4 to 20 mA/ HART

**Structure Code – Process Covers, Sensors, Fill Fluids,**

<table>
<thead>
<tr>
<th>Cover Material</th>
<th>Sensor-Material</th>
<th>Fill Fluids</th>
</tr>
</thead>
<tbody>
<tr>
<td>316 ss</td>
<td>316L ss</td>
<td>Silicone</td>
</tr>
<tr>
<td>316 ss</td>
<td>316L ss</td>
<td>Fluorinert.</td>
</tr>
<tr>
<td>316 ss</td>
<td>Hastelloy C</td>
<td>Silicone</td>
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<tr>
<td>316 ss</td>
<td>Hastelloy C</td>
<td>Fluorinert.</td>
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<tr>
<td>Hastelloy C</td>
<td>Hastelloy C</td>
<td>Silicone</td>
</tr>
<tr>
<td>Hastelloy C</td>
<td>Hastelloy C</td>
<td>Fluorinert.</td>
</tr>
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</table>

**Span Limits – Differential Pressure**

<table>
<thead>
<tr>
<th>kPa</th>
<th>inH₂O</th>
<th>mbar</th>
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</thead>
<tbody>
<tr>
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<td>3 and 30</td>
<td>7.5 and 75</td>
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<tr>
<td>0.50 and 50</td>
<td>2 and 200</td>
<td>5 and 500</td>
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<tr>
<td>2.5 and 210</td>
<td>10 and 840</td>
<td>25 and 2100</td>
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</table>

**Span Limits – Pressure**

<table>
<thead>
<tr>
<th>MPa</th>
<th>psia</th>
<th>bar or kg/cm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.02 and 2.1</td>
<td>3 and 300</td>
<td>0.21 and 21 with DP Codes B and C</td>
</tr>
<tr>
<td>0.07 and 3.5</td>
<td>10 and 500</td>
<td>0.07 and 35 with DP Code A</td>
</tr>
<tr>
<td>0.21 and 10</td>
<td>30 and 1500</td>
<td>2.1 and 100 with DP Codes B and C</td>
</tr>
</tbody>
</table>

**Process Connector Type (Material Same as Process Cover Material)**

<table>
<thead>
<tr>
<th>None, Covers Tapped for 1/4NPT</th>
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</thead>
<tbody>
<tr>
<td>¼ NPT</td>
</tr>
<tr>
<td>½ NPT</td>
</tr>
<tr>
<td>Rc ¼</td>
</tr>
<tr>
<td>Rc ½</td>
</tr>
<tr>
<td>½ Schedule 80 Welding Neck</td>
</tr>
</tbody>
</table>

**Conduit Connection and Housing Material**

<table>
<thead>
<tr>
<th>½ NPT, Aluminum Housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>PG 13.5, Aluminum Housing</td>
</tr>
<tr>
<td>½ NPT, 316 ss Housing</td>
</tr>
<tr>
<td>PG 13.5, 316 ss Housing</td>
</tr>
<tr>
<td>M20 Connection, Aluminum Housing</td>
</tr>
<tr>
<td>M20 Connection, 316 ss Housing</td>
</tr>
</tbody>
</table>

**Electrical Safety (See PSS for Description and Restrictions)**

<table>
<thead>
<tr>
<th>ATEX II GD, EEx ia IIC, or II ½ GD, EEx ib IIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX Flameproof; II 2 GD, EEx d IIC, Zone 1</td>
</tr>
<tr>
<td>ATEX II 3 GD, EEx nl IIC</td>
</tr>
<tr>
<td>ATEX Multiple Certifications (E, D, and N)</td>
</tr>
<tr>
<td>CSA Certified</td>
</tr>
<tr>
<td>CSA Certified (including Flameproof Zones)</td>
</tr>
<tr>
<td>FM approved</td>
</tr>
<tr>
<td>FM approved (including Flameproof Zones)</td>
</tr>
</tbody>
</table>
Optional Selections
Mounting Bracket Set – Specify Only One
Mounting Bracket Set, Painted Steel Bracket with Plated Steel Bolts. .............................................................. -M1
Mounting Bracket Set, 316 ss Bracket with 316 ss Bolts. .............................................................. -M2

Digital Indicator with Pushbuttons
Digital Indicator, Pushbuttons, and Window Cover. .............................................................. -L1

DIN 19213 Construction used with Process Connector Code “0” Only—Specify Only One
Single Ended Process Cover with M10 Bolting. .............................................................. -D1
Double Ended Process Cover with M10 Bolting (Blind Kidney Range on Back). .............................................................. -D2
Single Ended Process Cover with \( \frac{3}{8} \) inch Bolting. .............................................................. -D3
Double Ended Process Cover with \( \frac{3}{8} \) inch Bolting (Blind Kidney Flange on Back). .............................................................. -D4
Single Ended Process Covers with 316 ss \( \frac{3}{8} \) inch Bolting. .............................................................. -D5
Double Ended Process Covers with 316 ss \( \frac{3}{8} \) inch Bolting (Blind Kidney Flange on Back). .............................................................. -D6
Single Ended Process Covers with 17-4 ss \( \frac{3}{8} \) inch Bolting. .............................................................. -D7
Double Ended Process Covers with 17-4 ss \( \frac{3}{8} \) inch Bolting (Blind Kidney Flange on Back). .............................................................. -D8

Cleaning and Preparation – Specify Only One
Unit Degreased (not for Oxygen/Chlorine Service) .............................................................. -X1
(Cleaned and Prepared for Oxygen Service (Available only with Structure Codes having Fluorinert)) .............................................................. -X2
(Cleaned and Prepared for Chlorine Service (Available only with Structure Codes having Fluorinert)) (Includes 17-4 ss bolts; do not specify Option B2) .............................................................. -X3

Bolting for Process Covers/Connectors – Specify Only One
316 ss Bolts and Nuts. ................................................................................................................. -B1
17-4 ss Bolts and Nuts. .................................................................................................................. -B2
B7M Bolts and Nuts. ..................................................................................................................... -B3

Conduit Thread Adapters – Specify Only One
Hawk-Type ½ NPT Cable Gland for use with Conduit Connection Code 1 & 3 .............................................................. -A1
Plastic PG 13.5 Connector for use with Conduit Connection Codes 2 & 4 .............................................................. -A2
M20 Connector for use with Conduit Connection Codes 1 & 3 .............................................................. -A3
Trumpet shaped PG 13.5 Cable Gland (Nickel Plated Brass) for use with Conduit Connection Codes 2 & 4 .............................................................. -A4

Electronics Housing Features
Custody Transfer Lock and Seal. ........................................................................................................... -Z2

Custom Configuration – Specify Only One
Digital Output (4 to 20 mA Default if not selected) ........................................................................................................... -C1
Full Factory Configuration. ....................................................................................................................... -C2

Ermeto Connectors—Specify Only One
316 ss, Connecting 6 mm Tubing to ¼ NPT Process Connector .............................................................. -E3
316 ss, Connecting 12 mm Tubing to ½ NPT Process Connector .............................................................. -E4

Miscellaneous Optional Selections
Low Temperature Operative Limits of Electronics Housing Extended down to -50°C (-58°F) .............................................................. -J
Supplemental Customer Tag. .................................................................................................................. -T
Vent Screw in Side of Each Process Cover (Not available with DIN 19213 Construction) .............................................................. -V
Five-Year Warranty .............................................................. -W
IPI10 Pneumatic-to-Current Converters

The IPI10 Field-Mounted Pneumatic-to-Current Converters receive a standard pneumatic signal and transmit a proportional 4 to 20 mA dc signal. For complete specifications, refer to Product Specification Sheet PSS 2A-2A4 A.

**Performance Specifications**
Accuracy: ±0.075% of calibrated span

**Physical Specifications**

- **Connections:**
  - Electrical: Screw terminal
  - Pneumatic: ¼ NPT, internal thread
  - Conduit: ½ NPT both sides.

- **Measurement Connection Material:** 316L ss

- **Mounting:** Field. Nominal DN 50 (2 in) pipe with mounting bracket.

- **Enclosure Classification:** Meets IEC IP66 and NEMA Type 4X

**Functional Specifications**

- **Input Signals:** See How to Order

- **Ambient Temperature Limits:** -40 and +85°C (-40 and +185°F)

- **Electrical Classification:** FM and CSA, certified. Refer to Foxboro for complete specifications.

- **Configuration and Calibration:** Pushbutton

- **Power Requirements:** Requires external dc power for operation. See “Output Signal” table below.

### Output Signal

<table>
<thead>
<tr>
<th>Output Signal</th>
<th>Supply Voltage From Separate Unit (V dc)</th>
<th>Allowable Loop Load (ohms) at Nominal Supply Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>min.</td>
<td>nom.</td>
</tr>
<tr>
<td>4 to 20 mA dc</td>
<td>11.5</td>
<td>24</td>
</tr>
</tbody>
</table>
### How to Order—Specify model number IPI10 followed by order code for each selection

#### Electronics Version and Output Signal
- Electronic; 4 to 20 mA Analog Output .......................................................... A

#### Input Signal
- 3 to 15 psi ........................................................................................................... 2
- 3 to 27 psi ......................................................................................................... 3
- 0.2 to 1.0 kg/cm² .............................................................................................. 4
- 20 to 100 kPa .................................................................................................. 5
- 0.2 to 1.0 bar .................................................................................................... 6

#### Conduit Connections and Housing Material
- ½ NPT, Aluminum Housing ............................................................................. 2
- ½ NPT, 316 ss Housing ................................................................................... 4

#### Electrical Safety
- CSA Certified, Division 1 Explosionproof and Division 2 .......................... C
- FM Approved, Division 1 Explosionproof and Nonincendive ................. F
- SAA Certified Ex, d, IIC, Flameproof ............................................................. A
- SAA Certified Ex, n, IIC, Nonincendive ......................................................... K

#### Optional Selections

##### Indicator with Pushbuttons
- Window cover to allow viewing of internal LCD indicator when in service ................................................. L3

##### Electronics Housing Features—Specify Only One
- External Zero Adjustment ................................................................................ Z1
- Custody Transfer Lock and Seal .................................................................... Z2
- External Zero Adjustment and Custody Transfer Lock and Seal ................ Z3

##### Instruction Books
- Without Instruction Book and CD ................................................................. K1

##### Miscellaneous Optional Selections
- Five-Year Warranty ......................................................................................... W
- Supplemental Customer Tag (Stainless Steel Tag wired onto Transmitter) .................................................. T
- Without Mounting Bracket Assembly .......................................................... Y

Specify information for instrument tag
Pressure seals are used with the I/A Series Pressure Transmitters when it is necessary to keep the transmitter isolated from the process. A sealed system is used for a process fluid that may be corrosive, viscous, subject to temperature extremes, toxic, sanitary, or tend to collect and solidify.

The following Product Specification Sheets provide complete details:
- PS Series Pressure Seals: PSS 2A-1Z11A
- Pulp and Paper Structure Codes: PA-PJ: PSS 2A-1C13L

**Features:**
- Selection of Flanged Level or Flanged Remote Mount Seals with Flush or Extended Diaphragms.
- Recessed Diaphragm Seals for Direct or Remote Mount with Flanged, In-Line Saddle Weld or Threaded Process Connections.
- Sanitary Flush or Extended Diaphragm Seals offered that meet FDA and 3A Requirements. Sanitary Ends secured to Process with Tri-Clover Tri-Clamps or Threaded Connections.
- Pulp and Paper Industry Connections in 1 and 1 1/2 inch Sleeve and Threaded Versions.
- Flanged Seals with ANSI or BS/DIN Carbon or Stainless Steel Flanges in many Sizes and Ratings.
- Seals with Threaded Process Connections from 1/4 to 1 1/2 NPT.
- Standard Warranty 5 Years

- In-Line, Saddle Weld Seals for 3 or 4 inch (and larger) Process Pipes.
- Numerous Seal Sizes available depending on the Seal Model Selected.
- Diaphragms, Flush or Extended to reach the Process Fluid. Available with nominal Extension Lengths of 0 (zero), 38, 50, 100, 150, and 229 mm (0, 1.5, 2, 4, 6, and 9 in) depending on seal type.
- Capillary Lengths from 1.5 to 9 m (5 to 30 ft) with Flexible Armor, or Flexible Armor with a Protective Coating.
- Standard 316L ss, Hastelloy C, Titanium, Monel, and Inconel are offered as Diaphragm Materials consistent with the Seal Configuration selected.
- Fill Fluids accommodate Process Temperatures ranging from -59 to +304°C (-75 to +580°F)
### Pressure Seals and Industry-Specific Connections for Use with I/A Series Pressure Transmitters

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Description</th>
<th>Connection Type</th>
<th>Identification Number</th>
<th>Used With Transmitter Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal Mounted Directly on Transmitter</td>
<td>Flush or Extended Diaphragm Seal for DP or GP Transmitter (Flanged Level Transmitter)</td>
<td>ANSI or DIN Flange</td>
<td>Seal Model Code: PSFLT</td>
<td>IDP10, IDP25, &amp; IGP20</td>
</tr>
<tr>
<td></td>
<td>Recessed Diaphragm Seal, for use on AP or GP Transmitters</td>
<td>ANSI Flange</td>
<td>Seal Model Code: PSFAD</td>
<td>IAP10, IGP10, &amp; IGP25</td>
</tr>
<tr>
<td></td>
<td>Extended Diaphragm Seal with Pulp &amp; Paper Connection, for use on AP or GP Transmitters</td>
<td>Pulp &amp; Paper Threaded and Sleeve Types</td>
<td>Transmitter Structure Codes: PA – PJ</td>
<td>IAP10, IGP10, &amp; IGP25</td>
</tr>
<tr>
<td></td>
<td>Flush Diaphragm Seal with Tri-Clamp Connection, for use on AP or GP Transmitters</td>
<td>Sanitary Tri-Clamp</td>
<td>Seal Model Code: PSSCT</td>
<td>IDP10, IDP25, &amp; IGP20</td>
</tr>
<tr>
<td></td>
<td>Extended Diaphragm Seal with Tri-Clamp Connection, for use on AP or GP Transmitters</td>
<td>Sanitary Tri-Clamp</td>
<td>Transmitter Structure Codes: PX and PZ</td>
<td>IAP10, IGP10, &amp; IGP25</td>
</tr>
<tr>
<td></td>
<td>Extended Diaphragm Seal with Tri-Clamp Connection, for use on AP or GP Transmitters</td>
<td>Sanitary Tri-Clamp</td>
<td>Transmitter Structure Codes: M1, M6, &amp; M9</td>
<td>IAP10, IGP10, &amp; IGP25</td>
</tr>
<tr>
<td></td>
<td>Extended Diaphragm Seal with Tri-Clamp Connection, for use on AP or GP Transmitters</td>
<td>Sanitary Tri-Clamp</td>
<td>Seal Model Code: PSSST</td>
<td>IDP10, IDP25, &amp; IGP20</td>
</tr>
<tr>
<td></td>
<td>In-Line Saddle Weld Seal for 3- or 4-inch Nominal Pipe Size</td>
<td>Saddle Weld</td>
<td>Seal Model Code: PSISD</td>
<td>IAP10, IGP10, &amp; IGP25</td>
</tr>
<tr>
<td></td>
<td>Flush Diaphragm Seal for use with AP, GP, or DP Transmitters</td>
<td>ANSI or DIN Flange</td>
<td>Seal Model Code: PSFPS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Extended Diaphragm Seal for use with AP, GP, or DP Transmitters</td>
<td>ANSI or DIN Flange</td>
<td>Seal Model Code: PSFES</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Recessed Diaphragm Seal, for use with AP, GP, or DP Transmitters</td>
<td>ANSI Flange</td>
<td>Seal Model Code: PSFAR</td>
<td>IAP10, IAP20, IGP10, IGP20, IDP10, &amp; IDP25</td>
</tr>
<tr>
<td></td>
<td>Flush Diaphragm Seal with Tri-Clamp Connection, for use on AP, GP, or DP Transmitters</td>
<td>Sanitary Tri-Clamp</td>
<td>Seal Model Code: PSSCR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Extended Diaphragm Seal with Tri-Clamp Connection, for use on AP, GP, or DP Transmitters</td>
<td>Sanitary Tri-Clamp</td>
<td>Seal Model Code: PSSSR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In-Line Saddle Weld Seal for 3- or 4-inch Nominal Pipe Size</td>
<td>Saddle Weld</td>
<td>Seal Model Code: PSISR</td>
<td></td>
</tr>
</tbody>
</table>
Pressure

Pressure Seals and Industry Connections
for Use with I/A Series Pressure Transmitters

How to Specify:
1. Select the transmitter Model Code from Section 1, including its two-character Structure Code. For example IGP10-AT2C1F-M1, where “T2” is the Structure Code. The Structure Code always consists of the second and third characters after the first dash.

2. If the transmitter Structure Code starts with letters M, P, or T, the model code is complete. No additional seal information is required. You can use this section to review your selection and confirm that it meets your requirements.

3. If the transmitter Structure Code is D1 to D5, F1 to F4, or S1 to S6, specify a separate Pressure Seal Model Code from this section. A seal model code is used when a lot of information is required to define the seal.

4. If the transmitter Structure Code is SA to SJ, the transmitter is prepared for the attachment of non-Foxboro seals by others.

Examples:
- **IDP10 d/p Cell Transmitter with Flanged Level Seal**
  - Transmitter: IDP10-TF1C01F-L1 (Qty 1)
  - Flanged Level Seal: PSFLT-B2S0E51 (Qty 1)

- **IDP10 d/p Cell Transmitter with Dual Remote Flanged Flush Diaphragm Seals**
  - Transmitter: IDP10-DS1B01F-L1
  - Remote Flanged Seals: PSFPS-A2S0E344B (Qty 2)

- **IGP10 Gauge Pressure Transmitter with Direct Connect Threaded Seal**
  - Transmitter: IGP10-TD1D1F-L1 (Qty 1)
  - Threaded Seal: PSTAD-2UCCK2SAC1 (Qty 1)

- **IDP10 d/p Cell Transmitter with Flanged Level Seal & Remote Flanged Seal**
  - Transmitter: IDP10-AF3C01D (Qty 1)
  - Flanged Level Seal: PSFLT-B2S0E51 (Qty 1)
  - Remote Flanged Seal: PSFAR-C322SSKSA014C (Qty 1)

- **IAP10 Absolute Pressure Transmitter with Direct Connect Tri-Clamp Sanitary Seal**
  - Transmitter with Seal: IAP10-TPZC1F-L1
The PSFLT Series Flanged Level Seals are used with the IDP10, IDP25, and IGP20 Series Differential and Gauge Pressure Transmitters for determination of liquid level, interface level, or density in open, pressurized, or evacuated vessels. This Transmitter-Seal System provides a reliable, precise measurement.

How to Order — Specify Complete Transmitter Model Number and Specify: PSFLT

Seal Orientation

Seal is for High Side of IDP10, IDP25, or IGP20

| Structure Number (Flange Size, Seal Wetted Material, and Extension Length) |
|------------------|------------------|------------------|
| Flange Size      | Seal Wetted Material | Extension Length |
| 2 in (50 mm)     | 316L ss           | 2 in (50 mm)     |
| 2 in (50 mm)     | Hastelloy C       | 2 in (100 mm)    |
| 2 in (50 mm)     | Tantalum          | 4 in (100 mm)    |
| 3 in (80 mm)     | 316L ss           | 4 in (100 mm)    |
| 3 in (80 mm)     | Hastelloy C       | 6 in (150 mm)    |
| 3 in (80 mm)     | Tantalum          | 6 in (150 mm)    |
| 2 in (50 mm)     | 316L ss           | 2 in (50 mm)     |
| 2 in (50 mm)     | Hastelloy C       | 2 in (100 mm)    |
| 2 in (50 mm)     | 316L ss           | 4 in (100 mm)    |
| 2 in (50 mm)     | Hastelloy C       | 4 in (100 mm)    |
| 2 in (50 mm)     | 316L ss           | 6 in (150 mm)    |
| 2 in (50 mm)     | Hastelloy C       | 6 in (150 mm)    |
| 3 in (80 mm)     | 316L ss           | 2 in (50 mm)     |
| 3 in (80 mm)     | Hastelloy C       | 2 in (100 mm)    |
| 3 in (80 mm)     | 316L ss           | 4 in (100 mm)    |
| 3 in (80 mm)     | Hastelloy C       | 4 in (100 mm)    |
| 3 in (80 mm)     | 316L ss           | 6 in (150 mm)    |
| 3 in (80 mm)     | Hastelloy C       | 6 in (150 mm)    |
| 4 in (100 mm)    | 316L ss           | 2 in (50 mm)     |
| 4 in (100 mm)    | Hastelloy C       | 2 in (100 mm)    |
| 4 in (100 mm)    | 316L ss           | 4 in (100 mm)    |
| 4 in (100 mm)    | Hastelloy C       | 4 in (100 mm)    |
| 4 in (100 mm)    | 316L ss           | 6 in (150 mm)    |
| 4 in (100 mm)    | Hastelloy C       | 6 in (150 mm)    |

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
### Flange Rating and Material (non-process wetted)

- **ANSI Class 150, Carbon Steel** ................................................................. 1
- **ANSI Class 300, Carbon Steel** ................................................................. 2
- **ANSI Class 600, Carbon Steel** ................................................................. 3
- **BS and DIN PN 10/40, Carbon Steel** ..................................................... A
- **BS and DIN PN 10/16, Carbon Steel** ..................................................... C
- **BS and DIN PN 25/40, Carbon Steel** ..................................................... D
- **ANSI Class 150, 316 ss** ............................................................................ E
- **ANSI Class 300, 316 ss** ............................................................................ F
- **ANSI Class 600, 316 ss** ............................................................................ G
- **BS and DIN PN 10/40, 316 ss** ................................................................. H
- **BS and DIN PN 10/16, 316 ss** ................................................................. R
- **BS and DIN PN 25/40, 316 ss** ................................................................. T

### Instrument Connection

- Bolted, gasketed ......................................................................................... 5

### Fill Fluid - Pressure Seal

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Temperature Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC200, 10 cSt Silicone</td>
<td>-40 and +204°F</td>
</tr>
<tr>
<td>FC77, Fluorinert</td>
<td>-75 and +180°F</td>
</tr>
<tr>
<td>DC200, 3 cSt silicone</td>
<td>-40 and +300°F</td>
</tr>
<tr>
<td>DC704, Silicone</td>
<td>10 and 400°F</td>
</tr>
<tr>
<td>Neobee M20</td>
<td>0 and 400°F</td>
</tr>
</tbody>
</table>

### Optional Selections

**Extended Diaphragm Diameter Reduced to:**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Used with the following Structure and Flange Rating/Material Codes shown above</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.841 to 1.861 in</td>
<td>2S21, 2S2E, 2S41, 2S4E, 2S61, 2S6E</td>
</tr>
<tr>
<td>2.772 to 2.792 in</td>
<td>3S21, 3S2E, 3S41, 3S4E, 3S61, 3S6E</td>
</tr>
</tbody>
</table>
PSFPS and PSFES Series – Flanged Connection, Remote Mount Pressure Seals with Flush or Extended Diaphragm

The PSFPS and PSFES with Remote Mount, Flush or Extended Diaphragm Seals are used with the IDP10, IDP25, IGP10, IGP20, IGP25, IAP10, and IAP20 Series Differential, Gauge, and Absolute Pressure Transmitters. The transmitter can be mounted in a remote location with interconnecting capillary lengths up to 9 m (30 ft). This Transmitter-Seal System provides a reliable, precise measurement.

How To Order – Specify Complete Transmitter Model Number and Specify: PSFPS or PSFES

Seal Orientation
- Two Seal System, Balanced, Same Model Numbered Seal on both Sides, IDP10 and IDP25 only ........................................ -A(a)
- One Seal System, High Side, IDP10, IDP25, IGP20, or IAP20 ................................................................. -B
- One Seal System, Low Side, IDP10 or IDP25 only .............................................................................................. -C
- One Seal System, IGP10, IGP25, or IAP10 only ................................................................................................. -D

Structure Code – Flange Size, Seal Wetted Material, and Extension Length

<table>
<thead>
<tr>
<th>Flange Size</th>
<th>Seal Wetted</th>
<th>Extension Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 mm (2 in)</td>
<td>316 ss</td>
<td>Flush (with PSFPS Seals only)</td>
</tr>
<tr>
<td>50 mm (2 in)</td>
<td>Hastelloy C</td>
<td>Flush (with PSFPS Seals only)</td>
</tr>
<tr>
<td>50 mm (2 in)</td>
<td>Tantalum</td>
<td>Flush (with PSFPS Seals only)</td>
</tr>
<tr>
<td>80 mm (3 in)</td>
<td>316 ss</td>
<td>Flush (with PSFPS Seals only)</td>
</tr>
<tr>
<td>80 mm (3 in)</td>
<td>Hastelloy C</td>
<td>Flush (with PSFPS Seals only)</td>
</tr>
<tr>
<td>80 mm (3 in)</td>
<td>Tantalum</td>
<td>Flush (with PSFPS Seals only)</td>
</tr>
<tr>
<td>50 mm (2 in)</td>
<td>316 ss</td>
<td>50 mm (2 in) – (with PSFES Seals only)</td>
</tr>
<tr>
<td>50 mm (2 in)</td>
<td>Hastelloy C</td>
<td>50 mm (2 in) – (with PSFES Seals only)</td>
</tr>
<tr>
<td>50 mm (2 in)</td>
<td>316 ss</td>
<td>100 mm (4 in) – (with PSFES Seals only)</td>
</tr>
<tr>
<td>50 mm (2 in)</td>
<td>Hastelloy C</td>
<td>100 mm (4 in) – (with PSFES Seals only)</td>
</tr>
<tr>
<td>50 mm (2 in)</td>
<td>316 ss</td>
<td>150 mm (6 in) – (with PSFES Seals only)</td>
</tr>
<tr>
<td>80 mm (3 in)</td>
<td>316 ss</td>
<td>150 mm (6 in) – (with PSFES Seals only)</td>
</tr>
<tr>
<td>50 mm (2 in)</td>
<td>Hastelloy C</td>
<td>50 mm (2 in) – (with PSFES Seals only)</td>
</tr>
<tr>
<td>80 mm (3 in)</td>
<td>Hastelloy C</td>
<td>50 mm (2 in) – (with PSFES Seals only)</td>
</tr>
<tr>
<td>80 mm (3 in)</td>
<td>316 ss</td>
<td>100 mm (4 in) – (with PSFES Seals only)</td>
</tr>
<tr>
<td>80 mm (3 in)</td>
<td>Hastelloy C</td>
<td>100 mm (4 in) – (with PSFES Seals only)</td>
</tr>
<tr>
<td>80 mm (3 in)</td>
<td>316 ss</td>
<td>150 mm (6 in) – (with PSFES Seals only)</td>
</tr>
</tbody>
</table>
Pressure

PSFPS and PSFES

100 mm (4 in) 316 ss 50 mm (2 in) – (with PSFES Seals only) ........................................ 4S2
100 mm (4 in) Hastelloy C 50 mm (2 in) – (with PSFES Seals only) .................................. 4C2
100 mm (4 in) 316 ss 100 mm (4 in) – (with PSFES Seals only) ........................................ 4S4
100 mm (4 in) Hastelloy C 100 mm (4 in) – (with PSFES Seals only) .................................. 4C4
100 mm (4 in) 316 ss 150 mm (6 in) – (with PSFES Seals only) ........................................ 4S6
100 mm (4 in) Hastelloy C 150 mm (6 in) – (with PSFES Seals only) .................................. 4C6

Flange Rating and Material (non-process wetted)

ANSI Class 150, Carbon Steel ........................................................................................................ 1
ANSI Class 300, Carbon Steel ......................................................................................................... 2
ANSI Class 600, Carbon Steel ........................................................................................................ 3
BS and DIN PN 10/40 (for 50 and 80 mm only), Carbon Steel ................................................ 4A
BS and DIN PN 10/16 (for 100 mm only), Carbon Steel (PSFES Seals Only) .......................... 4C
BS and DIN PN 25/40 (for 100 mm only), Carbon Steel (PSFES Seals Only) .......................... 4D
ANSI Class 150, 316 ss .................................................................................................................. 4E
ANSI Class 300, 316 ss .................................................................................................................. 4F
ANSI Class 600, 316 ss .................................................................................................................. 4G
BS and DIN PN 10/40 (for 50 and 80 mm only), 316 ss ............................................................ 4H
BS and DIN PN 10/16 (for 100 mm only), 316 ss (PSFES Seals Only) ...................................... 4R
BS and DIN PN 25/40 (for 100 mm only), 316 ss (PSFES Seals Only) ...................................... 4T
Flange Provided by User (PSFPS Seals Only) ............................................................................. 4Y

Instrument Connections

Capillary Welded at the Transmitter and at the Seal ........................................................................ 3

Fill Fluid – Pressure Seal and Capillary

<table>
<thead>
<tr>
<th>Fill Fluid</th>
<th>Temperature Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC200, 10 cSt Silicone</td>
<td>-40 and +232°C, -40 and +450°F</td>
</tr>
<tr>
<td>FC77, Fluorinert</td>
<td>-75 and +180°F</td>
</tr>
<tr>
<td>DC704, Silicone</td>
<td>10 and 580°C</td>
</tr>
<tr>
<td>Neobee M20</td>
<td>0 and 400°C</td>
</tr>
</tbody>
</table>

Capillary Internal Diameter

- 0.027 inches; Not Available with DC704 Silicone, Fill Fluid Code 4 ........................................ 3
- 0.040 inches ................................................................................................................................. 4
- 0.062 inches; not available with IGP10, IGP25, or IAP10 ........................................................... 6

Capillary Length and Type

- 1.5 m (5 ft) 316 ss Flexible Armor .......................................................................................... A
- 3.0 m (10 ft) 316 ss Flexible Armor ....................................................................................... B
- 4.5 m (15 ft) 316 ss Flexible Armor ........................................................................................ C
- 6.0 m (20 ft) 316 ss Flexible Armor ....................................................................................... D
- 7.5 m (25 ft) 316 ss Flexible Armor ....................................................................................... E
- 9.0 m (30 ft) 316 ss Flexible Armor ........................................................................................ F
- 1.5 m (5 ft) 316 ss Flexible Armor, Protective Coat ................................................................. G
- 3.0 m (10 ft) 316 ss Flexible Armor, Protective Coat ................................................................. H
- 4.5 m (15 ft) 316 ss Flexible Armor, Protective Coat ................................................................. J
- 6.0 m (20 ft) 316 ss Flexible Armor, Protective Coat ................................................................. K
- 7.5 m (25 ft) 316 ss Flexible Armor, Protective Coat ................................................................. L
- 9.0 m (30 ft) 316 ss Flexible Armor, Protective Coat ................................................................. M

a) Specify quantity of 2 seals when Seal Orientation code “A” is specified.
**PSFAR and PSFAD Series – Flanged Connection, Remote or Direct Mount Pressure Seals with Recessed Diaphragms**

The PSFAR with Flanged Remote Mount Recessed Diaphragm Seals are used with the IDP10, IDP25, IGP10, IGP20, IGP25, IAP10, and IAP20 Series Differential, Gauge, and Absolute Pressure Transmitters. The PSFAD with Direct Mount, Recessed Diaphragm Seals are used with the IGP10, IGP25, and IAP10 Gauge and Absolute Pressure Transmitters. These Transmitter-Seal Systems provide precise, reliable measurements and have a wide variety of sizes and materials.

**How To Order – Specify Complete Transmitter Model Number and Specify: PSFAR or PSFAD**

**Seal Orientation – PSFAR Seals Only; for PSFAD Seals, go to Diaphragm Size Selection**

- Two Seal System, Balanced, Same Seal on both Sides, IDP10 or IDP25 only ........................................... A(a)
- One Seal System, High Side, IDP10, IDP25, IGP20, or IAP20 ......................................................... B
- One Seal System, Low Side, IDP10 or IDP25 only .................................................................................. C
- One Seal System, IGP10, IGP25, or IAP10 only .................................................................................... D

**Diaphragm Size**

- 2.4 in (Recommended Standard for IGP10, IGP25, and IAP10) ................................................................. 2
- 3.0 in (Recommended Standard for IDP10, IDP25, IGP20, and IAP20) ....................................................... 3
- 4.0 (for Optimal Temperature Performance) - used with PSFAR only ..................................................... 4

**Process Connector (Same Material as Upper Housing)**

- ½ in Raised Face Flange ......................................................................................................................... A
- ¾ in Raised Face Flange .......................................................................................................................... B
- 1 in Raised Face Flange ............................................................................................................................ C
- 1½ in Raised Face Flange .......................................................................................................................... D
- 2 in Raised Face Flange ............................................................................................................................. E
- 3 in Raised Face Flange ............................................................................................................................. F

**Flange Rating**

- ANSI Class 150 ........................................................................................................................................... A
- ANSI Class 300 ........................................................................................................................................... B
- ANSI Class 600 ........................................................................................................................................... C
- ANSI Class 1500 ....................................................................................................................................... D

**Lower Housing Material (Process Wetted)**

- 316 ss ........................................................................................................................................................ S
- Carbon Steel ............................................................................................................................................... T
- Hastelloy C .................................................................................................................................................. U
- Tantalum Plate; standard with Tantalum Diaphragm .............................................................................. V
- Titanium grade 4 ........................................................................................................................................ W
- Inconel 600 ................................................................................................................................................ X
- Monel 400 .................................................................................................................................................. Y
- Glass Filled ptfe (Teflon) (b) ..................................................................................................................... Z
- Polyvinyl Chloride (PVC) (b) .................................................................................................................... AA

**Diaphragm Material**

- 316 ss ........................................................................................................................................................ S
- Hastelloy C276 ........................................................................................................................................... T
- Tantalum; standard with Tantalum Lower Housing .................................................................................. U
- Titanium Grade 2 (must specify Titanium Upper Housing) .................................................................... V
- Inconel 600 ................................................................................................................................................ W
- Monel 400 (must specify Monel Upper Housing) .................................................................................... X
- Nickel 200 .................................................................................................................................................. Y
- Polyvinyl Chloride (PVC) (b) .................................................................................................................... AA
### Upper Housing Material (Non-Process Wetted)
- 316L ss .......................... S
- 316L ss with Monel 400 Insert ................................... M
- 316L ss with Titanium Grade 4 Insert ......................... E

### Instrument Connection
- PSFAR Only – Capillary-to-transmitter welded; capillary-to-seal ¼ NPT .......................... 1
- PSFAD Only – ½ NPT ........................................................................................................ 2

### Gasket
- Organic Fiber with Nitrile; Standard with Class 150 and Class 300 Flange Rating .................. S
- 316 ss, Silver Plated; Standard with Class 600 and Higher Flange Rating .......................... T
- ptfe (Teflon); Standard with Nonmetallic Lower Housings .................................................. T
- Buna N ............................................................................................................................... B
- Viton .................................................................................................................................. V
- Grafoil ................................................................................................................................ G
- Hastelloy C, Silver Plated .................................................................................................... C

### Flushing Connector
- None. .................................................................................................................................. A
- ¼ NPT .................................................................................................................................. A
- Dual ¼ NPT .......................................................................................................................... C

### Bolting – Used with Stud Mounting Configuration
- None/Not Applicable – See Note(c) ................................................................. 0
- Carbon Steel (Standard Construction) .................................................................................. C
- High Strength 300 Series ss (for ANSI Class 600 and Higher) .......................................... H
- 300 Series ss (for ANSI Class 300 and Lower) .................................................................. S

### Fill Fluid – Pressure Seal and Capillary (capillary applies to PSFAR only)

<table>
<thead>
<tr>
<th>Fill Fluid</th>
<th>Temperature Limits</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DC200, 10 cSt Silicone</td>
<td>-40 and +232</td>
<td>1</td>
</tr>
<tr>
<td>FC77, Fluorinert</td>
<td>-59 and +82</td>
<td>2</td>
</tr>
<tr>
<td>DC200, 3 cSt Silicone</td>
<td>-40 and +149</td>
<td>3</td>
</tr>
<tr>
<td>DC704, Silicone</td>
<td>-12 and +304</td>
<td>4</td>
</tr>
</tbody>
</table>

### Capillary Internal Diameter – Select for PSFAR Seals Only
- 0.027 in; Not Available with Fluid Code 4 (DC704 Silicone) .......................................... 3
- 0.040 in ........................................................................................................................... 4
- 0.062 in; Not Available with IAP10, IGP10, and IGP25 Transmitters .............................. 6

### Capillary Length and Type – Select for PSFAR Seals Only
- 1.5 m (5 ft) 316 ss Flexible Armor .................................................................................. A
- 3.0 m (10 ft) 316 ss Flexible Armor ................................................................................ B
- 4.5 m (15 ft) 316 ss Flexible Armor ................................................................................ C
- 6.0 m (20 ft) 316 ss Flexible Armor ................................................................................ D
- 7.5 m (25 ft) 316 ss Flexible Armor ................................................................................ E
- 9.0 m (30 ft) 316 ss Flexible Armor ................................................................................ F
- 1.5 m (5 ft) 316 ss Flexible Armor, Protective Coat ......................................................... G
- 3.0 m (10 ft) 316 ss Flexible Armor, Protective Coat ......................................................... H
- 4.5 m (15 ft) 316 ss Flexible Armor, Protective Coat ......................................................... J
- 6.0 m (20 ft) 316 ss Flexible Armor, Protective Coat ......................................................... K
- 7.5 m (25 ft) 316 ss Flexible Armor, Protective Coat ......................................................... L
- 9.0 m (30 ft) 316 ss Flexible Armor, Protective Coat ......................................................... M

(a) Specify quantity of 2 seals when Seal Orientation Code “A” is specified.
(b) The maximum working pressure with the nonmetallic ptfe and PVC lower housings is 150 psig, regardless of the higher allowable flange pressure ratings.
(c) Select None (0) unless the following stud mounting seal configuration applies:
- Code 2 Diaphragm size with a process connector less than 1 inch.
- Code 3 and 4 Diaphragm sizes with a process connector less than 2 inches.
(d) Maximum temperature limit is 204˚C (400˚F) when transmitters are used with a direct connect PSFAD seal.
PSTAR and PSTAD Series – Threaded Connection, Remote or Direct Mount Pressure Seals with Recessed Diaphragm

The PSTAR with Remote Mount, Threaded, Recessed Diaphragm Seals are used with the IDP10, IDP25, IGP10, IGP20, IGP25, IAP10, and IAP20 Differential, Gauge, and Absolute Pressure Transmitters. The PSTAD with Direct Mount, Threaded Seals are used with the IGP10, IGP25, and IAP10 Gauge and Absolute Pressure Transmitters. These transmitter-seal systems are used when a threaded connection to the process is required, along with precise reliable measurements.

How To Order – Specify Complete Transmitter Model Number and Specify: PSTAR or PSTAD

Seal Orientation – Select for PSTAR Seals Only
- Two Seal System, Balanced, Same Seal on both Sides, IDP10 or IDP25 only ...........................................-A(a)
- One Seal System, High Side, IDP10, IDP25, IGP20, or IAP20 .............................................................. - B
- One Seal System, Low Side, IDP10 or IDP25 only ...................................................................................... - C
- One Seal System, IGP10, IDP25, or IAP10 only ......................................................................................... - D

Diaphragm Size
- 2.4 in (Recommended Standard for IGP10, IGP25, and IAP10) .................................................................2
- 3.0 in (Recommended Standard for IDP10, IGP25, IGP20, and IAP20) ...............................................3
- 4.0 (for Optimal Temperature Performance) - used with PSTAR only ......................................................4

Process Connector
- ¼ in NPT, Internally Threaded ..................................................................................................................1
- ½ in NPT, Internally Threaded ..................................................................................................................2
- ¾ in NPT, Internally Threaded ..................................................................................................................3
- 1 in NPT, Internally Threaded ..................................................................................................................4
- 1½ in NPT, Internally Threaded ...............................................................................................................5

Pressure Rating (at 100˚F)
- 2500 psig when using Carbon Steel Bolts (1250 psig when using 300 Series ss Bolts)...............................U

Lower Housing Material (Process Wetted)
- 316 ss .................................................................................................................................................. S
- Hastelloy .............................................................................................................................................. C
- Tantalum Plate; standard with Tantalum Diaphragm ..................................................................................T
- Titanium Grade 4 .................................................................................................................................... E
- Inconel 600 ........................................................................................................................................... L
- Monel 400 ............................................................................................................................................. M
- Nickel 200 ............................................................................................................................................. N

Diaphragm Material
- 316 ss .................................................................................................................................................. S
- Hastelloy C276 ....................................................................................................................................... C
- Tantalum; Standard with Tantalum Lower Housing .......................................................................................T
- Titanium Grade 2 (must Specify Titanium Upper Housing) ................................................................. E
- Inconel 600 ........................................................................................................................................... L
- Monel 400 (must Specify Monel Upper Housing) .......................................................................................M
- Nickel 200 ............................................................................................................................................. N
Upper Housing Material (non-process wetted)
- 316L ss ................................................................. S
- Monel 400 ........................................................... M
- Titanium Grade 4 .................................................. E

Instrument Connection
- PSTAR Only – Capillary-to-transmitter welded; capillary-to-seal ¼ NPT ........................................... 1
- PSTAD Only – ½ NPT .................................................. 2

Gasket
- Organic Fiber with Nitrile; Standard. .......................................................... S
- 316 ss, Silver Plated ...................................................... 3
- ptfe Teflon .................................................................. T
- Buna N ........................................................................ B
- Viton ............................................................................ V
- Grafoil ......................................................................... G
- Hastelloy C, Silver Plated .................................................... C

Flushing Connector
- None................................................................................. A
- ¼ NPT .............................................................................. B
- Dual ¼ NPT ..................................................................... C

Bolting
- Carbon Steel (for 2500 psig Pressure Rating). .................................................. C
- 300 Series ss (for 1250 psig Pressure Rating). .................................................. S

Fill Fluid – Pressure Seal

<table>
<thead>
<tr>
<th>Fill Fluid</th>
<th>Temperature Limits °C</th>
<th>°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC200, 10 cSt Silicone</td>
<td>-40 and +232</td>
<td>-40 and +450(c)</td>
</tr>
<tr>
<td>FC77, Fluorinert</td>
<td>-59 and +82</td>
<td>-75 and +180</td>
</tr>
<tr>
<td>DC200, 3 cSt Silicone</td>
<td>-40 and +149</td>
<td>-40 and +300</td>
</tr>
<tr>
<td>DC704, Silicone</td>
<td>-12 and +304</td>
<td>10 and +580(c)</td>
</tr>
</tbody>
</table>

Capillary Internal Diameter – Select for PSTAR Seals Only
- 0.027 in; Not Available with Fill Fluid Code 4 (DC704 Silicone). .................................................. 3
- 0.040 in ...................................................................... 4
- 0.062 in; Not Available with IGP10, IGP25, and IAP10 Transmitters ................................................. 6

Capillary Length and Type – Select for PSTAR Seals Only
<table>
<thead>
<tr>
<th>Capillary Length</th>
<th>Capillary Type</th>
<th>Material</th>
<th>Protective Coat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5 m (5 ft)</td>
<td>316 ss Flexible Armor</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>3.0 m (10 ft)</td>
<td>316 ss Flexible Armor</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>4.5 m (15 ft)</td>
<td>316 ss Flexible Armor</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>6.0 m (20 ft)</td>
<td>316 ss Flexible Armor</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>7.5 m (25 ft)</td>
<td>316 ss Flexible Armor</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>9.0 m (30 ft)</td>
<td>316 ss Flexible Armor</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>1.5 m (5 ft)</td>
<td>316 ss Flexible Armor, Protective Coat</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>3.0 m (10 ft)</td>
<td>316 ss Flexible Armor, Protective Coat</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>4.5 m (15 ft)</td>
<td>316 ss Flexible Armor, Protective Coat</td>
<td>J</td>
<td></td>
</tr>
<tr>
<td>6.0 m (20 ft)</td>
<td>316 ss Flexible Armor, Protective Coat</td>
<td>K</td>
<td></td>
</tr>
<tr>
<td>7.5 m (25 ft)</td>
<td>316 ss Flexible Armor, Protective Coat</td>
<td>L</td>
<td></td>
</tr>
<tr>
<td>9.0 m (30 ft)</td>
<td>316 ss Flexible Armor, Protective Coat</td>
<td>M</td>
<td></td>
</tr>
</tbody>
</table>

(a) Specify quantity of 2 seals when Seal Orientation Code “A” is specified.
(b) See Pressure-Temperature Limits in Table in PSS for pressure ratings at temperature above 100°F.
(c) Maximum temperature limit is 204°C (400°F) when transmitters are used with a direct connect PSTAD seal.
The PSISR with Remote Mount, In-Line Welded, Recessed Diaphragm Seals are used with the IDP10, IDP25, IGP10, IGP20, IGP25, IAP10, and IAP20 Series Differential, Gauge, and Absolute Pressure Transmitters. The PSISD with Direct Mount, In-Line Welded Seals are used with the IGP10, IGP25, and IAP10 Gauge and Absolute Pressure Transmitters. These transmitter-seal systems are used in applications that require a continuous process flow across the diaphragm to insure that pressure sensing is not inhibited by buildup of solids.

How To Order — Specify Complete Transmitter Model Number and Specify: PSISR or PSISD

| Seal Orientation – PSISR Seals Only; for PSISD Seals, go to Diaphragm Size Selection |
|---------------------------------------------------------------|--------------------------|
| Two Seal System, Balanced, Same Seal on both Sides, IDP10 or IDP25 only | A(a)                     |
| One Seal System, High Side, IDP10, IDP25, IGP20, or IAP20      | B                       |
| One Seal System, Low Side, IDP10 or IDP25 only                 | C                       |
| One Seal System, IGP10, IDP25, or IAP10 only                   | D                       |

<table>
<thead>
<tr>
<th>Diaphragm Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.4 in.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-Line, Saddle Weld to Nominal 3-inch Pipe.</td>
</tr>
<tr>
<td>In-Line, Saddle Weld to Nominal 4-inch Pipe.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pressure Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equivalent to a Nominal 3- or 4-inch Schedule 40 Pipe</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lower Housing Material (Process Wetted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Steel</td>
</tr>
<tr>
<td>316 ss</td>
</tr>
<tr>
<td>Hastelloy C</td>
</tr>
<tr>
<td>Titanium Grade 4</td>
</tr>
<tr>
<td>Inconel 600</td>
</tr>
<tr>
<td>Monel 400</td>
</tr>
<tr>
<td>Nickel 200</td>
</tr>
<tr>
<td>None (Select for Replacement Seals only).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diaphragm Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>316 ss</td>
</tr>
<tr>
<td>Hastelloy C276</td>
</tr>
<tr>
<td>Tantalum</td>
</tr>
<tr>
<td>Titanium Grade 2 (must Specify Titanium Upper Housing)</td>
</tr>
<tr>
<td>Inconel 600</td>
</tr>
<tr>
<td>Monel 400 (must Specify Monel Upper Housing)</td>
</tr>
<tr>
<td>Nickel 200</td>
</tr>
</tbody>
</table>
**Upper Housing Material (non-process wetted)**

- 316L ss .................................................. S
- Monel 400 .................................................... M
- Titanium Grade 4 .......................................... E

**Instrument Connection**

- PSISR Only – Capillary-to-transmitter welded; capillary-to-seal ¼ NPT ..................... 1
- PSISD Only – ½ NPT ............................................. 2

**Gasket**

- Organic Fiber with Nitrile (Standard) .................................................. S
- ptfe (Teflon) .......................................................... T

**Bolting (b)**

- Carbon Steel (Standard) .......................................................... C
- 300 Series ss .......................................................... S

**Fill Fluid - Pressure Seal**

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Temperature Limits</th>
<th>Fill</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC200, 10 cSt Silicone</td>
<td>-40 and +232 F</td>
<td></td>
</tr>
<tr>
<td>DC77, Fluorinert</td>
<td>-59 and +82 F</td>
<td></td>
</tr>
<tr>
<td>DC200, 3 cSt Silicone</td>
<td>-40 and +149 F</td>
<td></td>
</tr>
<tr>
<td>DC704, Silicone</td>
<td>-12 and +304 F</td>
<td></td>
</tr>
</tbody>
</table>

**Capillary Internal Diameter - Select for PSISR Seals Only**

- 0.027 in; Not Available with Fluid Code 4 (DC704) ........................................ 3
- 0.040 in .......................................................... 4
- 0.062 in; Not Available with IGP10, IGP25, and IAP10 Transmitters .................... 6

**Capillary Length and Type - Select for PSISR Seals Only**

- 1.5 m (5 ft) 316 ss Flexible Armor .................................................. A
- 3.0 m (10 ft) 316 ss Flexible Armor .................................................. B
- 4.5 m (15 ft) 316 ss Flexible Armor .................................................. C
- 6.0 m (20 ft) 316 ss Flexible Armor .................................................. D
- 7.5 m (25 ft) 316 ss Flexible Armor .................................................. E
- 9.0 m (30 ft) 316 ss Flexible Armor .................................................. F
- 1.5 m (5 ft) 316 ss Flexible Armor, Protective Coat .................................... G
- 3.0 m (10 ft) 316 ss Flexible Armor, Protective Coat ................................. H
- 4.5 m (15 ft) 316 ss Flexible Armor, Protective Coat ................................... J
- 6.0 m (20 ft) 316 ss Flexible Armor, Protective Coat ................................... K
- 7.5 m (25 ft) 316 ss Flexible Armor, Protective Coat ................................... L
- 9.0 m (30 ft) 316 ss Flexible Armor, Protective Coat ................................... M

(a) Specify quantity of 2 seals when Seal Orientation Code “A” is specified.

(b) The PSISR and PSISD use a standard eight-bolt pattern. If a custom six-bolt pattern is required, contact Foxboro.

(c) The maximum temperature is 204°C (400°F) when transmitters are used with a direct connect PSISD seal.
The PSSCR Sanitary Series with Remote Mount, Flush Diaphragm Seals are used with the IDP10, IDP25, IGP20, IGP25, IAP20, IGP10, and IAP10 Series Differential, Gauge, and Absolute Pressure Transmitters. The PSSCT Direct Mount seals are used with the IGP20, IDP10, or IDP25 Gauge and Differential Pressure Transmitters. These sanitary seals meet 3-A Sanitary Standards. They attach to the process connection and are secured with a user-supplied Tri-Clover Tri-Clamp.

Process Pressure-Temperature Limits
The maximum working pressure of the seal process connection varies with the sanitary clamping device provided by the user. Refer to Tri-Clover Tri-Clamp standards to determine the pressure-temperature limits of the clamping system that you are using. Do not exceed the Tri-Clover Tri-Clamp limits, nor the temperature limits of the seal and capillary fill fluid selected.

How To Order – Specify Complete Transmitter Model Number and Specify: PSSCR or PSSCT

Seal Orientation
Two Seal System, Balanced – Same Seal on both Sides, IDP10 or IDP25 only ............ -A(a)
One Seal System, High Side, IDP10, IDP25, IGP20, or IAP20 (specify -B for PSSCT) .... -B
One Seal System, Low Side, IDP10 or IDP25 only ............................................. -C
One Seal System, IGP10, IGP25, or IAP10 only .................................................... -D

Diaphragm Size
2 inch Tri Clamp .................................................................................................... 2
3 inch Tri Clamp .................................................................................................... 3
4 inch Tri Clamp (not for PSSCT) ......................................................................... 4

Process Connector (do not specify for PSSCT – Tri Clamp is standard)
Tri-Clover Tri Clamp .......................................................................................... 1

Diaphragm Material (do not specify for PSSCT – 316L ss is standard)
316L ss .................................................................................................................. S
Hastelloy C276 ..................................................................................................... C

Instrument Connection
PSSCR: capillary welded at both transmitter and seal
PSSCT: Bolted, Gasketed

Fill Fluid - Pressure Seal and Capillary

<table>
<thead>
<tr>
<th>Fill Fluid</th>
<th>Temperature Limits</th>
<th>°C</th>
<th>°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neobee M20</td>
<td>-18 and +204</td>
<td>0</td>
<td>+400</td>
</tr>
</tbody>
</table>

Capillary Internal Diameter (do not specify for PSSCT)

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Capillary Internal Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.027 in</td>
<td>.................................... 3</td>
</tr>
<tr>
<td>0.040 in</td>
<td>.................................... 4</td>
</tr>
<tr>
<td>0.062 in</td>
<td>.................................... 6</td>
</tr>
</tbody>
</table>
Capillary Length and Type (do not specify for PSSCT)

1.5 m (5 ft) 316 ss Flexible Armor, Protective Coat .............................................................. G
3.0 m (10 ft) 316 ss Flexible Armor, Protective Coat ............................................................... H
4.5 m (15 ft) 316 ss Flexible Armor, Protective Coat ............................................................... J
6.0 m (20 ft) 316 ss Flexible Armor, Protective Coat ............................................................... K
7.5 m (25 ft) 316 ss Flexible Armor, Protective Coat ............................................................... L
9.0 m (30 ft) 316 ss Flexible Armor, Protective Coat ............................................................... M

(a) When Seal Orientation Code A is specified, then indicate that two identically model numbered seals are required.
PSSSR and PSSST Series – Sanitary, Tri-Clamp, Remote or Direct Mount Pressure Seals with Extended Diaphragm

The PSSSR Sanitary Series with Remote Mount, Extended Diaphragm Seals are used with the IDP10, IDP25, IGP20, IGP25, IAP20, IGP10, and IAP10 Series Differential, Gauge, and Absolute Pressure Transmitters. The PSSST Direct Mount Seals are used with the IGP20, IDP10, or IDP25 Gauge and Differential Pressure Transmitters. These Sanitary Seals meet 3-A Sanitary Standards. They attach a welded spud connection and are secured with a Tri-Clover Tri-Clamp, supplied with the transmitter.

How to Order – Specify Complete Transmitter Model Number and Specify: PSSSR and PSSST

Seal Orientation
- Identical seal for both sides of IDP10 or IDP25 ........................................ -A
- Seal is for the high side of IDP10, IDP25, IGP20 or IAP20 (Specify B for PSSST) ........................................ -B
- Seal is for the low side of IDP10 or IDP25 ........................................ -C
- Seal is for an IGP10, IGP25 or IAP10 ........................................ -D

Structure Code – Seal/Tank Spud Size, Diaphragm Material, and Extension Length

<table>
<thead>
<tr>
<th>Spud Size</th>
<th>Diaphragm Material</th>
<th>Extension Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 in/Mini-Spud</td>
<td>316L ss</td>
<td>1½ inch</td>
</tr>
<tr>
<td>2 in/Mini-Spud</td>
<td>316L ss</td>
<td>6 inches</td>
</tr>
<tr>
<td>2 in/Mini-Spud</td>
<td>316L ss</td>
<td>9 inches</td>
</tr>
<tr>
<td>4 in/Standard Spud</td>
<td>316L ss</td>
<td>2 inches</td>
</tr>
<tr>
<td>4 in/Standard Spud</td>
<td>316L ss</td>
<td>6 inches</td>
</tr>
</tbody>
</table>

Instrument Connection
- PSSSR Only – Capillary welded both transmitter and seal ........................................ 3
- PSSST Only – Bolted, Gasketed ........................................ 5

Fill Fluid – Pressure Seal, and Capillary as applicable
- Neobee M20, -18 and +204°C (0 and +400°F) Temperature Limits ........................................ 5

Capillary Internal Diameter – Select with PSSSR Seals Only
- 0.040 in. I.D. ........................................ 4

Capillary Length and Type – Select with PSSSR Seals Only
- 1.5 m (5 ft) 316 ss Flexible Armor, Protective Coat ........................................ G
- 3.0 m (10 ft) 316 ss Flexible Armor, Protective Coat ........................................ H
- 4.5 m (15 ft) 316 ss Flexible Armor, Protective Coat ........................................ J
- 6.0 m (20 ft) 316 ss Flexible Armor, Protective Coat ........................................ K
- 7.5 m (25 ft) 316 ss Flexible Armor, Protective Coat ........................................ L
- 9.0 m (30 ft) 316 ss Flexible Armor, Protective Coat ........................................ M
### Accessories – Tank Weld Spuds

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>For Use with Structure Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1212AU</td>
<td>Standard Spud – 2 inch extension</td>
<td>4S2</td>
</tr>
<tr>
<td>N1212AV</td>
<td>Standard Spud – 6 inch extension</td>
<td>4S6</td>
</tr>
<tr>
<td>N1212GG</td>
<td>Mini Spud – 1.5 inch extension</td>
<td>2S2</td>
</tr>
<tr>
<td>N1214BP</td>
<td>Mini Spud – 6 inch extension</td>
<td>2S6</td>
</tr>
<tr>
<td>N1214BQ</td>
<td>Mini Spud – 9 inch extension</td>
<td>2S9</td>
</tr>
</tbody>
</table>
Pressure

Structure Codes TA-TB, T2-T5, M1-M9 & PX-PZ – Sanitary Process Connections for IGP10, IGP25, and IAP10 Gauge and Absolute Pressure Transmitters

- **Process Connectors**
  - Selection of Tri-Clamp, mini-tank spuds, or flush-threaded spud types.
- **Process Wetted Parts**
  - 316L ss or Hastelloy C Diaphragm
  - 316L ss Connection
- **Process O-Ring (Tri-Clamp and Mini Tank Spud Versions)**
  - EPDM
- **Process Gasket (Threaded Type)**
  - Gylon® (filled ptfe)
- **Fill Fluid**
  - Neobee M-20

### Integral Sanitary Process Connectors

All welding, integral, 316L stainless steel process connector with Tri-Clamp™ flush or extended diaphragms or threaded, extended diaphragm versions. Flush Tri-clamp connections offered in 1½, 2, and 3 inch sizes with either a 316L ss or Mastelloy C diaphragm; mini tank spud connections are offered with a 1½, 6, or 9 inch extension with a 316L ss diaphragm; and flush-threaded spud type connections are offered in 1 and 1½ inch sizes.

For complete specifications, refer to Product Specification Sheet PSS 2A-1C13K.

### How to Order – Specify Model Code of IAP10, IGP10, or IGP25 Transmitter with one of the following Structure Codes:

<table>
<thead>
<tr>
<th>Structure Code</th>
<th>Connection</th>
<th>Diaphragm Material</th>
<th>Fill Fluid</th>
<th>Process Connect Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>TA</td>
<td>1.5-in Tri-Clamp, Sanitary</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>1.5-in Tri-Clamp, Sanitary</td>
</tr>
<tr>
<td>T2</td>
<td>2.0-in Tri-Clamp, Sanitary</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>2.0-in Tri-Clamp, Sanitary</td>
</tr>
<tr>
<td>T3</td>
<td>3.0-in Tri-Clamp, Sanitary</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>3.0-in Tri-Clamp, Sanitary</td>
</tr>
<tr>
<td>TB</td>
<td>1.5-in Tri-Clamp, Sanitary</td>
<td>Hastelloy C276</td>
<td>NEOBEE M-20</td>
<td>1.5-in Tri-Clamp, Sanitary</td>
</tr>
<tr>
<td>T4</td>
<td>2.0-in Tri-Clamp, Sanitary</td>
<td>Hastelloy C276</td>
<td>NEOBEE M-20</td>
<td>2.0-in Tri-Clamp, Sanitary</td>
</tr>
<tr>
<td>M1</td>
<td>Mini Tank Spud Seal, 1½ in extension</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>Mini Tank Spud Seal, 1½ in extension</td>
</tr>
<tr>
<td>M6</td>
<td>Mini Tank Spud Seal, 6-in extension</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>Mini Tank Spud Seal, 6-in extension</td>
</tr>
<tr>
<td>M9</td>
<td>Mini Tank Spud Seal, 9-in extension</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>Mini Tank Spud Seal, 9-in extension</td>
</tr>
<tr>
<td>PX</td>
<td>1-in Flush-Threaded Spud Type</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>1-in Flush-Threaded Spud Type</td>
</tr>
<tr>
<td>PZ</td>
<td>1.5-in Flush-Threaded Spud Type</td>
<td>316L ss</td>
<td>NEOBEE M-20</td>
<td>1.5-in Flush-Threaded Spud Type</td>
</tr>
</tbody>
</table>

For Tank Spuds and other accessories, refer to page 1-67.
Structure Codes PA-PJ – Pulp and Paper Process Connections for IGP10, IGP25, and IAP10 Gauge and Absolute Pressure Transmitters

How to Order – Specify Model Code of IAP10, IGP10, or IGP25 Transmitter with one of the following Structure Codes:

<table>
<thead>
<tr>
<th>Connection</th>
<th>Diaphragm</th>
<th>Fill</th>
<th>Process Connection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Material</td>
<td>Fluid</td>
<td></td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>Sleeve Type, 1 inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>Threaded Type, 1 inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>Sleeve Type, 1½ inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>316L ss</td>
<td>Silicone</td>
<td>Threaded Type, 1½ inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>Silicone</td>
<td>Sleeve Type, 1 inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>Silicone</td>
<td>Threaded Type, 1 inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>Silicone</td>
<td>Sleeve Type, 1½ inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>Silicone</td>
<td>Threaded Type, 1 inch nominal</td>
</tr>
<tr>
<td>316L ss</td>
<td>Hastelloy C276</td>
<td>Silicone</td>
<td>Threaded Type, 1 inch nominal</td>
</tr>
</tbody>
</table>

For Tank Spuds and other accessories, refer to page 1-67.

For complete specifications, refer to Product Specification Sheet PSS 2A-1C13L.
# Tank Spuds and Accessories – for Transmitters with Sanitary and Pulp and Paper Industry Connections

## Weld Spuds, Heat Sink/Plugs, Calibration Adapters, and O-Rings/Gaskets

### Sanitary Transmitters

<table>
<thead>
<tr>
<th>Description</th>
<th>Used with Structure Code</th>
<th>Part Number(b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>For use with Mini Tank Spud Connector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weld Spud, 1.5 inch Extension</td>
<td>M1</td>
<td>N1212GG</td>
</tr>
<tr>
<td>Weld Spud, 6 inch Extension</td>
<td>M6</td>
<td>N1214BP</td>
</tr>
<tr>
<td>Weld Spud, 9 inch Extension</td>
<td>M9</td>
<td>N1214BQ</td>
</tr>
<tr>
<td>Package of 5 spare O-rings</td>
<td>M1, M6, M9</td>
<td>N1212LB(d)</td>
</tr>
<tr>
<td>For use with 1 inch Flush, Threaded Connector</td>
<td>PX</td>
<td>N1214XW</td>
</tr>
<tr>
<td>Weld Spud(c)</td>
<td>PX</td>
<td>N1214YS</td>
</tr>
<tr>
<td>Heat Sink/Plug(c)</td>
<td>PX</td>
<td>N1214XX</td>
</tr>
<tr>
<td>Calibration Adapter</td>
<td>PX</td>
<td>N1214YX(d)</td>
</tr>
<tr>
<td>Process Gasket (Gylon)(c)</td>
<td>PX</td>
<td>N1214YL(d)</td>
</tr>
<tr>
<td>For use with 1.5 inch Flush, Threaded Connector</td>
<td>PZ</td>
<td>N1214LP</td>
</tr>
<tr>
<td>Weld Spud(c)</td>
<td>PZ</td>
<td>N1214LY(d)</td>
</tr>
<tr>
<td>Heat Sink/Plug(c)</td>
<td>PZ</td>
<td>N1214LYR</td>
</tr>
<tr>
<td>Calibration Adapter</td>
<td>PZ</td>
<td>N1214LYM</td>
</tr>
<tr>
<td>Process Gasket (Gylon)</td>
<td>PZ</td>
<td>N1214LYV(d)</td>
</tr>
</tbody>
</table>

### Pulp & Paper Transmitters

<table>
<thead>
<tr>
<th>Description of Accessory</th>
<th>Use with Structure Code</th>
<th>Part Number(b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>For use with 1 inch sleeve type connector</td>
<td>PA, PE</td>
<td>N1214LH</td>
</tr>
<tr>
<td>Weld Spud</td>
<td>PA, PE</td>
<td>N1214MP</td>
</tr>
<tr>
<td>Calibration adapter</td>
<td>PA, PE</td>
<td>N1214XX</td>
</tr>
<tr>
<td>Process O-Ring at diaphragm (Viton), 1-in sleeve</td>
<td>PA, PE</td>
<td>N1214YY(d)</td>
</tr>
<tr>
<td>Process O-Ring, outer (viton), 1-in sleeve</td>
<td>PA, PE</td>
<td>N1214YZ(d)</td>
</tr>
<tr>
<td>For use with 1 inch flush, threaded type connector</td>
<td>PB, PF</td>
<td>N1214XW</td>
</tr>
<tr>
<td>Weld Spud</td>
<td>PB, PF</td>
<td>N1214YS</td>
</tr>
<tr>
<td>Heat sink/plug(c)</td>
<td>PB, PF</td>
<td>N1214XX</td>
</tr>
<tr>
<td>Calibration adapter</td>
<td>PB, PF</td>
<td>N1214YX(d)</td>
</tr>
<tr>
<td>Process gasket (Gylon)</td>
<td>PB, PF</td>
<td>N1214YM(d)</td>
</tr>
<tr>
<td>For use with 1.5 inch sleeve type connector</td>
<td>PC, PG</td>
<td>N1214MM</td>
</tr>
<tr>
<td>Weld Spud</td>
<td>PC, PG</td>
<td>N1214MQ</td>
</tr>
<tr>
<td>Calibration adapter</td>
<td>PC, PG</td>
<td>N1214YW(d)</td>
</tr>
<tr>
<td>Process O-Ring (Viton)</td>
<td>PC, PG</td>
<td>N1214YG(d)</td>
</tr>
<tr>
<td>For use with 1.5 inch flush, threaded type connector</td>
<td>PD, PH</td>
<td>N1214LH</td>
</tr>
<tr>
<td>Weld Spud(c)</td>
<td>PD, PH</td>
<td>N1214LYR</td>
</tr>
<tr>
<td>Heat sink/plug(c)</td>
<td>PD, PH</td>
<td>N1214LYM</td>
</tr>
<tr>
<td>Calibration adapter</td>
<td>PD, PH</td>
<td>N1214LYV(d)</td>
</tr>
<tr>
<td>Process gasket (Gylon)</td>
<td>PD, PH</td>
<td>N1214LW(d)</td>
</tr>
<tr>
<td>For use with 1.5 inch threaded type connector for Ametek spud</td>
<td>PJ</td>
<td>N1214AM</td>
</tr>
<tr>
<td>Weld Spud(c)</td>
<td>PJ</td>
<td>N1214AP</td>
</tr>
<tr>
<td>Heat sink/plug(c)</td>
<td>PJ</td>
<td>N1214AN</td>
</tr>
<tr>
<td>Calibration adapter</td>
<td>PJ</td>
<td>N1214AO(d)</td>
</tr>
</tbody>
</table>

(a) Accessories are ordered and supplied separately. Also, refer to pages 1-64 for tank spuds for PSSSR and PSSST Sanitary Seals.
(b) Refer to PSS Dimensions-Nominal section for configuration and dimensions of accessories listed.
(c) When ordering a weld spud with a threaded type connector, note that use of a heat sink/plug is required to prevent metal distortion due to the high temperature of the welding process.
(d) Each transmitter is shipping with its required gaskets or O-rings. Part number listed is for a package of five O-rings or gaskets. This package of gaskets/ O-Rings is recommended as extras or spares.
The following chapters contain Product Specifications of the Instruments:

- **CO**  Compact Orifice Assemblies for use with DP Transmitters
- **IFOA** Integral Flow Orifice Assemblies for use with DP Transmitters

**Note:** Refer to Section 3 for In-Line Flow Meters (Coriolis, Vortex, and Mag Flow) and related instruments.
Model CO Compact Orifice Complete with Foxboro® Differential Pressure Transmitters

The Model CO Compact Orifice is a wafer body orifice plate that includes an integral three-valve manifold. This one-piece unit mounts directly to an I/A Series® differential pressure transmitter. An alignment ring and an optional installation kit provide the hardware necessary to properly install the orifice in various pipeline sizes having ANSI® or DIN flanges. For complete specifications, refer to Product Specification Sheet PSS 3-5A1E.

**Standard Specifications**

*Orifice Type:* Concentric, square edge, corner tap  
*Process Fluids:* Liquid, gas, and steam  
*Process Temperature Limits:* -40 to +232°C (-40 to +450°F)  
*Maximum Working Pressure:* Per ANSI Class 600 or DIN PN 100 flanges  
*Flow (Discharge) Coefficient Uncertainty:*  
- 15 TO 40 mm (½ TO 1½ in) LINE SIZES  
  - 1.75% Uncertainty  
- 50 TO 100 mm (2 TO 4 in) LINE SIZES  
  - 1.25% Uncertainty  
*Pipeline Sizes:*  
- DN 15, DN 25, DN 50, DN 80, or DN 100;  
- 1/2, 1, 1 1/5, 2, 3, or 4 in  
*Beta Ratio*(b): 0.40 or 0.65  
*Process Connections:* Mounts between ANSI Class 150, 300, or 600 flanges, or DIN PN 16, PN 40, or PN 100 flanges.  
*Assembly to Transmitter:* Delivered assembled to a calibrated Foxboro® IDP10, IDP25 or IDP50 d/p Cell Transmitter, or an IMV25 or IMV 30 Multivariable Transmitter.  
*Body and Gasket Materials — Process Wetted:*  
- Compact Orifice: 316 ss with ptfe gasket  
- Optional Flange Gaskets: Durlon 8500 Aramid/Inorganic Fiber with NBR rubber binder  
*Stud and Nut Material — Not Process Wetted:*  
- Compact Orifice-to-Transmitter: 316 ss Studs, A193 Gr. B8M  
- 316 ss Nuts, A194 Gr. 8M  
- Optional Flange Bolting: Plated Carbon Steel Studs and Nuts
Alignment Rings and Hardware Kit Provided for Proper Installation

Centering of the compact orifice within the pipeline is necessary to reduce flow errors and improve overall measurement performance. Therefore, to ensure proper installation, an alignment ring is provided that is consistent with the pipeline size and whether ANSI or DIN flanges are used. For users who require flange bolting hardware for use with the alignment ring, an optional installation kit (studs, nuts, and gaskets) can be provided consistent with pipeline size and flange type ANSI or DIN selected.

How to Order – Specify the complete model number of the Transmitter, plus the following Auxiliary Specification (AS) Code. Installation Kit is optional. (Compact Orifice and Transmitter are shipped as an assembly.)

### Auxiliary Specification (AS) Code – Compact Orifice

<table>
<thead>
<tr>
<th>Description (a)</th>
<th>AS Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact Orifice with Integral 3-Valve Manifold</td>
<td>CO</td>
</tr>
</tbody>
</table>

#### Pipeline Size

- DN 15 or ½ inch Pipe - HH
- DN 25 or 1 inch Pipe - 11
- DN 40 or 1½ inch Pipe - 1H
- DN 50 or 2 inch Pipe - 22
- DN 80 or 3 inch Pipe - 33
- DN 100 or 4 inch Pipe - 44

#### Beta Ratio

- 0.40 - 4
- 0.65 - 6

#### Alignment Ring

- For use with ANSI Flanges - A
- For use with DIN Flanges - D

*Example: AS Code CO-224A*

a) Refer to AS Code CI if an optional installation kit is needed to assemble the orifice to the pipeline.

### Auxiliary Specification (AS) Code – Optional Installation Kit

<table>
<thead>
<tr>
<th>Description (a)</th>
<th>AS Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation Kit for Compact Orifice (a)</td>
<td>CI</td>
</tr>
</tbody>
</table>

#### Pipeline Size

- DN 15 or ½ inch Pipe - HH
- DN 25 or 1 inch Pipe - 11
- DN 40 or 1½ inch Pipe - 1H
- DN 50 or 2 inch Pipe - 22
- DN 80 or 3 inch Pipe - 33
- DN 100 or 4 inch Pipe - 44

#### Flange Rating

- ANSI Class 150 Flange - AN150
- ANSI Class 300 Flange
- ANSI Class 600 Flange - AO600
- DIN PN 16 - PN016
- DIN PN 40 - PN040
- DIN PN 100 - PN100

*Example: AS Code CI-22AN150*

a) The optional installation kit includes the bolts, nuts, and gaskets required to assemble the Model CO to the pipeline.

Used with Foxboro® Transmitters

The compact orifice is used with the following I/A Series d/p Cell transmitters listed below.

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Protocol</th>
<th>PSS No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDP10</td>
<td>DP</td>
<td>FoxCom™</td>
<td>2A-1C14 A</td>
</tr>
<tr>
<td>IDP10</td>
<td>DP</td>
<td>HART™</td>
<td>2A-1C14 B</td>
</tr>
<tr>
<td>IDP10</td>
<td>DP</td>
<td>Fieldbus(b)</td>
<td>2A-1C13 E</td>
</tr>
<tr>
<td>IDP10</td>
<td>DP</td>
<td>Analog(c)</td>
<td>2A-1C14 C</td>
</tr>
<tr>
<td>IDP10</td>
<td>DP</td>
<td>Analog(d)</td>
<td>2A-1C13 D</td>
</tr>
<tr>
<td>IDP25</td>
<td>Multirange (DP)</td>
<td>FoxCom, HART, and Fieldbus</td>
<td>2A-1C14 K</td>
</tr>
<tr>
<td>IDP50</td>
<td>Premium Performance (DP)</td>
<td>FoxCom, HART, and Fieldbus</td>
<td>2A-1C14 L</td>
</tr>
<tr>
<td>IMV25</td>
<td>Multivariable (DP, AP, and T)</td>
<td>FoxCom, HART</td>
<td>2A-1C15 B</td>
</tr>
<tr>
<td>IMV30</td>
<td>Multivariable (DP, AP, and T)</td>
<td>FoxCom and HART</td>
<td>2A-1C15 A</td>
</tr>
</tbody>
</table>

a) DP = Diff. Pressure; AP = Absolute Pressure; T = Temperature.
b) Fieldbus = FOUNDATION® Fieldbus.
c) Analog = 4 to 20 mA dc analog output.
d) Analog = 1 to 5 V dc (Low Power)
The IFOA Series Integral Flow Orifice Assemblies adapt electronic and/or pneumatic d/p Cell Transmitters for measuring small flow rates.

For complete specifications, refer to Product Specification Sheet PSS 3-5A1 B.

- The IFOA has very high accuracy when equipped with associated piping
- The IFOA can be used with any differential pressure transmitter having standard process connections
- Process wetted materials are available for use with both corrosive and noncorrosive fluids
- The transmitter can be either integrally coupled or remotely connected
- Process wetted material meets NACE Standard MR-01-75

Specifications

Assemblies with Associated Piping:

**Body Material:** Cast AISI Type 316 ss ASTM A351 Grade CF-8M stainless steel.
- Piping Material: Seamless stainless alloy steel pipe to ASTM A-312 Grade TP-316, Schedule 40 for the 15 and 25 mm (½ and 1 in) sizes, Schedule 80 for the 40 mm (1½ in) size.
- Flange Material: Forged 316 ss ASTM A182 F316.

Assemblies without Associated Piping:

**Body Material:** Cast AISI Type 316 ss ASTM A351 Grade CF-8M stainless steel or cast Hastelloy C Grade CW-2M per ASTM A494/A494M-86, as specified.

**Body Bolting:** ASTM A193 Grade B7 cadmium- or zinc-plated with yellow chromate finish alloy steel stud bolts and ASTM A194 Grade 2H nuts. Orifice Plate Material: 316 ss ASTM A240, Monel ASTM B127, or Hastelloy C276 ASTM B626, as specified.

**Orifice Sealing Gasket Material:** Glass-reinforced ptfe.

Assemblies with or without Associated Piping

**Static Pressure Rating and Process Temperature Limits:**

<table>
<thead>
<tr>
<th>End Connection</th>
<th>Assembly Size</th>
<th>Static Pressure Rating and Process Temperature Limits&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>in</td>
</tr>
<tr>
<td>Weld Ends</td>
<td>15</td>
<td>½</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threaded Ends</td>
<td>15, 25</td>
<td>½, 1</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>1.5</td>
</tr>
<tr>
<td>Flanged Ends²</td>
<td>All sizes</td>
<td>Static Pressure Rating of Flange Selected</td>
</tr>
</tbody>
</table>
**Optional Features**
- Process wetted materials in compliance with NACE Standard MR-01-75.
- High pressure assembly (IFO). Static pressure rating 40 MPa (6000 psi).
- 17-4 ss body bolting.
- Oxygen service preparation.
- 3-valve manifolds.
- 180° U-Bend Integral Orifice Attachment.
- Orifice Kits
  - 316 ss—Consisting of 7 bored diameters per standard specifications for 15 mm (½ in) assembly
  - 316 ss—Consisting of 5 bored diameters per standard specifications for 25 mm (1 in) assembly.
  - 316 ss—Consisting of 5 bored diameters per standard specifications for 40 mm (1½ in) assembly.
  - Monel—Consisting of 7 bored diameters per standard specifications for 15 mm (½ in) assembly.

**How to Order** — Specify model number IFOA followed by order code for each selection (Transmitter may be specified and ordered separately).

**Nominal Size**

<table>
<thead>
<tr>
<th>Size (mm)</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 (½ in)</td>
<td>0H</td>
</tr>
<tr>
<td>25 (1 in)</td>
<td>01</td>
</tr>
<tr>
<td>40 (1½ in)</td>
<td>1H</td>
</tr>
</tbody>
</table>

**Body Material**

<table>
<thead>
<tr>
<th>Material</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>316 ss</td>
<td>S</td>
</tr>
<tr>
<td>Hastelloy C, Grade CW-2M</td>
<td>H</td>
</tr>
</tbody>
</table>

**End Connection without Associated Piping**

<table>
<thead>
<tr>
<th>Type</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socket Weld Body</td>
<td>1</td>
</tr>
<tr>
<td>Threaded Body (NPT)</td>
<td>2</td>
</tr>
<tr>
<td>Threaded Body (R metric)</td>
<td>8</td>
</tr>
</tbody>
</table>

**End Connection with Associated Piping**

<table>
<thead>
<tr>
<th>Type</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Ends Prepared for Welding</td>
<td>3</td>
</tr>
<tr>
<td>Pipe Ends Threaded (NPT)</td>
<td>4</td>
</tr>
<tr>
<td>Pipe Ends Threaded (R metric)</td>
<td>9</td>
</tr>
<tr>
<td>Pipe Ends Flanged ANSI Class 150</td>
<td>5</td>
</tr>
<tr>
<td>Pipe Ends Flanged ANSI Class 300</td>
<td>6</td>
</tr>
<tr>
<td>Pipe Ends Flanged ANSI Class 600, 15 and 25 mm (½ and 1 in) only</td>
<td>7</td>
</tr>
</tbody>
</table>

**Orifice Plate Material**

<table>
<thead>
<tr>
<th>Material</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>316 ss</td>
<td>S</td>
</tr>
<tr>
<td>Monel</td>
<td>M</td>
</tr>
<tr>
<td>Hastelloy C276</td>
<td>H</td>
</tr>
</tbody>
</table>

**Orifice Bore Diameter**

**Nominal Size 15 mm (1/2 in)**

<table>
<thead>
<tr>
<th>Diameter (mm)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.508</td>
<td>A</td>
</tr>
<tr>
<td>0.889</td>
<td>B</td>
</tr>
<tr>
<td>1.524</td>
<td>C</td>
</tr>
<tr>
<td>2.540</td>
<td>D</td>
</tr>
<tr>
<td>4.064</td>
<td>E</td>
</tr>
<tr>
<td>6.350</td>
<td>F</td>
</tr>
<tr>
<td>8.890</td>
<td>G</td>
</tr>
<tr>
<td>Jewel orifice. 316 ss base material. 0.0508 to 0.381 mm (0.002 to 0.015 in)</td>
<td>U</td>
</tr>
<tr>
<td>Nonstandard within beta limits of 0.1 to 0.8</td>
<td>V</td>
</tr>
</tbody>
</table>

**Nominal Size 25 mm (1 in)**

<table>
<thead>
<tr>
<th>Diameter (mm)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.147</td>
<td>H</td>
</tr>
<tr>
<td>8.661</td>
<td>J</td>
</tr>
<tr>
<td>12.14</td>
<td>K</td>
</tr>
<tr>
<td>16.64</td>
<td>L</td>
</tr>
<tr>
<td>21.13</td>
<td>M</td>
</tr>
<tr>
<td>Nonstandard within beta limits of 0.1 to 0.8</td>
<td>V</td>
</tr>
</tbody>
</table>
### Nominal Size 40 mm (1½ in)

<table>
<thead>
<tr>
<th>Size</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.703 mm</td>
<td>0.382 in</td>
</tr>
<tr>
<td>13.67 mm</td>
<td>0.538 in</td>
</tr>
<tr>
<td>19.08 mm</td>
<td>0.751 in</td>
</tr>
<tr>
<td>25.86 mm</td>
<td>1.018 in</td>
</tr>
<tr>
<td>29.97 mm</td>
<td>1.180 in</td>
</tr>
<tr>
<td>Nonstandard</td>
<td>within beta limits of 0.1 to 0.8</td>
</tr>
</tbody>
</table>

### Optional Connectors (For remote mounting d/p Cell Transmitter)

- 316ss, ½ NPT
- 316 ss, R ½
- Hastelloy C, ½ NPT
- Hastelloy C, R ½

Specify orifice bore diameter or supply completed flow data sheets (refer to Foxboro) for nonstandard or jewel orifices.

Specify Optional Features

Specify information for instrument tag.
The following chapters contain Product Specifications of the Instruments:

- **84** Series Vortex Flowmeters
- **CFS10** Mass Flowtubes
- **CFS10** Sanitary Mass Flowtubes
- **CFS20** Mass Flowtubes
- **CFS20** Sanitary Mass Flowtubes
- **CFT51** Mass Flow Transmitters

High Power, Expulse, Magnetic Flowmeters:

- **2800** Series PTFE Lined Flowtubes
- **IMT96** Series Transmitters

Pulse DC Magnetic FlowMeters:

- **8000A** Series Wafer Body
- **9100A, 9200A, 9300A** Series Flanged Body Flowtubes
- **IMT25** Intelligent Magnetic Flow Transmitters
- **MAG2IC, MAG2RT, MAG2RS** Intelligent Magnetic Flow Transmitters and Flowtube

Sanitary Magnetic Flowmeters

- **4700S, 47/48** Sanitary Magnetic Flowmeter: Model 4700S Ceramic or PFA lined Sanitary Flowtube and Models 47 and 48 Transmitters
- **75RTA, 75LBA, 75MCA** Series FlowExpert Computing Totalizer/Batcher
- **IMTSIM** Magnetic Flow Simulator
- **IFOA** Integral Flow Orifice Assemblies

**Note:** Refer to Sections 1 and 2 for DP and Multivariable Transmitters and Primary Elements used for Flow Rate Measurement.

Visit FlowExpertPro.com for all of your sizing requirements.
The 84 Series Vortex Flowmeters measure flow by monitoring the action of vortices formed in the fluid by a patented shedder bar. Lifetime Warranty on the sensor, and Two Year Warranty on all other components. Refer to Product Specifications sheet PSS 1-8A3A for intelligent digital/analog, wafer and flanged: PSS 1-8A5A for sanitary and PSS 1-8A6A for Low Power version.

Performance Specifications

Accuracy: Installation parameters such as pipe bore, location of valves and proximity to elbows, etc., will affect the accuracy of the flow measurement. The I/A Series Vortex Flowmeter can be configured to compensate for these effects and correct the measurement.

For Liquids: Accuracy within the calibrated Reynolds Number range is ±0.5% of reading. Outside the calibrated range the accuracy is ±1.0% of reading for flow rates with Reynolds Number of 20,000 or greater. ±2.0% for Reynolds numbers between 5000 and 20,000.

For Gases and Steam: Accuracy is ±1% of reading for flow rates with Reynolds Number of 20,000 or greater. Type D and Type T electronics ±2.0% for Reynolds numbers between 5000 and 20,000.

Physical Specifications

Material: See How to Order

Mounting: 84W: Wafer style, mounts between ANSI Class 150, 300, or 600, or metric PN16, 40, 63, or 100 flanges.
84F: Flanged type. See How to Order for flanges available. (Consult Foxboro for 900CL and 1500 CL)

Enclosure Classification: Meets IEC IP66 and provides the watertight protection of NEMA Type 4X

Electrical Connections: Tapped for either M 20 or 1/2” NPT Conduit

Optional Features

✓ Isolation Manifold Valve: Bonnet mounted, ported ball valve. Allows sensor to be removed without interrupting the flow in the pipeline.
✓ NACE: Meets NACE Standard MR-01, stainless steel material only
✓ Oxygen Service: Cleaned and packaged for oxygen service with Fluorolube filled sensor diaphragm only. Maximum temperature 95°C (200°F)
✓ Gold Plated Sensor

Functional Specifications

Flow Measurement Ranges: Meter size is determined from flow velocity calculations. Refer to Foxboro’s FlowExpert Sizing Program

Process Temperature Limits: -20 and +430°C (0-800°F); depending on sensor selection (see How to Order)

Ambient Temperature Limits: -40 and +80°C (-140 and +176°F)

Operating Pressure:
84W Series: Equivalent rating of mating flanges or piping per ANSI B16.5 with a maximum limit of 10 MPa (1500 psi) at 24°C (75°F)
84F Series: Up to pressure rating of meter flanges

Electrical Classification: FM and CSA certified. Explosion-proof and intrinsically safe versions available. Refer to Foxboro for complete specifications.

Low Power Version: For use in battery and solar powered applications. Intelligent electronics, Low Power, HART Protocol, with and without pulse output.

Foxboro Certificates of Compliance/Conformance

Standard Certificate of Compliance and Material Certification of Process Wetted Metal (conforms to BS EN 10204 3.1).
## Flow (Vortex Flowmeters)

### How to Order 84F: Flanged Version–Specify model number 84F followed by order code for each selection

#### Electronics Version
- Intelligent Electronics, HART Communication Protocol, with Pulse Output
- Intelligent Electronics, HART Communication Protocol, without Pulse Output
- Intelligent Electronics, Low Power, HART Communication Protocol, with Pulse Output
- Intelligent Electronics, Low Power, HART Communication Protocol, without Pulse Output

#### Nominal Line Size
- 3/4 in (DN 15) Line Size
- 1 in (DN 25) Line Size
- 1 1/2 in (DN 40) Line Size
- 2 in (DN 50) Line Size
- 3 in (DN 80) Line Size
- 4 in (DN 100) Line Size
- 6 in (DN 150) Line Size
- 8 in (DN 200) Line Size
- 10 in (DN 250) Line Size
- 12 in (DN 300) Line Size

#### Body, Flange, and Shedder Bar Material
- CF8M 316 SS Cast Body/Shedder and Type 316 SS Flanges (Line Sizes 3Q to 04) and Type 304 SS Flanges (Line Sizes 06 to 12)
- CF8M 316SS Cast Body/Shedder and Type 316 SS Flanges (Line Sizes 3Q to 04) and Type 304 SS Flanges (Line Sizes 06 to 12) (Face-to-face lengths are backward compatible with Style A Model 84 Vortex Flowmeters)
- CF8M 316 SS Cast Body/Shedder and A105 Carbon Steel Flanges
- Duplex SS Cast Body/Shedder per ASTM A 995, Grade 4A, CD3MN and Duplex SS Flanges per A182 Grade F51
- CX2MW Cast Nickel Alloy (equivalent to Hastelloy® C-22) Body/Shedder and Nickel Alloy N06022 Flanges

#### End Connections and Flange Rating
- ANSI Class 150 RF
- ANSI Class 300 RF
- ANSI Class 600 RF
- ANSI Class 900 RF (Not Available with Line Sizes 10 and 12)
- ANSI Class 1500 RF (Not Available with Line Sizes 10 and 12)
- ANSI Class 150 RTJ (Not Available with Line Size 3Q)
- ANSI Class 300 RTJ
- ANSI Class 600 RTJ
- ANSI Class 900 RTJ (Not Available with Line Sizes 10 and 12)
- ANSI Class 1500 RTJ (Not Available with Line Sizes 10 and 12)
- PN16 EN1092-1 Raised Face Type “D” Nut Groove (Available with Line Sizes 06 through 12 only)
- PN25 EN1092-1 Raised Face Type “D” Nut Groove (Available with Line Sizes 08 through 12 only)
- PN40 EN1092-1 Raised Face Type “D” Nut Groove
- PN63 EN1092-1 Raised Face Type “D” Nut Groove
- PN100 EN1092-1 Raised Face Type “D” Nut Groove
- PN160 EN1092-1 Raised Face Type “D” Nut Groove (Not Available with Line Sizes 3Q, 10, and 12)
- PN16 EN1092-1 Raised Face Finish Type B1 (Available with Line Sizes 06 through 12 only)
- PN25 EN1092-1 Raised Face Finish Type B1 (Available with Line Sizes 08 through 12 only)
- PN40 EN1092-1 Raised Face Finish Type B1
- PN63 EN1092-1 Raised Face Finish Type B2
- PN100 EN1092-1 Raised Face Finish Type B2
- PN160 EN1092-1 Raised Face Finish Type B2 (Not Available with Line Sizes 3Q, 10, and 12)
- Single Measurement; No Isolation Valve
- Dual Measurement; Manifold with no Isolation Valves
- Single Measurement; Manifold with 1 Isolation Valve; CF8M (316 SS); Not Available with End Connections 4, 9, H, K, M, S, and T
- Dual Measurement; Manifold with 2 Isolation Valves; CF8M (316 SS); Not Available with End Connections 4, 9, H, K, M, S, and T

#### Sensor Fill, Temperature Range, and Material
- Standard Temperature Range (with Fill Fluid)
  - Fluorolube Fill, 0 to 200°F (-20 to +90°C) Nickel alloy CW2M (equivalent to Hastelloy C-4C)
  - Silicone Fill, 0 to 400°F (-20 to +200°C) Nickel alloy CW2M (equivalent to Hastelloy C-4C)
  - Extended Temperature Range (No Fill Fluid)
- Unfilled, 400°F to 700°F (200°C to 370°C) Nickel alloy CW2M (equivalent to Hastelloy C-4C)
- Unfilled, 400°F to 800°F (200°C to 430°C) Stainless Steel Type CF3M

#### Electronics Housing, Mounting, Material, and Conduit Connections
- Integral Top Mounted 1/2-NPT Conduit Connections
- Integral Top Mounted M20 Conduit Connections
- Remote Mounted 1/2-NPT Conduit Connections
- Remote Mounted M20 Conduit Connections

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
84F Flanged Version (continued)

Local Digital Indicator/Configurator
No Digital Indicator/Configurator (Blind Unit). ................................................................. N
Full Function Digital Indicator/Configurator ................................................................. J

Electrical Safety (Also see Electrical Safety Specifications section for further details)
ATEX intrinsically safe; I 1G II 2D Ex ia IIC T4 Ga Ex tb IIC T103°C Db; not available with Mounting Codes T and R ............................... E
ATEX flameproof, not available with Mounting Codes T and R: .......................................................................................................................... H
For II 2/1 (1) G II 2D Ex d [ia Ga] ia IIC T4 GB Ex tb IIC T85°C Db; available with Mounting Code V only ............................... L
For II 2/1 (1) G II 2D Ex d [ia Ga] IIC T4 GB Ex tb IIC T85°C Db; available with Mounting Code W only ............................... B
CSA intrinsically safe; Division 1; also zone certified Ex ia IIC .............................................. C
CSA nonincendive; Division 2 ................................. M
CSA explosionproof; Division 1 .......................................................... D
FM intrinsically safe; Division 1; also zone approved AEx ia IIC ........................................ F
FM nonincendive; Division 2 ................................. K
FM explosionproof; Division 1 .......................................................... G
IECEx intrinsically safe; Ex ia IIC T4 Ga Ex tb IIC T103°C Db; not available with Mounting Codes T and R .................................................. R
IECEx flameproof, not available with Mounting Codes T and R: .................................................. B
For Ex d [ia Ga] IIC T4 GB Ex tb IIC T85°C Db; available with Mounting Code V only ............................... L
For Ex d [ia Ga] IIC T4 GB Ex tb IIC T85°C Db; available with Mounting Code W only ............................... B
NEPSI intrinsically safe, Zone 0, Ex ia IIC; not available with Mounting Codes T and R .... R
NEPSI flameproof, Zone 1, Ex d IIC; not available with Mounting Codes T and R .......... Y
No Agency Electrical Certifications; with CE mark, PED Controls and Records ............... Z
No Agency Certifications; no CE mark; Units not to be installed in European Union (EU) countries .................................................................

Optional Selections
Cable Length Selection for Remote Electronics Housing
20 ft (6 m) Cable to Connect to Remote Electronics Housing ........................................... B
30 ft (9 m) Cable to Connect to Remote Electronics Housing ........................................... D
40 ft (12 m) Cable to Connect to Remote Electronics Housing ........................................... E
50 ft (15 m) Cable to Connect to Remote Electronics Housing ........................................... G

Cleaning – Oxygen/Chlorine Service
Cleaning of Process Wetted Parts per Compressed Gas Association’s CGA G-4.1 and ASTM G93 ......................................................... H
Available only with Body/Flange/Shedder Material Code R and Y.
Not available with Line Sizes 10 and 12 or with Isolation Valve Codes D, K, and L.
Not available with Extended Temperature Codes E and G.

Sensor Plating
Gold Plated Sensor ................................................................................................................. J

Foxboro Certificates of Compliance/Conformance
Standard Certificate of Compliance .................................................................................. L
Foxboro Material Certification of Process Wetted Metal (Conforms to BS EN 10204 3.1) ..... M
Process Wetted Parts Conform to NACE Standard MR-01 .................................................. Q

Foxboro Calibration Certificate
Calibration and Pressure Test Certified Copy ........................................................................ N

Cable Connectors – with Electrical Housing Codes T and R only (1/2 NPT)
Hawke-Type Cable Gland (Available only with Electrical Safety Codes E, H, Y, and Z) ................................................................. P
PG11 Cable Gland, Trumpet Shaped (Not available with explosionproof/flameproof certifications). ........................................................................................................ R

Conduit Fitting
Adapter for use with 1/2 NPT conduit (Available with Remote Mounted Housing Code R only) ........................................................................................................ T

Welding Certificate (Size Codes 06 through 12 only)
Welding certified to conform to ASME Boiler and Pressure Vessel Code, Section IX ....... F
Radiographic Examination (X-Ray) of Flange Welds ......................................................... V
Welding certified to conform to ASME Boiler and Pressure Vessel Code, Section IX and Radiographic Examination (X-Ray) of welds .... V

Instruction Manual
Detailed Instruction Manual in place of Universal MI 019-145 .............................................. C

Notes
(a) For remote mounting, select optional cable length.
(b) For ATEX and IECEx certifications, select M20.
(c) For Line Sizes 3Q, D1, and 1H, select End Connection H
(d) See Welding Certificate Option X for extended temperature range (400°F to 800°F/200°C to 430°C).
(e) Contact Invensys for availability in Style B.
(f) High Temperature Sensors are not available with Body, Flange, and Shedder Bar Material selection D (Duplex SS).
(g) For Line Sizes 3Q, 01, and 1H, select End Connection 8.
(h) Only electrical certifications F, K, and G are available with these model codes at this time.
(i) Available with ANSI End Connections 1, 2 and 3 for Line Sizes 3Q through 08, and End Connections 1 and 2 for Line Sizes 10 and 12.
(j) These options should only be used when replacing a Model 84F Style A meter or for stocking purposes for Model 84F Style B meters.
(k) Hastelloy® is a registered trademark of Haynes International Inc.
(l) For Line Size 08 with 4, 5, 9, T, K, and M End Connectors, Welding Certificate Option X is required.
**Flow (Vortex Flowmeters)**

84W: Wafer Version

**How to Order 84W: Wafer Version**—Specify model number 84W followed by order code for each selection

**Electronics Type**
- Intelligent Electronics, HART Communication Protocol, with Pulse Output ..............-T
- Intelligent Electronics, HART Communication Protocol, without Pulse Output ........-U
- Intelligent Electronics, Low Power, HART Protocol, with Pulse Output.............-L
- Intelligent Electronics, Low Power, HART Protocol, without Pulse Output........-M

**Nominal Line Size**
- 3/4 in (DN 15) Line Size .......................................................... 3Q
- 1 in (DN 25) Line Size ............................................................... 01
- 1 1/2 in (DN 40) Line Size ....................................................... 1H
- 2 in (DN 50) Line Size .............................................................. 02
- 3 in (DN 80) Line Size ............................................................... 03
- 4 in (DN 100) Line Size ............................................................. 04
- 6 in (DN 150) Line Size ............................................................. 06
- 8 in (DN 200) Line Size ............................................................ 08

**Body and Shedder Bar Material**
- ASTM A351-CF8M (316 ss) Cast Body and Shedder ......................................... S
- ASTM A494-CW2M (Hastelloy C) Cast Body and Shedder; With Size Codes 3Q to 04 only .. H

**Mounting and Centering Systems**
- Centering for ANSI Class 150, 300, and 600 Flanges Sizes 3Q through 04 only ........ 1
  - Centering for PN 16 Flange Sizes 01 through 03 only
  - Centering for PN 40 Flange Sizes 01 through 03 and 06 and 08 only
  - Centering for PN 63 and PN 100 Flanges All line sizes
- Centering for ANSI Class 600 Flange Sizes 06 and 08 only .............................. 3
- Centering for PN 16 Flange Sizes 04, 06, and 08 only .................................... 4
- Centering for PN 40 Flange Size 04 only ...................................................... 5
- Centering for PN 16 and PN 40 Flanges Size 3Q only ........................................ 9

**Isolation Valve and Manifold**
- S = No Isolation Valve or Manifold .......................................................... S
- K = Manifold with Isolation Valve, ASTM A 351-CF8M Stainless Steel (316 ss) ........ K

**Sensor Fill, Temperature Range, and Material**
- **Standard Temperature Range (with Fill Fluid)**
  - Fluorolube Fill 0 to 200°F (-20 to 90°C) Hastelloy ....................................... D
  - Fluorolube Fill 0 to 200°F (-20 to 90°C) Stainless Steel ............................... F
  - Silicone Fill 0 to 400°F (-20 to 200°C) Hastelloy ...................................... R
  - Silicone Fill 0 to 400°F (-20 to 200°C) Stainless Steel ................................. S
- **Extended Temperature Range (No Fill Fluid)**
  - Unfilled, 300 to 800°F (150 to 430°C) Hastelloy Type CW2M (b) ................. C
  - Unfilled, 300 to 800°F (150 to 430°C) Stainless Steel Type CF3M (b) ............. T

**Electronics Housing Mounting, Material, and Conduit Connections**
- T = Integrally Mounted to Flowtube; Aluminum Housing, 1/2 NPT Conduit Connection .................................................. T
- V = Integrally Mounted to Flowtube; Aluminum Housing, M20 Conduit Connection ................................................ V
- R = Remote Mounted; Aluminum Housing, 1/2 NPT Conduit Connection (a) ........ R
- W = Remote Mounted; Aluminum Housing, M20 Conduit Connection (a) ............ W

**Local Digital Indicator/Configurator**
- N = No Digital Indicator/Configurator (Blind Unit) ........................................... N
- J = Full Function Digital Indicator/Configurator ............................................... J
84W: Wafer Version (continued)

**Electrical Safety (Also see Electrical Safety Specifications section for further details)**

ATEX intrinsically Safe; II 1 GD, Ex ia IIC; T4
(not available with mounting Codes T and R). ........................................... E

ATEX flameproof: ............................................................... H
for II 2/1 (1) GD, Ex d [ia] ia; T4; with Mounting Code V only.
for II 2 (1) GD, Ex d [ia], T4; with Mounting Code W only.
for II 1 GD, Ex ia IIC; T4; with Mounting Code W only.

CSA intrinsically safe; Division 1; T4. .................................................. C

CSA Nonincendive; Division 2, T4. ..................................................... M

CSA explosionproof; Division 1; T5. .................................................. D

FM intrinsically safe; Division 1; T4. .................................................. F

FM nonincendive; Division 2, T4. ..................................................... K

FM explosionproof; Division 1; T5. .................................................. G

IECEx intrinsically safe; Ex ia IIC; Dust-ignitionproof Ex tD A20, IP66
(not available with .................................................. L
Mounting Codes T and R).

IECEx flameproof:
Ex d [ia] ia IIC; Dust-ignitionproof Ex tD A20, IP66; with Mounting Code V only.
Ex d [ia]; Dust-ignitionproof Ex tD A20, IP66; with Mounting Code W only.
Ex ia IIC; Dust-ignitionproof Ex tD A20, IP66; with Mounting Code W only.

NEPSI intrinsically safe, Zone 0, Ex ia IIC (not with mounting codes T and R) .... R

NEPSI flameproof, Zone 1, Ex d IIC (not with mounting codes T and R) ........ S

No Agency Electrical Certifications; (with CE mark, PED Controls and Records). .................................. Y

No Agency Certifications; (no CE mark;
Units not to be installed in European Union (EU) countries) ......................... Z

**Optional Selections**

**Cable Length Selection for Remote Electronics Housing**

- 20 ft (6 m) Cable to Connect to Remote Electronics Housing .................................. B
- 30 ft (9 m) Cable to Connect to Remote Electronics Housing .................................. D
- 40 ft (12 m) Cable to Connect to Remote Electronics Housing .............................. E
- 50 ft (15 m) Cable to Connect to Remote Electronics Housing .............................. G

**Cleaning - Oxygen/Chlorine Service**

Cleaning of Process Wetted Parts per Compressed Gas Association’s CGA G-4.1 and ASTM G93 ........................................ H

Not available with Isolation Valve Code K or Sensor Codes C and T

**Sensor Plating**

Gold Plated Sensor ................................................................. J

**Foxboro Certificates of Compliance/Conformance**

Standard Certificate of Compliance .................................................. L

Material Certification of Process Wetted Metal (Conforms to BS EN 10204 3.1) ........ M

Process Wetted Parts Conform to NACE Standard MR-01 .......................... Q

**Foxboro Calibration Certificate**

Foxboro Calibration and Pressure Test Certified Copy .............................. N

**Cable Connectors - with Electrical Housing Codes T and R only (1/2 NPT)**

- Hawke-Type Cable Gland ....................................................... P
- PG11 Cable Gland, Trumpet Shaped ........................................... R

**Conduit Fitting**

Adapter for use with 1/2 NPT conduit (Available with Remote Mounted Housing Code R only) ........ T

**Instruction Manual**

Detailed Instruction Manual in place of Universal MI 019-145 .......................... C

**Notes**

(a) With remote mounted electronics housing, you must also select Optional Cable Length -B, -D, -E, or -G.

(b) Application ALERT: For Extended Temperature Range sensors used in hazardous or volatile gas applications, there is the potential of fugitive emissions to occur through the sensor vented restrictor if the sensor diaphragm were to fail.

(c) The Low Power Vortex Flowmeter is not available with a 4 to 20 mA output.
84S: Sanitary Vortex Flowmeter

How to Order—Specify model number 84S followed by order code for each selection

**Electronics Type**
- Intelligent Electronics, HART Communication Protocol, with Pulse Output .................................................. T
- Intelligent Electronics, HART Communication Protocol, without Pulse Output ............................................. U
- Intelligent Electronics, Low Power, HART Protocol, with Pulse Output(c) .................................................. L
- Intelligent Electronics, Low Power, HART Protocol, without Pulse Output(c) ........................................... M

**Nominal Line Size**
- 2 in (DN 50), Stainless Steel Tubing ........................................ 02
- 3 in (DN 80), Stainless Steel Tubing ........................................ 03

**End Connection Type (Welded to Flowmeter Body) (a)**
- 3A I-Line Fitting, Mates with Cherry Burrell 15 WI or Equivalent .................................................. C
- ANSI Class 150 RF Flange (b) .................................................. F
- Metric (DIN 11851) Coupling with External Knuckle Thread, per DIN 405, Part 1 ........................................ M
- RJT Coupling per BS 1864, with External Whitworth Thread, 6 TPI .................................................. R
- 3A Tri-Clamp Type Quick- Disconnect Ferrule, Mates with Tri-Clover 14 WMP, or equivalent ................ T
- ISS (ISO 2853) Coupling with External Trapezoidal Thread, 8 TPI .................................................. U

**Local Digital Indicator/Configurator**
- No Digital Indicator/Configurator (Blind Unit) ........................................ N
- Full Function Digital Indicator/Configurator .................................................. J

**Electronics Housing Material and Conduit Connections**
- Remote Mounted; Aluminum Housing; 1/2 NPT Conduit Connections .................................................. R
- Remote Mounted; Aluminum Housing; M20 Conduit Connections .................................................. W

**Electrical Safety (Also see Electrical Safety Specifications section)**
- ATEX intrinsically Safe; II 1 GD, EEx ia IIC; T4; with Housing Code W only .................................................. E
- ATEX flameproof; for II 2 (1) GD, EEx d [ia] IIC; T4; with Housing Code W only ........................................ H
- CSA intrinsically safe; Division 1 / Zone 0; T4 .................................................. C
- CSA nonincendive; Division 2; T4 .................................................. D
- CSA explosionproof; Division 1 / Zone 0; T5 .................................................. D
- FM intrinsically safe for Ex ia Class I, Division 1 Groups A,B,C and D, Class II and III, Division 2 .... G
- Groups E, F and G; T4 @ 80°C; Dust-ignitionproof for Class II and III, Division 1, Groups C and D ........... K
- FM nonincipidive Class I, II and III, Division 2, Groups A,B,C,D,F and G, T4 @ 80°C .............................. L
- FM explosionproof for Class I, Division 1, Groups B,C and D, T4 @ 80°C ............................................... G
- IECEx intrinsically safe; Ex ia IIC; T4; Dust-ignitionproof Ex tD A20, IP66 with ..................................... L
- Mounting Code W only .................................................. L
- IECEx flameproof; Ex d [ia] IIC; T4; Dust-ignitionproof Ex tD A20, IP66 with .................................... B
- Mounting Code W only .................................................. B
- NEPSI Intrinsically Safe, Zone 0, Ex ia II C, T4 (-20C to 80C or -40C to 80C w/o display) ................. R
- NEPSI Flameproof, Zone 1, Ex d II C, T5 (except acetylene) (-20C to 85C or -40C to 85C w/o display) ... S
- No Agency Electrical Certifications; (with CE mark, and PED Controls and Records) .............................. Y
- No Agency Certifications; (no CE mark; Units not to be installed in European Union) (EU countries) .... Z

**Optional Selections**

**Foxboro Certificates of Compliance/Conformance**
- Standard Certificate of Compliance .................................................. L
- Material Certification of Process Wetted Metal (Conforms to BS EN 10204 3.1) ..................................... M

**Foxboro Calibration Certificate**
- Calibration and Pressure Test Certification .................................................. N

**Instruction Manual**
- Detailed Instruction Manual in place of Universal MI 019-145 .................................................. C

**Notes**
(a) Mating end connections, gaskets, and clamps to be supplied by the user.
(b) WirelessHART Adaptors, Temperature Converters and Gateways can be ordered separately via part numbers 217233, 217234, 211735, 220390, 211734, 219035 and 211749.
(c) Models 11, 13, & 15: CERT-K only available with MR-01. Models 40, 43, & 45: CERT-K limited to PB-AM, PB-BM, DE-A with MR-01, or DE-B with MR-01.
CFS10 Coriolis Mass Flowtubes

The CFS10 Series Mass Flowtubes utilize the Coriolis Principle to provide true mass flow rate measurements directly, without the need for external temperature, pressure, or specific gravity (S.G.) input.

For complete specifications, refer to Product Specification Sheet PSS 1-2B1 A.

Functional Specifications
Nominal Mass Flow Rate Ranges:

<table>
<thead>
<tr>
<th>Flowtube Size</th>
<th>Mass Flow Rate Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flowtube Limits:</td>
<td>Nominal kg/min</td>
</tr>
<tr>
<td>in</td>
<td>mm</td>
</tr>
<tr>
<td>1/8</td>
<td>3</td>
</tr>
<tr>
<td>1/4</td>
<td>6</td>
</tr>
<tr>
<td>1/2</td>
<td>15</td>
</tr>
<tr>
<td>3/4</td>
<td>20</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>1.5</td>
<td>40</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
</tr>
</tbody>
</table>

Process Density: Process fluid ranges from 200 to 3000 kg/m³ (12.5 to 187 lb/ft³) or a specific gravity range of 0.2 to 3. Note that a specific gravity of 1 corresponds to a fluid density of 1000 kg/m³ (62.4 lb/ft³).

Flowtube Limits²:

<table>
<thead>
<tr>
<th>Size</th>
<th>Process Temp. °C</th>
<th>°F</th>
<th>Maximum Working Pressure bar</th>
<th>psig</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 &amp; 6 1/8 &amp; 1/4</td>
<td>40</td>
<td>100</td>
<td>207</td>
<td>3000</td>
</tr>
<tr>
<td>100</td>
<td>200</td>
<td>174</td>
<td>2530</td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>300</td>
<td>156</td>
<td>2270</td>
<td></td>
</tr>
<tr>
<td>180</td>
<td>356</td>
<td>148</td>
<td>2144</td>
<td></td>
</tr>
<tr>
<td>15-50 1/2 - 2</td>
<td>40</td>
<td>100</td>
<td>99</td>
<td>1440</td>
</tr>
<tr>
<td>100</td>
<td>200</td>
<td>85</td>
<td>1240</td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>300</td>
<td>77</td>
<td>1120</td>
<td></td>
</tr>
<tr>
<td>180</td>
<td>356</td>
<td>75</td>
<td>1080</td>
<td></td>
</tr>
</tbody>
</table>

Normal Operating Condition Limits:
Process Temperature: -200 and +180°C (-328 & +356°F).
Ambient Temperature: -40 and +85°C (-40 & +185°F).
Relative Humidity: 5 and 100%
Mass Flowmeters

End Connection Limits:

<table>
<thead>
<tr>
<th>Type</th>
<th>Process Temp.</th>
<th>Max. Working Pressure (316/316L Flanges)</th>
<th>Hastelloy C-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSI Class 150</td>
<td>100°F</td>
<td>275 psig</td>
<td>290 psig</td>
</tr>
<tr>
<td></td>
<td>200°F</td>
<td>240 psig</td>
<td>260 psig</td>
</tr>
<tr>
<td></td>
<td>300°F</td>
<td>215 psig</td>
<td>230 psig</td>
</tr>
<tr>
<td></td>
<td>356°F</td>
<td>204 psig</td>
<td>213 psig</td>
</tr>
<tr>
<td>ANSI Class 300</td>
<td>100°F</td>
<td>720 psig</td>
<td>750 psig</td>
</tr>
<tr>
<td></td>
<td>200°F</td>
<td>620 psig</td>
<td>750 psig</td>
</tr>
<tr>
<td></td>
<td>300°F</td>
<td>560 psig</td>
<td>730 psig</td>
</tr>
<tr>
<td></td>
<td>356°F</td>
<td>535 psig</td>
<td>713 psig</td>
</tr>
<tr>
<td>ANSI Class 600</td>
<td>100°F</td>
<td>1440 psig</td>
<td>1500 psig</td>
</tr>
<tr>
<td></td>
<td>200°F</td>
<td>1240 psig</td>
<td>1500 psig</td>
</tr>
<tr>
<td></td>
<td>300°F</td>
<td>1120 psig</td>
<td>1455 psig</td>
</tr>
<tr>
<td></td>
<td>356°F</td>
<td>1067 psig</td>
<td>1421 psig</td>
</tr>
<tr>
<td>BS 4504 (DN)</td>
<td>50°C</td>
<td>40 bar</td>
<td>40.4 bar3</td>
</tr>
<tr>
<td>10/16/25/40</td>
<td>100°C</td>
<td>34.2 bar</td>
<td>34.2 bar3</td>
</tr>
<tr>
<td></td>
<td>150°C</td>
<td>30.8 bar</td>
<td>30.8 bar3</td>
</tr>
<tr>
<td></td>
<td>180°C</td>
<td>29.3 bar</td>
<td>29.3 bar3</td>
</tr>
</tbody>
</table>

**Flange to NPT/BS21R**

Maximum working pressure is limited by the flangtube limits above or by the user's end connection, whichever is PN100/2(DN) less.

**End Connections**

- Threaded, NPT, ANSI B2.1 (not available with code 10, 15 or 20 above)
- ANSI Class 150 flange (not available with code 02)
- ANSI Class 300 flange (not available with code 02)
- ANSI Class 600 flange (not available with code 02)
- PN 10/16, 25/40 flange (not available with code 02)
- PN 100 flange, mates with BS4504, Part 4, 1969 (100/2) (not available with code 02)
- DIN Coupling With External Thread, DIN 11851
- For Mating To Tri-Clamp, Quick Disconnect Ferrule

**Performance Specifications**

- **Accuracy (Flow Rate):** ±0.15% of reading, or ±0.015% of nominal flow range, whichever is greater.
- **Accuracy (Density):**
  - Flowtube Size
    - mm: 3 to 6
      - Accuracy (Density): ±0.0025 g/cm³ (0.04 lb/ft³)
    - mm: 15 to 50
      - Accuracy (Density): ±0.0015 g/cm³ (0.024 lb/ft³)

**Physical Specifications**

- **Enclosure:** Welded AISI Type 304 stainless steel. Hermetically sealed with 70kPa (10.15 psia) internal pressure.
- **Accuracy (Temperature):** ±1°C (±1.8°F) for process fluid temperatures between -60 and +100°C (-76 and +212°F). Or ±3°C (±5.4°F) for process fluid temperatures from -130 to -60°C (-202 to -76°F) and from 100 to 180°C (212 to 356°F).
- **Note:** Stated flow rate accuracy includes the combined effects of linearity, hysteresis, repeatability, and zero offset.
CFS10 Flowtube (continued)

Electrical Classification (Refer to Foxboro for details)

- ATEX (KEMA), II 2 G, Ex eib, IIIB; T2 - T6 (a) .................................................. MMM
- ATEX (KEMA), II 3 G, Ex naA, II; T3 - T6 (a) ................................................... LLL
- CSA, Nonincendive for use in Class I, Division 2, Hazardous Locations (a) ........................................ CNN
- FM, Intrinsically Safe, Class I, Division 1, Groups C and D (a) ......................... FBB
- FM, Nonincendive for Class I, Division 2, Groups A, B, C, and D (a) ............... FNN
- CSA/CSAus Division 1/Zone 0 Intrinsically Safe (b) ........................................... FAA
- CSA/CSAus Division 2/Zone 2 Non-Incendive (b) ............................................. FNN
- ATEX Intrinsic safe Ex ia/ic (f) ........................................................................ AA
- ATEX Non Sparking Zone 2 Ex nA (b) ............................................................. ANN
- IECEx Intrinsic safe Ex ia/ic (b) ......................................................................... EAA
- IECEx Non Sparking Zone 2 Ex nA (b) ............................................................. ENN

Optional Features

- Bidirectional flow calibration ........................................................................... B
- Cryogenic applications for temperatures below -130°C (-202°F) ......................... C
- Radiography of pressure retaining welds. A copy of the Quality Assurance Department’s radiographic inspection report on the process containment welds is provided ........................................... X
- Foxboro material certification of process wetted metal (conforms to DIN 50049, Paragraph 3.1B) ...................................................... M
- Weight & Measures custody transfer/NTEP ....................................................... T
- Optional tamperproof sealing for terminal block .............................................. S

**Specify One**

- Calibrated for use with a CFT50/CFT51 transmitter (default) ......................... E
- Calibrated for use with a CFT10 or CFT15 transmitter ................................. F
- Dual calibrations for use with a CFT10, CFT15, CFT50/CFT51 transmitter .......... G
- Nominal Flowtube -02
- All other sizes

---

Model Code-Cable

- PVC-Insulated cable, -20 to +80°C (-4 to +176°F) Ambient ............................. KFS1
- FEP-Insulated cable, -40 to +85°C (-40 to +185°F) Ambient ............................. KFS2

Cable length

- 20 feet ........................................................................................................... F0020
- 50 feet ........................................................................................................... F0050
- 100 feet ......................................................................................................... F0100
- 200 feet ......................................................................................................... F0200
- 500 feet ......................................................................................................... F0500
- 750 feet ......................................................................................................... F0750
- 1000 feet ....................................................................................................... F1000
- 6 meters ......................................................................................................... M006
- 15 meters ......................................................................................................... M015
- 30 meters ......................................................................................................... M030
- 60 meters ......................................................................................................... M060
- 150 meters ....................................................................................................... M150
- 225 meters ....................................................................................................... M225
- 300 meters ....................................................................................................... M300

---

Specify flow data (rate, pressure, temperature, density, vapor pressure, etc.)

Specify information for instrument tag

Notes

(a) Applies to tubes used with CFT50 only.
(b) Applies to tubes used with CFT51 only.
(c) 1/4” meter utilizes a 1/2” flange when end connections C thru F are selected.
(d) Recommended standard cable:
  - Cable manufacturer: Belden
  - Manufacturer part number: 8778
  - Voltage rating: 30V ac
  - Insulation jacket material: PVC/PVC
  - Ambient temperature limits: -20 and +80°C (-4 and +176°F)
The CFS10 Series I/A Series Sanitary Mass Flowtubes utilize the Coriolis Principle to provide true mass flow rate measurements directly, without the need for external temperature, pressure, or specific gravity (S.G.) inputs. Ideally suited for general Food and Drug Industry applications. Process wetted parts are stainless steel and finished to Sanitary Standards. Flowtube is free from internal crevices, and allows for in-line cleaning using various combinations of cleaning solutions.

For complete specifications, refer to Product Specification Sheet PSS 1-2B1 A.

### Performance Specifications

**Accuracy (Flow Rate):**
±0.15% of reading, or ±0.015% of nominal flow range, whichever is greater.

**Accuracy (Density):**

<table>
<thead>
<tr>
<th>Flowtube Size</th>
<th>Accuracy (Density)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>in</td>
</tr>
<tr>
<td>15 to 50</td>
<td>1/2 to 2</td>
</tr>
</tbody>
</table>

**Milk Density Statement:** Density accuracy specifications for milk standardization applications: ±0.0005 g/cc provided flowtube is correctly installed per Instruction book 3393.

**Accuracy (Temperature):** ±1°C (±1.8°F) for process fluid temperatures between -60 and +100°C (-76 and +212°F). Or ±3°C (±5.4°F) for process fluid temperatures from -130 to -60°C (-202 to -76°F) and from 100 to 180°C (212 to 356°F).

**Note:** Stated flow rate accuracy includes the combined effects of linearity, hysteresis, repeatability, and zero offset.

**Process Density:** Process fluid ranges from 200 to 3000 kg/m³ (12.5 to 187 lb/ft³), or a specific gravity range of 0.2 to 3. Note that a specific gravity of 1 corresponds to a fluid density of 1000 kg/m³ (62.4 lb/ft³).

**Maximum Process Pressure:** 10 bar at 25°C (145 psig at 77°F)

**Normal Operating Condition Limits:** Process Temperature: -130 and +180°C (-202 & +356°F). Ambient Temperature: -40 and +85°C (-40 & +185°F).

**Relative Humidity:** 5 and 100%

### Functional Specifications

#### Nominal Flow Rate Ranges:

<table>
<thead>
<tr>
<th>Flowtube Size</th>
<th>Nominal Flow Rate Range</th>
<th>Mass Flow Rate Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>in</td>
<td>mm</td>
<td>kg/min</td>
</tr>
<tr>
<td>1/4</td>
<td>6</td>
<td>0.09 to 9</td>
</tr>
<tr>
<td>1/2</td>
<td>15</td>
<td>0.4 to 40</td>
</tr>
<tr>
<td>3/4</td>
<td>20</td>
<td>0.9 to 90</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>1.8 to 80</td>
</tr>
<tr>
<td>1 1/2</td>
<td>40</td>
<td>4 to 400</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>7 to 700</td>
</tr>
</tbody>
</table>

**Notes:**
1. Extended upper range is based on a fluid specific of 0.8 at a temperature of 100°C (212°F). To find the extended upper range at other specific gravities and temperatures, contact Foxboro.

---

**Flow**

CFS10 Sanitary Mass Flowtubes

- **3A Authorized**
- **Single Continuous, Thick Walled, Full Bore Flowtube**
  - Virtually eliminates tube fatigue failure.
  - Low pressure loss.
  - Self-draining in a vertical line.
  - Excellent for clean fluids, slurries, and shear sensitive liquids.
- **Patented Antiphase Double Driver, Double Sensor with Synchronous Mode Demodulation**
  - Accurate measurement of the Coriolis force at low flow rates.
  - Low power consumption for intrinsic safety.
- **Flowtube Assembly Provides:**
  - Improved dependability.
  - Excellent accuracy at low flow rates.
  - Application versatility.
  - Ease of installation or retrofit.
- **Wide Range of Sanitary End Connections**
  - Formatting with Tri-Clover Quick-Disconnect Ferrule.
  - DIN coupling with external thread, DIN 11851.

**Physical Specifications**

**Enclosure:** Welded AISI Type 304 stainless steel. Hermetically sealed with 70 kPa (10.15 psia) internal pressure.
How to Order

Nominal Flowtube and End Connection Size:
- 6 mm (1/4 in) ................. 0.03
- 15 mm (1/2 in) ............... 0.05
- 20 mm (3/4 in) ............... 0.08
- 25 mm (1 in) ................. 0.10
- 40 mm (1 1/2 in) ............ 0.15
- 50 mm (2 in) ................. 0.20

Flowtube Wetted Material
- AISI Type 316L Stainless Steel prepared for sanitary applications
- (3A Authorization Number 224)
- Contact Swanson Flo for details.

End Connections (Supplied in AISI Type 316 stainless steel only):
For mating to tri-clover quick disconnect ferrule
- DIN coupling with external thread, DIN 11851

Electrical Classification (Refer to Foxboro for details)
- ATEX (KEMA), III 2 G; EEx ib, IIB, T2-T6
d- ATEX (KEMA), III 2 G; EEx nA, II; T3 - T6
- CSA, Nonincendive for use in Class I, Division 2, Hazardous Locations
c- FM, Intrinsically Safe, Class I, Division 1, Groups C and D
d- FM, Nonincendive for use in Class I, Division 2, Groups A, B, C, and D
e- CSA/CSAus Division 1/Zone 0 Intrinsically Safe
f- CSA/CSAus Division 2/Zone 2 Non-Incendive
- FM Division 1/Zone 0 Intrinsically Safe
- FM Division 2/Zone 2 Non-Incendive
- ATEX Non Sparking Zone 2 Ex nA
- IECEx Intrinsically safe Ex ia/ic
- IECEx Non Sparking Zone 2 Ex nA
- No Certified Connectivity (CFT51)
- No Certified Connectivity (CFT50)

Optional Features
- Bidirectional flow calibration
- Foxboro material certification of process wetted materials (conforms to DIN 50049, Paragraph 3.1B)
- Weight & Measures custody transfer/NETEP
- Optional tamperproof sealing

Specify One
- Calibrated for use with a CFT50/CFT51 transmitter (default)
- Dual calibrations for use with a CFT10, CFT15, or CFT50/CFT51 transmitter

Model Code-Cable
- PVC-Insulated cable, -20 to +80°C (-4 to 176°F) Ambient
- FEP-Insulated cable, -40 to +85°C (-40 to 185°F) Ambient

Cable length
- 20 feet ..................... F0020
- 50 feet ..................... F0050
- 100 feet ................... F0100
- 200 feet ................. F0200
- 500 feet ................. F0500
- 750 feet ................... F0750
- 1000 feet .............. F1000
- 1500 feet ............. F1500
- 2000 feet ............ F2000
- 3000 feet ............ F3000

How to Order-Cable
- Specify flow data (rate, pressure, temperature, density, vapor pressure, etc.)
- Specify information for instrument tag

Notes
(a) IMPORTANT: The flowtube is NOT supplied with cable for transmitter interconnection. Standard cable can be ordered separately. See Cable Model Code for ordering information.
(b) Specify one of either -E, -F, or -G Calibration Options only.
(c) Option -S not available with Electrical Safety Codes MMM and LLL.
(d) Option -T not available with Electrical Safety Codes CNN, MMM, and LLL.
(e) Applies to tubes used with CFT50 only.
(f) Applies to tubes used with CFT51 only.
(g) With codes 03, 05, 08, and 10 above, a 1-inch connector is used.
(h) Recommended Standard Cable:
- Cable Manufacturer: Belden
- Part Number: 8778
- Voltage Rating: 30 V ac
- Insulation/Jacket Material: PVC/PVC
- Ambient Temperature Limits: -20 and +80°C (-4 and 176°F)
The CFS20 Series Mass Flowtubes utilize the Coriolis Principle to provide true mass flow rate measurements directly, without the need for external temperature, pressure, or specific gravity (S.G.) input. For complete specifications, refer to Product Specification Sheet PSS 1-2B4 A.

**Performance Specifications**

Accuracy (Flow Rate): ±0.15% of reading, or ±0.015% of nominal flow range, whichever is greater.

Note: Stated flow rate accuracy includes the combined effects of linearity, hysteresis, repeatability, and zero offset.

Accuracy (Density): ±0.0015 g/cm (0.024 lb/ft³)

Milk Density Statement: Density accuracy specifications for milks standardization applications: ±0.0005 g/cc provided flowtube is correctly installed per Instruction book 3393.

Accuracy (Temperature): ±1°C (±1.8°F) for process fluid temperatures between -60 and +100° C (-76 and +212°F). Or ±3°C (±5.4°F) for process fluid temperatures from -130 to -60°C (-202 to -76°F) and from 100 to 180°C (212 to 356°F).

**Nominal Flow Rate:**
- CFS20-15: 9 to 900 lb/min (40 to 400 kg/min)
- CFS20-30: 40 to 4000 lb/min (18 to 1815 kg/min)

**Extended Upper Flow Range:**
- CFS20-15: 1070 lb/min (485 kg/min)
- CFS20-30: 4500 lb/min (2040 kg/min) Based on a fluid specific gravity of 0.8 and 212°F (100°C). To find the extended upper range at other specific gravities and temperatures, contact Foxboro.

**Functional Specifications:**

- **Flowtube Limits**
  - Type
  - Process Temperature
  - Max. Working Pressure
  - Hastelloy C-2³

<table>
<thead>
<tr>
<th>Type</th>
<th>Process Temp.</th>
<th>Max. Working Pressure (316/316L Flanges)</th>
<th>Hastelloy C-2³</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSI</td>
<td>100°F</td>
<td>275 psig</td>
<td>290 psig</td>
</tr>
<tr>
<td>Class 150</td>
<td>200°F</td>
<td>240 psig</td>
<td>260 psig</td>
</tr>
<tr>
<td></td>
<td>300°F</td>
<td>215 psig</td>
<td>230 psig</td>
</tr>
<tr>
<td></td>
<td>356°F</td>
<td>208 psig</td>
<td>217 psig</td>
</tr>
<tr>
<td>ANSI</td>
<td>100°F</td>
<td>720 psig</td>
<td>750 psig</td>
</tr>
<tr>
<td>Class 300</td>
<td>200°F</td>
<td>620 psig</td>
<td>750 psig</td>
</tr>
<tr>
<td></td>
<td>300°F</td>
<td>560 psig</td>
<td>730 psig</td>
</tr>
<tr>
<td></td>
<td>356°F</td>
<td>540 psig</td>
<td>719 psig</td>
</tr>
<tr>
<td>ANSI</td>
<td>100°F</td>
<td>1440 psig</td>
<td>1500 psig</td>
</tr>
<tr>
<td>Class 600</td>
<td>200°F</td>
<td>1240 psig</td>
<td>1500 psig</td>
</tr>
<tr>
<td></td>
<td>300°F</td>
<td>1120 psig</td>
<td>1455 psig</td>
</tr>
<tr>
<td></td>
<td>356°F</td>
<td>1080 psig</td>
<td>1435 psig</td>
</tr>
<tr>
<td>BS 4504</td>
<td>50°C</td>
<td>40 bar²</td>
<td>41.7 psig</td>
</tr>
<tr>
<td>(DN) PN</td>
<td>100°C</td>
<td>34.2 bar²</td>
<td>37.1 psig</td>
</tr>
<tr>
<td>10/16/25/40</td>
<td>150°C</td>
<td>30.8 bar²</td>
<td>32.9 psig</td>
</tr>
<tr>
<td></td>
<td>180°C</td>
<td>29.3 bar²</td>
<td>30.6 psig</td>
</tr>
</tbody>
</table>

Flange to mate
- Maximum working pressure is limited with
- BS4504 (1969) by the flowtubelimits above or by the user’s
- PN 100/2 (DN) end connection, whichever is less

**Physical Specifications**

- **Enclosure:** Welded AISI Type 304 stainless steel. Hermetically sealed with 70kPa (10.15 psia) internal pressure.
- **Process Density:** Process fluid density ranges from 200 to 3000 kg/m³ (12.5 to 187 lb/ft³) or a specific gravity range of 0.2 to 3.
- **Normal Operating Condition Limits:**
  - Process Temperature: -130 and +180°C (-202 and +356°F).
  - Ambient Temperature: -40 and +85°C (-40 and +185°F).
  - Relative Humidity: 5 and 100%

**Notes for End Corrections Limits Table**
1. Linear interpolation is acceptable.
2. To obtain MPa value, divide bar value by 10. To obtain kPa value, multiply bar value by 100.
3. 40 mm (1.5 inch) only.

**End Connection Limits**
How to Order—Specify model number CFS20 followed by order code for each selection

Nominal Flowtube and Flange Size (Sensor):

<table>
<thead>
<tr>
<th>Flowtube Wetted Material: AISI Type 316L</th>
<th>CFS20-60</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 mm (1.5 in)</td>
<td></td>
</tr>
<tr>
<td>80 mm (3 in)</td>
<td></td>
</tr>
</tbody>
</table>

End Connections

| ANSI Class 150 flange                  | C        |
| ANSI Class 300 flange                  | D        |
| ANSI Class 600 flange                  | E        |
| PN 10/16, 25/40                        | F        |
| PN 100 flange, mates with BS4504, Part 4, 1969 (100/2) | J        |

Electrical Classification (Refer to Foxboro for details)

<table>
<thead>
<tr>
<th>Cable Insulation Material</th>
<th>KFS1</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC-Insulated cable, -20 to +80°C (-4 to 176°F) Ambient</td>
<td>KFS2</td>
</tr>
<tr>
<td>FEP-Insulated cable, -40 to +85°C (-40 to +185°F) Ambient</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable length</th>
<th>F0020</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 feet</td>
<td>F0050</td>
</tr>
<tr>
<td>50 feet</td>
<td>F0100</td>
</tr>
<tr>
<td>100 feet</td>
<td>F0200</td>
</tr>
<tr>
<td>200 feet</td>
<td>F0300</td>
</tr>
<tr>
<td>500 feet</td>
<td>F0750</td>
</tr>
<tr>
<td>1000 feet</td>
<td>F1000</td>
</tr>
<tr>
<td>6 meters</td>
<td>M006</td>
</tr>
<tr>
<td>15 meters</td>
<td>M015</td>
</tr>
<tr>
<td>30 meters</td>
<td>M030</td>
</tr>
<tr>
<td>60 meters</td>
<td>M060</td>
</tr>
<tr>
<td>150 meters</td>
<td>M150</td>
</tr>
<tr>
<td>220 meters</td>
<td>M225</td>
</tr>
<tr>
<td>300 meters</td>
<td>M300</td>
</tr>
</tbody>
</table>

Specify flow data (rate, pressure, temperature, density, vapor pressure, etc.) Specify information for instrument tag

This product and its components are protected by one or more of the following U.S. patents: 4,891,991; 4,911,020; 5,048,350; 5,050,439; 5,271,281; 5,343,764; 5,546,814 and others pending. Corresponding patents have been issued or are pending in other countries.

Notes

(a) Applies to tubes used with CFT50 only
(b) Applies to tubes used with CFT51 only
(c) Contact Foxboro for availability
(d) Recommended Standard Cable:
   - Part Number: 8778
   - Voltage Rating: 30 V ac
   - Insulation/Jacket Material: PVC/PVC
   - Ambient Temperature Limits: -20 and +80°C (-4 and 176°F)
The CFS20 Series Sanitary Mass Flowtubes utilize the Coriolis Principle to provide true mass flow rate measurements directly, without the need for external temperature, pressure, or specific gravity (S.G.) inputs. Ideally suited for general Food and Drug Industry applications. Process wetted parts are stainless steel and finished to Sanitary Standards. Flowtube is free from internal crevices, and allows for in-line cleaning using various combinations of cleaning solutions.

For complete specifications, refer to Product Specification Sheet PSS 1-2B4 A.

**Performance Specifications**

**Accuracy (Flow Rate):** ±0.15% of reading, or ±0.015% of nominal flow range, whichever is greater.

**Note:** Stated flow rate accuracy includes the combined effects of linearity, hysteresis, repeatability, and zero offset.

**Accuracy (Density):** ±0.0015 g/cm³ (0.024 lb/ft³).

**Milk Density Statement:** Density accuracy specifications for milk standardization applications: ±0.0005 g/cc provided flowtube is correctly installed per Instruction book 3393.

**Accuracy (Temperature):** ±1°C (±1.8°F) for process fluid temperatures between -60 and +100°C (-76 and +212°F). Or ±3°C (±5.4°F) for process fluid temperatures from -130 to -60°C (-202 to -76°F) and from 100 to 180°C (212 to 356°F).

**Nominal Flow Range:** 40 to 4000 lb/min (18 to 1815 kg/min)

**Extended Upper Flow Range:** 4500 lb/min (2040 kg/min) based on a fluid specific gravity of 0.8 and at 212°F (100°C). To find the extended upper range at other specific gravities and temperatures, contact Foxboro.

**Functional Specifications**

**Process Density:** Process fluid density ranges from 200 to 3000 kg/m³ (12.5 to 187 lb/ft³), or a specific gravity of 1 corresponds to a fluid density of 1000 kg/m³ (62.4 lb/ft³).

**Maximum Process Pressure:** 10 bar (145 psi) gauge at 25°C (77°F)

**Normal Operating Condition Limits:**

- Process Temperature: -130 and +180°C (-202 and +356°F).
- Ambient Temperature: -40 and +85°C (-40 and +185°F).
- Relative Humidity: 5 and 100%

**Physical Specifications**

**Enclosure:** Welded AISI Type 304 stainless steel. Hermetically sealed with 70 kPa (10.15 psia) internal pressure
### How to Order—Specify model number CFS20 followed by the order code for each section.

#### Nominal Flowtube and End Connection Size:

<table>
<thead>
<tr>
<th>Size</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>80mm (3 in.)</td>
<td>30</td>
</tr>
</tbody>
</table>

#### Flowtube Wetted Material

- **AISI Type 316L Stainless Steel** prepared for sanitary applications
- *(3A Authorization Number 224)*

#### End Connections (Supplied in AISI Type 316 stainless steel only):

- For mating to tri-clover quick-disconnect ferrule
- **DIN** coupling with external thread, **DIN 11851**

#### Electrical Classification (Refer to Foxboro for details)

<table>
<thead>
<tr>
<th>Classification</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX (KEMA), II 2 G, Ex ib, IIB; T2 - T6</td>
<td>EMM</td>
</tr>
<tr>
<td>ATEX (KEMA), II 3 G, Ex nA, Ii; T3 - T6</td>
<td>LLL</td>
</tr>
<tr>
<td>CSA, Nonincendive for use in Class I, Division 2, Hazardous Locations</td>
<td>CNN</td>
</tr>
<tr>
<td>FM, Intrinsically Safe, Class I, Division 1, Groups C and D</td>
<td>FBB</td>
</tr>
<tr>
<td>FM, Nonincendive for Class I, Division 2, Groups A, B, C, and D</td>
<td>FNN</td>
</tr>
<tr>
<td>CSA/CSAus Division 1/Zone 0 Intrinsically Safe</td>
<td>CAA</td>
</tr>
<tr>
<td>CSA/CSAus Division 2/Zone 2 Non-Incendive</td>
<td>CEN</td>
</tr>
<tr>
<td>FM Division 1/Zone 0 Intrinsically Safe</td>
<td>FAA</td>
</tr>
<tr>
<td>FM Division 2/Zone 2 Non-Incendive</td>
<td>FFA</td>
</tr>
<tr>
<td>ATEX Intrinsically Safe Ex ia/ic</td>
<td>FAA</td>
</tr>
<tr>
<td>ATEX Non Sparking Zone 2 Ex nA</td>
<td>AAN</td>
</tr>
<tr>
<td>IECEx Intrinsically Safe Ex ia/ic</td>
<td>EEA</td>
</tr>
<tr>
<td>IECEx Non Sparking Zone 2 Ex nA</td>
<td>EEN</td>
</tr>
</tbody>
</table>

#### Optional Features

- Bidirectional flow calibration
- Foxboro material certification of process wetted materials (conforms to DIN 50049, Paragraph 3.1B)

**Specify One**

- Calibrated for use with a CFT50 transmitter (default)
- Calibrated for use with a CFT10 or CFT15 transmitter
- Dual calibrations for use with a CFT10, CFT15, or CFT50 transmitter

#### Model Code-Cable

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFS20 Sanitary</td>
<td></td>
</tr>
</tbody>
</table>

#### Cable Insulation Material

- PVC-Insulated cable, -20 to +80°C (-4 to 176°F) Ambient
- FEP-Insulated cable, -40 to +85°C (-40 to +185°F) Ambient

#### Cable length

<table>
<thead>
<tr>
<th>Length</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 feet</td>
<td>F0020</td>
</tr>
<tr>
<td>50 feet</td>
<td>F0050</td>
</tr>
<tr>
<td>100 feet</td>
<td>F0100</td>
</tr>
<tr>
<td>200 feet</td>
<td>F0200</td>
</tr>
<tr>
<td>500 feet</td>
<td>F0500</td>
</tr>
<tr>
<td>750 feet</td>
<td>F0750</td>
</tr>
<tr>
<td>1000 feet</td>
<td>F1000</td>
</tr>
<tr>
<td>6 meters</td>
<td>M006</td>
</tr>
<tr>
<td>15 meters</td>
<td>M015</td>
</tr>
<tr>
<td>30 meters</td>
<td>M030</td>
</tr>
<tr>
<td>60 meters</td>
<td>M060</td>
</tr>
<tr>
<td>150 meters</td>
<td>M150</td>
</tr>
<tr>
<td>225 meters</td>
<td>M225</td>
</tr>
<tr>
<td>300 meters</td>
<td>M300</td>
</tr>
</tbody>
</table>

#### Specify flow data (rate, pressure, density, vapor pressure, etc.)

#### Specify information for instrument tag

This product and its components are protected by one or more of the following U.S. patents: 4,891,991; 4,911,020; 5,048,350; 5,050,439; 5,271,281; 5,343,764; 5,546,814 and others pending. Corresponding patents have been issued or are pending in other countries.

**Notes**

- (a) Applies to tubes used with CFT50 only.
- (b) Applies to tubes used with CFT15 only.
- (c) Recommended Standard Cable:
  - Cable Manufacturer: Belden
  - Part Number: 8778
  - Voltage Rating: 30 V ac
  - Insulation/Jacket Material: PVC/PVC
  - Ambient Temperature Limits: -20 and +80°C (-4 and 176°F)
CFT51 Mass Flow Transmitters

- Patented DSP techniques minimize shortcomings of existing Coriolis flowmeters for measurement of two-phase flow, partial empty tube conditions, and batching from empty.
- Digital precision, stability, and resolution ensure top measurement performance over analog transmitters using the same mass flowtube.
- New transmitter technology eliminates need for slug flow software.
- Select from six separate output signal combinations. Each combination of four different signals includes a 4 to 20 mA output with either HART or Modbus protocols.
- Remote communications via HART or Modbus in a single loop or multidrop configuration.
- Totally configurable from the local LCD Indicator using four pushbuttons.
- Available for ac or dc supply voltage applications.
- Transmitter can be remote mounted at distances up to 305 m (1000 ft) from flowtube. Mounting bracket allows remote transmitter to be mounted to a surface, or to a DN50 to DN80 (2 in to 3 in) pipe.
- CFT51 Transmitter is backward compatible to existing CFS10 and CFS20 flowtubes. The CFT51 may have some limitations based on certifications.
- Transmitter enclosure satisfies IP66 and NEMA™ requirements.
- Designed for FM, CSA, and ATEX Hazardous Area locations. Applicable agency plate also includes CE mark.

The model CFT51 is an enhanced version of the CFT50 in that it provides all the features available with the CFT50 transmitter, and it also provides on-line flowtube verification and on-line pressure compensation capabilities. The CFT51 Coriolis Mass Flow Transmitter combines with models CFS10 and CFS20 mass flowtubes to form a mass flow and density measuring system. The CFT51 incorporates advanced digital processing to overcome many of the traditionally difficult coriolis challenges such as two phase (gas/liquid) flows and starting and/or finishing empty in batching or dosing applications. PSS 1-2B7 C

**Performance Specifications (under reference operating conditions unless otherwise specified)**

**Accuracy — Mass Flow Rate** (includes linearity, hysteresis, and repeatability): ±0.10% and zero instability (see Table 1) — liquids. ±0.50% and zero instability — gases. Accuracy in % of rate is therefore;

\[
\text{Accuracy} = \pm 0.10\% + \left( \frac{\text{Zero Instability}}{\text{Mass Flow Rate}} \times 100 \right)\%
\]

**Table 1. Zero Instability (a)**

<table>
<thead>
<tr>
<th>Flowtube Size</th>
<th>Zero Instability kg/min</th>
<th>Zero Instability lb/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFS10 3 mm (1/8 in)</td>
<td>0.000016</td>
<td>0.00035</td>
</tr>
<tr>
<td>CFS10 6 mm (1/4 in)</td>
<td>0.00045</td>
<td>0.001</td>
</tr>
<tr>
<td>CFS10 15 mm (1/2 in)</td>
<td>0.00204</td>
<td>0.0045</td>
</tr>
<tr>
<td>CFS10 20 mm (3/4 in)</td>
<td>0.00454</td>
<td>0.010</td>
</tr>
<tr>
<td>CFS10 25 mm (1 in)</td>
<td>0.00907</td>
<td>0.020</td>
</tr>
<tr>
<td>CFS10 40 mm (1 1/2 in)</td>
<td>0.0204</td>
<td>0.045</td>
</tr>
<tr>
<td>CFS10 50 mm (2 in)</td>
<td>0.0340</td>
<td>0.075</td>
</tr>
<tr>
<td>CFS20 40 mm (1 1/2 in)</td>
<td>0.0204</td>
<td>0.045</td>
</tr>
<tr>
<td>CFS20 80 mm (3 in)</td>
<td>0.0907</td>
<td>0.200</td>
</tr>
</tbody>
</table>

(a) In the accuracy equation, Zero Instability and Mass Flow Rate units must be the same.

**Accuracy — Density (liquids):** ± 0.0005 g/cc³ provided by built-in density optimization function.

**Functional Specifications**

**Power Requirements:**
- ac Supply
  - Supply Voltage: 102 to 264 V ac
  - Supply Frequency: 47 to 63 Hz
  - Power: 18 VA maximum
- dc Supply
  - Supply Voltage: 10 to 36 V dc
  - Power: 15 W maximum
  - Operating Current: 1 A
  - Startup Current: 3 A

**Transmitter Capabilities:**
- Direct Mass Flow Rate
- Volumetric Flow Rate
- Totalized Mass Flow Rate
- Totalized Volumetric Flow Rate
- Process Fluid Density
- Temperature
- Bidirectional Flow
- Percent Solids/Concentration
- Brix and BaumÉ Scales

**Totalization:**
- The transmitter has nonvolatile RAM for the following:
  - Forward Totals
  - Reverse Totals
Functional Specifications (continued)

How to Order—Specify model number CFT51 followed by order code for each selection

Communication Interface (d)
- HART Communication Protocol .......................................................... T
- Modbus Communication Protocol ........................................................ M

Mass Flowtube Interface
- Foxboro CFS10 and CFS20 Series Flowtubes .......................................... B

Transmitter Mounting
- Remote Mounted Transmitter ............................................................... 1

Language
- English .................................................................................................. E

Nominal Supply Voltage
- 120 to 240 V ac, 50 or 60 Hz, Externally Powered I/O ............................ A
- 10 to 36 V dc , Externally Powered I/O .................................................. B

Local LCD Indicator with Pushbuttons
- None – Blind UnitAmbient ................................................................. A
- Integral LCD Indicator with Pushbuttons for Local Configuration .......... B

Housing Field Cable Entries
- 1/2 NPT Connection (Two places) ...................................................... A
- M20 Connection (Two places) ............................................................ B

Interconnecting Cable Material
- No Cable ................................................................................................ N
- IPVC Insulated Cable; Temperature Range from -20 to +80°C (-4 to +176°F)... P
- FEP Insulated Cable; Temperature Range from -40 to +85°C (-40 to +185°F) F

Interconnecting Cable Length
- No Cable ................................................................................................ N
- 20 foot cable/6 meter cable .................................................................... G
- 50 foot cable/15 meter cable .................................................................. P
- 100 foot cable/31 meter cable .............................................................. H
- 200 foot cable/61 meter cable ............................................................... J
- 500 foot cable/152 meter cable .............................................................. K
- 750 foot cable/229 meter cable ............................................................. L
- 1000 foot cable/305 meter cable ........................................................... M

Ordering Model Number Selection Table continued next page.
**Electrical Safety (Also see Electrical Safety Specifications section) (e)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX flameproof with intrinsically safe flowtube connections</td>
<td>ADA</td>
</tr>
<tr>
<td>ATEX flameproof with energy limited flowtube connections</td>
<td>ADN</td>
</tr>
<tr>
<td>ATEX nonsparking with intrinsically safe flowtube connections</td>
<td>ANA</td>
</tr>
<tr>
<td>ATEX nonsparking with energy limited flowtube connections</td>
<td>ANN</td>
</tr>
<tr>
<td>CSA/CSAus explosionproof with intrinsically safe flowtube connections</td>
<td>CDA</td>
</tr>
<tr>
<td>CSA/CSAus explosionproof with nonincendive flowtube connections</td>
<td>CDN</td>
</tr>
<tr>
<td>CSA/CSAus nonincendive and energy limited with intrinsically safe flowtube connections</td>
<td>CNA</td>
</tr>
<tr>
<td>CSA/CSAus nonincendive with nonincendive flowtube connections</td>
<td>CNN</td>
</tr>
<tr>
<td>FM explosionproof with intrinsically safe flowtube connections</td>
<td>FDA</td>
</tr>
<tr>
<td>FM explosionproof with nonincendive flowtube connections</td>
<td>FDN</td>
</tr>
<tr>
<td>FM nonincendive with intrinsically safe flowtube connections</td>
<td>FNA</td>
</tr>
<tr>
<td>FM nonincendive with nonincendive flowtube connections</td>
<td>FNN</td>
</tr>
<tr>
<td>IECEx flameproof with intrinsically safe flowtube connections</td>
<td>EDA</td>
</tr>
<tr>
<td>IECEx flameproof with energy limited flowtube connections</td>
<td>EDN</td>
</tr>
<tr>
<td>IECEx nonsparking with intrinsically safe flowtube connections</td>
<td>ENA</td>
</tr>
<tr>
<td>IECEx nonsparking with energy limited flowtube connections</td>
<td>ENN</td>
</tr>
<tr>
<td>NEPSI flameproof with intrinsically safe flowtube connections&lt;sup&gt;e&lt;/sup&gt;</td>
<td>NDA</td>
</tr>
<tr>
<td>NEPSI flameproof with energy limited flowtube connections&lt;sup&gt;e&lt;/sup&gt;</td>
<td>NDN</td>
</tr>
<tr>
<td>NEPSI nonsparking with intrinsically safe flowtube connections&lt;sup&gt;e&lt;/sup&gt;</td>
<td>NNA</td>
</tr>
<tr>
<td>NEPSI nonsparking with energy limited flowtube connections&lt;sup&gt;e&lt;/sup&gt;</td>
<td>NNN</td>
</tr>
<tr>
<td>No Certifications</td>
<td>ZZZ</td>
</tr>
</tbody>
</table>

**Tamperproof and Custody Transfer Options**

- Tamperproof Sealing for Housing and Terminal Block Covers -S
- Weights and Measures Custody Transfer (NTEP)<sup>b</sup> -T

**Paint Options**

- Epoxy Paint<sup>c</sup> -E

**Mounting Bracket Material and Pipe Size**

- Stainless Steel -F
- Carbon Steel, 3-inch pipe -G
- Stainless Steel, 3-inch pipe -H

**Notes**

(a) The Model CFT51 is an enhanced version of the Model CFT50 Digital Coriolis Mass Flow Transmitter. Other than its physical configuration, it offers the same features as the Model CFT50, but with additional features, particularly applications for Bunker Fuel Custody Transfer and Wet Gas Allocation measurements.

(b) When used with the Models CFS10 and CFS20 Style B Flowtubes, the flowtubes must also have Option -T (NTEP). Also, Option -T is only available with Electrical Safety Codes FDA, FDN, FNA, and FNN, and only available with LCD Indicator with Keypad Code B.

(c) Epoxy paint finish option applies to the enclosure body; the enclosure covers use an epoxy paint finish as standard.

(d) Factory default setting. Transmitters with display and keypad may be changed in the field.

(e) These transmitters have been designed to meet the electrical safety specifications listed in the table above. Contact Invensys (see back page) for the status of agency approvals or certifications.

Specify information for instrument tag
High Power, ExPulse, Magnetic Flowmeters 2800 Series
PTFE Lined Flowtubes, IMT96 Series Transmitter

A Magnetic Flowmeter consisting of a flowtube, signal cable, and Transmitter measures flow rate of conductive liquids and transmits a proportional electrical signal.

For complete information on all options, specifications and ordering instructions, refer to Product Specification Sheets PSS 1-6B5 A, C & E (Flowtubes) and PSS 1-6F8 A (IMT96 Series Transmitter) and PSS 1-6C1 A (E96 Series Transmitter).

Obstructionless Tube
- PTFE liner 15 and 600 mm (1/2 to 24 in.)
- Polyurethane Liner 50mm and 900mm (2 to 36 in.)
- Neoprene Liner 350mm and 900mm (14 to 36 in.)
- Refer to Product Specification Sheets PSS 1 6B5 A & E for specifications and ordering information on polyurethane and neoprene liner options.

Designed for Wide Variety of Applications
- Suitable for all conductive liquids and slurries.
- IMT96 Series Transmitter
  - Choice of Digital, analog, or Pulse Output Signals.
    Refer to PSS 1-6F8 A for Product Specifications.
  - Surface or pipe mounting options.

Functional Specifications
Flow Rates: Minimum and Maximum Upper Range Limits

<table>
<thead>
<tr>
<th>Flowtube Size</th>
<th>Upper Range Limits</th>
<th>IMT96 Series ac Transmitter</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>in</td>
<td>min</td>
</tr>
<tr>
<td>15</td>
<td>1/2</td>
<td>4.2</td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>40</td>
<td>1.5</td>
<td>37.8</td>
</tr>
<tr>
<td>50</td>
<td>2</td>
<td>60</td>
</tr>
<tr>
<td>80</td>
<td>3</td>
<td>132</td>
</tr>
<tr>
<td>100</td>
<td>4</td>
<td>246</td>
</tr>
<tr>
<td>150</td>
<td>6</td>
<td>570</td>
</tr>
<tr>
<td>200</td>
<td>8</td>
<td>1020</td>
</tr>
<tr>
<td>250</td>
<td>10</td>
<td>1500</td>
</tr>
<tr>
<td>300</td>
<td>12</td>
<td>2280</td>
</tr>
<tr>
<td>350</td>
<td>14</td>
<td>3410</td>
</tr>
<tr>
<td>400</td>
<td>16</td>
<td>4540</td>
</tr>
<tr>
<td>450</td>
<td>18</td>
<td>5680</td>
</tr>
<tr>
<td>500</td>
<td>20</td>
<td>7190</td>
</tr>
<tr>
<td>600</td>
<td>24</td>
<td>11400</td>
</tr>
</tbody>
</table>

Process Temperature and Pressure Limits (PTFE):

- Process temperature and pressure must be within the boundaries:
  - LABCM for flowtubes with ANSI Class 150 and 300 flanges.
  - LHJKM for flowtubes with PN 10 flanges.
  - LDEFM for flowtubes with PN 16, 25, and 40 flanges.
  - Refer to Foxboro for applications involving elevated pressure.

Performance Specifications
Accuracy—Digital and Pulse Outputs

<table>
<thead>
<tr>
<th>Flow System</th>
<th>Tube Size</th>
<th>System Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flowtube</td>
<td>15 to 300mm</td>
<td>±0.50% of rate</td>
</tr>
<tr>
<td>and IMT96</td>
<td>(1/2 to 12 in)</td>
<td></td>
</tr>
<tr>
<td>Transmitter</td>
<td>400 to 900mm</td>
<td>±1.0% of rate</td>
</tr>
<tr>
<td></td>
<td>(14 to 36 in)</td>
<td></td>
</tr>
</tbody>
</table>

Minimum Conductivity of Process Fluid: 2 µmho/cm
Ambient Temperature Limits:
- Flowtube: -30 and +60°C (-20 and +140°F).
- Transmitter: -30 and +70°C (-25 and +160°F).

Electrical Classification: FM and CSA certified versions available for ordinary locations, and Division 2 hazardous locations. Refer to Foxboro for complete specifications.
**Physical Specifications**

**Enclosure Classification:** Flowtubes (280H through 2824 Series) and Transmitters. Meets the requirements of IEC IP65 and provides the environmental protection of NEMA Type 4X.

**Electrode Materials:** See How to Order.

**Lining Materials:** PTFE

**Mounting:**
- Flowtube: By process connection flanges. See How to Order.
- Transmitter: Pipe; Bracket for mounting to DN 50 or 2 in pipe.
- Surface; Plate permits mounting to surface such as a wall.

### How to Order—Specify Flowtube Model Number

<table>
<thead>
<tr>
<th>Nominal Line Size</th>
<th>Flowtube Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 mm (1/2 in)</td>
<td>280H</td>
</tr>
<tr>
<td>25 mm (1 in)</td>
<td>2801</td>
</tr>
<tr>
<td>40 mm (1 1/2 in)</td>
<td>281H</td>
</tr>
<tr>
<td>50 mm (2 in)</td>
<td>2802</td>
</tr>
<tr>
<td>80 mm (3 in)</td>
<td>2803</td>
</tr>
<tr>
<td>100 mm (4 in)</td>
<td>2804</td>
</tr>
<tr>
<td>150 mm (6 in)</td>
<td>2806</td>
</tr>
<tr>
<td>200 mm (8 in)</td>
<td>2808</td>
</tr>
<tr>
<td>250 mm (10 in)</td>
<td>2810</td>
</tr>
<tr>
<td>300 mm (12 in)</td>
<td>2812</td>
</tr>
<tr>
<td>350 mm (14 in)</td>
<td>2814</td>
</tr>
<tr>
<td>400 mm (16 in)</td>
<td>2816</td>
</tr>
<tr>
<td>450 mm (18 in)</td>
<td>2818</td>
</tr>
<tr>
<td>500 mm (20 in)</td>
<td>2820</td>
</tr>
<tr>
<td>600 mm (24 in)</td>
<td>2824</td>
</tr>
</tbody>
</table>

**Tube Construction**

- Type 304 ss, Schedule 10 (2801 through 2812 only). ........................................ SA
- 310 ss, Schedule 40 (280H only) ................................................................. SB
- 304 ss, 3.18 mm (0.125 in) wall (2814 through 2824 only) SE

**End Connections**

- ANSI Class 150 raised face (RF) flange carbon steel (280H through 2824) . BA
- ANSI Class 150 RF flange, AISI Type 316 ss (280H through 2808 only) BB
- ANSI Class 300 RF flange, as (280H through 2808 only) BD
- PN 10 RF flange, cs (280H through 2824 only) ZD
- PN 16, cs (280H through 2812 only) ........................................................ ZF
- PN 25, cs (280H through 2808 only) ........................................................ ZG
- PN 40, cs (280H through 2808 only) ........................................................ ZL
- PN 10, 316 ss (280H through 2808 only) .................................................. 2M
- PN 16, 316 ss (280H through 2808 only) .................................................. 2N
- PN 40, 316 ss (280H through 2808 only) .................................................. 2P
- PN 6, cs (2814 through 2824 only) .......................................................... ZZ

**Lining**

- PTFE ........................................................................ T

**Electrodes**

- 316L ss ......................................................................... S
- Hastelloy C .................................................................. H
- Platinum—10% iridium .................................................... P
- Tantalum-tungsten .......................................................... B
- Titanium ........................................................................ T
- Conical shaped, 316L ss (2801 through 2824 only) ............ C
- Conical shaped, Hastelloy C (2801 through 2824 only) .......... K
### Nominal Supply Voltage and Frequency

- For use with 120 V, 60 Hz (E96), (2810 and 2824 Parallel Coils only) ................................................. A
- For use with 240 V, 60 Hz (E96), (280H through 2808 Parallel Coils not Available) ................................. B
- For use with 120 V, 50 Hz (E96) .............................................................................................................. C
- For use with 220 V, 50 Hz (E96) .............................................................................................................. D
- For use with 240 V, 50 Hz (E96), (Series Coils Only) .............................................................................. E
- Pulsed dc from 896 Transmitter (Series Coils Only) ............................................................................. F
- Either Pulsed dc from 896 Transmitter or 120 V, 60 Hz (E96) ................................................................. G
- For use with IMT96, 60 Hz ......................................................................................................................... K
- For use with IMT96, 50 Hz ......................................................................................................................... L
- For use with IMT96 or 120 V, 60 Hz (E96) ............................................................................................. N
- For use with IMT96 or 240 V, 60 Hz (E96) ............................................................................................. S

### Housing

- General purpose, NEMA 4X Housing ..................................................................................................... G
- Submersible Accidental and Total Submersion (280H to 2812) ............................................................. N
- High humidity/condensate ....................................................................................................................... C
- Accidental Submersion (2814 through 2824 only) .................................................................................. H

### Options

- Cable Glands (not with -S option) ............................................................................................................. G
- Signal Cable Seal (not with -G option) ..................................................................................................... S
- PTFE Lining Protector (280H through 2812 only) ................................................................................. T
- Ultrasonic Electrode Cleaning (transducer with oscillator and cable) (2802 and 2824 only) ................. U
- Ultrasonic Electrode Cleaning (transducer, cable and junction box for portable oscillator) (2802 and 2824 only) ................................................................................................................. W
- Ultrasonic Electrode Cleaning (transducer only) (2802 and 2824 only) .............................................. Z

### Specify electrical classification.

**Specify:**
- Flow range (normal and maximum)
- Liquid composition
- Liquid conductivity
- Operating temperature (normal and maximum)
- Operating pressure (normal and maximum)

### Specify information for instrument tag.

### How to Order—Specify Transmitter Model Number IMT96

**Transmitter Mounting**
- Pipe Mounting ........................................................................................................................................ P
- Surface Mounting or Wall Mounting or Panel Mount ................................................................................ S

**Language**
- English Only ........................................................................................................................................ E

**Nominal Power Supply and Frequency**
- 120 Vac, 47 to 63 Hz ................................................................................................................................. A
- 230 Vac, 47 to 63 Hz ................................................................................................................................. B
- 240 Vac, 47 to 63 Hz ................................................................................................................................. C

**Digital Communication Protocol**
- HART Communication Protocol ............................................................................................................. T

**Integral Display/Keypad**
- Wide Angle LCD Display/Keypad ........................................................................................................... B

**Transmission Signal Output**
- Internally Powered, 4-20 mA and Superimposed Digital (1200 Baud HART or 600 Baud FoxCom) .......... 1
- Externally Powered, 4-20 mA and Superimposed Digital (1200 Baud HART or 600 Baud FoxCom) .......... 2
Pulse Output Signal

- Off ................................................................. .0
- Internally Powered, on ........................................... .1
- Externally Powered, on ......................................... .2

Electrical Classification

- CSA, Ordinary Locations ........................................ K
- CSA, Class I, Div 2; Class II, Div 2; Class III, Div 2 ........ L
- FM Ordinary Locations .......................................... M
- FM, Nonincendive, Class I, II, and III, Div 2 .............. N
- No certification required ......................................... Z

Optional Selections

- I/O Access Port .................................................. A
- Display/Keypad Protective Cover .............................. B
- Terminal Block, 90 deg. Insertion ............................. C
- Cable glands (non-conduit applications) (Not for Elec. Class. -L or -N) ........................................... G

Specify signal cable (Transmitter to Flowtube)

Specify length in Feet (P/N R0101ZS) or length in Meters (P/N B4017TE)

This product and its components are protected by one or more of the following U.S. patents: 5,773,723; 5,895,864 and others pending. Corresponding patents have been issued or are pending in other countries.

Notes

1 750 and 900 mm (30 and 36 in) also available. Refer to PSS 1-6BS E for complete specifications.
2 At Reference Operating Conditions, System Performance of Combined Transmitter and Flowtube.
3 Foxboro offers several other materials for specific applications; pressure/temperature limits and corrosion resistance differ from those shown for ptfe: Polyurethane—available on 50 through 900 mm (2 through 36 in sizes). For best resistance to abrasion and wear caused by solid particles in the process. Neoprene—available on 350 through 900 mm (14 through 36 in) sizes.
4 Consult Foxboro for availability of other options
5 Sizes greater than 600 mm (24 in) consult Foxboro
6 The LCD Indicator has ambient temperature limits of -20 to +70°C (-4 to +158°F).
7 Internal versus external power can be changed in the field by switch selection.
8 Pulse output can be configured as either a scaled Pulse Output or a frequency Pulse Output.
9 Contact Foxboro for status of testing laboratory certifications or approvals.
Flow


Flow

8000A, 9100A, 9200A, 9300A, IMT25

A Magnetic Flowmeter consisting of a flowtube, signal cable, and Transmitter measures flow rate of conductive liquids (usually water based) and transmits a proportional electrical signal.

Refer to Product Specifications sheet PSS 1-6F2A (8000A Series), 1-6FA (9300A Series), 1-6F9A (9100A Series) 1-6F10A (9200A Series), 1-6F5A (IMT25) for complete description and specifications.

- **8000A** – Wafer Design Flowtubes
  - Available in 15 to 150 mm (1/16 to 6 in.) sizes
  - Ceramic and Retained PFA liner options
  - Sanitary design 25 to 80 mm (1/2 to 3 in.)
- **9300A** – Compact Lay Length Flanged Design Flowtubes
  - Available in 25 to 400 mm (1/2 to 16 in.) sizes
  - PTFE or PFA Liner
  - Meets ISO/CD Standard 13359
- **I/A Series Intelligent Transmitter (IMT25)**
  - Digital, analog, pulse output signals
  - Relay outputs for alarms (IMT25 only)
- **Remote Communications**
  - Transmitters can be interrogated or configured via Hand-Held Terminal, PC, or I/A Series Workstation
- **9200A** – Large Flanged Flowtubes for General Process Industries
  - Available in 15 to 2000 mm (1/2–78 in.)
  - Neoprene, EPDM, PTFE, Ebonite, and Linatex Liners
  - Built in grounding (reference) electrodes standard, no need for grounding rings
  - Meets ISO lengths for applicable sizes
- **9100A** – Flanged Flowtubes for the Municipal Water and Water & Waste
  - Available in 25 to 2000 mm (1–78 in.)
  - Ebonite liner
  - Available with Din, ANSI, AWWA flanges

**Functional Specifications**

- **Minimum Conductivity of Process Fluid:** 5 µhm/cm (5 µS/cm)
- **Ambient Temperature Limits:**
  8000A/9300A: -40 and 70°C (-40 and 158°F)
  IMT25: -30 and 70°C (-22 and 158°F)
- **Process Temperature Limits (Remote Mounted Transmitter):**
  8000A (Ceramic): -40 and 204°C (-40 and 400°F).
  Maximum allowable step change in temperature is an increase of 125°C (225°F) and a decrease of 75°C (135°F).
  8000A/9300A (PFA): -40 and 180°C (-40 and 250°F)
  1/2" - 6", 8" - 12"
- **Process Temperature Limits:**
  8000A (Ceramic): Full vacuum and 740 psi @ 100°F (1/16 to 2 in.) Full vacuum and 675 psi @ 100°F (3 to 6 in.)
  8000A/9300A (PFA): Full vacuum and 740 psi @ 100°F For 9300A PTFE and Polyurethane refer to PSS 1-6F4A
- **Process Temperature Limits:**
  9200A with PTFE Liner: Limits are No Vacuum and Flange Rating; but not exceeding 40 bar gauge (580 psig) with EPDM, Neoprene, Ebonite, or Linatex Liner: Full Vacuum and Flange Rating
- **Process Temperature Limits:**
  9100A Ebonite liner: 0 and 70°C (32 and 158°F)
- **Process Pressure Limits:**
  9200A with PTFE Liner: Limits are No Vacuum and Flange Rating; but not exceeding 40 bar gauge (580 psig) with EPDM, Neoprene, Ebonite, or Linatex Liner: Full Vacuum and Flange Rating
- **Flow Rates:**

<table>
<thead>
<tr>
<th>Size</th>
<th>Flow Units</th>
<th>Minimum &amp; Maximum Upper Range Values</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>8000A</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.6</td>
<td>1/16 Lpm gpm</td>
<td>0.11 and 1.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.03 and 0.3</td>
</tr>
<tr>
<td>3</td>
<td>1/8 Lpm gpm</td>
<td>0.26 and 4.92</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.07 and 1.3</td>
</tr>
<tr>
<td>6</td>
<td>1/4 Lpm gpm</td>
<td>0.68 and 13.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.18 and 3.6</td>
</tr>
<tr>
<td>15</td>
<td>1/2 Lpm gpm</td>
<td>3.8 and 76</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.8 and 76</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 and 20</td>
</tr>
<tr>
<td>25</td>
<td>1 Lpm gpm</td>
<td>13.2 and 265</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13.2 and 265</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.5 and 70</td>
</tr>
<tr>
<td>40</td>
<td>1-1/2 Lpm gpm</td>
<td>34.1 and 644</td>
</tr>
<tr>
<td></td>
<td></td>
<td>34.1 and 644</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9.0 and 170</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9.0 and 170</td>
</tr>
</tbody>
</table>

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
### Flow

#### Performance Specifications

**Accuracy - Pulse and Digital Output:**

<table>
<thead>
<tr>
<th>Flowtube Size</th>
<th>8000A</th>
<th>9300A</th>
<th>System Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2 - 6 in</td>
<td>1/2 - 6 in</td>
<td>±0.25% of Reading</td>
<td></td>
</tr>
<tr>
<td>(15 - 150 mm)</td>
<td>(25 - 150 mm)</td>
<td>±0.005 ft/s</td>
<td></td>
</tr>
<tr>
<td>1/16 - 1/4 in</td>
<td>8 - 16 in</td>
<td>±0.50% of Reading</td>
<td></td>
</tr>
<tr>
<td>(1.16 - 6 mm)</td>
<td>(200 - 400 mm)</td>
<td>±0.010 ft/s</td>
<td></td>
</tr>
</tbody>
</table>

### IMT 25 Transmitters

**Electrical Outputs:**

- 4 to 20 mA current, digital, pulse
- 2 relays outputs for alarms (IMT25 only)

**Electrical Classification:** FM, CSA, CENELEC certified versions available for ordinary location and hazardous locations. Refer to Foxboro for complete specifications and availability.

**Display Options:** 32 alphanumeric character, 2-line, back-lighted LCD display. Indicate ± total, net total, net inventory total & ±mn; rate in desired engineering units.

### Optional Features

**Grounding (Protective) Rings:** Two grounding (protective) rings are required, one on each end of flowtube, if mating piping is nonmetallic or lined metallic piping.

**Signal Cable:** Part Number R0101ZS (if ordered feet) or Part Number B4017TE (if ordered in meters). Maximum length 300 m (1000 ft).

### Physical Specifications

**Enclosure Classification:** Meets the requirements of IEC IP66 and provides the environmental protection of NEMA Type 4X

**Enclosure Finish:** High-build epoxy paint

**Lining Material:**

- Ceramic: 1.6 to 150 mm (1/16 to 6 in) sizes.
- PTFE: 15 to 600 mm (1/2 to 16 in) sizes.
- PFA: 15 to 400 mm (1/2 to 16 in) sizes.
- Poly: 200 to 400 mm (8 to 16 in) sizes

**Electrode Material:** Platinum and Tantalum for ceramic flowtubes. Assorted materials for PTFE and PFA flowtubes

**Mounting:**

- Flowtube: By process connection flanges. See How to Order.
- Transmitters:
  - Pipe: Bracket for mounting to DN 50 or 2 in pipe.
  - Surface: Plate permits mounting to surface such as a wall.
- Flowtube: Bolted directly to any 15 to 400 mm (1/2 to 16 in) 8000A and 9300 Series Flowtube (except sanitary)
### How to Order

**8000A Series Flowtube**

Specify 8000A Series Flowtube:

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.6 mm (1/16 in) Line Size (ceramic liner only)</td>
<td>801SA</td>
</tr>
<tr>
<td>3 mm (1/8 in) Line Size (ceramic liner only)</td>
<td>801EA</td>
</tr>
<tr>
<td>6 mm (1/4 in) Line Size (ceramic liner only)</td>
<td>801QA</td>
</tr>
<tr>
<td>15 mm (1/2 in) Line Size.</td>
<td>800HA</td>
</tr>
<tr>
<td>25 mm (1 in) Line Size</td>
<td>8001A</td>
</tr>
<tr>
<td>40 mm (1 1/2 in) Line Size.</td>
<td>801HA</td>
</tr>
<tr>
<td>50 mm (2 in) Line Size</td>
<td>8002A</td>
</tr>
<tr>
<td>80 mm (3 in) Line Size</td>
<td>8003A</td>
</tr>
<tr>
<td>100 mm (4 in) Line Size</td>
<td>8004A</td>
</tr>
<tr>
<td>150 mm (6 in) Line Size</td>
<td>8006A</td>
</tr>
</tbody>
</table>

**Tube Construction/End Connection**

- Wafer Body (Mounts between ANSI Class 150 or 300, or Metric PN 10 or PN 16 Flanges) .................................................. W
- Lining Material
  - Ceramic ........................................................................ C
  - PFA (800HA to 8006A only) ............................................. P
- Transmitter Mounting
  - Remote (Pipe or Surface) Mounting ................................ R
  - Flowtube Mounting (800HA to 8006A) to IMT25 .................. I
- Electrodes
  - Tantalum (801SA to 801QA only) ceramic lined or
    Tantulam-Tungsten (800HA to 8006A) PFA lined .................. B
  - Conical 316 ss (8001A to 8006A) PFA lined only ................. C
  - Hastelloy C (800HA to 8006A) PFA lined only .................... H
  - Conical Hastelloy C (8001A to 8006A) PFA lined only .......... K
  - Platinum (801SA to 8006A) ceramic lined or platinum-iridium
    (800HA to 8006A) PFA lined ........................................... P
  - 316 ss (800HA to 8006A) PFA lined only ........................ S
  - Titanium (800HA to 8006A) PFA lined only ....................... T
- Coil Drive/Supply
  - Pulsed dc (From Intelligent I/A Series Magnetic Flow Transmitters) ........................................ J
- Housing Construction
  - NEMA 4X Enclosure ......................................................... G
  - Accidental Submergence (Remote Mounted Transmitter Only) ... H
- Electrical Certification
  - CSA, Ordinary Locations ............................................... CGZ
  - CSA, Class 1, Division 2 Locations ................................. CNZ
  - European, non-sparking .................................................. KNZ
  - FM, Ordinary Locations .................................................. FGA
  - FM, n, i a Connections .................................................. FNA
  - No Certification .......................................................... ZZZ
- Optional Selection(s)
  - Mounting Hardware for ANSI Class 150 Flanges .................. A
  - Mounting Hardware for ANSI Class 300 Flanges .................. B
  - Mounting Hardware Metric PN 10 Flanges .......................... C
  - Mounting Hardware Metric PN 16 Flanges ......................... D
  - Cable Glands (non-conduit applications) .......................... G
9300A Series Flowtube

<table>
<thead>
<tr>
<th>Nominal Flowtube Size</th>
<th>Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 mm (1/2 in)</td>
<td>930HA</td>
</tr>
<tr>
<td>25 mm (1 in)</td>
<td>9301A</td>
</tr>
<tr>
<td>40 mm (1 1/2 in)</td>
<td>9301HA</td>
</tr>
<tr>
<td>50 mm (2 in)</td>
<td>9302A</td>
</tr>
<tr>
<td>80 mm (3 in)</td>
<td>9303A</td>
</tr>
<tr>
<td>100 mm (4 in)</td>
<td>9304A</td>
</tr>
<tr>
<td>150 mm (6 in)</td>
<td>9306A</td>
</tr>
</tbody>
</table>

 Tube Construction
ALI Type 304 ss or 305 ss flowtube;
Face-to-Face dimensions conform to ISO/DIS 13359

End Connections

| ANSI Class 150, Carbon Steel flange | BA |
| ANSI Class 150, 316 ss flange      | BB |
| ANSI Class 300, Carbon Steel flange | BD |
| ANSI Class 300, 316 ss flange      | BC |
| Metric PN 10, Carbon Steel flange  | ZD |
| Metric PN 16, Carbon Steel flange  | ZE |
| Metric PN 25, Carbon Steel flange  | ZF |
| Metric PN 40, Carbon Steel flange  | ZG |
| Metric PN 10, 316 ss flange        | ZL |
| Metric PN 16, 316 ss flange        | ZM |
| Metric PN 25, 316 ss flange        | ZN |
| Metric PN 40, 316 ss flange        | ZP |

Lining Material

| ptfe (Polytetrafluoroethylene)     | -T |
| pfa (Perfluoroalkoxy) (9301A to 9306A only) | -P |

Electrodes

| Tantalum-Tungsten                  | B  |
| Hastelloy C                        | H  |
| Conical Hastelloy C (9301A to 9306A only) | K  |
| Platinum-Iridium                   | P  |
| 316L ss                            | S  |
| Conical 316L ss (9301A to 9306A only) | C  |
| Titanium                           | T  |

Coil Drive/Supply

Pulsed dc

Housing/Transmitter Mounting

| NEMA 4 (ptfe)/NEMA 4X (pfa), Remote mounted transmitter | -G |
| NEMA 4 (ptfe)/NEMA 4X (pfa), Remote mounted transmitter | -N |
| Total/accidental submergence (Remote mounted transmitter) | -I |

Electrical Classification

| CSA, Ordinary location              | K  |
| CSA, Class I, Div. 2               | L  |
| FM, Ordinary location              | M  |
| CENELEC, e, ia (environment and pipeline Zone 1) | S  |
| FM, Class I, Div. 2, Nonincendive  | N  |
| European, nonincendive, Zone 2     | U  |
| No certification                   | Z  |

Options

| Heyco Glands (not available with Housing -T or -I) | -G |
| Teflon lining protector               | -T |
Specify:

- Flow range (normal and maximum)
- Liquid composition
- Liquid conductivity
- Operating temperature (normal and maximum)
- Operating pressure (normal and maximum)

Specify other Optional Features

Specify information for instrument tag

Notes
1. Available with -T (ptfe) lining only
2. Available with -P (pfa) lining only
3. Sealed for accidental or continuous operation under water up to 9 m (30 ft) deep. Supplied with kit for sealing
4. Must be used with transmitter certified for Class I, Groups B, C, and D, Division 2 locations
5. For flowtubes with integrally mounted transmitter, cable glands may be specified with the transmitter options
6. Cable glands are assembled to flowtube junction box and are specified for nonconduit applications. (not for Electrical Classification Code L & N)
7. Not available with Metric Flange Connections ZD & ZE

9300A Series Flowtube
Specify 9300A Series Flowtube Model Number

Nominal Flowtube Size

<table>
<thead>
<tr>
<th>Size</th>
<th>Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 mm (8 in)</td>
<td>9308A</td>
</tr>
<tr>
<td>250 mm (10 in)</td>
<td>9310A</td>
</tr>
<tr>
<td>300 mm (12 in)</td>
<td>9312A</td>
</tr>
<tr>
<td>450 mm (14 in)</td>
<td>9314A</td>
</tr>
<tr>
<td>400 mm (16 in)</td>
<td>9316A</td>
</tr>
</tbody>
</table>

Tube Construction
AISI Type 304 ss;
Face-to-Face dimensions conform to ISO/DIS 13359

End Connections
- ANSI Class 150, Carbon Steel flange
- ANSI Class 150, 316 ss flange
- ANSI Class 300, Carbon Steel flange
- ANSI Class 300, 316 ss flange
- Metric PN 10, Carbon Steel flange
- Metric PN 16, Carbon Steel flange
- Metric PN 25, Carbon Steel flange
- Metric PN 40, Carbon Steel flange
- Metric PN 10, 316 ss flange
- Metric PN 16, 316 ss flange
- Metric PN 25, 316 ss flange
- Metric PN 40, 316 ss flange

Lining Material
- Polyurethane
- pfa (Perfluoroalkoxy) (8 inch, 10 inch, 12 inch)
- ptfe (Polytetrafluoroethylene)

Electrodes
- Tantalum-Tungsten
- Hastelloy C
- Conical Hastelloy C (9301A to 9306A only)
- Platinum-Iridium
- 316L ss
- Conical 316L ss (9301A to 9306A only)
- Titanium

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
Coil Drive/Supply
Pulsed dc

Housing/Transmitter Mounting
NEMA 4X, Remote mounted transmitter
Total/accidental submergence (Remote mounted transmitter)
NEMA 4X, Integamity mounted IMT25 and IMT25L

Electrical Safety
CSA, Ordinary location
CSA, Class I, Div. 212
FM, Ordinary location
FM, Class I, Div. 2, Nonincendive
European, nonincendive, Zone 2
No certification

Options
Cable glands (not with -T or -I housing)
Grounding Electrodes
Lining protector (8 inch, 10 inch, 12 inch, 14 inch, 16 inch)

Specify:
- Flow range (normal and maximum)
- Liquid composition
- Liquid conductivity
- Operating temperature (normal and maximum)
- Operating pressure (normal and maximum)

Specify other Optional Features

Specify information for instrument tag

Notes
8 Available with -P (pfa) lining only
9 The -T option not available with metric End Connection Options
10 Available with pfa (-P lining) and ptfe (-T lining) only
11 Sealed for accidental or continuous operation under water up to 9 m (30 ft) deep. Supplied with kit for sealing
12 Must be used with transmitter certified for Class I, Groups B, C, and D, Division 2 locations
13 The cable glands provide a sealed cable entry for field wiring to the flowtube junction box, and are generally specified in non-conduit applications (not for Electrical Classification Codes L or N). For flowtubes with integrally mounted transmitters (-I or -T housing) cable glands may be specified with the transmitter options

9100A Series Magnetic Flowtubes
Specify 9100A Series Magnetic Flowtube Model Number

Nominal Flowtube Size (a)

<table>
<thead>
<tr>
<th>DN Flange Size</th>
<th>Inch Flange Size</th>
<th>Model</th>
<th>DN Flange Size</th>
<th>Inch Flange Size</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 mm ..........</td>
<td>1 in ............</td>
<td>9101A</td>
<td>500 mm ..........</td>
<td>20 in ...........</td>
<td>9120A</td>
</tr>
<tr>
<td>40 mm ..........</td>
<td>1 1/2 in ..........</td>
<td>9111A</td>
<td>600 mm ..........</td>
<td>24 in ...........</td>
<td>9124A</td>
</tr>
<tr>
<td>50 mm ..........</td>
<td>2 in ............</td>
<td>9102A</td>
<td>700 mm ..........</td>
<td>28 in ...........</td>
<td>9128A</td>
</tr>
<tr>
<td>65 mm ..........</td>
<td>2 1/2 in ..........</td>
<td>9121A</td>
<td>..................</td>
<td>30 in ...........</td>
<td>9130A</td>
</tr>
<tr>
<td>80 mm ..........</td>
<td>3 in ............</td>
<td>9103A</td>
<td>800 mm ..........</td>
<td>32 in ...........</td>
<td>9132A</td>
</tr>
<tr>
<td>100 mm ..........</td>
<td>4 in ............</td>
<td>9104A</td>
<td>900 mm ..........</td>
<td>36 in ...........</td>
<td>9136A</td>
</tr>
<tr>
<td>125 mm ..........</td>
<td>5 in ............</td>
<td>9105A</td>
<td>1000 mm ..........</td>
<td>40 in ...........</td>
<td>9140A</td>
</tr>
<tr>
<td>150 mm ..........</td>
<td>6 in ............</td>
<td>9106A</td>
<td>1050 mm ..........</td>
<td>42 in ...........</td>
<td>9142A</td>
</tr>
<tr>
<td>200 mm ..........</td>
<td>8 in ............</td>
<td>9108A</td>
<td>1100 mm ..........</td>
<td>44 in ...........</td>
<td>9144A</td>
</tr>
<tr>
<td>..................</td>
<td>..................</td>
<td>.......</td>
<td>1200 mm ..........</td>
<td>48 in ...........</td>
<td>9148A</td>
</tr>
<tr>
<td>250 mm ..........</td>
<td>10 in ...........</td>
<td>9110A</td>
<td>1400 mm ..........</td>
<td>54 in ...........</td>
<td>9154A</td>
</tr>
<tr>
<td>300 mm ..........</td>
<td>12 in ...........</td>
<td>9112A</td>
<td>1500 mm ..........</td>
<td>60 in ...........</td>
<td>9160A</td>
</tr>
<tr>
<td>350 mm ..........</td>
<td>14 in ...........</td>
<td>9114A</td>
<td>1600 mm ..........</td>
<td>66 in ...........</td>
<td>9166A</td>
</tr>
<tr>
<td>400 mm ..........</td>
<td>16 in ...........</td>
<td>9116A</td>
<td>1800 mm ..........</td>
<td>72 in ...........</td>
<td>9172A</td>
</tr>
<tr>
<td>450 mm ..........</td>
<td>18 in ...........</td>
<td>9118A</td>
<td>2000 mm ..........</td>
<td>78 in ...........</td>
<td>9178A</td>
</tr>
</tbody>
</table>
### Tube Construction
- AISI Type 304 Stainless Steel Tube (304 ss)

### End Connections
- ANSI Class 150, Carbon Steel Flange – 1 to 24 in Line Sizes
- AWWA C-207, Class D, Carbon Steel Flange – 28 to 78 in Line Sizes
- PN 6, EN 1092-1, Carbon Steel Flange – 1400 to 2000 mm Line Sizes
- PN10, EN 1092-1, Carbon Steel Flange – 200 to 2000 mm Line Sizes
- PN 16, EN 1092-1, Carbon Steel Flange – 65 to 2000 mm Line Sizes
- PN 40, EN 1092-1, Carbon Steel Flange – 25 to 50 mm Line Sizes

(a) See “End Connection” selections further in Code to determine ANSI, AWWA, and BS (DIN) flanges applicable to each flowtube size.

(b) For PED, please contact Invensys Foxboro.

### Liner Material
- Ebonite

### Electrodes
- Hastelloy C-276

### Coil Drive
- Pulsed dc

### Housing Construction/Transmitter Mounting
- Coated Carbon Steel Housing with Aluminum Terminal Box
  - Terminal Box has 1/2 inch Conduit Threads
  - Remote Mounted Transmitter
- Coated Carbon Steel Housing with Polyamide Terminal Box
  - Terminal Box has 1/2 inch NPT Conduit Threads with Cable Glands
  - Remote Mounted Transmitter
- Coated Carbon Steel Housing with Polyamide Terminal Box, M20 Conduit

### Electrical Safety (Also see Electrical Safety Specifications section)
- FM/CSA, Nonincendive Class 1, Div 2

**Example:** 9116A-CA-BHJ-GN
9200A Series Magnetic Flowtubes
Specify 9200A Series Magnetic Flowtube Model Number

Nominal Flowtube Size

<table>
<thead>
<tr>
<th>DN Flange Size</th>
<th>Inch Flange Size</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 mm</td>
<td>1/2 in</td>
<td>920HA</td>
</tr>
<tr>
<td>25 mm</td>
<td>1 in</td>
<td>921HA</td>
</tr>
<tr>
<td>50 mm</td>
<td>2 in</td>
<td>9202A</td>
</tr>
<tr>
<td>65 mm</td>
<td>2-1/2 in</td>
<td>922HA</td>
</tr>
<tr>
<td>80 mm</td>
<td>3 in</td>
<td>9203A</td>
</tr>
<tr>
<td>100 mm</td>
<td>4 in</td>
<td>9204A</td>
</tr>
<tr>
<td>125 mm</td>
<td>5 in</td>
<td>9205A</td>
</tr>
<tr>
<td>150 mm</td>
<td>6 in</td>
<td>9206A</td>
</tr>
<tr>
<td>200 mm</td>
<td>8 in</td>
<td>9208A</td>
</tr>
<tr>
<td>250 mm</td>
<td>10 in</td>
<td>9210A</td>
</tr>
<tr>
<td>300 mm</td>
<td>12 in</td>
<td>9212A</td>
</tr>
<tr>
<td>350 mm</td>
<td>14 in</td>
<td>9214A</td>
</tr>
<tr>
<td>400 mm</td>
<td>16 in</td>
<td>9216A</td>
</tr>
<tr>
<td>450 mm</td>
<td>18 in</td>
<td>9218A</td>
</tr>
</tbody>
</table>

DN Flange Size | Inch Flange Size | Model |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>500 mm</td>
<td>20 in</td>
<td>9220A</td>
</tr>
<tr>
<td>600 mm</td>
<td>24 in</td>
<td>9224A</td>
</tr>
<tr>
<td>700 mm</td>
<td>28 in</td>
<td>9228A</td>
</tr>
<tr>
<td>750 mm</td>
<td>30 in</td>
<td>9230A</td>
</tr>
<tr>
<td>800 mm</td>
<td>32 in</td>
<td>9232A</td>
</tr>
<tr>
<td>900 mm</td>
<td>36 in</td>
<td>9236A</td>
</tr>
<tr>
<td>1000 mm</td>
<td>40 in</td>
<td>9240A</td>
</tr>
<tr>
<td>1050 mm</td>
<td>42 in</td>
<td>9242A</td>
</tr>
<tr>
<td>1100 mm</td>
<td>44 in</td>
<td>9244A</td>
</tr>
<tr>
<td>1200 mm</td>
<td>48 in</td>
<td>9248A</td>
</tr>
<tr>
<td>1400 mm</td>
<td>54 in</td>
<td>9254A</td>
</tr>
<tr>
<td>1500 mm</td>
<td>60 in</td>
<td>9260A</td>
</tr>
<tr>
<td>1600 mm</td>
<td>66 in</td>
<td>9266A</td>
</tr>
<tr>
<td>1800 mm</td>
<td>72 in</td>
<td>9272A</td>
</tr>
<tr>
<td>2000 mm</td>
<td>78 in</td>
<td>9278A</td>
</tr>
</tbody>
</table>

Tube Construction
AISI Type 304 Stainless Steel Tube (304 ss) .......................................................... -SI
End Connections
ANSI Class 150, Carbon Steel Flange – 1/2 to 24 in Line Sizes ................................. CA
ANSI Class 150, Stainless Steel Flange – 1/2 to 24 in Line Sizes ............................... CB
ANSI Class 300, Carbon Steel Flange – 1/2 to 24 in Line Sizes ................................. CD
AS4087, Class 16, Carbon Steel Flange – 15 to 1200 mm ............................................ A2
AS4087, Class 21, Carbon Steel Flange – 15 to 1200 mm ............................................ A3
AS4087, Class 35, Carbon Steel Flange – 15 to 1200 mm ............................................ A4
AWWA C-207, Class D Carbon Steel Flange – 28 to 78 in Line Sizes .............................. WC
AS 2129, Table E, Carbon Steel Flange – 15 to 1200 mm Line Sizes ............................. AC
EN 1092-1, PN 6, Carbon Steel Flange – 65 to 2000 mm Line Sizes .............................. CZ
EN 1092-1, PN 6, Stainless Steel Flange – 65 to 600 mm Line Sizes ............................ CY
EN 1092-1, PN 10, Carbon Steel Flange – 200 to 2000 mm Line Sizes ........................... CX
EN 1092-1, PN 10, Stainless Steel Flange – 200 to 600 mm Line Sizes ........................ CV
EN 1092-1, PN 16, Carbon Steel Flange – 65 to 1200 mm Line Sizes ............................ CE or CP
EN 1092-1, PN 16, Stainless Steel Flange – 65 to 600 mm Line Sizes .......................... CM
EN 1092-1, PN 25, Carbon Steel Flange – 200 to 600 mm Line Sizes ............................ CN
EN 1092-1, PN 25, Stainless Steel Flange - 200 to 600 mm ........................................ CP
EN 1092-1, PN 40, Carbon Steel Flange – 15 to 600 mm Line Sizes ............................ CG
9200A Series Magnetic Flowtubes (Continued)

**Liner Material**
- Neoprene .......................................................... N
- EPDM (an Ethylene Propylene Terpolymer) ............... E
- ptfe – 100°C (212°F) Limit .................................... T
- Ebonite - B
- Linatex - L

(a) See “End Connection” selections further in Code for ANSI, AWWA, AS, and DIN flanges applicable to each flowtube size.
(b) For PED, please contact Invensys Foxboro.

**Electrodes(a)**
- AISI Type 316Ti Stainless Steel (316Ti ss) .................. S
- Hastelloy C-276 .......................................................... H
- Platinum-Iridium .......................................................... P
- Titanium T
- Tantalum ................................................................. B

**Coil Drive**
- Pulsed dc .............................................................. J

**Housing Construction/Transmitter Mounting**
- Coated Carbon Steel Housing with Aluminum Terminal Box ................. G
  - Terminal Box has 1/2 inch Conduit Threads
  - Remote Mounted Transmitter
- Polyamide terminal box with 1/2 inch NPT conduit ......................... F
- Polyamide terminal box with 1/2 inch M20 conduit ......................... V

**Electrical Safety (Also see Electrical Safety Specifications section)**
- FM/CSA, Nonincendive, Class 1, Division 2 .......................... N

**Example:** 9216A-SICA-NSJ-GM

(a) Fluid reference electrode included, except for flowtubes with a ptfe liner.

**IMT25 Transmitter**

Specify IMT25 Transmitter Model Number

**Transmitter Housing**
- Pipe Mounting ......................................................... P
- Surface Mounting ....................................................... S
- Flowtube Mounting\(^{(14,15)}\) ..................................... I

**Language**
- English Only (Available only with HART Protocol Selection “T”) ................. E

**Nominal Supply Voltage and Frequency**
- 85 to 264 V ac, 47 to 63 Hz ........................................... A
- 24 V dc\(^{(16)}\) ............................................................... B
Flow

8000A, 9100A, 9200A, 9300A, IMT 25

Digital Communications Protocol
- FOUNDATION Fieldbus H
- Digital HART Protocol

Integral Display/Keypad
- No Display/Keypad
- Wide Angle LCD Display/Keypad

Transmission Output Signal
- Internally Powered, 4-20 mA and Superimposed Digital (1200 Baud HART)
- Externally Powered, 4-20 mA and Superimposed Digital (1200 Baud HART)

Pulse Output Signal (Field Selectable)
- Off
- On, Internally powered
- On, Externally powered

Electrical Classification
- CSA, ordinary locations
- CSA, Class 1, Division 2, Class II, Division 2; Class III, Division 2
- FM, ordinary location
- FM, Class 1, Division 2
- European Zone 2, Intrinsically Safe, ib Connection
- European, Zone 2, Nonincendive, Ex N
- No Certification required

Optional Selections
- I/O Access Port
- Display/Keypad Protective Cover
- Dual compartment enclosure with top insertion terminal block
- Dual compartment enclosure with lug type terminal block
- Cable glands (non-conduit applications) (Not for Elec. Class -L or -N)

Specify signal cable (part number R0101ZS) length, transmitter to flowtube (part number R0101ZS for feet, or part number B4017TE for meters)

Specify other Optional Features

Specify information for instrument tag

Notes
14 Flowtube mounted transmitter may only be used with process temperatures not exceeding 120°C (250°F)
15 IMT25 can only be integrally mounted to 8000A and 9300A Series Flowtubes
16 The 24 V dc selection requires greater than 1.5 amperes
17 Internal versus external power can be changed in field by switch selection
18 Pulse output can be configured as scaled or frequency pulse
19 These transmitters have been designed to meet the specified electrical safety descriptions. For status of testing laboratory approvals or certifications, contact Foxboro. Also see “Electrical Safety Specifications” section
20 Not available with the “I” Flowtube Mounting selection

This product and its components are protected by one of the following U.S. patents: 4,773,275; 5,224,394; 5,773,723; 5,895,864 and others pending.
Model MAG2IC Intelligent Magnetic Flowmeter with Integrally Mounted Transmitter, Model MAG2RT Remote Mounted Intelligent Transmitter, and Model MAG2RS Remote Mounted Flowtube

The Foxboro brand M4G2 Series Flowmeters are high performance, intelligent Magnetic Flowmeters based on field proven two-wire, loop powered technology. They offer the stable and accurate measurement of a traditional magnetic flowmeter with low power consumption, resulting in a lower overall cost of ownership. The flowmeters are provided in an integrally mounted transmitter configuration, or with a remote transmitter and flowtube with an interconnecting cable.

- Field proven, loop powered, 2-wire operation
- High accuracy to ±0.5% of rate
- Minimum measurable fluid conductivity down to 10 µS/cm
- Suitable for use in numerous process fluid measurement industries
- Electrode status diagnostic (determines empty pipe detection, or scaling on electrode)
- Adjustable low flow cutoff
- 4 to 20 mA dc Analog Output with HART Communications
- Approved/Certified by many agencies for use in hazardous area locations
- Enclosure meets IEC IP67 and NEMA 4X ratings
- FlowEXpertPro™ sizing program; see next page
- Flanged body flowtubes are offered in 2.5 to 200 mm (0.1 to 8 in) line sizes when integrally mounted, and in 10 to 200 mm (1 to 4 in) line sizes when remote mounted
- Wafer body flowtubes are offered in 25 to 100 mm (1 to 4 in) line sizes when either integrally or remote mounted
- Flowtubes used with ANSI Class 150 or 300 flanges, or DN PN10, PN16, or PN25 flanges
- Standard mounting brackets and hardware for surface or pipe mounting of the remote transmitter
- Interconnecting cable for remote configurations offered in numerous lengths up to 70 m (233 ft), depending on line size

**Functional Specifications**

*High Accuracy and Stable Output*: MAG2 provides a high accuracy of ±0.5% of rate

*Minimum Measurable Fluid Conductivity*: MAG2 offers a minimum process fluid conductivity of 10 µS/cm, which is excellent when compared to other 2-wire magnetic flowmeters, thereby maximizing applicability.

*Low Flow Cutoff, Dropout, and Empty Pipe Detection*: Refer to the Functional Specifications section for a description of these flow features.

**Flanged or Wafer Body Flowtube with Integral or Remote Mounted Transmitter**: The MAG2 Series are offered as flanged or wafer body flowtubes with either an integrally or remote mounted transmitter. This provides the user with the flexibility required to satisfy different installation configurations.

**Communications**: 4 to 20 mA with HART communications. Allows direct analog connection to common receivers while also providing remote control and configuration capability with a HART Communicator or a host configurator.

**Performance Specifications**

**Lightning Protection**: Equipped with a lightning arrester in the power source and external output terminals; it can withstand a transient surge of 12 kV, 1000 A without permanent damage.

**Power Failure**: An EEPROM retains data record of totalized value when pulse output is used (retention period approximately 10 years).

**Measurable Electrical Conductivity**:
- Integral Transmitter Versions: 10 µS/cm, or greater
- Remote Transmitter Versions
  - Nominal Line Sizes 10 and 15 mm (3/8 and 1/2 in), 50 µS, or greater
  - Nominal Line Sizes 25 to 200 mm (1 to 8 in), 10 µS, or greater

**Large Selection of Flowtube Sizes**:
- **Model MAG2IC (with Integral Transmitter)**
  - Flanged Body: 2.5 to 200 mm (0.1 to 8 in) line sizes
  - Wafer Body: 25 to 100 mm (1 to 4 in) line sizes
- **Flange Ratings**
  - ANSI Class 150 or 300
  - DIN PN10, PN16, or PN25

**Wide Variety of Applications**:
- Corrosive liquid measurement
- Chemical solution measurement
- Drainage/waste disposal fluid measurement
- Drinking water and waste water service
- Industrial/agricultural water measurement
- Seawater measurement
**Physical Specifications**

**Size:**
- Wafer Body
  - 25, 40, 50, 65, 80, and 100 mm
  - (1, 1½, 2, 2½, 3, and 4 in)
- Flanged Body
  - 2.5, 5, 10, 15, 25, 40, 50, 65, 80, 103, 150, and 200 mm
  - (½, 1, 1½, 2, 2½, 3, 4, 6, and 8 in)

  *NOTE: The 2.5 and 5 mm (0.1 and 0.2 in) Flanged Body Tubes are available with the Model MAG2IC flowmeter only.*

**Flange Rating:**
- ANSI Class 150 or 300
- DIN PN10, PN16, or PN25

**Enclosure Rating:** Enclosure has the dusttight and immersion protection rating of IP67 as defined by IEC 60529, and provides the environmental and corrosion resistant protection rating of NEMA 4X.

**Transmitter Enclosure Material:** Low copper, aluminum alloy

**Transmitter Enclosure Finish:**
- Standard – baked acrylic paint
- Corrosion resistant – baked epoxy paint

**Terminal Box Material (Model MAG2RS only):**
- Low copper, aluminum alloy

**Terminal Box Finish (Model MAG2RS only):**
- Standard – baked acrylic paint
- Corrosion resistant – baked epoxy paint

**Flowtube Body Materials:**
- Case material
  - Sizes 2.5 to 15 mm (0.1 to ½ in): CF8M
  - Sizes 25 to 200 mm (1 to 8 in): 304 ss
- Measuring pipe material – 304 ss

**Flange Material:**
- Sizes 2.5 to 65 mm (0.1 to 2½ in) – 304 ss
- Sizes 80 to 200 mm (3 to 8 in) – carbon steel with a corrosion resistant paint

**Process Wetted Materials:**
- Lining – PFA
- Electrodes – 316L ss, ASTM B574 (Hastelloy C-276 equivalent), Titanium, Tantalum, Nickel (except with Line Size Codes 002, 005, and 010), Zirconium, or Platinum
- Grounding rings – 316 ss, ASTM B575 (Hastelloy C-276 equivalent), Titanium, Tantalum, Zirconium, or Platinum

**Dimensions — Nominal:** see DIMENSIONS-NOMINAL section

**Approximate Weight — Model MAG2RT (Remote Mounted Transmitter):** 2.8 kg (6.2 lb)

---

**Model MAG2IC – Magnetic Flowmeter with Integrally Mounted Magnetic Flow Transmitter**

**How to Order**—Specify model number MAG2IC followed by order code for each selection

**Nominal Line Size**
- 2.5 mm (0.1 in) (Flanged Body only)……………………………………………………0-02
- 5 mm (0.2 in) (Flanged Body only)……………………………………………………0-05
- 10 mm (½ in) (Flanged Body only)……………………………………………………0-10
- 15 mm (½ in) (Flanged Body only)……………………………………………………0-15
- 25 mm (1 in) (Flanged and Wafer Body)………………………………………………0-25
- 40 mm (1½ in) (Flanged and Wafer Body)………………………………………………0-40
- 50 mm (2 in) (Flanged and Wafer Body)………………………………………………0-50
- 65 mm (2½ in) (Flanged and Wafer Body)………………………………………………0-65
- 80 mm (3 in) (Flanged and Wafer Body)………………………………………………0-80
- 100 mm (4 in) (Flanged and Wafer Body)……………………………………………..0-100
- 150 mm (6 in) (Flanged Body only)……………………………………………………1-150
- 200 mm (8 in) (Flanged Body only)……………………………………………………2-200

**Flowtube Lining Material**
- PFA ………………………………………………………………………………………………P

**End Connection and Flange Rating**
- Wafer Body, ANSI Class 150…………………………………………………………….. 21
- Wafer Body, ANSI Class 300…………………………………………………………….. 22
- Wafer Body, DIN PN10…………………………………………………………………… 41
- Wafer Body, DIN PN16…………………………………………………………………… 42
- Wafer Body, DIN PN25…………………………………………………………………… 43
- Flanged Body, ANSI Class 150……………………………………………………………. A1
- Flanged Body, ANSI Class 300……………………………………………………………. A2
- Flanged Body, DIN PN10………………………………………………………………….. D1
- Flanged Body, DIN PN16………………………………………………………………….. D2
- Flanged Body, DIN PN25………………………………………………………………….. D3
Electrode Material
- 316L ss
- Hastelloy C-276
- Titanium
- Zirconium
- Tantalum
- Nickel
- Platinum-Iridium

Earthing (Grounding) Ring
- 316L ss
- Hastelloy C-276
- Titanium
- Zirconium
- Tantalum
- Platinum

Wiring Connection (Transmitter Enclosure)
- G ½ Internal Thread – without Watertight Gland
- G ½ Internal Thread – with one Plastic Watertight Gland
- G ½ Internal Thread – with one brass Ni-Plated Watertight Gland
- ½ NPT Internal Thread – without Watertight Gland
- M20 Internal Thread – without Watertight Gland
- G ½ Internal Thread – with two Plastic Watertight Glands
- G ½ Internal Thread – with two Brass Ni-Plated Watertight Glands

Face to Face Dimension
- Standard

Installation/Display Direction (Refer to Figure 7 below)
- Horizontal Piping – Right Side viewed from Upstream
- Horizontal Piping – Left Side viewed from Upstream
- Horizontal Piping – Downstream Side
- Horizontal Piping – Upstream Side
- Vertical Piping Mounting – Right Side of Piping – Flow Direction: Upward
- Vertical Piping Mounting – Left Side of Piping – Flow Direction: Upward

Calibration
- Standard Calibration (3 points: 0%, 50%, and 100%)

Output Signal
- 4 to 20 mA dc Analog Output with HART Communications

Electrical Safety (also see Electrical Safety Specifications section for further Information)
- No Approvals or Certifications
- FM/CSA Approved/Certified Explosion proof, Class I, Division 1
- FM/CSA Approved/Certified Nonincendive, Class I, Division 2

Finish/Paint
- Standard Paint
- Corrosion Resistant Paint

Mounting Hardware
- None
- 304 ss Bolts and Nuts (only for ANSI Class 150 and 300 Wafer Body Flowtubes)

Optional Selections
- None (Required selection if options are not selected)
- With Tag Number Plate on the Transmitter Enclosure; maximum 20 characters
- With Tag Number Plate attached to Flowmeter with Wire

Notes
- A 15 mm (0.5 in) flange is used for Nominal Line Size Codes -002 to -015.
- Wiring Connection Code D must be selected with Electrical Safety Code 1 or 2.
- Code T replaces Code H.
Model MAG2RT – Remote Mounted Magnetic Flow Transmitter

How to Order—Specify model number MAG2RT followed by order code for each selection

Output Signal
- 4 to 20 mA dc Analog Output with HART Communications (a) ........................................... -T

Wiring Connection (Transmitter Enclosure)
- G ½ Internal Thread – without Watertight Gland ................................................................. .A
- G ½ Internal Thread – with two Plastic Watertight Glands .................................................. .B
- G ½ Internal Thread – with two brass Ni-Plated Watertight Glands .................................... .C
- ½ NPT Internal Thread – without Watertight Gland .............................................................. .D
- M20 Internal Thread – without Watertight Gland ................................................................. .E

Transmitter Mounting (b)
- Wall Mounting with Standard Surface Mounting Brackets .............................................. .G
- Nominal DN 50 or 2 inch Pipe Mounting with Standard Bracket Set .................................. .H

Electrical Safety (also see Electrical Safety Specifications section)
- No Approvals or Certifications ............................................................................................... .X
- FM/CSA Approved/Certified Nonincendive, Class I, Division 2 (c) ........................................ .2

Optional Selections
- None ...................................................................................................................................... .X
- With Tag Number Plate on the Transmitter Housing; maximum 20 characters ...................... .K
- Corrosion-Resistant Paint ...................................................................................................... .2

Notes
- a Code -T replaces Code -H.
- b Refer to DIMENSIONS-NOMINAL Section.
- c Must select Wiring Connection D.
Model MAG2RS – Remote Mounted Magnetic Flowtube

How to Order—Specify model number MAG2RS followed by order code for each selection

### Nominal Line Size
- 10 mm (⅜ in) (Flanged Body only) – a 15 mm (0.5 in) Flange is used with this Line Size...-010
- 15 mm (½ in) (Flanged Body only) – a 15 mm (0.5 in) Flange is used with this Line Size...-015
- 25 mm (1 in) (Flanged and Wafer Body)...-025
- 40 mm (1½ in) (Flanged and Wafer Body)...-040
- 50 mm (2 in) (Flanged and Wafer Body)...-050
- 65 mm (2½ in) (Flanged and Wafer Body)...-065
- 80 mm (3 in) (Flanged and Wafer Body)...-080
- 100 mm (4 in) (Flanged and Wafer Body)...-100
- 150 mm (6 in) (Flanged Body only)...-150
- 200 mm (8 in) (Flanged Body only)...-200

### Flowtube Lining Material
- PFA

### End Connection and Flange Rating
- Wafer Body, ANSI Class 150...-21
- Wafer Body, ANSI Class 300...-22
- Wafer Body, DIN PN10...-41
- Wafer Body, DIN PN16...-42
- Wafer Body, DIN PN25...-43
- Flanged Body, ANSI Class 150...-A1
- Flanged Body, ANSI Class 300...-A2
- Flanged Body, DIN PN10...-D1
- Flanged Body, DIN PN16...-D2
- Flanged Body, DIN PN25...-D3

### Electrode Material
- 316L ss...-L
- Hastelloy C-276...-C
- Titanium...-K
- Zirconium...-H
- Tantalum...-T
- Nickel...-N
- Platinum-Iridium...-P

### Earthing (Grounding) Ring
- 316 ss...-S
- Hastelloy C-276...-C
- Titanium...-K
- Zirconium...-H
- Tantalum...-T
- Platinum...-P

### Wiring Connection (Flowtube Terminal Box)
- G ½ Internal Thread – without Watertight Gland...-A
- G ½ Internal Thread – with one Plastic Watertight Gland...-B
- G ½ Internal Thread – with one brass Ni-Plated Watertight Gland...-C
- ½ NPT Internal Thread – without Watertight Gland(a)...-D
- M20 Internal Thread – without Watertight Gland...-E

### Face to Face Dimension
- Standard...-A
Flow

Calibration
Standard Calibration (3 points: 0%, 50%, and 100%) .................................................. A

Electrical Safety (also see Electrical Safety Specifications section)
No Approvals or Certifications ............................................................... X
FM/CSA Approved/Certified Nonincendive, Class I, Division 2\(^{(a)}\) ................................. 2

Optional Selections (Misc.)
None (Required selection if options are not selected) ............................................ X
With Tag Number Plate on the Flowtube Terminal Box; maximum 16 characters ................. K
Corrosion-Resistant Paint ........................................................................... 2
Attached 304 ss Bolts and Nuts for Installation; Wafer Body Flowtube only .................. 4

Optional Cable Length Selection for Interconnecting Flowtube to Remote Transmitter
None (make this selection if interconnecting cable is not desired) ............................... XX
2 m (6.6 ft) .................................................................................. 02
3 m (9.8 ft) .................................................................................. 03
4 m (13.1 ft) .................................................................................. 04
5 m (16.4 ft) .................................................................................. 05
10 m (32.8 ft) ............................................................................... 10
15 m (49.2 ft) ............................................................................... 15
20 m (65.6 ft) ............................................................................... 20
30 m (98.4 ft) ............................................................................... 30
40 m (131.2 ft) ............................................................................. 40
50 m (164.0 ft) ............................................................................. 50
60 m (196.8 ft) ............................................................................. 60
70 m (229.7 ft) ............................................................................. 70

Optional Terminals for Flowtubes\(^{(b)}\)
Terminals for Flowtube and no Terminals on Transmitter ................................................ AX
No Terminals on Flowtube and with Terminals on Transmitter ........................................ XA
Terminals for both Flowlube and Transmitter ................................................................. AA

Notes
\(a\) Wiring Connection Code D (½ NPT internal thread) must be selected with Electrical Safety Code 2.
\(b\) Select Optional Terminals only when an Optional Cable is selected.
I/A Series® IMTSIM™ Magnetic Flow Simulator

The IMTSIM product is a hand-held instrument used to verify the calibration and operations of IMT25 Magnetic Flow Transmitters in the field. The IMTSIM product produces an output signal similar to that of a 2800, 8300, 8000A, or 9300A Series Magnetic flowtube. This signal is used as an output to the transmitter being tested. Proper operation of the transmitter is determined by comparing the actual transmitter output created in response to the calibrated IMTSIM output signal.

Refer to Product Specification Sheet PSS 1-6F7A for complete description and specifications.

How to Order – Specify model number IMTSIM- followed by order code for selection

Version
- Standard ................................................................. -1

Cable/Connector
- 38-inch neoprene cable with four test probes having pin terminations .......................................................... 1
These FlowExpert units provide for the following applications:

Model 75RTA Ratemeter/Totalizer for use where flow rate indication and total are required.
Model 75LBA Liquid Batcher for use where batching functions for liquids are required.
Model 75MCA Mass Computer for computation and display of flow rate and total flow of liquids, gases, and steam in mass engineering units.

Refer to Product Specifications sheet PSS 1-9B1 A (75RTA), PSS 1-9C1 A (75LBA), and PSS 1-9D1 A (75MCA) for complete description and specifications.

Physical Specifications

Panel Mounted Enclosure: Noryl enclosure with polyester front panel. The panel-mounted instrument can be mounted flush on a control rack or panel. Instrument front face is sealed to provide the environmental protection of NEMA Type 4X.

Field Mounted Enclosure: The panel mounted instrument is mounted flush in the door of a glass-filled polyester enclosure with a baked gray finish. The field-mounted enclosure may be mounted to a surface or to a nominal DN 50 or 2-inch pipe. It meets the requirements of IEC IP65 and NEMA Type 4X.

Agency Approvals: The 75RTA, 75LBA, and 75MCA have been approved by CSA for use in general purpose (ordinary) locations.

Overall Dimensions:

Panel-Mounted Enclosure:
- Height—86 mm (3.4 in)
- Width—157 mm (6.2 in)
- Depth—117 mm (4.6 in)

Field-Mounted Enclosure:
- Height—290 mm (11.4 in)
- Width—238 mm (9.4 in)
- Depth—170 mm (6.7 in)

Approximate Mass:
- Panel Mounted Unit: 0.8 kg (1.75 lb)
- Field Mounted Unit: 4 kg (8.8 lb)

Functional Specifications

Inputs/Outputs:

<table>
<thead>
<tr>
<th>Item</th>
<th>75RTA</th>
<th>75LBA</th>
<th>75MCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Input</td>
<td>4-20 mA or 0-10 KHz Pulse</td>
<td>4-20 mA or 0-5 KHz Pulse</td>
<td>4-20 mA or 0-5 KHz Pulse</td>
</tr>
<tr>
<td>Temperature Input</td>
<td>None</td>
<td>4-wire Pt RTD or 4-20 mA</td>
<td>4-wire Pt RTD or 4-20 mA</td>
</tr>
<tr>
<td>Pressure Input</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Contact Inputs</td>
<td>5</td>
<td>Up to 3</td>
<td>Up to 3</td>
</tr>
<tr>
<td>Analog Output</td>
<td>4-20 mA proportional to rate</td>
<td>4-20 mA proportional to rate, temperature or density</td>
<td>4-20 mA proportional to rate, temperature, pressure, or density</td>
</tr>
<tr>
<td>Totalizer Pulse</td>
<td>Selectable width and frequency coincident with least significant whole digit on totalizer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact Alarm Outputs</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Outputs</td>
<td>None</td>
<td>2 for batching using on/off valves</td>
<td>2 for alarms</td>
</tr>
</tbody>
</table>

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
Operating Conditions:

<table>
<thead>
<tr>
<th>Influence</th>
<th>Normal Operating Condition Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient Temperature</td>
<td>0 and 50°C (32 and 122°F)</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>0 and 85% Noncondensing</td>
</tr>
<tr>
<td>Supply Voltage (ac)</td>
<td>Rated Voltage +10% and -15%</td>
</tr>
<tr>
<td>Supply Frequency (ac)</td>
<td>Rated Frequency ±3 Hz</td>
</tr>
<tr>
<td>Supply Voltage (dc)</td>
<td>18 and 27 V dc</td>
</tr>
<tr>
<td>RFI Susceptibility</td>
<td>3 V/m from 27 to 1000 MHz</td>
</tr>
<tr>
<td>Vibration</td>
<td>Up to 200 Hz at an acceleration of 5 m/s² (1/2 &quot;g&quot;)</td>
</tr>
</tbody>
</table>

How to Order—Specify model number 75 followed by order code for each selection

Instrument

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratemeter/Totalizer</td>
<td>RTA</td>
</tr>
<tr>
<td>Liquid Batcher</td>
<td>LBA</td>
</tr>
<tr>
<td>Mass Computer</td>
<td>MCA</td>
</tr>
</tbody>
</table>

Enclosure

<table>
<thead>
<tr>
<th>Enclosure</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel Mounting</td>
<td>PD</td>
</tr>
<tr>
<td>Field Enclosure, Surface Mounting</td>
<td>FE</td>
</tr>
<tr>
<td>Field Enclosure, Pipe Mounting</td>
<td>FF</td>
</tr>
</tbody>
</table>

Language

<table>
<thead>
<tr>
<th>Language</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>E</td>
</tr>
</tbody>
</table>

Supply Voltage

<table>
<thead>
<tr>
<th>Supply Voltage</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>120/240 V ac, 50/60 Hz; 24 V dc</td>
<td>F</td>
</tr>
</tbody>
</table>

Input Signal

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Input Signal</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>75RTA</td>
<td>Pulse Primary flow Input Signal, 0 to 10 kHz</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Analog Primary Flow Input Signal, 4 to 20 mA</td>
<td>B</td>
</tr>
<tr>
<td>75LBA</td>
<td>Pulse Primary flow Input Signal, 0 to 5 kHz</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Analog Primary Flow Input Signal, 4 to 20 mA</td>
<td>B</td>
</tr>
<tr>
<td>75MCA</td>
<td>Pulse Primary flow Input Signal, 0 to 5 kHz, Liquid Applications</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Analog Primary Flow Input Signal, 4 to 20 mA, Liquid Applications</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>Pulse Primary Flow Input Signal, 0 to 5 kHz, Gas/Steam Applications</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Analog Primary Flow Input Signal, 4 to 20 mA, Gas/Steam Applications</td>
<td>D</td>
</tr>
</tbody>
</table>

Specify information for instrument tag
Sanitary Magnetic Flowmeter: Model 4700S Ceramic or PFA-lined Sanitary Flowtube and Models 47 and 48 Transmitters

A Sanitary Magnetic Flowmeter consisting of a flowtube and transmitter measures the flow of conductive liquids (usually water based) and transmits a proportional electrical signal. Sanitary design, specifically suited for food, beverage and water applications.

Refer to Product Specifications Sheets PSS 1-6G2A (4700S Series Flowtube) and PSS 1-6G1A (Model 47 and 48 Series Transmitter for complete description and specifications.

### Performance Specifications
Performance stated under Reference Operating Conditions and is for the Magnetic Flow System—Transmitter with Flowtube.

#### Accuracy—Digital and Pulse Outputs

<table>
<thead>
<tr>
<th>Sanitary Flowtube Model and Liner Used</th>
<th>Magnetic Flow System Accuracy with:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 47 Transmitter</td>
<td>Model 48 Transmitter</td>
</tr>
<tr>
<td>4700S with Ceramic Liner</td>
<td>±0.5% of Flow Rate</td>
</tr>
<tr>
<td>4700S with PFA Liner</td>
<td>±0.5% of Flow Rate</td>
</tr>
</tbody>
</table>

Accuracy: 4 to 20 mA Output (or 0 to 20 mA)
Same as Digital/Pulse Output accuracy but add ± (0.1% of flow rate + 0.05% of Span)

Repeatability: ±0.1% of Flow Rate for velocities ≥0.5 m/s (1.6 ft/s)
Supply Voltage Effect: <±0.005% of measured value for 1% voltage change

Ambient Temperature Effect:
- Current Output: <±0.003%/°C
- Pulse Frequency Output: <±0.003%/°C

### Model 47/48—Functional Specifications

#### Pulse/Frequency Output Signal:
- Output: 0 to 10 000 Hz, 50% duty cycle
- Damping: 0.1 to 30 seconds, adjustable
- Active: 24 V dc, 30 mA, Load >1000 Ω and <10 000 Ω
- Passive: 3 to 30 V dc, 110 mA, Load >200 Ω and <10 000 Ω

#### Contact (Relay) Output Signal:
- Changeover relay
- 42 V ac/2 A; 24 V dc/1 A

#### Digital Input Signal (HART):
- Input: 11 to 30 V dc, R = 4400 Ω
- Activation Time: 50 ms

#### Current:
- 2.5 mA at 11 V dc
- 7 mA at 30 V dc

#### Supply Voltage and Power Consumption:
- 115 to 230 V ac: 9 VA
- 11 to 24 V ac: 9 W
- 24 V dc: 6 W
- 12 V dc: 5 W

Flowtube Excitation Frequency: When used with Model 47 Transmitter: 3-1/8 Hz pulsating dc current (±125 mA)
When used with Model 48 Transmitter: 3-1/8, 6-1/4, or 12-1/2 Hz pulsating dc current (±125 mA)

#### Communications:
Model 47 Transmitter: HART Communication Protocol can be incorporated in the electronics provided.
Model 48 Transmitter: HART Communication Protocol can be provided using an “add-on” module which is easily inserted in the transmitter’s bottom surface compartment. This can be done in the factory or in the field, as specified. This “add-on” feature allows other communication protocol modules to be easily used in the future by simply replacing the communications module.

#### Functions:
Flow rate, two totalizers, low flow cutoff, flow direction, and diagnostics. Additionally, the Model 48 Transmitter provides a batch function.

#### Galvanic Isolation:
All inputs and outputs are galvanically isolated.

#### Low Flow Cutoff—Programmable:
- 0 to 9.9% of maximum flow rate
- Detection of empty pipe (special cable required—see Signal and Coil Driver section)
Model 47/48—Functional Specifications (cont.)
Totalizer: Two 8-digit totalizers for forward, net, and reverse flow. Reverse flow is indicated by a negative sign (-).

Empty Tube Zero: Automatic empty tube zero adjustment used to drive output signal to “zero flow rate” when the electrodes become uncovered by the conductive liquid.

Model 47/48—Physical Specifications
Enclosure Construction (Including Terminal Box): The overall enclosure construction meets IEC IP67, and provides the environment protection NEMA Type 6 (submersion in 1.5 m (5 ft) of water for 72 hours).
Enclosure Material: Fiberglass reinforced polyamide
Enclosure Finish: Gray and blue pigmented polyamide material
Transmitter Mounting: The transmitter is either directly mounted to the flowtube, or can be remotely mounted to a surface or DN 50 (2 in) pipe using a mounting bracket. See Optional Selections and Accessories, and Dimensions—Nominal sections.
Electrical Connections: Four holes with 1/2" NPT or M2" cable glands are provided for cable entry into the terminal box.
Mounting Position: The transmitter can be mounted in any position without degrading performance. The only requirements are that the flowtube be completely full with the process liquid during measurement, and that the electrodes should not be near the top or bottom of the pipeline. Also with either integrally or remote mounted transmitters, the enclosure box can be rotated 90° in either direction to allow selecting the best view of the displays and use of the keypad.
Approximate Mass:
Remote Mounted Transmitter: 1.65 kg (3.6 lb), includes mounting bracket

Transmitter Mounted to Flowtube:

<table>
<thead>
<tr>
<th>Flowtube Size</th>
<th>Transmitter and Flowtube (a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI (metric units)</td>
<td>U.S. customary units</td>
</tr>
<tr>
<td>DN 10</td>
<td>1/2 in</td>
</tr>
<tr>
<td>DN 15</td>
<td>3/4 in</td>
</tr>
<tr>
<td>DN 25</td>
<td>1 in</td>
</tr>
<tr>
<td>DN 40</td>
<td>1-1/2 in</td>
</tr>
<tr>
<td>DN 50</td>
<td>2 in</td>
</tr>
<tr>
<td>DN 65</td>
<td>2-1/2 in</td>
</tr>
<tr>
<td>DN 80</td>
<td>3 in</td>
</tr>
<tr>
<td>DN 100</td>
<td>4 in</td>
</tr>
</tbody>
</table>

Model 4700S—Functional Specifications
Nominal Flowtube1 Sizes: 10, 15, 25, 50, 60, 65, 80, and 100 mm (1.2, 3/4, 1, 1-1/2, 2, 2-1/2, 3, and 4 in)
Flow Velocity:
Minimum Measuring Range: 0 to 0.25 m/s (0 to 0.82 ft/s)
Maximum Measuring Range: (0 to 32.8 ft/s)
Recommended Operating Velocity: Approximately 1.5 to 5 m/s (5 to 16 ft/s)
Test Pressure:
Ceramic-Lined Flowtube: 80 bar (1160 psi) which is two times the maximum process pressure
PFA-Lined Flowtube: 40 bar (580 psi) which is two times the maximum process pressure
Sanitary Approvals:
Ceramic-Lined Flowtube: 3-A and EHEDG Sanitary Standards
PFA-Lined Flowtube: 3-A Sanitary Standard
Ceramic Lining: This lining provides a crevice-free process surface. Ceramic also provides excellent corrosion and abrasion resistance and is suitable for high pressure, high temperature, or vacuum service applications.
PFA Lining: The PFA lining meets the sanitary material requirements of FDA. It is excellent when used with sanitary, clean, mildly corrosive, or severely corrosive fluids. It is satisfactory when used with mild abrasive fluids, and is not recommended for use with severe abrasive fluids.
End Connections Adapters:
Flowtube End of Adapter: Adapter clamped to flowtube using a sanitary clamp.

<table>
<thead>
<tr>
<th>Type to Pipeline</th>
<th>Flowtube Description(a)</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welded to Pipeline</td>
<td>DIN 11850, ISO 2037, SMS 3008, and BS 4825-1</td>
<td>40 bar (580 psi)</td>
</tr>
<tr>
<td>Clamped to Pipeline</td>
<td>DIN 32676, ISO 2852, SMS 3016, and BS 4825-3</td>
<td>16 bar (230 psi)</td>
</tr>
<tr>
<td>Threaded to Pipeline</td>
<td>DIN 11851, DIN 2853, SS 3351, BS 4825-4</td>
<td>40 bar (580 psi)</td>
</tr>
</tbody>
</table>

Pipeline End of Adapter: Adapter either welded, clamped or threaded to pipeline; refer to Model Code, and see End Connection Adapters table below.

Process Fluid Conductivity: The minimum process fluid conductivity required is 5 µS/cm. For empty pipe detection, the minimum conductivity is 20 µS/cm. Refer to TI 27-072 for conductivities of various process liquids.
Model 4700S—Functional Specifications (cont.)

Signal and Coil Driver Cable Length: For remote transmitter installations, the maximum allowable cable length is 300 m (985 ft) between flowtube and transmitter when using standard 3-conductor (with shield) cable. This length can be increased to 500 m (1640 ft) by using a special cable. See Figure 3 for the relationship between minimum fluid conductivity and cable length. Also see the transmitter product specification document PSS 1-6G1 A for further data relating to the transmitter-to-flowtube cables.

![Figure 3. Process Fluid Conductivity vs. Cable Length](image)

Ambient Temperature vs. Process Temperature with Integrally Mounted Transmitters: The ambient temperature limits of 50°C (122°F) specified when the transmitter is directly mounted is restricted, depending on the process temperature of the liquid. Figure 4 shows the reduction in ambient temperature required as the process temperature increases to its maximum limit.

![Figure 4. Ambient vs. Process Temperature for Integrally Mounted Transmitters](image)

Model 4700S—Physical Specifications

Enclosure Construction (Including Terminal Box): The overall enclosure construction meet IEC IP67 and provides the environmental protection of NEMA Type 4X. When used with an optional submersion kit, the enclosure meets IP68 and NEMA Type 6. See Optional Selections section.

Flowtube Enclosure: 316 ss

Terminal Box Enclosure: Fiberglass reinforced polyamide, or 316 ss, as specified

Flowtube Liner and Electrodes: Ceramic (Al2O3) liner with platinum electrodes, or PFA liner with Hastelloy C-276 electrodes

Gaskets: EPDM1, rated -20 to +150°C (-4 to +302°F) is standard; or optionally NBR1, rate -20 to + 100° (-4 to +212°F)

Clamps: AISI Type 304 stainless steel (304 ss)

End Connection Adapters: 316 ss

Model 4700S—Optional Selections and Accessories

NBR Gaskets: NBR gaskets are offered as options to the standard EPDM gaskets provided with each end connection sanitary clamp. Temperature rating of NBR gaskets is -20 to +100°C (-4 to +212°F) Specify Part Number per table below.

<table>
<thead>
<tr>
<th>Flowtube Size</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 10 (1/2 in)</td>
<td>083G2216</td>
</tr>
<tr>
<td>DN 15 (3/4 in)</td>
<td>083G2217</td>
</tr>
<tr>
<td>DN 25 (1 in)</td>
<td>083G2219</td>
</tr>
<tr>
<td>DN 40 (1-1/2 in)</td>
<td>083G2221</td>
</tr>
<tr>
<td>DN 50 (2 in)</td>
<td>083G2222</td>
</tr>
<tr>
<td>DN 65 (2-1/2 in)</td>
<td>083G2223</td>
</tr>
<tr>
<td>DN 80 (3 in)</td>
<td>083G2224</td>
</tr>
<tr>
<td>DN 100 (4 in)</td>
<td>083G2225</td>
</tr>
</tbody>
</table>

1/2 NPT Conduit Connectors: The standard terminal box cable entries are through PG 13.5 cable glands. For users who use NPT conduit, 1/2 NPT conduit connectors are provided. Specify Part Number 083N4394.

Submersion Kit to IEC IP68: The standard flowtube enclosure meets IEC IP67 relating to the effects of immersion in water. Use of the submersion kit upgrades the protection in IEC IP68. The table below compares the standard protection, and improved protection using the submersion kit. Specify Part Number 08540220 for the IP68 Submersion Kit.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Submersion Depth</th>
<th>Submersion Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP67; NEMA 4X (Standard)</td>
<td>1.5 m Water (5 ft Water)</td>
<td>72 hours</td>
</tr>
<tr>
<td>IP68; NEMA 8 (Optional)</td>
<td>10 m Water (33 ft Water)</td>
<td>72 hours</td>
</tr>
</tbody>
</table>
### 4700 Series Sanitary Magnetic Flowtubes

**Nominal Flowtube Size**
- DN 10 (1/2 in) Flowtube .................................................. 010
- DN 15 (3/4 in) Flowtube .................................................. 015
- DN 25 (1 in) Flowtube .......................................................... 025
- DN 40 (1-1/2 in) Flowtube .................................................. 040
- DN 50 (2 in) Flowtube .......................................................... 050
- DN 65 (2-1/2 in) Flowtube .................................................. 065
- DN 80 (3 in) Flowtube .......................................................... 080
- DN 100 (4 in) Flowtube ..................................................... 100

**Linear and Electrode Materials**
- Ceramic Liner with Platinum Electrodes .................................. C
- PFA Liner with Hastelloy C Electrodes¹ .................................. P

**Terminal Box**
- Fiberglass Reinforced Polyamide
  - 1/2” NPT .......................................................... F
  - M20 ........................................................................... V
- AISI Type 316SS Stainless Steel
  - 1/2” NPT .......................................................... H
  - M20 ........................................................................... W

**Electrical Safety**
- UL, ULc, CE, C-Tick; For use in General Purpose (Ordinary) Locations ........................................ A

**End Connection**
- None² .......................................................... NN
- Tri-Clover® Welded Connection ........................................... WA
- DIN 11850 Welded Connection ........................................... WB
- ISO 2037 Welded Connection ............................................. WC
- BS 4825-1 Welded Connection ........................................... WE
- Tri-Clamp® Type ........................................................... CA
- DIN 32676 Clamp Type ..................................................... CB
- ISO 2852 Clamp Type ..................................................... CC
- BS 4825-3 Clamp Type ..................................................... CE
- DIN 11851 Threaded Connection ....................................... TA
- SMS 1145 Threaded Connection ......................................... TE

**Optional Model Suffix(es) Included**
- EPDM gasket material ...................................................... -E
- NBR gasket material ........................................................ -N

**Notes**
1. Select only for pressure less than or equal to 40 bar (4 MPa, 580 psi).
2. Generally selected for flowtube replacement.
3. Two adapters, two EPDM gaskets, and two clamps (for joining adapter to flowtube) are provided with these selections.
47/48 Series Sanitary Magnetic Flowtubes

Magnetic Flow Transmitter
- System Accuracy of ±0.5% with Model 4700S Sanitary Flowtubes with Ceramic or PFA liners ...................................................... 47
- System Accuracy of ±0.25% with Model 4700S Sanitary Flowtubes with Ceramic Liner, and ±0.05% with Model 4700S Sanitary Flowtubes with a PFA Liner .... 48

Supply Voltage and Frequency
- 115 to 230 V ac, 50 to 60 Hz. ................................................... -A
- 11 to 24 V ac or 11 to 30 V dc .................................................. -B

Communication Protocol
- 4 to 20 mA Current Output ..................................................... A
- Intelligent; Digital, HART and 4 to 20 mA(1) ........................ A
- With Indicator and Keypad ..................................................... A
- Blind; without Indicator and Keypad(2) .................................. B

Transmitter Enclosure
- Fiberglass Reinforced Polyamide Enclosure Meet IEC IP67 and NEMA Type 6(3) ...................................................... 1

Electrical Safety
- UL, ULc, CE, C-Tick; For use in General Purpose (Ordinary) Locations ...................................................... A

Note
1. When HART Communication is specified, included is a waterproof connector for installation in the flowtube terminal box. With the Model 47 Transmitter, HART communications is incorporated in the electronics provided. With the Model 48 Transmitter, HART communications is provided by and "add-on" module (included) in the field or during installation. See “Optional Selections and Accessories” section.
2. The "blind" (no indicator or keypad) transmitter is not offered with Communication Protocol Code "A" (4 to 20 mA).
3. If transmitter is not directly mounted to a flowtube, then a mounting bracket, and signal and coil driver cable are required. See "Optional Selections and Accessories" section for mounting bracket and cable specifications, and ordering information.
Temperature and Humidity

The following chapters contain Product Specifications of the Instruments:

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTT15</td>
<td>Temperature Transmitters (4-20 mA/HART, Foundation Fieldbus, and Profibus)</td>
</tr>
<tr>
<td>RTT20</td>
<td>Temperature Transmitters (4-20 mA, 4-20 mA/HART, and with LCD Indicators)</td>
</tr>
<tr>
<td>RTT30</td>
<td>Temperature Transmitter</td>
</tr>
<tr>
<td>RTT80</td>
<td>Temperature Transmitter</td>
</tr>
<tr>
<td>PR</td>
<td>Series Platinum Resistance Temperature Detectors (RTDs)</td>
</tr>
<tr>
<td>MT</td>
<td>Series Minox™ Thermocouples</td>
</tr>
<tr>
<td>Thermowells</td>
<td>Thermowells</td>
</tr>
<tr>
<td>DEWCEL</td>
<td>Dew Point Measurement System</td>
</tr>
</tbody>
</table>
I/A Series® Model RTT15 Temperature Transmitters

I/A Series Temperature Transmitters operate with RTDs and thermocouples and also accept ohm or dc millivolt inputs. The linearized and isolated output is 4 to 20 mV dc with HART protocol, or Foundation Fieldbus or Profibus digital protocol, depending on selected version.

For complete specifications, refer to Product Specification Sheet PSS 2A-1 F5 A.

- Single Unit
  - Accepts RTD, thermocouple, ohms, or mV dc
- Sensor Fail Check
- Supports 2, 3, or 4-wire RTDs
- Choice of Communications and Outputs
  - 4 to 20 mA/HART
  - Foundation Fieldbus
  - Profibus
- Variety of weatherproof and explosionproof housings for remote or element mounting.

Foxboro RTT15 Temperature Transmitters provide highly reliable, stable, and accurate temperature measurements, using either RTD or thermocouple sensors. This microprocessor-based transmitter is fully user-configurable and is available with a choice of 4-20 mA/HART, Foundation Fieldbus, or Profibus communications.

The compact DIN B size module is available in a variety of weatherproof or explosionproof housings, including remote, pipe-mounted types and integral, sensor-mounted versions. The bare module may also be surface or DIN rail mounted (using optional DIN rail clip). The transmitter is also intrinsically safe.

RTT15 transmitters can be used with a wide variety of sensors, including two, three, or four-wire RTDs and Types B, E, J, K, L, N, R, S, T, U, W3, and W4 thermocouples. In thermocouple applications, the transmitter is configurable for an internal, external, or constant cold junction reference.

The 4-20mA/HART version is configurable for low and high out-of-range and failure current signals, including conformance to NAMUR 43. Diagnostics include sensor short and open detection for RTDs and sensor open detection for thermocouples.

The 4-20 mA/HART version also supports average and difference measurement, using dual two-wire RTDs or thermocouples.

The Foundation Fieldbus/Profibus version supports average, difference, and redundant measurements, using a choice of dual two-wire RTDs or thermocouples or a combination of a two or three-wire RTD with a thermocouple.

The RTT15 transmitter is part of the Foxboro family of intelligent temperature transmitters and carries a standard five year warranty. The combination of high functionality, performance, and reliability at a very affordable price results in exceptional value.
### Span and Range Limits – RTD Inputs

<table>
<thead>
<tr>
<th>RTD Type</th>
<th>°C</th>
<th>°F</th>
<th>°C</th>
<th>°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platinum, 100 Ω</td>
<td>10 and 1050</td>
<td>18 and 1890</td>
<td>-200 and +850</td>
<td>-328 and +1652</td>
</tr>
<tr>
<td>Nickel 100 Ω</td>
<td>10 and 310</td>
<td>18 and 558</td>
<td>-60 and +250</td>
<td>-76 and +482</td>
</tr>
</tbody>
</table>

### Transmitter Accuracy$^{(2)}$ – General Value

- **HART**: ±0.05% of span for all input types.
- **FIELDBUS/PROFIBUS**: ±0.05% of reading for all input types.

### Transmitter Accuracy$^{(2)}$ – Basic Value

- **Platinum RTD Input**: ±0.1ºC (±0.18ºF)
- **TC Type E, J, K, L, N, T, AND U Input**: ±0.5ºC (±0.9ºF)
- **TC Type B, R, S, W3, AND W5 Input**: ±1.0ºC (±1.8ºF)

2 Transmitter accuracy is the greater of the general or basic values listed. This value does not include specific sensor effects.

### Span and Range Limits - TC Input

<table>
<thead>
<tr>
<th>TC Type</th>
<th>°C</th>
<th>°F</th>
<th>°C</th>
<th>°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>100 and 1420</td>
<td>180 and 2556</td>
<td>400 and 1820</td>
<td>752 and 3308</td>
</tr>
<tr>
<td>E</td>
<td>50 and 1100</td>
<td>90 and 1980</td>
<td>-100 and +1000</td>
<td>-148 and +1832</td>
</tr>
<tr>
<td>J</td>
<td>50 and 1300</td>
<td>90 and 2340</td>
<td>-100 and +1200</td>
<td>-148 and +2192</td>
</tr>
<tr>
<td>K</td>
<td>50 and 1552</td>
<td>90 and 2794</td>
<td>-180 and +1372</td>
<td>-292 and +2502</td>
</tr>
<tr>
<td>L</td>
<td>50 and 1100</td>
<td>90 and 1980</td>
<td>-200 and +900</td>
<td>-328 and +1652</td>
</tr>
<tr>
<td>N</td>
<td>50 and 1480</td>
<td>90 and 2664</td>
<td>-180 and +1300</td>
<td>-292 and +2372</td>
</tr>
<tr>
<td>R</td>
<td>100 and 1810</td>
<td>180 and 3258</td>
<td>-50 and +1760</td>
<td>-58 and +3200</td>
</tr>
<tr>
<td>S</td>
<td>100 and 1810</td>
<td>180 and 3258</td>
<td>-50 and +1760</td>
<td>-58 and +3200</td>
</tr>
<tr>
<td>T</td>
<td>50 and 600</td>
<td>90 and 1080</td>
<td>-200 and +400</td>
<td>-328 and +752</td>
</tr>
<tr>
<td>U</td>
<td>50 and 800</td>
<td>90 and 1440</td>
<td>-200 and +600</td>
<td>-328 and 1112</td>
</tr>
<tr>
<td>W3</td>
<td>100 and 2300</td>
<td>180 and 4140</td>
<td>0 and 2300</td>
<td>32 and 4172</td>
</tr>
<tr>
<td>W5</td>
<td>100 and 2300</td>
<td>180 and 4140</td>
<td>0 and 2300</td>
<td>32 and 4172</td>
</tr>
</tbody>
</table>
# Temperature and Humidity

## How to Order — Specify RTT15

### Output:
- 4 to 20 mA with HART digital communications
- FOUNDATION Fieldbus H1 digital communications
- Profibus PA digital communications

### Input Configuration:
- Single Input – configured for one sensor
- Dual Input – configured for average of two sensors of the same type
- Dual Input – configured for difference of two sensors of the same type
- Dual Input – configured for redundancy of two sensors of the same type

*Note: Not available with -T Output Signal*

### Housing and Sensor Mounting:
- Basic Module Without Housing; for use with Remote Sensor
- Connection Head Housing (aluminum weatherproof) with Bare Sensor
- Connection Head Housing (aluminum explosionproof) with Bare Sensor
- Connection Head Housing (aluminum weatherproof) w/Sensor for Thermowell Mounting
- Connection Head Housing (aluminum explosionproof) w/Sensor for Thermowell Mounting
- Universal Housing (aluminum) for use with Remote Sensor
- Universal Housing (stainless steel) for use with Remote Sensor
- Universal Housing (aluminum) with Bare Sensor
- Universal Housing (stainless steel) with Bare Sensor
- Universal Housing (aluminum) for use with Remote Sensor
- Universal Housing (stainless steel) for use with Remote Sensor
- Universal Housing (aluminum) w/Sensor for Thermowell Mounting
- Universal Housing (stainless steel) w/Sensor for Thermowell Mounting

### Sensor Length: (applicable when a single sensor is to be factory-assembled to housing)
- None – Sensor Ordered Separately (requires Housing Code B, S, or T)
- 2 inch (50 mm)
- 2.5 inch (64 mm)
- 3 inch (76 mm)
- 3.5 inch (89 mm)
- 4 inch (102 mm)
- 4.5 inch (114 mm)
- 5 inch (127 mm)
- 5.5 inch (140 mm)
- 6 inch (152 mm)
- 7 inch (178 mm)
- 8 inch (203 mm)
- 9 inch (229 mm)
- 10 inch (254 mm)
- 11 inch (279 mm)
- 12 inch (305 mm)
- 12 inch (305 mm)
- 18 inch (457 mm)
- 24 inch (610 mm)
- 30 inch (762 mm)
- 36 inch (914 mm)
- Custom lengths between 2 & 120 inches (50 mm & 3 m)

### Measurement Input Type:
- Thermocouple, Type K
- Thermocouple, Type J
- Thermocouple, Type E
- Thermocouple, Type T
- Thermocouple, Type N
- Thermocouple, Type B
- Thermocouple, Type L
- Thermocouple, Type R
- Thermocouple, Type S
- Thermocouple, Type U
### Temperature and Humidity

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Model Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermocouple, Type W3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Thermocouple, Type W5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>RTD, 2-wire, 100 ohm platinum IEC 751 (ASTM -B Standard Accuracy), 316 ss Sheath</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>RTD, 3-wire, 100 ohm platinum IEC 751 (ASTM -B Standard Accuracy), 316 ss Sheath</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Housing B, S, T</td>
<td>Q</td>
<td></td>
</tr>
<tr>
<td>Housing D, E, F, W, Y, L, M</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>RTD, 4-wire, 100 ohm platinum IEC 751 (ASTM -A High Accuracy), 316 ss Sheath</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Housing B, S, T</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Housing D, E, F, W, Y, L, M</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>RTD, 3-wire, 100 ohm nickel DIN 43760, 316 ss Sheath</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>ohm (only available with Housing Codes B, S, or T)</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>Millivolt (only available with Housing Codes B, S, or T)</td>
<td>M</td>
<td></td>
</tr>
</tbody>
</table>

### Thermowell Assembled to Housing:

<table>
<thead>
<tr>
<th>Description</th>
<th>Model Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Well or Well Supplied Separately</td>
<td>N/A</td>
</tr>
<tr>
<td>Threaded, 3/4 NPT Ext. Thread, 304 ss, Plain Well Assembled to Hsg. w/Union</td>
<td>TA</td>
</tr>
<tr>
<td>Threaded, 3/4 NPT Ext. Thread, 316 ss, Plain Well Assembled to Hsg. w/Union</td>
<td>TB</td>
</tr>
<tr>
<td>Threaded, 3/4 NPT Ext. Thread, 316 ss, Lagging Well Assembled to Hsg. w/Union</td>
<td>TC</td>
</tr>
<tr>
<td>Threaded, 1 NPT Ext. Thread, 316 ss, Plain Well Assembled to Hsg. w/Union</td>
<td>TD</td>
</tr>
<tr>
<td>Threaded, 1 NPT Ext. Thread, Hastelloy C, Plain Well Assembled to Hsg. w/Union</td>
<td>TE</td>
</tr>
<tr>
<td>Threaded, 1 NPT Ext. Thread, 304 ss, Lagging Well Assembled to Hsg. w/Union</td>
<td>TF</td>
</tr>
<tr>
<td>Threaded, 1 NPT Ext. Thread, 316 ss, Lagging Well Assembled to Hsg. w/Union</td>
<td>TG</td>
</tr>
<tr>
<td>Flanged, 1 in. ANSI Class 150 RF, 316 ss, Plain Well Assembled to Hsg. w/Union</td>
<td>TH</td>
</tr>
<tr>
<td>Flanged, 1.5 in. ANSI Class 150 RF, 316 ss, Plain Well Assembled to Hsg. w/Union</td>
<td>TI</td>
</tr>
<tr>
<td>Thermowell Series “W-”, assembled to housing; specify “W-” model code</td>
<td>TX</td>
</tr>
</tbody>
</table>

### Electrical Classification: (See PSS for Description and Restrictions)

<table>
<thead>
<tr>
<th>Classification</th>
<th>Model Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSA Certified</td>
<td>C</td>
</tr>
<tr>
<td>ATEX Intrinsic Safe</td>
<td>E</td>
</tr>
<tr>
<td>ATEX Flameproof</td>
<td>D</td>
</tr>
<tr>
<td>FM Approved</td>
<td>F</td>
</tr>
</tbody>
</table>

### Optional Selections:

#### Housing Features (Select Only One)

- Custody Transfer Lock and Seal (only available with Housing S, T, W, Y, L, & M) | A1
- PG13.5 Conduit Thread (only available with Housing S, T, W, Y, L, & M) | A2
- Metric Conduit Adaptor (1/2 NPT by M20 x 1.5) (not available w/Hsg Code B) | A3
- Stainless Steel Union and fittings (only available with Housing E, F, & L - std on M) | S3
- 1/2 NPT fitting (instead of standard 1/2 NPT) to fit user-supplied well with 1/2 NPT internal thread (only available when Housing Code E, F, L, or M is selected and Thermowell Code NA is selected) | D5
- Mounting Set – Painted Steel (only available with Housing S, T, W, Y, L, & M) | M1
- Mounting Set – Stainless Steel (only available with Housing S, T, W, Y, L, & M) | M2
- Adapter Plate & Screws to mount RTT15 Module in E93/E94/893/RTT10 Housings (only available with Housing Code B) | D3
- Inconel Sheath on Sensor (not available with Sensor Code N) | S1
- VIno with 3/4 NPT external thread | D4
- Custom Database Configuration (requires “C2 Form” with all data specified) | C2
- Without Instruction Book and CD | K1
- Indicator | L2

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
Functional Specifications

Range and Maximum Span Limits:

<table>
<thead>
<tr>
<th>Input Type (Model Letter)</th>
<th>Sensor Input</th>
<th>°C</th>
<th>°F</th>
<th>°C</th>
<th>°F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RTDs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td>Pt 100 DIN/IEC</td>
<td>-200 to 850</td>
<td>-328 to 1562</td>
<td>1050</td>
<td>1890</td>
</tr>
<tr>
<td>A</td>
<td>Pt 100 DIN/IEC</td>
<td>-200 to 850</td>
<td>-328 to 1562</td>
<td>1050</td>
<td>1890</td>
</tr>
<tr>
<td>P</td>
<td>Pt 100 SAMA</td>
<td>-200 to 650</td>
<td>-328 to 1202</td>
<td>850</td>
<td>1530</td>
</tr>
<tr>
<td>D</td>
<td>Ni 200</td>
<td>-130 to 315</td>
<td>-202 to 599</td>
<td>445</td>
<td>801</td>
</tr>
<tr>
<td>G</td>
<td>Ni 120 (Minco)</td>
<td>-80 to 320</td>
<td>-112 to 608</td>
<td>400</td>
<td>720</td>
</tr>
<tr>
<td>I</td>
<td>Ni 100</td>
<td>-60 to 250</td>
<td>-76 to 482</td>
<td>310</td>
<td>558</td>
</tr>
<tr>
<td>F</td>
<td>Cu 10</td>
<td>-70 to 150</td>
<td>-94 to 302</td>
<td>220</td>
<td>396</td>
</tr>
<tr>
<td><strong>Thermocouples</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Type B</td>
<td>0 to 1820</td>
<td>32 to 3308</td>
<td>1820</td>
<td>3276</td>
</tr>
<tr>
<td>C</td>
<td>Type C</td>
<td>0 to 2320</td>
<td>32 to 4208</td>
<td>2320</td>
<td>4176</td>
</tr>
<tr>
<td>E</td>
<td>Type E</td>
<td>-270 to 1000</td>
<td>-454 to 1832</td>
<td>1270</td>
<td>2286</td>
</tr>
<tr>
<td>J</td>
<td>Type J</td>
<td>-210 to 1200</td>
<td>-346 to 2129</td>
<td>1410</td>
<td>2538</td>
</tr>
<tr>
<td>K</td>
<td>Type K</td>
<td>-270 to 1372</td>
<td>-454 to 2502</td>
<td>1642</td>
<td>2956</td>
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<tr>
<td>L</td>
<td>Type L</td>
<td>-200 to 900</td>
<td>-328 to 1652</td>
<td>1100</td>
<td>1980</td>
</tr>
<tr>
<td>N</td>
<td>Type N</td>
<td>-270 to 1300</td>
<td>-454 to 2372</td>
<td>1570</td>
<td>2826</td>
</tr>
<tr>
<td>R</td>
<td>Type R</td>
<td>-50 to 1768</td>
<td>-58 to 3214</td>
<td>1818</td>
<td>3272</td>
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<tr>
<td>S</td>
<td>Type S</td>
<td>-50 to 1768</td>
<td>-58 to 3214</td>
<td>1818</td>
<td>3272</td>
</tr>
<tr>
<td>T</td>
<td>Type T</td>
<td>-270 to 400</td>
<td>-454 to 752</td>
<td>670</td>
<td>1206</td>
</tr>
<tr>
<td>U</td>
<td>Type U</td>
<td>-200 to 600</td>
<td>-328 to 1112</td>
<td>800</td>
<td>1440</td>
</tr>
<tr>
<td><strong>Dew Point</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td></td>
<td>-45 to 60</td>
<td>-50 to 140</td>
<td>105</td>
<td>195</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Millivolt</td>
<td>-15 to 115 mV dc</td>
<td>120 mV dc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>Ohms</td>
<td>0 to 500 ohms</td>
<td>500 ohms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td>Custom</td>
<td>2 to 22 User Defined Points</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I/A Series Temperature Transmitters accept inputs from platinum RTDs (DIN, IEC or SAMA), various thermocouples, ohms, or dc millivolts. The linearized and isolated output is configurable for 4 to 20 mA dc, 4 to 20 mA dc with Hart.

For complete specifications, refer to Product Specification Sheet PSS 2A-1 F4 A.
Temperature and Humidity

How to Order—Specify model number RTT20 followed by order code for each selection

Output

| 4-20 mA (CAUTION—See Note¹)                  | .    |
| 4-20 mA with HART communications(3)         | .T   |

Package Configuration

| Basic Unit                                     | .1B  |
| Thermowell mount (Aluminum Housing)           | .1L  |
| Thermowell mount (316ss Housing)              | .1M  |
| Bare Element mount (Aluminum Housing)         | .1W  |
| Bare Element Mount (316ss Housing)            | .1Y  |
| Aluminum Housing, no sensor                   | .1S  |
| 316ss Housing, no sensor                      | .1T  |

Sensor Length ("A" length for Code 1W or "U+T" length for Code 1L)

| None(4)                                        | .N   |
| 2 inch (50 mm)(5)                              | .A   |
| 2.5 inch (64 mm)(5)                            | .B   |
| 3 inch (76 mm)(5)                              | .C   |
| 3.5 inch (89 mm)(5)                            | .D   |
| 4 inch (102 mm)(5)                             | .E   |
| 4.5 inch (114 mm)(5)                           | .F   |
| 5 inch (127 mm)(5)                             | .G   |
| 5.5 inch (140 mm)(5)                           | .H   |
| 6 inch (152 mm)(5)                             | .I   |
| 7 inch (178 mm)(5)                             | .J   |
| 8 inch (203 mm)(5)                             | .K   |
| 9 inch (229 mm)(5)                             | .L   |
| 9 inch (229 mm)(5)                             | .M   |
| 10 inch (254 mm)(5)                            | .P   |
| 11 inch (279 mm)(5)                            | .Q   |
| 12 inch (305 mm)(5)                            | .R   |
| 18 inch (457 mm)(5)                            | .S   |
| 24 inch (601 mm)(5)                            | .T   |
| 30 inch (762 mm)(5)                            | .U   |
| 36 inch (914 mm)(5)                            | .V   |
| Length per Sales Order (120 inch max.)(5)      | .X   |

Measurement Input Type

Thermocouple

| None                                           | .X   |
| Type B                                         | .B   |
| Type C                                         | .C   |
| Type E                                         | .E   |
| Type J                                         | .J   |
| Type K                                         | .K   |
| Type L                                         | .L   |
| Type N                                         | .N   |
| Type R                                         | .R   |
| Type S                                         | .S   |
| Type T                                         | .T   |
| Type U                                         | .U   |

RTDs

| 100 ohm platinum DIN 751 (ASTM-B Standard Accuracy) | .Q   |
| 100 ohm platinum DIN 751 (ASTM-A High Accuracy)     | .A   |
| 100 ohm platinum SAMA                               | .P   |
| 200 ohm nickel                                     | .D   |
| 120 ohm nickel Minco                               | .G   |
| 100 ohm nickel DIN 43760                            | .I   |
| 10 ohm copper                                      | .F   |
## Measurement Input Type (continued)

### Other (Sensor Length N Only)
- Millivolt
- Ohms
- Dew point (Foxboro Model 2781 Dewcell)
- None
- Custom (22 point configurable)

### Electrical Agency Approval (see PSS for description and restrictions)
- CSA Intrinsically Safe
- CSA Explosion proof (6, 7)
- CSA Division 2
- CENELEC Intrinsically Safe
- ATEX Flameproof (13)
- FM Intrinsically Safe
- FM Explosion proof (6, 7)
- FM Non-incendive
- European Non sparking

### Optional Selections
- Custody Transfer Lock and Seal
- PG 13.5 Conduit Thread (8)
- Metric adapter (1/2" NPT to PG 13.5)
- Custom Database Configuration
- DIN Rail Mounting Hardware (10)
- Ship with thermowell attached (11)
- Adapter plate
- Delete Paper Instruction Book
- CD-ROM Instruction Book
- Three line LCD/Configurator
- Mounting Set (12)
- Stainless Steel Mounting Set (12)
- Inconel Sheath (12)
- Dual Sensor (2 two wire RTDs in one sheath)
- 4 wire RTD

**Specify calibrated range ________ to ________ (°C or °F)**

**Specify tag number**

**Specify Thermowell for package configuration code 1L or 1m**

### Notes
2. Remote configuration with PC20, PC50, or the I/A Series System.
3. Remote configuration with a HART Communicator, PC20, PC50, or I/A Series System.
4. Always selected for Package Configuration Code 1B, 1S, and 1T.
5. Available with Package Configuration Code 1Y, 1W, 1L, and 1M only.
6. Must have integrally mounted thermowell option -D2 on all explosion proof agency certifications when Package Configuration Code 1L or 1M is specified.
7. Available with Package Configuration Codes 1L, 1M, 1S, and 1T only.
8. Available with Package Configuration Code 1S or 1T with electrical code EA, ED or KN only.
9. Available with Output Code D when configured for FoxCom digital output and tied to FBM 18, 39, 43 or 44.
10. Available with basic Package Configuration Code 1B only.
11. Must have integrally mounted thermowell option -D2 on all explosion proof agency certifications.
12. Mounting Set for 50 mm (2 inch) pipe or surface mount only available with Package Configuration Code 1S or 1T.
13. Package Configuration Codes 1S and 1T only.
I/A Series® Model RTT30 Temperature Transmitters

I/A Series Temperature Transmitters accept inputs from platinum RTDs (DIN, IEC or SAMA), and can be used with a wide variety of temperature sensors, including 2, 3, and 4 wire RTDs, most popular thermocouples, and various thermocouples, ohms, mA, or dc millivolts input devices.

For complete specifications, refer to Product Specification Sheet PSS 2A-1 F6 A.

- Field proven microprocessor based transmitter ensures accurate measurement and performance.
- Remote Communication with HART Communicator or PC based Configurator.
- Dual, independent sensor input capability for difference/average measurement, or sensor backup.
- Drift alarm, sensor backup, and sensor corrosion detection enhances reliable operation.
- Sensor input to output galvanic isolation of 2 kV.
- Operation voltage monitoring for high measurement performance.
- Compact, dual compartment enclosure with fully potted electronics. Enclosure meets 1P67 and NEMA 4X ratings.

### Functional Specifications

#### Range and Maximum Span Limits:

<table>
<thead>
<tr>
<th>RDT Designation and Description</th>
<th>Measurement Range Limits</th>
<th>Minimum Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cu10 - alpha = 0.004274; To Edison Copper Winding No. 15</td>
<td>-100 and +260°C (-148 and +500°F)</td>
<td>10°C (18°F)</td>
</tr>
<tr>
<td>Cu50 - alpha = 0.004278; To GOST</td>
<td>-200 and +200°C (-328 and +392°F)</td>
<td>10°C (18°F)</td>
</tr>
<tr>
<td>Cu100 - alpha = 0.004278; To GOST</td>
<td>-200 and +200°C (-328 and +392°F)</td>
<td>10°C (18°F)</td>
</tr>
<tr>
<td>Ni100 - alpha = 0.006180; To DIN 43760</td>
<td>-60 and +250°C (-76 and +482°F)</td>
<td>10°C (18°F)</td>
</tr>
<tr>
<td>Ni120 - alpha = 0.006720; To Edison Curve</td>
<td>-70 and +270°C (-94 and +518°F)</td>
<td>10°C (18°F)</td>
</tr>
<tr>
<td>Ni1000 - alpha = 0.006180; To DIN 43760</td>
<td>-60 and +250°C (-76 and +482°F)</td>
<td>10°C (18°F)</td>
</tr>
<tr>
<td>Pt50 - alpha = 0.003911; To GOST</td>
<td>-200 and +1100°C (-328 and +2012°F)</td>
<td>10°C (18°F)</td>
</tr>
<tr>
<td>Pt100 - alpha = 0.003916; To JIS C1604-81</td>
<td>-200 and +649°C (-328 and +1200°F)</td>
<td>10°C (18°F)</td>
</tr>
<tr>
<td>Pt100 - alpha = 0.003911; To GOST</td>
<td>-200 and +850°C (-328 and +1562°F)</td>
<td>10°C (18°F)</td>
</tr>
<tr>
<td>Pt100 - alpha = 0.00385; To IEC 60751</td>
<td>-200 and +850°C (-328 and +1562°F)</td>
<td>10°C (18°F)</td>
</tr>
<tr>
<td>Pt200 - alpha = 0.00385; To IEC 60751</td>
<td>-200 and +850°C (-328 and +1562°F)</td>
<td>10°C (18°F)</td>
</tr>
<tr>
<td>Pt500 - alpha = 0.00385; To IEC 60751</td>
<td>-200 and +250°C (-328 and +482°F)</td>
<td>10°C (18°F)</td>
</tr>
<tr>
<td>Pt1000 - alpha = 0.00385; To IEC 60751</td>
<td>-200 and +250°C (-328 and +482°F)</td>
<td>10°C (18°F)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thermocouple Designation and Description</th>
<th>Measurement Range Limits</th>
<th>Minimum Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type T - Cu-CuNi; IEC 584-1</td>
<td>-270 and +400°C (-454 and +752°F)</td>
<td>50°C (90°F)</td>
</tr>
<tr>
<td>Type E - Cu-CuNi; IEC 584-1</td>
<td>-270 and +1000°C (-454 and +1832°F)</td>
<td>50°C (90°F)</td>
</tr>
<tr>
<td>Type N - Cu-CrSi-NiSi; IEC 584-1</td>
<td>-270 and +1300°C (-454 and +2372°F)</td>
<td>50°C (90°F)</td>
</tr>
<tr>
<td>Type K - NiCr-Ni; IEC 584-1</td>
<td>-270 and +1372°C (-454 and +2501°F)</td>
<td>50°C (90°F)</td>
</tr>
<tr>
<td>Type J - Fe-CuNi; IEC 584-1</td>
<td>-210 and +1200°C (-346 and +2192°F)</td>
<td>50°C (90°F)</td>
</tr>
<tr>
<td>Type U - Cu-CuRh; IEC 43710</td>
<td>-200 and +600°C (-328 and +1112°F)</td>
<td>50°C (90°F)</td>
</tr>
<tr>
<td>Type L - Fe-CuNi; IEC 43710</td>
<td>-200 and +900°C (-328 and +1652°F)</td>
<td>50°C (90°F)</td>
</tr>
<tr>
<td>Type R - PtRh13-Pt; IEC 584-1</td>
<td>-50 and +1768°C (-58 and +3214°F)</td>
<td>50°C (90°F)</td>
</tr>
</tbody>
</table>
**Temperature and Humidity**

**Functional Specifications (continued)**

<table>
<thead>
<tr>
<th>Thermocouple Designation and Description</th>
<th>Measurement Range Limits</th>
<th>Minimum Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type S – PtRh10-Pt; IEC 584-1</td>
<td>-50 and +1768°C (-58 and +3214°F)</td>
<td>50°C (90°F)</td>
</tr>
<tr>
<td>Type B(A) – PtRh30-PtRh6; IEC 584-1</td>
<td>0 and +1820°C (32 and +3308°F)</td>
<td>50°C (90°F)</td>
</tr>
<tr>
<td>Type C – W5Re-W26Re; ASTM E988</td>
<td>0 and +2320°C (32 and +4208°F)</td>
<td>50°C (90°F)</td>
</tr>
<tr>
<td>Type D – W3Re-W25Re; ASTM E988</td>
<td>0 and +2495°C (32 and +4523°F)</td>
<td>50°C (90°F)</td>
</tr>
</tbody>
</table>

**Notes**

a. The measuring error (see Table 1) will increase for temperatures lower than 300°C (572°F).

b. When operation conditions are based on a large temperature range, the RTT30 offers the ability to split the range. For example, a Type S or R thermocouple can be used for the low range, while a Type B can be used for the upper range.

---

**How to Order—Specify model number RTT30 followed by order code for each selection**

**Configuration**

**Communication Protocol**

- Digital HART and 4 to 20 mA dc ........................................... -A

**Housing**

- Aluminum Housing: No Indicator ........................................ 1
- Aluminum Housing: With Indicator ...................................... 2
- 316L ss Housing: No Indicator ............................................. 3
- 316L ss Housing: With Indicator ......................................... 4

**Cable Entry**

- 1/2 NPT Threaded Connection ............................................. 1
- M20 x 1.5 Threaded Connection(e) ..................................... 2

**Mounting Sets**

- None — Not required ..................................................... 1
- L-Shaped 304 ss Bracket, for Surface or Nominal DN 50 or 2 in Pipe Mounting ............................................. 2
- U-Shaped 316L ss Bracket, for Nominal DN 50 or 2 in Pipe Mounting ..................................................... 3

**Electrical Safety (also see Electrical Safety Specifications section)(c)**

- None — Not used in Hazardous Areas ................................. A
- FM IS, NI I/1+2 ABCD; also Class 1, Zones 0 and 2 ................. C
- FM XP, NI, DIP, I, II, III/1+2/A-G; also Class 1, Zones 1 and 2(a) F
- FM XP, DIP, IS, NI, I, II, III/1+2/A-G; also Class 1, Zones 0, 1 and 2(a) J
- CSA for use in Ordinary/General Purpose locations .................. O
- CSA IS, NI I/1+2 ABCD; also Class 1, Zones 0 and 2 ............... D
- CSA XP, NI, DIP, I, II, III/1+2/A-G; also Class 1, Zones 1 and 2 G
- CSA XP, DIP, IS, NI, I, II, III/1+2/A-G; also Class 1, Zones 0, 1 and 2 K
- ATEX II 1 G, Exe ia IIC, T4/T5/T6 ....................................... B
- ATEX II 2 G, Exe d IIC, T4/T5/T6 ....................................... E
- ATEX EEx d, Exe ia, T4/T5/T6 ........................................... H
- ATEX II 3 G, Exe nA nL IIC, T4/T5/T6 ................................ L
- ATEX II D; IP66/67 ......................................................... N
- ATEX II GD; Exe ia IIC, T4/T5/T6 ....................................... T

**Device Setup**

- Factory Default Setup .................................................... A
- Setup according to Configuration Sheet ................................ B

**Optional Selections**

- Works Calibration Certificate; 6 Point Calibration, 60 Hz Filter(b) .................................................. F1
- Marking — Tag on Metal Plate; information base on Submitted Configuration Sheet ..................................... Z1

**Notes**

a. The M20 threaded connection is not available with FM explosionproof approval Codes F and J.

b. The Calibration Certificate is an evaluation and documentation of 6 fixed resistance values over the complete measuring range.

c. Contact Foxboro for a listing of electrical approvals and certifications available at this time.
# RTT80 - I/A Series Advanced Temperature Transmitters with HART Communication Protocol

The RTT80 is a mid-tier two-wire temperature transmitter available with HART, FOUNDATION Fieldbus, dual sensor inputs, dual compartment housing, diagnostics, alarms, RTDs and TCs. The RTT80 stands out due to signal reliability, long-term stability, high precision and advanced diagnostics (important in critical processes). For the highest level of safety, availability and risk reduction. PSS 2a-118a

- Field proven microprocessor based transmitter ensures accurate measurement and performance.
- Remote Communication with HART Communicator or PC based Configurator.
- Dual, independent sensor input capability for difference/average measurement, or sensor backup.
- Drift alarm, sensor backup, and sensor corrosion detection enhances reliable operation.
- Sensor input to output galvanic isolation of 2 kV.
- Operation voltage monitoring for high measurement performance.

## Functional Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Inputs:</td>
<td>2-, 3- and 4- wire RTD (Pt50, Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Cu50) Thermocouples; B,C,D,E,J,K,L,N,R,S,T and U Resistance and Millivolt input devices</td>
</tr>
</tbody>
</table>
| Ambient Temperature Range Operative Limits: | Without Integral Indicator: -40 and +85°C (-40 and +185°F)  
With Integral Indicator: -40 - +70°C (-40 and +158°F) |
| Relative Humidity:                     | 0 and 100% (condensation permitted)                                      |
| Supply Voltage:                        | With HART Indicator: 18 - 40 V dc  
Without HART Indicator: 11 - 40 V dc                                     |
| Repeatability:                         | +/-0.0015% of the input range of the sensors                             |
| Long-term Stability:                   | <0.1°C (<0.18 °F) per year or < 0.5% per year (whichever is greater)   |
| Response Time:                         | 1 second per channel                                                     |
| Fault Information: per NAMUR NE 43:   | Under-range: Linear drop to 3.8 mA  
Over-range: Linear rise to 20.5 mA  
Failure (sensor break or short circuit) <3.6 mA low or > 21 mA high (Selectable).  
High alarm is adjustable between 21.6 and 23 mA for flexibility with various control systems. |
| Warm-Up Time:                          | 4 seconds                                                               |
| Electrical Conduit:                    | ½ NPT and M20                                                           |
| Weight:                                | Approximately 1.4 to 1.8 oz                                             |
**Temperature and Humidity**

**Communications**
- 4 to 20 mA with HART digital communications.

**Sensor Input**
- Single Input; Configured for One Sensor
- Dual Input; Configured for Average of two 2-wire sensors of same type

**Housing and Sensor Mounting**
- Basic Module for DIN Rail or Surface Mounting or Replacement
- Universal Aluminum Housing for use with Remote Sensor
- Universal SS Housing for use with Remote Sensor
- Universal Aluminum Housing w/Bare Sensor
- Universal SS Housing w/Bare Sensor
- Universal Aluminum Housing w/ Sensor and Thermowell Mounting
- Universal SS Housing w/ Sensor and Thermowell Mounting

**Input Measurement Type**
- Thermocouple, Type B
- Thermocouple, Type C
- Thermocouple, Type D
- Thermocouple, Type E
- Thermocouple, Type J
- Thermocouple, Type K
- Thermocouple, Type L
- Thermocouple, Type N
- Thermocouple, Type R
- Thermocouple, Type S
- Thermocouple, Type T
- Thermocouple, Type U
- 2-wire RTD, 100 ohm platinum IEC 751 (ASTM-B Std Accuracy) SS Sheath
- 3-wire RTD, 100 ohm platinum IEC 751 (ASTM-B Std Accuracy) SS Sheath
- 4-wire RTD, 100 ohm platinum IEC 751 (ASTM-B Std Accuracy) SS Sheath
- 3-wire RTD, 100 ohm platinum IEC 751 (ASTM-A High Accuracy) SS Sheath
- 4-wire RTD, 100 ohm platinum IEC 751 (ASTM-A High Accuracy) SS Sheath
- 3-wire RTD, 100 ohm nickel DIN 43760, SS Sheath
- Dual 3-wire RTD, 100 ohm platinum IEC 751 in one thermowell
- Ohms input
- Millivolt input

**Thermowell Assembled to Housing**
- No Well or Well is supplied separately
- Thermowell Series “T-” assembled to housing; specify child thermowell
- Thermowell Series “W-” assembled to housing; specify “W-” model code

---

**Contact Information**
Contact Swanson Flo | www.swansonflo.com | 800-288-7926
### Hazardous Area Certifications

<table>
<thead>
<tr>
<th>Certificate</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSA IS, I/1/ABCD</td>
<td>Non-hazardous area</td>
</tr>
<tr>
<td>CSA NI I/2/ABCD</td>
<td>CSA Explosionproof, Class I, Div 1, BCD; Dust-ignitionproof, Class II Div 1, EFG, Class III, Div 1. Also zone certified, CI I, Zone 1, Ex d IIC(f)</td>
</tr>
<tr>
<td>ATEX III G EEx nA, nL, IIC T4/T5/T6</td>
<td>ATEX Explosionproof, II 1/2 G Ex d IIC, ATEX Flameproof, II 2 G Ex d IIC ATEX Flameproof, II 2 D(f)</td>
</tr>
<tr>
<td>FM IS, I/1/ABCD</td>
<td>FM Explosionproof, Class I, Division 1, Groups B, C and D; Dust-ignitionproof, Class II, Division 1, Groups E, F and G; Class III Division 1(f)</td>
</tr>
<tr>
<td>CSA NI I/2/ABCD</td>
<td>CSA NI I/2/ABCD</td>
</tr>
<tr>
<td>CSA Explosionproof, Class I, Div 1, BCD; Dust-ignitionproof, Class II Div 1, EFG, Class III, Div 1. Also zone certified, CI I, Zone 1, Ex d IIC(f)</td>
<td></td>
</tr>
<tr>
<td>ATEX II 1G EEx ia IIC T4/T5/T6</td>
<td>ATEX II 1G EEx ia IIC T4/T5/T6</td>
</tr>
<tr>
<td>FM IS, I/1/ABCD</td>
<td>FM IS, I/1/ABCD</td>
</tr>
<tr>
<td>FM NI I/2/ABCD</td>
<td>FM NI I/2/ABCD</td>
</tr>
<tr>
<td>ATEX Explosionproof, II 1/2 G Ex d IIC, ATEX Flameproof, II 2 G Ex d IIC ATEX Flameproof, II 2 D(f)</td>
<td>ATEX Flameproof, II 1/2 G Ex d IIC, ATEX Flameproof, II 2 D(f)</td>
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<td>ATEX Flameproof, Ex d IIC</td>
<td>ATEX Flameproof, Ex d IIC</td>
</tr>
<tr>
<td>IECEx Ex ia IIC T4/T5/T6</td>
<td>IECEx Ex ia IIC T4/T5/T6</td>
</tr>
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<td>IECEx Ex na, nL, IIC T4/T5/T6</td>
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<td>IECEx Flameproof, Ex d IIC</td>
</tr>
<tr>
<td>NEPSI Ex ia IIC T4-T6(f)</td>
<td>NEPSI Ex ia IIC T4-T6(f)</td>
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<td>NEPSI Ex na nL IIC T4/T5/T6(f)</td>
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<tr>
<td>NEPSI Flameproof, Ex d IIC(f)</td>
<td>NEPSI Flameproof, Ex d IIC(f)</td>
</tr>
</tbody>
</table>

### Optional Selections

#### Housing Features

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custody Transfer Lock and Seal(f)</td>
<td>Custody Transfer Lock and Seal(f)</td>
</tr>
<tr>
<td>Metric M20 Conduit Connection(f)</td>
<td>Metric M20 Conduit Connection(f)</td>
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</table>

#### Housing Connection to Well

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless Steel Union and Fittings(g)</td>
<td>Stainless Steel Union and Fittings(g)</td>
</tr>
<tr>
<td>Thermowell with ¾&quot; NPT internal Thread, supplied by customer(c)</td>
<td>Thermowell with ¾&quot; NPT internal Thread, supplied by customer(c)</td>
</tr>
</tbody>
</table>

#### Mounting Sets

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting Set – Painted Steel(f)</td>
<td>Mounting Set – Painted Steel(f)</td>
</tr>
<tr>
<td>Mounting Set – Stainless Steel(f)</td>
<td>Mounting Set – Stainless Steel(f)</td>
</tr>
<tr>
<td>Clip for DIN rail mounting of the basic module(h)</td>
<td>Clip for DIN rail mounting of the basic module(h)</td>
</tr>
</tbody>
</table>

#### Other Optional Features

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
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<tbody>
<tr>
<td>Custom Database Configuration</td>
<td>Custom Database Configuration</td>
</tr>
<tr>
<td>Omit Instruction Book (CD-ROM)</td>
<td>Omit Instruction Book (CD-ROM)</td>
</tr>
<tr>
<td>With Local Indicator</td>
<td>With Local Indicator</td>
</tr>
<tr>
<td>Cleaned and Prepared for Oxygen Service(i)</td>
<td>Cleaned and Prepared for Oxygen Service(i)</td>
</tr>
<tr>
<td>SIL 2 Certification(e)(l)</td>
<td>SIL 2 Certification(e)(l)</td>
</tr>
<tr>
<td>Wake Frequency Calculations(c)</td>
<td>Wake Frequency Calculations(c)</td>
</tr>
<tr>
<td>Add ½ inch to sensor length</td>
<td>Add ½ inch to sensor length</td>
</tr>
<tr>
<td>NACE Compliant Thermowell(c)(d)</td>
<td>NACE Compliant Thermowell(c)(d)</td>
</tr>
</tbody>
</table>

### Notes

- (a) Requires Housing and Sensor Mounting Code JJ, KK, NN, PP, WW, YY, LL or MM.
- (b) Required with Housing and Sensor Mounting Codes BB, JJ, KK, QQ, RR, SS, TT, WW and YY.
- (c) Requires Housing and Sensor Mounting Code NN, PP, LL or MM.
- (d) Applies only to Thermowell code “TK”.
- (e) HART protocol only.
- (f) Not available with Housing and Sensor Mounting Code BB.
- (g) Available with Housing and Sensor Mounting codes NN and LL. Standard on Housing and Sensor Codes PP and MM.
- (h) Housing and Sensor Mounting Code BB only.
- (i) Not available at this time.
- (j) Requires Housing and Sensor Mounting Code BB.
- (k) Sensor ordered separately.
- (l) Sensor ordered separately. Temple Transmitter is factory configured for the measurement type specified whether sensor is included or not. You can change the configuration to a different type using appropriate configuration software for the selected protocol or specify -C2 Option for custom factory configuration. On dual sensor input (Sensor Input = 2), both inputs are configured the same.
- (m) Not available at this time.
PR Series Platinum Resistance Temperature Detectors (RTDs)

The PR Series RTDs are sensors whose electrical resistance changes with a change in temperature. They measure temperatures from -200 to +650°C (-320 to +1200°F) and are calibrated to either ASTM (IEC, DIN) or SAMA standard curves. The resistance output from the element may be directly connected to a variety of resistance temperature measurement instruments.

**Functional Specifications:**

**Temperature Limits:** The maximum temperature limit is determined by the lowest upper range limit (URL) of the element, connection head, or sheath.

- **Element:** -200 and +650°C (-330 and +1200°F)
- **Connection Head:** -40 and +105°C (-40 and +220°F)
- **316 ss Sheath:** -200 and +480°C (-320 and +900°F)
- **Inconel Sheath:** -200 and +650°C (-320 and +1200°F)

**ASTM Calibration:**
Per ASTM E1137-87. Resistance at 0°C (32°F) is as follows (also conform to DIN and IEC calibrations):
- for ASTM-B, 100.00 ± 0.10
- for ASTM-A, 100.00 ± 0.05
Refer to Technical Information Sheet TI 005-028. Alpha is 0.00385 \$/°C.

**SAMA Calibration:**
SAMA Standard RC 21-4-1966. Curves PR 279 (°C) and PR 278 (°F). Alpha is 0.003923 \$/°C. Resistance of 98.129 ±0.1 at 0°C (32°F). Refer to TI 5-27a.

**External Pressure:** The detector sheath can be exposed to an external pressure of 21 MPa (3000 psi, 210 bar or kg/cm²) without a change in resistance of more than the amount equivalent to 0.05°C (0.1°F). There will be no permanent change in the resistance at the ice point after this exposure.

**Vibration:** A detector, with 76 mm (3 in) of its sheathed length unsupported or overhanging, will withstand 250 m/s² (25 “g”) vibration from 20 to 2000 Hz in any axis for 25 minutes without damage.

**Physical Specifications**

**RTD Configurations:** See Figure 1. Three configurations are offered. A well-type assembly with a nipple coupler; a well-type assembly with a nipple and union coupler; and a bare element-type assembly. The bare element-type assembly has a hex-head nipple with 1/2 NPT external thread welded on sensor for process mounting and mounting to connection head.

**Sensor Type:** Single or dual platinum resistance temperature sensor, strain free, fully annealed, with three-lead configuration. Four-wire RTDs are available on request.

**Sensor Wires** Three leads are color coded white, and two red. White for the one leg of the detector, and the two reds for the two legs to the other side of the detector. Stranded 0.50 mm² or 22 AWG wire with ptfe insulation.

**Sensitive Length:** 40 mm (1.6 in) minimum, measured from the closed end.

**Internal Insulation:** Glass fiber over sensitive length, high-purity aluminum oxide powder packed over remaining length.

**Sheath Sealant:** Epoxy compound applied at open end of sheath to prevent entry of moisture.

**Sheath Outside Diameter (O.D.):** 6.35 mm (0.250 in). Note that a well inside diameter (I.D.) of 6.60 mm (0.260 in) is required.

**Insertion Length:** Refer to Model Code.

**Construction:** All welded and moisture sealed. 316 ss for temperature up to 480°C (900°F), Inconel 600 for temperatures up to 650°C (1200°F).

**Weatherproof/General Purpose Connection Head:** The weatherproof/general purpose connection head when used with a well, contains a compression spring to maintain RTD tip contact. Diecast aluminum alloy with O-ring gasketed cover. A 1/2 NPT conduit connection is provided for field wiring to a ceramic terminal block within the connection head. The assembly meets IEC IP65, provides the environmental protection of NEMA Type 4. See Figure 1.

**Explosionproof/Flameproof Connection Head:** The explosionproof/flameproof connection head is used to protect conductors in conduit systems within hazardous areas. The head contains a compression spring to maintain RTD tip contact. Diecast low copper aluminum alloy, painted, with an O-ring gasketed cover. A 1/2 NPT conduit connection is provided for field wiring to a ceramic terminal block within the connection head. The assembly meets IP66 and provides the environmental and corrosion resistance protection of NEMA Type 4X.
**Performance Specifications**

**Accuracy:**
- ASTM-A CALIBRATION SENSORS (OPTIONAL HIGH ACCURACY): ±0.13 + 0.0017(T)°C, where T = °C temperature, absolute value. (Better than IEC-A calibration accuracy.)
- ASTM-B CALIBRATION SENSORS: ±0.25 + 0.0042(T)°C, where T = °C temperature, absolute value. (Better than DIN and IEC-B calibration accuracy.)
- SAMA CALIBRATION SENSORS: ±0.26°C (±0.5°F) or ±0.25% of temperature reading, whichever is larger, for 480°C (900°F) and below; ±0.5% of temperature reading.

**Reproducibility:**
- ±0.125°C (±0.25°F) for 480°C (900°F) and below; ±0.25°C (±0.5°F) for above 480°C (900°F).

**Operational Stability:**
- Less than ±0.06°C (±0.1°F) shift from initial calibration in one year.

**Response Time:**
- 5 seconds maximum for a 63% recovery; based on a step change in temperature of the bare sensor starting at an ambient room temperature of 25°C (77°F) to being immersed in 100°C.

---

**How to Order—Specify model number PR followed by order code for each selection Configuration**

<table>
<thead>
<tr>
<th>Description</th>
<th>Sensor Type(a)</th>
<th>Connection Head(a)</th>
<th>Construction(a)</th>
<th>Calibration Curve(b)</th>
<th>Sheath - 6.35 mm (0.25 in) O.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platinum RTD</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Element</td>
<td></td>
<td>Weatherproof/General Purpose</td>
<td>Well Type, Nipple Coupler, steel (for connection to Well)(c)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dual Element</td>
<td></td>
<td>Explosionproof and Weatherproof, FM and FMc Approvals(f)</td>
<td>Well Type, Union Coupler, steel (for connection to Well)(c)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>连接头</td>
<td></td>
<td>Explosionproof and Weatherproof, CSA Certification(f)</td>
<td>Well Type, Union Coupler, 316 ss (for connection to Well)(c)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flameproof and Weatherproof, ATEX Certification(f)(g)</td>
<td>Bare Element with 316Lss threaded hex fitting (1/2 NPT external thread) welded on to sensor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flameproof and Weatherproof, IECEx Certification(f)(g)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Figure 1**

---

**Contact Swanson Flo | www.swansonflo.com | 800-288-7926**
## Temperature and Humidity

### Length "U" or "U + T" Dimension

<table>
<thead>
<tr>
<th>Length &quot;U&quot; or &quot;U + T&quot; Dimension</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>51 mm (2.0 in.)</td>
<td>-002</td>
</tr>
<tr>
<td>76 mm (3.0 in.)</td>
<td>-00A</td>
</tr>
<tr>
<td>90 mm (3.5 in.)</td>
<td>-003</td>
</tr>
<tr>
<td>102 mm (4 in.)</td>
<td>-004</td>
</tr>
<tr>
<td>127 mm (5 in.)</td>
<td>-005</td>
</tr>
<tr>
<td>152 mm (6 in.)</td>
<td>-006</td>
</tr>
<tr>
<td>178 mm (7 in.)</td>
<td>-007</td>
</tr>
<tr>
<td>203 mm (8 in.)</td>
<td>-008</td>
</tr>
<tr>
<td>229 mm (9 in.)</td>
<td>-009</td>
</tr>
<tr>
<td>254 mm (10 in.)</td>
<td>-010</td>
</tr>
<tr>
<td>279 mm (11 in.)</td>
<td>-011</td>
</tr>
<tr>
<td>305 mm (12 in.)</td>
<td>-012</td>
</tr>
<tr>
<td>330 mm (13 in.)</td>
<td>-013</td>
</tr>
<tr>
<td>356 mm (14 in.)</td>
<td>-014</td>
</tr>
<tr>
<td>381 mm (15 in.)</td>
<td>-015</td>
</tr>
<tr>
<td>406 mm (16 in.)</td>
<td>-016</td>
</tr>
<tr>
<td>432 mm (17 in.)</td>
<td>-017</td>
</tr>
<tr>
<td>457 mm (18 in.)</td>
<td>-018</td>
</tr>
<tr>
<td>483 mm (19 in.)</td>
<td>-019</td>
</tr>
<tr>
<td>508 mm (20 in.)</td>
<td>-020</td>
</tr>
<tr>
<td>533 mm (21 in.)</td>
<td>-021</td>
</tr>
<tr>
<td>559 mm (22 in.)</td>
<td>-022</td>
</tr>
<tr>
<td>584 mm (23 in.)</td>
<td>-023</td>
</tr>
<tr>
<td>610 mm (24 in.)</td>
<td>-024</td>
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<tr>
<td>635 mm (25 in.)</td>
<td>-025</td>
</tr>
<tr>
<td>660 mm (26 in.)</td>
<td>-026</td>
</tr>
<tr>
<td>686 mm (27 in.)</td>
<td>-027</td>
</tr>
<tr>
<td>711 mm (28 in.)</td>
<td>-028</td>
</tr>
<tr>
<td>737 mm (29 in.)</td>
<td>-029</td>
</tr>
<tr>
<td>762 mm (30 in.)</td>
<td>-030</td>
</tr>
<tr>
<td>787 mm (31 in.)</td>
<td>-031</td>
</tr>
<tr>
<td>813 mm (32 in.)</td>
<td>-032</td>
</tr>
<tr>
<td>838 mm (33 in.)</td>
<td>-033</td>
</tr>
<tr>
<td>864 mm (34 in.)</td>
<td>-034</td>
</tr>
<tr>
<td>889 mm (35 in.)</td>
<td>-035</td>
</tr>
<tr>
<td>914 mm (36 in.)</td>
<td>-036</td>
</tr>
</tbody>
</table>

Nonstandard length are whole inches from 37 through 300 inches; specify desired length by substituting numerical values for Xs; e.g., -048 = 48 inches.

### Optional Selections

- **Sensor Length 0.5 in longer than the specified length;**
  
- **(not available with Length Codes 00A or 003)**
  
- **Shipped without Thermowell; for customer to install thermowell (e)**
  
- **Thermowell other than the Standard -T Series Wells.**

### Threaded Coupler Options for Bare Elements - Code B

| Packing Type, 1/2 NPT              | -T1  |
| Packing Type, 3/4 NPT              | -T2  |
| Packing Type, 1 NPT                | -T3  |
| Spring Loading Type, 1/2 NPT       | -T4  |
| Spring Loading Type, 3/4 NPT       | -T5  |
| Compression Type, 1/4 NPT          | -T6  |
| Compression Type, 1/2 NPT          | -T7  |

### Calibration Options

- **Three Point Calibration with Certificate.**
- **Cryogenic Calibration; -40 to -75°C (-40 to -100°F)**
- **Cryogenic Calibration; -75 to -130°C (-100 to -200°F)**
- **Cryogenic Calibration; -130 to -200°C (-200 to -320°F)**
Notes

(a) See Figure 1 and DIMENSIONS-NOMINAL section for RTD assembly configurations.
(b) See Performance Specifications section for Calibration Curve Accuracy.
(c) With a bare sheath assembly, the "U" or "U + T" dimension is identified as the "A" dimension. See Dimensions-Nominal section.
(d) For Well Type construction, the well must be specified separately. Refer to Physical Specifications section.
(e) No Agency electrical safety certifications apply.
(f) Thermowells for Explosionproof/Flameproof atmospheres are only available in the following materials: carbon steel C-1018, 316 ss, 316L ss, 304 ss, 304L ss, Alloy 20 Cb-3, Hastelloy B, Hastelloy C-276, Inconel 600, R-Monel 405, K-Monel 500, Nickel 200, Titanium, and Cr/Moly steels.
(g) ATEX and IECEx, d, not available with Construction Code U, carbon steel union coupler.
MT Series MINOX™ Thermocouples

MINOX Thermocouples are thermocouple wires with mineral insulation lightly compacted about the conductors and encased in a metal sheath. MINOX Assemblies are specified because of their strength, protection against corrosion and contaminating atmospheres, and ability to be spring loaded to ensure tip contact at well bottom. The output from the element may be directly connected to a variety of thermocouple temperature measuring instruments.

Performance Specifications

<table>
<thead>
<tr>
<th>Thermocouple Type</th>
<th>Temperature Range (ºC)</th>
<th>Temperature Range (ºF)</th>
<th>Tolerance (ºC or %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>-200 to 0</td>
<td>-328 to +32</td>
<td>±2.2ºC or ±2.0%</td>
</tr>
<tr>
<td></td>
<td>0 to 1250</td>
<td>32 to 2300</td>
<td>±2.2ºC or ±0.75%</td>
</tr>
<tr>
<td>N</td>
<td>-200 to 0</td>
<td>-328 to +32</td>
<td>±2.2ºC or ±2.0%</td>
</tr>
<tr>
<td></td>
<td>0 to 1250</td>
<td>32 to 2300</td>
<td>±2.2ºC or ±0.75%</td>
</tr>
<tr>
<td>J</td>
<td>0 to 750</td>
<td>32 to 1400</td>
<td>±2.2ºC or ±0.75%</td>
</tr>
<tr>
<td>E</td>
<td>-200 to 0</td>
<td>-328 to +32</td>
<td>±1.7ºC or ±1.0%</td>
</tr>
<tr>
<td></td>
<td>0 to 900</td>
<td>32 to 1600</td>
<td>±1.7ºC or ±0.5%</td>
</tr>
<tr>
<td>E</td>
<td>-200 to 0</td>
<td>-328 to +32</td>
<td>±1ºC or ±1.5%</td>
</tr>
<tr>
<td></td>
<td>0 to 350</td>
<td>32 to 700</td>
<td>±1ºC or ±0.75%</td>
</tr>
</tbody>
</table>

Notes
(a) Conforms to ANSI MC 96.1.
(b) See Standard Specifications section for temperature limits with different MINOX assembly configurations.
(c) Whichever is greater. The “percent of reading” limit of error applies to the °C temperature only.
To determine the error in °F, multiply the °C error by 1.8.

Standard Specifications

MINOX Thermocouple Configurations: Three configurations are offered. A well-type assembly with a nipple coupler; a well-type assembly with a nipple and union coupler; and a bare element-type assembly. The bare element-type assembly has a hex-head nipple with 1/2 NPT external thread welded on sensor for process mounting and mounting to connection head. See Figure 1.

Sensor Type: Single or Dual Element

Temperature Limits: The maximum temperature limit is determined by the lowest upper range limit (URL) of the element, connection head, or sheath.

ELEMENT: Refer to Performance Specifications table above.

CONNECTION HEAD: -40 and +105ºC (-40 and +220ºF)
316 SS SHEATH: -200 and +870ºC (-320 and +1600ºF)
INCONEL SHEATH: -200 and +1150ºC (-320 and +2100ºF)

Calibration: ANSI MC 96.1, Types K, N, J, E, or T, as specified.

Grounded Measuring Junction: The thermocouple wires are welded to the internal surface of the sheath tip.

Isolated Measuring Junction: Thermocouple wires are electrically insulated from the sheath. Recommended for most applications.

Insertion Length, A, U, or U +T: 90 to 914 mm (3.5 to 36 in) standard; nonstandard lengths to 7.6 in (300 in) available, see Model Code, and Dimensions-Nominal sections.

Sensitive Length: 40 mm (1.6 in) minimum, measured from closed end.

Sheath Sealant: Epoxy compound applied at open end of sheath to prevent entry of moisture.

Sheath Outside Diameter (O.D.): 6.35 mm (0.250 in). Note that a well inside diameter (I.D.) of 6.60 mm (0.260 in) is required.
**How to Order**

**Description**
- MINOX Thermocouple

**Sensor Type**
- Single Element
- Dual Element

**Connection Head**
- Weatherproof/General Purpose
- Explosionproof and Weatherproof, FM and FMc Approvals
- Explosionproof and Weatherproof, CSA Certification
- Flameproof and Weatherproof, ATEX Certification
- Flameproof and Weatherproof, IECEx Certification

**Construction**
- Well Type, Nipple Coupler, steel (for connection to Well)
- Well Type, Nipple Coupler, 316 ss (for connection to Well)
- Well Type, Union Coupler, steel (for connection to Well)
- Well Type, Union Coupler, 316 ss (for connection to Well)
- Bare Element with 316Lss threaded hex fitting (1/2 NPT external thread) welded on to sensor

**Thermocouple Type**
- Type E
- Type J
- Type K
- Type N
- Type T

**Measuring Junction**
- Isolated
- Grounded (Earthed) - Not with Type T Thermocouple

**Sheath** - 6.35 mm (0.25 in) O.D.
- 316 ss
- Inconel

---

**Internal Insulation:** Glass fiber over sensitive length; high-purity aluminum oxide powder over remaining length.

**Construction:** All welded and moisture sealed, 316 ss for temperature up to 870°C (1600°F), and Inconel 600 for temperatures up to 1150°C (2100°F).

**Wiring:** Refer to Figure 2 for terminal block configuration.

---

**Figure 1**

![Diagram of MINOX Thermocouple components]
### Temperature and Humidity

#### Length "U" or "U + T" Dimension

<table>
<thead>
<tr>
<th>Length (mm)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>-002</td>
</tr>
<tr>
<td>76</td>
<td>-00A</td>
</tr>
<tr>
<td>90</td>
<td>-003</td>
</tr>
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<td>-004</td>
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<td>889</td>
<td>-035</td>
</tr>
<tr>
<td>914</td>
<td>-036</td>
</tr>
</tbody>
</table>

Nonstandard length are whole inches from 37 through 300 inches; specify desired length by substituting numerical values for Xs; e.g., -048 = 48 inches.

#### Optional Selections

- **Sensor Length 0.5 in longer than the specified length:** -H
- **Shipped without Thermowell; for customer to install thermowell** -W
- **Thermowell other than the Standard -T Series Wells:** -X

#### Threaded Coupler Options for Bare Elements - Code B

- **Packing Type, 1/2 NPT:** -T1
- **Packing Type, 3/4 NPT:** -T2
- **Packing Type, 1 NPT:** -T3
- **Spring Loading Type, 1/2 NPT:** -T4
- **Spring Loading Type, 3/4 NPT:** -T5
- **Compression Type, 1/4 NPT:** -T6
- **Compression Type, 1/2 NPT:** -T7

#### Calibration Options

- **Three Point Calibration with Certificate:** -C1
- **Cryogenic Calibration; -40 to -75°C (-40 to -100°F):** -C2
- **Cryogenic Calibration; -75 to -130°C (-100 to -200°F):** -C3
- **Cryogenic Calibration; -130 to -200°C (-200 to -320°F):** -C4
Notes
(a) See Figure 1 and DIMENSIONS-NOMINAL section for RTD assembly configurations.
(b) See Performance Specifications section for Calibration Curve Accuracy.
(c) With a bare sheath assembly, the "U" or "U + T" dimension is identified as the "A" dimension. See Dimensions-Nominal section.
(d) For Well Type construction, the well must be specified separately. Refer to Physical Specifications section.
(e) No Agency electrical safety certifications apply.
(f) Thermowells for Explosionproof/Flameproof atmospheres are only available in the following materials: carbon steel C-1018, 316 ss, 316L ss, 304 ss, 304L ss, Alloy 20 Cb-3, Hastelloy B, Hastelloy C-276, Inconel 600, R-Monel 405, K-Monel 500, Nickel 200, Titanium, and Cr/Moly steels.
(g) ATEX and IECEx, d, not available with Construction Code U, carbon steel union coupler.
Thermowells

Foxboro Thermowells separate the temperature-measuring sensitive portion of thermocouple, or resistance temperature detector from a potentially corrosive. These wells permit ready removal of the sensor without process shutdown.

Proven Dependability
Foxboro Thermometer Wells have been a widely accepted standard of the process control industry for over sixty years. Many thousands of successful, trouble-free installations have demonstrated the exceptional dependability of these wells.

High Quality Construction
Invensys Foxboro offers thermowells made to accept standard or custom temperature sensors. Wells are machined from industry standard 316 ss, and a polished finish assures maximum corrosion resistance. All wells are manufactured in accordance with applicable ASME (PTC - Performance Test Code), ASTM, and ANSI standards.

Special Sanitary Construction
The Model TS Sanitary Well is further polished to a finish exceeding Ra 32 microinches, and the 3A number 4 finish. This provides a surface free of bacteria-harboring surface irregularities.

Numerous Configurations Available
A selection of straight, tapered, or stepped shank wells is offered. U-lengths range from 2 to 36 in (51 to 914 mm), and lagging lengths range from 2 to 4 in (51 to 102 mm). The process connection can either be an ANSI Class 150, 300, or 600 flange, a 1/2, 3/4, or 1 NPT external thread, a 1.05-, 1.315-, or 1.5-inch O.D. Well connection for socket- welding, or a 1-, 1 1/2-, or 2-inch Tri-Clamp. A 1/2 in internal NPSM thread is provided on all well heads for sensor entry.

Total Temperature Solutions
Invensys Foxboro is your single point of contact for world class process temperature measurement and control. We offer a complete line of temperature transmitters, sensors, thermowells, connection heads, controllers, and recorders to meet all of your requirements. Let us make this process easy for you.

Dimensions
Refer to Dimensions sections and table below.

<table>
<thead>
<tr>
<th>Thermowell Model</th>
<th>Dimensional Print</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model TF</td>
<td>DP 002-110</td>
</tr>
<tr>
<td>Model TT</td>
<td>DP 002-112</td>
</tr>
<tr>
<td>Mode TW</td>
<td>DP 002-113</td>
</tr>
<tr>
<td>Model TS</td>
<td>DP 002-111</td>
</tr>
</tbody>
</table>

For complete specifications please refer to Foxboro’s PSS3-3D1A.
### Thermowells

#### How to Order – Specify Model TW or TS Model Code

<table>
<thead>
<tr>
<th>Model TW Weld-In Wells</th>
<th>Model TW Weld-In Wells</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td><strong>Model</strong></td>
</tr>
<tr>
<td>Weld-In Well</td>
<td>TW</td>
</tr>
<tr>
<td><strong>Internal Diameter</strong></td>
<td>-2</td>
</tr>
<tr>
<td>0.260 in (6.6 mm)</td>
<td></td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>C</td>
</tr>
<tr>
<td>316 ss</td>
<td></td>
</tr>
<tr>
<td><strong>Process Connection Size</strong></td>
<td></td>
</tr>
<tr>
<td>Nominal 3/4-inch Pipe (Socket Weld)</td>
<td>B</td>
</tr>
<tr>
<td>1.05-inch O.D. Well Connection</td>
<td></td>
</tr>
<tr>
<td>Nominal 1-inch Pipe (Socket Weld)</td>
<td>C</td>
</tr>
<tr>
<td>1.315-inch O.D. Well Connection</td>
<td></td>
</tr>
<tr>
<td>1.5-inch Diameter, Weld-in</td>
<td>D</td>
</tr>
<tr>
<td><strong>Shank Type</strong></td>
<td></td>
</tr>
<tr>
<td>Straight</td>
<td>2</td>
</tr>
<tr>
<td>Stepped(^{a})</td>
<td>3</td>
</tr>
<tr>
<td>Tapered</td>
<td>4</td>
</tr>
<tr>
<td><strong>Insertion Length U(^b)</strong></td>
<td></td>
</tr>
<tr>
<td>2.0 in (51 mm)</td>
<td>0.020</td>
</tr>
<tr>
<td>2.5 in (64 mm)</td>
<td>0.025</td>
</tr>
<tr>
<td>3.0 in (76 mm)</td>
<td>0.030</td>
</tr>
<tr>
<td>3.5 in (89 mm)</td>
<td>0.035</td>
</tr>
<tr>
<td>4.0 in (102 mm)</td>
<td>0.040</td>
</tr>
<tr>
<td>4.5 in (114 mm)</td>
<td>0.045</td>
</tr>
<tr>
<td>5.0 in (127 mm)</td>
<td>0.050</td>
</tr>
<tr>
<td>5.5 in (140 mm)</td>
<td>0.055</td>
</tr>
<tr>
<td>6.0 in (152 mm)</td>
<td>0.060</td>
</tr>
<tr>
<td>to 36 in in 0.5 in increments</td>
<td></td>
</tr>
<tr>
<td>(to 914 mm in 12.7 mm increments)</td>
<td></td>
</tr>
<tr>
<td>36.0 in (914 mm)</td>
<td>0.360</td>
</tr>
<tr>
<td><strong>Lagging Length T</strong></td>
<td></td>
</tr>
<tr>
<td>0.0 (None)</td>
<td>0.0</td>
</tr>
<tr>
<td>2.0 in (51 mm)</td>
<td>20</td>
</tr>
<tr>
<td>2.5 in (64 mm)</td>
<td>25</td>
</tr>
<tr>
<td>3.0 in (76 mm)</td>
<td>30</td>
</tr>
<tr>
<td>3.5 in (89 mm)</td>
<td>35</td>
</tr>
<tr>
<td>4.0 in (102 mm)</td>
<td>40</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model TS Sanitary Wells</th>
<th>Model TS Sanitary Wells</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td><strong>Model</strong></td>
</tr>
<tr>
<td>Sanitary Well</td>
<td>TS</td>
</tr>
<tr>
<td><strong>Internal Diameter</strong></td>
<td>-2</td>
</tr>
<tr>
<td>0.260 in (6.6 mm)</td>
<td></td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>C</td>
</tr>
<tr>
<td>316 ss</td>
<td></td>
</tr>
<tr>
<td><strong>Process Connection Size</strong></td>
<td></td>
</tr>
<tr>
<td>1-inch Tri-Clamp</td>
<td>C</td>
</tr>
<tr>
<td>1 1/2-inch Tri-Clamp</td>
<td>D</td>
</tr>
<tr>
<td>2-inch Tri-Clamp</td>
<td>E</td>
</tr>
<tr>
<td><strong>Shank Type</strong></td>
<td></td>
</tr>
<tr>
<td>Straight</td>
<td>2</td>
</tr>
<tr>
<td>Stepped(^{a})</td>
<td>3</td>
</tr>
<tr>
<td>Tapered</td>
<td>4</td>
</tr>
<tr>
<td><strong>Insertion Length U(^b)</strong></td>
<td></td>
</tr>
<tr>
<td>2.0 in (51 mm)</td>
<td>0.020</td>
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</tr>
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</tr>
<tr>
<td>5.0 in (127 mm)</td>
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<td>6.0 in (152 mm)</td>
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<tr>
<td>to 36 in in 0.5 in increments</td>
<td></td>
</tr>
<tr>
<td>(to 914 mm in 12.7 mm increments)</td>
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<td>36.0 in (914 mm)</td>
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</tr>
<tr>
<td><strong>Lagging Length T</strong></td>
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<tr>
<td>0.0 (None)</td>
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<td>3.5 in (89 mm)</td>
<td>35</td>
</tr>
<tr>
<td>4.0 in (102 mm)</td>
<td>40</td>
</tr>
</tbody>
</table>

**Example:** TW-2CB203020

(a) Stepped shanks are only available with U length codes 030 to 360 (U-lengths > 2.5 in or > 64 mm).

(b) U length is from the raised face of the flange to the well tip.
The DEWCEL System provides a direct reading of absolute humidity in ambient temperature between -45 and +105°C (-50 and +220°F).

When connected to a temperature measurement device, the DEWCEL System measures absolute humidity. By means of appropriate tables, the temperature can be converted to dew point, percent water vapor, parts per million, or other units of absolute moisture. In practice, the conversion is accomplished in recorder chart layouts, characterized amplifiers, or computer programs.

Specifications:
- Accuracy: ±0.8°C (±1.5°F) at 32°C (90°F) dew point (not including temperature sensor tolerances).
- Dew Point Range Limits: -45 and +60°C (-50 and +140°F).
- Relative Humidity Limits: 12 and 100% relative humidity.
- Pressure Rating: Zero Pa absolute to 865 kPa gauge (zero psia to 125 psig)

The DEWCEL is used with RTD, thermocouple, or filled thermal system temperature measuring equipment.
For complete specifications, refer to Product Specification Sheet PSS 1-5A1 A.
The following chapter contains Product Specifications of the Instruments:

- **PC50**  PC-Based Configurator for Foxboro Intelligent Transmitters (FDT technology)
- **475**  HART Hand-held Communicator
- **HHT50**  Maintenance Tablet
Features

- The Model PC50 Field Device Tool (FDT) supports Invensys Foxboro intelligent transmitters and positioners.
- FDT is also an open tool for integration with third party Device Type Managers (DTMs).
- End users have freedom of choice in their selection of field devices from multiple vendors.
- Other protocols supported by FDT technology.
- Device configuration, device calibration, device diagnostics, and device characteristics.
- Capability to reconfigure, copy, clone, upload, download, and print out device databases.
- The Model PC50 Field Device Tool conforms to the FDT Specification which provides a standard mechanism for communication between applications and devices.

Optional Modem and Power Supply

A modem is required for communication between the intelligent field device and the FDT software installed in the PC. An optional FoxCom or HART modem kit is offered for a user who may not already have one installed. Also, an optional power supply is offered for users who need to power the device.

Note

1 Invensys Foxboro has tested and validated the software on Windows XP.
System Operation
The system relies on vendor-created device definitions (DTMs – Device Type Managers). For Invensys Foxboro devices with FoxCom or HART protocol, DTMs are provided as configurable software on a FoxCom or a HART CD-ROM.

Invensys Foxboro CD-ROMs include:
• PACTware™ Frame Application
• Invensys DTMs
• Communication DTMs
• Instructions

PACTware (Process Automation Configuration Tool) is a program designed to combine communication-capable field devices of different manufacturers. In accordance with the FDT Specification, PACTware is used as a frame application for DTMs. The frame provides the navigation tree, menu structure, device storage, and instrument database storage.

Invensys Foxboro DTMs will:
• Allow configuration of the device
• Communicate the device health to the user
• Perform device diagnostics
• Allow calibration of the device
• Support FDT interfaces providing parameter information and access using XML files

A Communication DTM provides the field connectivity needed by a device DTM. Support for connectivity is provided through a FoxCom or HART modem.

How to Order — Specify model number PC50 followed by order code for each selection

Communication Protocol*(a)
FoxCom and HART (FoxCom and HART DTM CD-ROMs) .................................................. B

Language
English .......................................................................................................................... E

Additional Software
Not Applicable .............................................................................................................. 0

Optional Selections
FoxCom Modem & Cable Kit......................................................................................... D
HART USB Modem & Cable Kit ...................................................................................... H
Power Supply for Transmitter(b) .................................................................................. C
HART Serial DB9 Modem & Cable Kit.......................................................................... T
USB-To-Serial Cable(c) .................................................................................................. U

(a) The Model PC50 FDT includes a PACTware CD-ROM, in addition to the DTM CD-ROM(s) selected under communication protocol.
(b) Power supply for transmitter is a 120 V ac 60 Hz-to-24 V dc converter; for use during calibration and configuration.
(c) Also available as a separate part by ordering P/N D0186XC. Allows PCS0 (Version 2.0) to communicate via USB port to serial modem.
The Model 475 Field Communicator is an intrinsically safe handheld configurator that uses the Windows CE operating system. It is loaded with all HART DDs that have been successfully tested and registered with the HART Foundation. Users can install new DDs using the Easy Upgrade feature.

**Specifications**

- Model 475 includes color LCD display, stylus and straps, leadset with connectors, resource CD, carrying case, and instructions.
- Easy upgrade feature allows system and DD upgrades by accessing a web site. User PC requires an IrDA port or an adapter (refer to Note b).

**How to Order — Specify model number 475 followed by order code for each selection**

**Communication Protocol**
- HART (d) .......................................................... H
- HART and FOUNDATION Fieldbus(a) ....................... F

**Battery Type**
- Rechargeable Li-ion Battery Pack. ................................ P

**Power Supply/Charger**
- Power Supply/Charger (Li-ion/NiMH, US/UK/EU connection types included). .............. 1

**Language**
- English ................................................................. E

**Product Certifications**
- ATEX, FM, CSA and IECEx Intrinsically Safe (includes FISCO as applicable) ......................... KL

**INCLUDED OPTIONS**
- Graphics and Device Configuration Management (c) ................................................................. GM

**BLUETOOTH**
- Bluetooth Communication(d) ................................................................ T

**Easy Upgrade**
- Easy Upgrade Feature for 3 years of upgrades(b) ................................................................. U

**Options**
- Spare Rechargeable Li-Ion Power Module(e) ................................................................. A
- Enclosures Protective Rubber Boot with Stand ................................................................. S

**Notes**

(a) Invensys Foxboro cannot provide upgrade service. Units must be returned to Emerson for upgrading.
(b) The Easy Upgrade feature allows the user to add new System Application software and device descriptions (DDs) to the 475 for a period of 3 years.
(c) Graphics enables a user to access enhanced graphical features when using the HART & FOUNDATION fieldbus application. Device Configuration Management provides the capability to store up to 1000 configurations and print them using the Easy Upgrade Utility.
(d) Bluetooth enables communication to a PC via the Bluetooth protocol. See list of countries with Bluetooth approval at www.fieldcommunicator.com. Not available in all countries.
(e) A fully charged Li-ion Power Module is capable of delivering power for 20 hours of typical field use. If requirements exceed this specification, a spare Power Module (Option A) should be specified.
HHT50 Maintenance Tablet

The Foxboro Maintenance Tablet is the industry's first field configuration tool incorporating FDT technology into a rugged tablet PC. It furnishes unprecedented flexibility and functionality in a portable device. This breakthrough unit combines Invensys PC50 2.0 configuration software with industry standard Field Device Tool software. So the Maintenance Tablet can configure any intelligent field device compatible with HART or FoxCom communications. And unlike handheld devices limited to the Windows CE operating system, the Maintenance Tablet runs powerful programs of the user's choice on a full Windows XP platform. The unit features USB and Ethernet port connections. Using proper accessories, it shares data with a laptop, PC, or network, allowing remote access and troubleshooting.

Features/Benefits
- Breakthrough flexibility, functionality, durability
- Optimal price/value ratio
- Versatile use with any FDT-compliant device using HART or FoxCom
- Full Windows XP Tablet PC operating system
- USB and Ethernet connectivity for data sharing
- Design fully ruggedized to military standards
- Compact 8.5 x 11 inch form factor
- Bright 10.4 inch color LED backlight display
- Functional accessories including cables, modems, and "grab and go" docking station
- Carrying case / backpack are standard items

How to Order — Specify model number HHT50 followed by order code for each selection

Additional Software
- PCMV Configurator (for Models IMV25, IMV30, IMV31, with FoxCom or HART) (a) .................. S1
- PCMM Configurator (for Model IMV25-M - Modbus) .................................................. S2

Modems
- FoxCom Modems; complete with USB-to-DB9 Adapter ................................................. M1
- HART Modem; complete with USB-to-DB9 Adapter ..................................................... M2
- RS485 Converter for use with PCMM and IMV25-M (Modbus) Only .............................. M3
- HART USB Modem and Cable Kit ................................................................................. M4

CD-ROM Drive and Docking Station
- Omit External CD-ROM Drive ................................. Add Docking Station with internal CD-ROM Drive ........................................ D1 D2

Power Cords (North American Power Cord is standard)
- European Power Cord ......................................................... P1
- United Kingdom (UK) Power Cord ........................................................................... P2

Miscellaneous Options
- Spare Battery ........................................................................ B
- Screen Protectors ........................................................................ G
- Power Supply for Transmitter ....................................................... C
- USB-to-DB9 Adapter ...................................................................... U

Notes
(a) PC50 software, complete with both foxCom and HART DTMs, is standard.
(b) This 9-Pin HART Modem is REQUIRED when using PC20 or PCMV Software.
(c) European power cord for Germany, Finland, France, Austria, Belgium, Denmark, Greece, Iceland, Italy, Netherlands, Norway, Poland, Portugal, and Sweden.
(d) UK power cord for also for Ireland and certain Middle Eastern, Asian, and African countries.
(e) Power supply for transmitter is a tool that requires 120 Vac, 60 Hz and supplies 24 Vdc for use during configuration.
(f) For use with existing Foxboro modems that do not have a USB adapter. Also available as a separate part by ordering P/N D0186XC.
The following chapter contains Product Specifications of the Instruments:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>875</td>
<td>Series Intelligent Electrochemical Line-powered Analyzer for pH/ORP, Contacting Conductivity/Resistivity, or Electrodeless Conductivity</td>
</tr>
<tr>
<td>873</td>
<td>Series Electrochemical Analyzers for pH/ORP, Contacting Conductivity, Electrodeless Conductivity, Dissolved Oxygen, and Resistivity Measurement</td>
</tr>
<tr>
<td>876</td>
<td>Series Intelligent Electrochemical Two-wire Transmitters for pH/ORP/ISE, Electrodeless Conductivity and Contacting Conductivity and Resistivity Measurement</td>
</tr>
<tr>
<td>871CC</td>
<td>Series Contacting Conductivity/Resistivity Sensor</td>
</tr>
<tr>
<td>871CR</td>
<td>Series Contacting Conductivity/Resistivity Sensor</td>
</tr>
<tr>
<td>871DO</td>
<td>Series Dissolved Oxygen Sensors</td>
</tr>
<tr>
<td>871A</td>
<td>Series pH and ORP Sensors</td>
</tr>
<tr>
<td>871PH</td>
<td>Series pH and ORP Sensors</td>
</tr>
<tr>
<td>PH10</td>
<td>DolpHin Series pH</td>
</tr>
<tr>
<td>ORP10</td>
<td>DolpHin ORP Sensors</td>
</tr>
<tr>
<td>PH12</td>
<td>Series pH Sensors</td>
</tr>
<tr>
<td>EP462A</td>
<td>Pure Water pH Sensors</td>
</tr>
<tr>
<td>EP460, EP466</td>
<td>Special Purpose pH Sensors</td>
</tr>
<tr>
<td>871EC</td>
<td>Series Electrodeless Conductivity Sensors</td>
</tr>
<tr>
<td>871FT</td>
<td>Series Non-invasive Sanitary and Industrial Flow-through Electrodeless Conductivity Sensor</td>
</tr>
<tr>
<td>FT10</td>
<td>Series Non-invasive, Non-metallic Flow-through Electrodeless Conductivity Sensor</td>
</tr>
</tbody>
</table>
875 Series Intelligent Electrochemical Line-powered Analyzer for pH/ORP, Contacting Conductivity/Resistivity, or Electrodeless Conductivity

These Microprocessor-based, line-powered intelligent analyzers, when used with compatible Foxboro sensors, provide high accuracy measurement indication, output and alarming capability for pH, ORP, conductivity or resistivity. A human interface guides the user through intuitive, menu-driven configuration, calibration, status, and diagnostic procedures. A history log provides a report for up to 100 time and date stamped events. PSS 6-1A1 E, 6-3A1 B or 6-3M C.

- Easy to Use
- Sensor and analyzer diagnostics
- Self-prompting Calibration Routines
- Dual 4 to 20 mA outputs and dual alarms
- Digital HART Communication
- RS-232 port and Windows-based configuration utility
- NEMA 4X field enclosure or panel mount with NEMA 4X front display
- pH/ORP/ISE Version
  - Compatible with Fluoride and pH/ORP sensors
- EC Version
  - Conductivity or Concentration Measurement
  - Up to three distinct applications, either standard or custom, may be programmed and autoswitched
- CR Version
  - Dual sensor inputs
  - Resistivity and/or conductivity measurement

### Functional Specifications

<table>
<thead>
<tr>
<th>Analyzer Type</th>
<th>Measurement Range</th>
<th>Minimum Output Type</th>
<th>Temperature Inputs</th>
<th>Power Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH/ORP</td>
<td>pH: -2 to 16pH</td>
<td>Digital: pH ± 0.1%</td>
<td>100 ohm PT RTD</td>
<td>24, 100, 120, 220, 240 Vac.</td>
</tr>
<tr>
<td></td>
<td>ORP: -2000 to +2000mV</td>
<td>Analog: pH ±0.15%</td>
<td>1000 ohm PT RTD</td>
<td>50 or 60 Hz. 24 Vdc</td>
</tr>
<tr>
<td></td>
<td>ISE: 0-9999ppm</td>
<td></td>
<td>3K ohm Balco RTD</td>
<td></td>
</tr>
<tr>
<td>EC</td>
<td>0 to 50 µS/cm min</td>
<td>Digital: EC ± 0.1%</td>
<td>100 ohm PT RTD</td>
<td>24, 100, 120, 220, 240 Vac.</td>
</tr>
<tr>
<td></td>
<td>2000 mS/cm max</td>
<td>Analog: EC ±0.15%</td>
<td>1000 ohm PT RTD</td>
<td>50 or 60 Hz. 24 Vdc</td>
</tr>
<tr>
<td>CR</td>
<td>Resistivity</td>
<td>Digital: CR ± 0.1%</td>
<td>100 ohm PT RTD</td>
<td>24, 100, 120, 220, 240 Vac.</td>
</tr>
<tr>
<td></td>
<td>0.1 to 20 Mohm.cm</td>
<td>Analog: CR ±0.15%</td>
<td>1000 ohm PT RTD</td>
<td>50 or 60 Hz. 24 Vdc</td>
</tr>
<tr>
<td></td>
<td>Conductivity</td>
<td></td>
<td>100K Thermistor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0-1 µS/cm to 0-20 mS/cm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Accuracy and Repeatability

<table>
<thead>
<tr>
<th>Analyzer Type</th>
<th>pH Range</th>
<th>Repeatability</th>
<th>Temperature Limit</th>
<th>Electromagnetic Compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital: pH</td>
<td>±0.1% full scale</td>
<td>Analog: pH ± 0.15% full scale</td>
<td>-10 to 65°C</td>
<td>Compliant with EMC Directive 89-336-EEC</td>
</tr>
<tr>
<td>Digital: EC</td>
<td>±0.5% full scale</td>
<td>Analog: EC ± 0.55% full scale</td>
<td>Ambient Temp effect /°C: Digital: ±0.05% of full scale</td>
<td>When used as specified</td>
</tr>
<tr>
<td>Digital: CR</td>
<td>±0.1% full scale</td>
<td>Analog: CR ± 0.15% full scale</td>
<td>Analog: ±0.05% of full scale</td>
<td></td>
</tr>
</tbody>
</table>

For more information, visit www.swansonflo.com or call 800-288-7926
How to Order—Specify model number 875 followed by order code for each selection

Specify Model Number
For pH, ORP, or ISE ................................................................. PH
For Electrodeless Conductivity Measurement ........................................ EC
For Contacting Conductivity or Resistivity ........................................... CR

Supply Voltage or Frequency
120V ac, 50 or 60 Hz ................................................................. A
220V ac, 50 or 60 Hz ................................................................. B
240V ac, 50 or 60 Hz ................................................................. C
24V ac, 50 or 60 Hz ................................................................. E
100Vac, 50 or 60 Hz ................................................................. J
24vdc* ................................................................. D

Enclosure Mounting
Panel Mounting ................................................................. 1
Field Mounting to a DN50 or 2 inch pipe ........................................ 2
Field mounting to a surface ............................................................. 3
Pipe, Reinforced ................................................................. 4

Electrical Safety
Factory Mutual certified for ordinary & Div 2 Locations, n ........................................ F
CSA certified for ordinary & Div 2 Locations, n ........................................ C
UL Ordinary locations ............................................................. U
ATEX Protection “n” for Zone 2; II, 3, G; Ex nc IIC ........................................ N
IEC Ex non-sparking, gas group IIC, Zone 2 ................................................ D

Options
Storm Door ................................................................. A
Digital HART Communication and 4 to 20 mA output .................................. C
Configurator utility (IBM/PC-AT Software) ........................................... F
Rugged Construction, passed shock + vibration testing, and provides 4-20 mA outputs 4,5,6 ........................................ N
Rugged Construction, passed shock + vibration testing, and provides 0 to 10 V dc outputs 4,5,6 ........................................ P

Specify Sensor Type:
pH: glass or antimony, ORP or ISE (fluoride)
EC (SP, HP, LB, UT, RE, BW, PP, PT, NL, TF, EV or 871FT and FT10 flow-through model
CR /Sensor cell factor/0.1cm^-1, 10cm^-1 or other (both channels)

Specify Measurement Range and Units of Measurement (CR; both channels)

Analog Output Range (two outputs)
Specify Temperature Compensation Element:
875PH: 100 ohm PT RTD (2 or 3 wire), 1000 ohm Pt RTD (2 or 3 wire), 3K ohm Balco RTD
875EC: 100 ohm PT RTD (2 or 3 wire), 1000 ohm Pt RTD (2 or 3 wire), 100K Thermistor
875CR: 100 ohm PT RTD (2 or 3 wire), 1000 ohm Pt RTD (2 or 3 wire), 100K Thermistor

User Tag and Application
Notes
1 The 875 has been designed to meet the electrical safety descriptions listed above. For detailed information, or status of testing laboratory approvals or certifications, contact Foxboro.
2 Panel Mounted unit must be installed as follows: For Ordinary, Class I, Division 2 location; install in a protective enclosure to prevent accessibility to live parts. For Class II, and Class III, Division 2 locations; install in a dust-tight enclosure.
3 Typically selected with ‘N’ option
4 Only available with supply voltage ‘A’
5 Only available with mounting configuration ‘4’
6 Only available with safety configuration ‘F’
7 Provides a volt dc four-wire analyzer
873 Series Electrochemical Analyzers for pH/ORP, Contacting Conductivity, Electrodeless Conductivity, Dissolved Oxygen, and Resistivity Measurement

The 873 Series Electrochemical Analyzers, when coupled with 871 Series and PH10 Series Sensors, measure pH, ORP, conductivity, resistivity, or dissolved oxygen. For complete specifications, refer to Product Specification Sheet 6-1C1 E.

**Functional Specifications**

*Output signal:* Isolated, 4 to 20 mA dc, 0 to 20 mA dc, or 0 to 10 V dc, as specified.

**Measurement Ranges and Span Limits:**

<table>
<thead>
<tr>
<th>Analyzer Type</th>
<th>Measurement Ranges</th>
<th>Minimum Output Span Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH/ORP</td>
<td>pH -2 to +16 ORP -999 to +1400 mV</td>
<td></td>
</tr>
<tr>
<td>DPX</td>
<td>-2 to +16 pH ORP -999 to 1400 mV ISE 0-2000 ppm to 0-200 ppm</td>
<td></td>
</tr>
<tr>
<td>Resistivity</td>
<td>0 to 2 Mohm-cm minimum 0 to 20 Mohm-cm maximum</td>
<td>10% of Upper Measurement Range Value</td>
</tr>
<tr>
<td>Contacting</td>
<td>0 to 1 µS/cm minimum 0 to 20,000 µS/cm maximum</td>
<td>10% of Upper Measurement Range Value</td>
</tr>
<tr>
<td>Conductivity</td>
<td>Electrodeless</td>
<td></td>
</tr>
<tr>
<td>Conductivity</td>
<td>0 to 50 µS/cm minimum 0 to 2000 mS/cm maximum</td>
<td>10% of Upper Measurement Range Value</td>
</tr>
<tr>
<td>Dissolved</td>
<td>0 to 100 ppm 0 to 100% saturation</td>
<td>10% of Upper Measurement Range Value</td>
</tr>
<tr>
<td>Oxygen</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Light Emitting Diode (LED) Readout:** 4 digits. Measurement Value: pH, mV, ppm, Mohm-cm, µS/cm, mS/cm, % (as applicable)

**Temperature:** Celsius (°C) or Fahrenheit (°F), depending on configuration

**Alarms:** Standard dual, setpoint adjustable zero to full scale; adjustable hysteresis is 0 to 99% of maximum upper measurement range value or dual feed, delay and trigger timers adjustable 0.00 to 99.99 minutes. Contacts rated 5A noninductive at 125 V ac, 30 V dc

**Physical Specifications**

**Mounting:**
- General Purpose Enclosure: Panel Mounting only.
- Field: (NEMA 4X) enclosure.
- Panel, pipe, surface, or movable surface mounting

**Housing:**
- General Purpose Enclosure: Molded, glass filled Noryl with NEMA 12 front panel.
- Field: (NEMA 4X enclosure)—cast and extruded aluminum, coated with epoxy-based paint

* Actual measurement range 0-20.0 ppm with 871D0 sensor

---

**Performance Specifications:**

**Accuracy:** 1
- pH/ORP: ±0.1%
- All others: ±0.5% of calibrated range
- Repeatability: ±0.1%

**Note:** 1 Reported as % of full scale used.

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Contact Swanson Flo | www.swansonflo.com | 800-288-7926
How to Order—Specify model number 873 followed by order code for each selection

Analyzer
- pH and ORP ................................................................. PH
- Resistivity ................................................................. RS
- Contacting Conductivity ........................................... CC
- Electrodeless Conductivity ......................................... EC
- Dissolved Oxygen .................................................... DO
- Dual pH/ORP/ISE ...................................................... DPX

Supply Voltage and Frequency: 50/60 Hz
- 120 V ac ................................................................. A
- *220 V ac ................................................................. B
- *240 V ac ................................................................. C
- 24 V ac ................................................................. E
- 100 V ac ................................................................. J

Measurement Output: Isolated
- 4 to 20 mA dc .......................................................... I
- 0 to 10 V dc ............................................................ T
- 0 to 20 mA dc .......................................................... E

Enclosure
- General Purpose (Molded Noryl) Panel Mount ................... P
- Field-Mounted (Metal) Panel Mount ................................. W
- Field-Mounted (Metal) Surface Mount ............................... X
- Field-Mounted (Metal) Pipe Mount ..................................... Y
- Field-Mounted (Metal) Movable Surface Mount ............... Z

Electrical Certification
- CSA, Division 2 A, E, and J only. Not available with Enclosure P .............................................................. CNZ
- Factory Mutual Certified for General Purpose Locations .............................................................. FGZ
- Factory Mutual Certified Nonincendive for Class I, Division 2, Groups A, B, C, and D; and suitable for Class II, Division 2 Groups F and G hazardous locations. Not available with Enclosure P .............................................................. FNZ

Options
- Curve Generation Program (EC & CC versions only) .................. 5
- Storm Door .................................................................. 7

Specify Sensor Type:
- pH: pH, ORP, antimony
- DPX: pH, ORP, ISE (both channels)
- EC: SP, HP, LB, UT, RE, BW, PP, PT, NL, TF, EV, or Complete 87IFT Model Code
- CC: 0.1/cm CF or 10/cm CF

Specify Measurement Range (Full Scale) with Measurement Units

Specify Temperature Element:
- EC: 100 K Thermistor or 100 ohm RTD
- CC: 100 Kohm Thermistor or 100 ohm RTD
- RS: 100 Kohm Thermistor or 100 ohm RTD

Specify Temperature Compensation (EC only)

Specify User Tag and Application

*220 and 240 V ac have CE certification.
876 Series Intelligent Electrochemical Two-wire Transmitters for pH/ORP Contacting Conductivity/Resistivity & Electrodeless Conductivity Measurement

These 2-wire intelligent transmitters, when coupled with applicable sensors, provide measurement indication and an output of HART digital signal and 4 - 20 mA analog for recording or control of pH/ORP, contacting conductivity/resistivity, or electrodeless conductivity. Their human interfaces and online diagnostics provide local configuration, calibration, status and troubleshooting. PSS 6-1A4 A, 6-3N3 A, and 6-3A2A

- Sensor and Transmitter
- Diagnostics
- Self-prompting Calibration Routines
- 4 to 20 mA and/or Digital
- Intrinsically Safe Construction
- Remote Configuration via HART
- Save and Restore Configuration
- pH/ORP Version
  - Compatible with Preamplified or Unamplified pH/ORP Sensors
  - Compatible with fluoride sensor EP459A
- EC Version
  - Conductivity or Concentration Measurement
  - Up to Three Distinct Applications, either standard or custom. May be Programmed and Autoswitched.
- CR Version
  - Conductivity or Resistivity Measurement
  - High Accuracy

**Performance Specifications**

**Accuracy:**

- **876PH** +/- 0.009 pH with 3-wire, 1000 ohm RTD
- **876EC** +/- 1% of absolute reading within specified range for sensor
- **876CR** +/- 0.5% of absolute reading over the input range of 40Ω to 10MΩ

**Stability (After 6 Months)**

- **876PH** +/- 0.009 pH with 3-wire, 1000 ohm RTD
- **876EC** Twice the absolute measurement accuracy value
- **876CR** Twice the absolute measurement accuracy value

**NAMUR Compliance**

- NAMUR NE 43 for analog overrange and underrange
- NAMUR NE 21 for interference immunity requirements

**Electromagnetic Compatibility (EMC)**


**Measurement Range (Selectable)**

- **876PH** -2 to +16pH
- **876EC** -2000 to +2000 mV ORP
- **876CR** 0 to 9999 ppm ion Selective Electrode concentration
### Display Format (Selectable)

876EC

- From 9.999 uS/cm to 9999 mS/cm
- Available display format depends on sensor type and units of measurement selected

876CR

- 0.9999 uS/cm to 9999 mS/cm
- 0.9999 Megohm-cm to 99.99 Megohm-cm
- Available display format depends on cell factor and units of measurement selected

### Temperature Inputs

876PH

- 100 ohm platinum RTD, 2 or 3 wires
- 1000 ohm platinum RTD, 2 or 3 wires
- 3000 ohm Balco RTD, 2 wires

876EC

- 100 ohm or 1000 ohm platinum RTD, 100 kohm thermistor

876CR

- 100 ohm or 1000 ohm platinum RTD
- 10 kohm or 100 kohm thermistor

### Temperature Compensation

876EC

- Absolute, NaCl, H2SO4, NaOH, linear, custom and several other standard types

876CR

- Absolute, NaCl, ultrapure water, linear, custom and several other standard types

### Sensor Compatibility

876EC

- 871EC, 871FT, EP307 and FT10 Series

876CR

- 871CC and 871CR Series

### Output Hold

- Hold OFF, Hold at PRESENT value, or Hold at Manual value

### Auto Buffer Recognition

876PH

- Six (6) tables of preprogrammed buffer valves

### History Log

- 100 most recent events stored in nonvolatile memory

### Environmental and Corrosion Resistance

- IP66 and NEMA 4X

### Electrical Safety Specifications

- See Model code
How to Order—876PH, 876EC or 876CR

876PH Ordering Instructions
1. Model Number
2. Measurement Range
3. Measurement Electrode Type; Specify Glass pH, Antimony pH, ORP or ISE
4. Temperature Compensation Input; Platinum or Balco RTD Type, Resistance, and 2- or 3-wires
5. User Tag and Application

876EC Ordering Instructions
1. Model Number
3. Measurement Display Format (example 9.999 mS/cm).
4. Temperature Compensation Type.
5. Analog Output Range.
6. Temperature Compensation Input:
   • 871EC-SP, -PT, -RE, -LB, -TF, -EV use 100 KΩ thermistor
   • 871EC-HP, -BW, -UT, PP use 100ΩRTD, 2-wire
   • 871EC-FT or FT10 RTD Code “R” use 1000ΩRTD, 3-wire
   • 871EC-FT, RTD Code “T” use 100ΩRTD, 2-wire
   • FT10 Code “T” use 100ΩRTD, 3-wire
7. User Tag and Application

876CR Ordering Instructions
1. Model Number
2. Sensor Cell Factor (0.1, 1.0, or 10 cm⁻¹).
4. Temperature Compensation Type.
5. Analog Output Range.
6. Temperature Compensation Input:
   • 2-wire platinum RTD; 100Ω
   • 2-wire platinum RTD; 1000Ω
   • 3-wire platinum RTD; 100Ω
   • 3-wire platinum RTD; 1000Ω
   • 10 kΩ thermistor
   • 100 kΩ thermistor
7. User Tag and Application
How to Order—876PH, 876EC or 876CR

Model
- Intelligent Transmitter for pH, ORP and ISE Measurement ............................................ 876PH
- Intelligent Transmitter for Electrodeless Conductivity Measurement ............................. 876EC
- Intelligent Transmitter for Contacting Conductivity and Resistivity Measurement ...... 876CR

Output Signal
- Intelligent; Digital HART and 4 to 20 mA ................................................................. -T

Enclosure Mounting
- Panel Mounting .............................................................................. W
- Surface Mounting ........................................................................... X
- Pipe Mounting (Horizontal or Vertical Pipe) ......................................................... Y

Electrical Safety (contact Foxboro for the current status of certifications)
- ATEX intrinsically safe; II 1 G, Ex ia IIC, Zone 0 ......................................................... AA
- ATEX energy limited for II 3 G, Ex nL IIC, Zone 2; and intrinsically safe for II 3 G, Ex ic IIC, Zone 2 ...... AN
- CSA intrinsically safe; Class I, II, III Division 1; and Ex ia IIC, Zone 0 ......................... CA
- CSA for Class I, II, III, Division 2; and energy limited for Ex nL IIC, Zone 2 .................. CN
- FM intrinsically safe; Class I, II, III, Division 1; and AEx ia IIC, Zone 0 ...................... FA
- FM nonincendive for Class I, II, III, Division 2; and energy limited for AEx nL IIC, Zone 2 .......... FN
- IECEx intrinsically safe; II 1 G, Ex ia IIC, Zone 0 ....................................................... DA
- IECEx energy limited II 3 G, Ex nL IIC, Zone 2; and intrinsically safe II 3 G, Ex ic IIC, Zone 2 ... DN
- No Certification .................................................................................. ZZ

Optional Selections
- Special per Engineering Order(a) ......................................................................... -1
- Storm Door(b) ......................................................................................... -7
- Detailed Instruction Manual(c) ........................................................................ -M

Notes
a  Provides ability to preconfigure the instrument with custom temperature compensation.
b  Used to protect front panel controls, particularly in field mounting applications.
c  A CD-ROM is shipped as standard with each transmitter.
The 871CC Series Contacting Conductivity/Resistivity Sensors, when coupled with 873CC, 873RS or 875CR Series Analyzers, or 876CR Intelligent Transmitter or 870CC Series Transmitters, measure conductivity or resistivity of process solutions. For complete specifications, refer to Product Specification Sheet PSS 6-3C2 A.

**Specifications:**
- **Wetted Parts Materials:** See Table 1
- **Temperature and Pressure Limits:** See Table 2
- **Conductivity Ranges:** For both 0.1 cm⁻¹ and 10 cm⁻¹ cell-factor sensor see Table 2
- **Resistivity Ranges:** For 0.1 cm⁻¹ cell-factor sensor only see Table 2
- **Temperature Compensator (Integral):** See Table 2
- **Cable:** Sensor Models 871CC-A to 871CC-G have integral PVC-insulated cable rated to 105°C (220°F); Sensor Models 871CC-K to 871CC-M have integral Tefzel-insulated cable rated to 150°C (300°F). Cables are 6 m (20 ft) long, screened (shielded), terminated in numbered spade lugs, or lugless. Type of cable used and method of attaching the cable to the sensor are matched to the application and mounting of sensor.
- **Mounting:** See “Sensor Application” table for mounting specifications

### Table 1 Process Wetted Parts
Sensors with ¾ NPT Bushing or Twist-Lock Process Connection

<table>
<thead>
<tr>
<th>Cell Factor</th>
<th>Sensor Code</th>
<th>Seals/0-Rings</th>
<th>Insulator</th>
<th>Removable Sheath</th>
<th>Bushing</th>
<th>Electrodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 cm⁻¹</td>
<td>-A</td>
<td>EPDM</td>
<td>Ryton¹</td>
<td>None</td>
<td>Teflon-S</td>
<td>Titanium or Monel, as Specified by Model Code</td>
</tr>
<tr>
<td></td>
<td>-F</td>
<td>EPDM</td>
<td>Ryton</td>
<td>None</td>
<td>Coated 300 Graphite Encapsulated in Gold-Plated Cups</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-K</td>
<td>EPDM</td>
<td>pctfe¹</td>
<td>None</td>
<td>Grade ss</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-E</td>
<td>EPDM</td>
<td>Ryton</td>
<td>None (twist lock)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 cm⁻¹</td>
<td>-A</td>
<td>EPDM</td>
<td>Noryl</td>
<td>ptef¹</td>
<td>Teflon-S</td>
<td>High Density</td>
</tr>
<tr>
<td></td>
<td>-F</td>
<td>EPDM</td>
<td>Noryl</td>
<td>ptef</td>
<td>Coated 300 Graphite</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-K</td>
<td>EPDM</td>
<td>pctfe</td>
<td>ptef</td>
<td>Grade ss</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-E</td>
<td>EPDM</td>
<td>Noryl</td>
<td>ptef</td>
<td>None (twist lock)</td>
<td></td>
</tr>
</tbody>
</table>

### Universal-Mount, Insertion, and Dip Sensors

<table>
<thead>
<tr>
<th>Cell Factor</th>
<th>Sensor Code</th>
<th>Seals/0-Rings</th>
<th>Insulator</th>
<th>Removable Sheath</th>
<th>Upper Housing</th>
<th>Electrodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 cm⁻¹</td>
<td>-B</td>
<td>EPDM</td>
<td>Ryton</td>
<td>None</td>
<td>316 ss</td>
<td>Titanium or Monel, as Specified by Model Code</td>
</tr>
<tr>
<td></td>
<td>-G</td>
<td>EPDM</td>
<td>Ryton</td>
<td>None</td>
<td>Ultem 1000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-D</td>
<td>EPDM</td>
<td>Ryton</td>
<td>None</td>
<td>316 ss (includes insertion shaft)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-M</td>
<td>EPDM</td>
<td>ptef</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 cm⁻¹</td>
<td>-B</td>
<td>EPDM</td>
<td>Noryl</td>
<td>ptef</td>
<td>Teflon-S</td>
<td>High Density</td>
</tr>
<tr>
<td></td>
<td>-G</td>
<td>EPDM</td>
<td>Noryl</td>
<td>ptef</td>
<td>Grade ss</td>
<td>Encapsulated in Gold-Plated Cups</td>
</tr>
<tr>
<td></td>
<td>-D</td>
<td>EPDM</td>
<td>Noryl</td>
<td>ptef</td>
<td>316 ss (includes insertion shaft)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-M</td>
<td>EPDM</td>
<td>ptef</td>
<td>ptef</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 1 (continued)
Sensors with Sanitary Fittings

<table>
<thead>
<tr>
<th>Cell Factor</th>
<th>Sensor Body Code</th>
<th>Seals/0-Rings</th>
<th>Insulator</th>
<th>Removable Sheath</th>
<th>Tri-Clamp*</th>
<th>Electrodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 cm⁻¹</td>
<td>-C</td>
<td>EPDM</td>
<td>Ryton</td>
<td>None</td>
<td>316 ss</td>
<td>Titanium or Monel, as Specified by Model Code</td>
</tr>
<tr>
<td></td>
<td>-L</td>
<td>EPDM</td>
<td>pctfe</td>
<td>None</td>
<td>316 ss</td>
<td>High Density Graphite Encapsulated in Gold-Plated Cups</td>
</tr>
<tr>
<td>10 cm⁻¹</td>
<td>-C</td>
<td>EPDM</td>
<td>Ryton</td>
<td>pfre</td>
<td>316 ss</td>
<td>-K, -L, or -M sensors is to be used with 870CC Series Transmitters, or with 874CC or 874RS Series Monitors, no automatic temperature compensation can be applied. RTDs are not supported on these instruments. RTD is compatible with 873RS, 873CC, 875CR, 876CR or 872-30 Series Analyzers.</td>
</tr>
<tr>
<td></td>
<td>-L</td>
<td>EPDM</td>
<td>pctfe</td>
<td>pfre</td>
<td>316 ss</td>
<td>-K, -L, or -M sensors is to be used with 870CC Series Transmitters, or with 874CC or 874RS Series Monitors, no automatic temperature compensation can be applied. RTDs are not supported on these instruments. RTD is compatible with 873RS, 873CC, 875CR, 876CR or 872-30 Series Analyzers.</td>
</tr>
</tbody>
</table>

Table 2 Pressure & Temperature Limits, Conductivity & Resistivity Ranges, Temperature Compensator

<table>
<thead>
<tr>
<th>Sensor Body Code</th>
<th>Temperature Limits 2</th>
<th>Pressure Limits</th>
<th>Applicable Conductivity &amp; Resistivity Ranges</th>
<th>Temperature Compensator (integral)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-A to -G</td>
<td>0° and 120°C (32° and 250°F)</td>
<td>-0.1 and +1.4 MPa (-15 and +200 psi)</td>
<td>From 0 to 1 up through 0 to 20 μS/cm Conductivity Range—From 0 to 2 up through 0 to 20 Mohm-cm Resistivity Range</td>
<td>100 kohm Thermistor for use with: 873RS, 873ARS, 873CC, 873ACC, 875CR Series Analyzers; 870CC and 876CR Series Transmitters; 872-30, 874CC, 874RS Series Monitors</td>
</tr>
<tr>
<td>-K to -M5</td>
<td>120°C at 3.4 MPA (250°F at 500psi)</td>
<td>150°C at 2.5 MPA (300°F at 375psi)</td>
<td>175°C at 1.7 MPA (350°F at 250psi)</td>
<td>100 ohm Platinum RTD for use with: 873RS, 873ARS, 873CC, 873ACC, 875CR Series Analyzers; 876CR Series Transmitter</td>
</tr>
</tbody>
</table>

Notes:
1 Ryton is polyphenylene sulfide; pfre is polytetrafluoroethylene; pctfe is polychlorotrifluoroethylene.
2 All 0.1 cm⁻¹ cell-factor sensors with Body Code A through M are labeled with the exact cell factor and temperature cell factor (except code ‘G’). All 0.1 cm⁻¹ cell-factor sensors are constructed and tested for an accuracy of better than ±2%.
3 Specifications are for 0.1 cm⁻¹ cell-factor sensors only. Maximum temperature for 10 cm⁻¹ cell-factor sensor is 150°C at 2.5 MPA (300°F at 375 psi).
4 Specify Option Code -9.
5 If -K, -L, or -M sensors is to be used with 870CC Series Transmitters, or with 874CC or 874RS Series Monitors, no automatic temperature compensation can be applied. RTDs are not supported on these instruments. RTD is compatible with 873RS, 873CC, 875CR, 876CR or 872-30 Series Analyzers.
How to Order—Specify model number 871CC followed by order code for each selection

### Mounting Design
- Threaded bushing/ ¾ NPT ................................................................. A
- Universal .................................................................................... B
- Sanitary ..................................................................................... C
- Insertion ..................................................................................... D
- Twist Lock ..................................................................................... E
- Threaded bushing/ ¾ NPT with ½ NPT conduit connector ............... F
- Dip sensor .................................................................................... G
- Threaded bushing/ ¾ NPT, high temperature\(^8\) ......................... K
- Sanitary, high temperature\(^8\) ......................................................... L
- Insertion/ high temperature\(^8\) ..................................................... M

### Cell Factor and Electrode Material
- 0.1 cm\(^{-1}\) titanium .......................................................................... 2
- 10 cm\(^{-1}\) graphite............................................................................. 4
- 0.1 cm\(^{-1}\) Monel. For Mounting Design codes A, G, or K only .... 6

### Optional Features
- Nonstandard cable length\(^9\) .......................................................... 3
- No spade lug terminals attached to end of cable.\(^10\) ..................... 4
- Nonstandard length integral cable terminated in connector. For Mounting Design code A or G only\(^9,11,12\) ...................... 5
- Integral connector on sensor. For Mounting Design code A and G only\(^11\) ................................................................. 6
- Standard length integral cable terminated in connector. 6 m (20 ft). For Mounting Design code A or G only\(^11,12\) ............ 7
- Cell factor determined in Foxboro pure water loop ......................... 9

Specify cable length, if nonstandard

Specify information for instrument tag

Specify mounting option accessories.

**Notes**
\(^8\) The K, L, and M sensors contain an integral 100 ohm platinum RTD for automatic temperature compensation. This RTD is compatible with 873RS, 873CC or 875CR Series Analyzers or 876CR, 872-30 Series Monitors only. If these sensors are to be used with 874RS or 874CC Series Monitors or 870CC Series Transmitters, no automatic temperature compensation can be applied.

\(^9\) Maximum length: 150 m (500 ft) for 873RS, 873CC, 872-30, 874RS, and 874CC Series; 30 m (100 ft) for 870CC Series and 875CR, 876CR.

\(^10\) Required when 871CC Series Sensor is used with 873RS or 873CC Series Analyzer or 874RS or 874CC Series Monitor.

\(^11\) Not recommended for resistivity measurements.

\(^12\) Requires patch cord.
The 871CR Series contacting conductivity and resistivity sensor is suitable for ionic measurements in most cleanwater applications found in power, semiconductor, pharmaceutical and other process industries. Application flexibility is enhanced by the choice of insulator materials and mounting hardware. Installations are simplified with the sliding bore piece design. The design also permits mounting hardware interchangeability and lower sensor replacement costs.

**Specifications**

**Pressure/Temperature Limitations:**
(Consult PSS 6-3C2B for precise specifications)

**General Purpose Applications:** Ambient temperatures and lower pressures generally can be satisfied with CPVC or Virgin PVDF insulators and bushings for 0.1/cm CF applications or Glass filled NORYL insulators and bushings for 10/cm CF applications. “Standard” PVC jacketed cable (rated to 80°C) can be specified for these applications.

**High Temperature and Pressure Applications:** 0.1/cm CF sensors require Virgin PEEK insulators, either Titanium or Virgin PEEK bushings (or other mounting hardware specified separately); 10/cm CF applications require PEEK insulators and PEEK or SS mounting. High temperature applications above 80°C (176°F) require High Temperature (teflon jacketed) cable.

**Cell Factor Measurement Range:** A choice of two cell factors, 0.1 and 10/cm is available with the 871CR sensor model code. See table below for measurement ranges available.
Measurement Ranges & Cell Factor:

<table>
<thead>
<tr>
<th>Cell Factor</th>
<th>Unit</th>
<th>876CR Transmitter</th>
<th>875CR Analyzer</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 cm⁻¹</td>
<td>Mohm-cm</td>
<td>0.0004 to 100.0</td>
<td>0.1-20</td>
</tr>
<tr>
<td>uS/cm</td>
<td></td>
<td>0.01 to 2500</td>
<td>1-200</td>
</tr>
<tr>
<td>10.0 cm⁻¹</td>
<td>kohm-cm</td>
<td>0.0040 to 999.9</td>
<td>0.5-200</td>
</tr>
<tr>
<td>uS/cm</td>
<td></td>
<td>100 to 9999</td>
<td>100-5000</td>
</tr>
<tr>
<td>mS/cm</td>
<td></td>
<td>0.001 to 250</td>
<td>0.1-20</td>
</tr>
</tbody>
</table>

Process Wetted Parts:

<table>
<thead>
<tr>
<th>Material</th>
<th>Process Wetted Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulator</td>
<td>CPVC</td>
</tr>
<tr>
<td>Virgin PVDF</td>
<td>Glass Filled PEEK</td>
</tr>
<tr>
<td>Virgin PEEK</td>
<td>Glass Filled PEEK</td>
</tr>
<tr>
<td>Electrode Material</td>
<td>Titanium</td>
</tr>
<tr>
<td>Monel</td>
<td>Graphite</td>
</tr>
<tr>
<td>O-Ring</td>
<td>Teflon Coated EPDM</td>
</tr>
<tr>
<td>Bushings</td>
<td>CPVC</td>
</tr>
<tr>
<td>Virgin PVDF</td>
<td>Glass Filled PEEK</td>
</tr>
<tr>
<td>Virgin PEEK</td>
<td>Glass Filled PEEK</td>
</tr>
<tr>
<td>Titanium</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>Triclamp</td>
<td>Titanium</td>
</tr>
<tr>
<td>Gate valve Shaft</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>Other: (Outer Sheath)</td>
<td>Titanium</td>
</tr>
</tbody>
</table>

How to Order—Specify model number 871CR followed by order code for each selection

Cell Factor
- 0.1/cm Conductivity Sensor with Class B 1000 ohm RTD .......................... -A
- 0.1/cm Resistivity Sensor with Class A 1000 ohm RTD2 .......................... -B
- 10/cm Conductivity Sensor with Class B 1000 ohm RTD .......................... -C

Insulator Material
- CPVC3 .................................................. .1
- Virgin PVDF4 ....................................... .2
- Virgin PEEK4 ....................................... .3
- Glass Filled PEEK5 .............................. .4
- Glass Filled NORYL5 ............................ .5

Electrode Material
- Graphite5 .......................................... .G
- Monel4 ............................................... .M
- Titanium4 .......................................... .T

Insertion Length
- Standard ........................................... 1
- 4 inch ............................................. 4
- 6 inch ............................................. 6

Sensor Mounting
- Universal Bore Piece with ¼ NPT CPVC bushing3, 6 ................................. -A
- Universal Bore Piece with ¼ NPT Virgin PVDF bushing4, 7 .................. -B
- Universal Bore Piece with ¼ NPT Virgin PEEK bushing4, 8 ................. -C
- Universal Bore Piece with ¼ NPT Glass Filled PEEK bushing5, 9 ....... -D
- Universal Bore Piece with ¼ NPT Glass Filled NORYL bushing5, 10 .... -E
- Universal Bore Piece with 1½ in Tri-Clamp Fitting11, 22 ..................... -F
- Insertion Sensor for use with 1 in S.S. Ball Valve Assembly4, 12, 13 ... -H
- Universal Bore Piece14 ................................ -J
- Universal Bore Piece with Integral Conduit Fitting14, 15 ................. -K
Temperature Compensation
1000 ohm RTD .................................................. .1

Cable Selection23
Standard Length (20 ft), standard temperature cable .............................................. A
Standard Length (20 ft), high temperature cable .................................................. B
30 ft standard temp cable ........................................... C
30 ft high temp cable .......................................................... D
40 ft standard temp cable ........................................... E
40 ft high temp cable .......................................................... F
60 ft standard temp cable Assembly .................................................. G
60 ft high temp cable .......................................................... H
80 ft standard temp cable ........................................... J
80 ft high temp cable .......................................................... K
No Cable (Integral Connector on Sensor)16, 17, 18, 19 .................................................. L

Termination
Cable with #6 Spade Lugs .................................................. 1
Cable with Connector at end16, 19, 20 .................................................. 2
Integral Connector on Sensor16, 17, 19, 21 .................................................. 3

Options
Cell Factor/Cert NIST Traceable (Use for USP23/24 compliance)8 .................................................................. -S
Cell Factor/CERT determined in Foxboro Pure Water Loop 26, 27, 28 .................................................. -R

Specify Mounting hardware25
Specify Electrical Certification
Specify Accessories
Specify Tag

Notes
1 Absolute ranges (without temperature compensation) exceed these ranges by roughly 5Xs
2 Recommended for optimum Resistivity Measurements
3 -A Cell Factor only
4 -A & -B Cell Factor only
5 -C Cell Factor only
6 Insulator Material “1” only
7 Insulator Material “2” only
8 Insulator Material “3” only
9 Insulator Material “4” only
10 Insulator Material “5” only
11 Insertion Lengths 4 and 6 only
12 Insertion Lengths 1 and 4 only
13 Electrode Material “G” or “T” only
14 No mounting accessories included
15 Not available with Cable “L”
16 Not recommended for optimum Resistivity Measurements
17 Not available with Sensor Mountings “H” or “K”
18 Termination “3” only
19 Patch Cable required. Specify Separately.
20 Not available with “high temp” Cable Selections
21 Cable Selection “L”
22 -A & -B Cell factor utilize Titanium Tri-clamp fitting; -C Cell factor uses 316 S.S. Tri-Clamp Fitting
23 Custom cable Lengths available. Contact Foxboro.
24 Ball valve assembly required for new installations. Specify Separately
25 Check PSS 6-3C2 B for accessories and Electrical Certificates
26 Available for insulator material “2”, virgin PVDF only
27 Contact Foxboro
28 -B cell factor only
871DO Series Dissolved Oxygen Sensors

The 871DO Sensor, when used in conjunction with DO Accessories, and the 873DO Electrochemical Analyzer, provides a reliable and accurate measurement of dissolved oxygen in aeration basins, aqueous streams, ponds, and industrial processes. For complete specifications, refer to Product Specification Sheet PSS 6-9B1 A.

Specifications
Sensor Type: Polarographic Clark Cell with composite membrane enclosing four electrodes in KCl electrolyte
Measuring Electrode: Gold
Isolated Reference Electrode: Silver/Silver Chloride (Ag/AgCl)
Auxiliary (Counter) Electrode: Silver
Test Electrode: Gold
Membrane: Composite Stainless Steel reinforced membrane on replaceable cap

Process Wetted Parts Materials:
Body: PVDF (Upper Housing), Noryl (Lower Housing)
Membrane: Silicone Rubber
Membrane Cap Holder: Noryl
O Ring: Silicone Rubber, Viton, and EPR
Vent Cap: Acetal
Vent Seal Gasket: Silicone Rubber
Automatic Temperature Compensation: Achieved using 100 k ohm thermistor within sensor to provide compensation between 0 and 50°C (32 and 122°F)

Process Pressure-Temperature Limits: 0 and 210 kPa gauge (0 and 30 psig) 0 and 50°C (32 and 122°F)

Sensor Mounting: 1-in external MNPT on both ends, with a 1.125-in wrench flat on body. For in-situ or in-line mounting, as required.

Cable Length:
Integral Cable, Standard: 9 m (30 ft)
Integral Cable Maximum: 150 m (500 ft)

Integral Cable Terminations:
Standard Terminations: Seven connections #22 AWG, stripped and tinned.
Optional Terminations: Male connector to mate with patch cable from 873DO Analyzer.

Approximate Mass: 0.34 kg (0.75 lb)
How to Order—Specify model number 871DO followed by order code for each selection

Membrane
- Composite membrane.

Optional Features
- Nonstandard length integral cable, terminated in stripped and tinned leads, 150 m (500 ft) maximum. Specify length. Specify:
  - Nonstandard length integral cable, terminated in male connector, 150 m (500 ft) maximum. Specify length.
  - Standard length 9 m (30 ft) integral cable, terminated in male connector.

Specify cable length, if nonstandard

Specify mounting hardware, junction box, and extension cable, if required (Refer to PSS 6-9B1 A for details)

Specify information for instrument tag

This product and its components are protected by U.S. patent 5,326,447. Corresponding patents have been issued or are pending in other countries.

Notes
1 Requires patch cord. Specify either P/N BS806JY (10 ft) or P/N BS806JT (special length per sales order).
871A Series pH and ORP Sensors

The 871A Series pH and ORP Sensors are suitable for most pH and ORP measurement applications. Units are for use with 873PH and 875PH Series Analyzers or 876PH Series Transmitters.

### Functional Specifications

**Pressure/Temperature Rating:**

- Normal Operating Condition Limits
- Process Pressure: 1000 psi
- Process Temperature: 100 °C

### Physical Specifications

**Process Wetted Parts Material:**
- Body: PVDF
- Measuring Electrode:
  - pH: Flat glass
  - ORP: Platinum or gold, as specified
- Reference Electrode: Ceramic junction
- O-Ring: EPR (Ethylene Propylene Rubber)

**Sensor Mounting:** 1-inch external NPT on both ends. For in line or submersible mounting, as required

**Wire Terminations:** (see note 10, next page)
- For Standard Configuration Sensors: Stripped & Tinned
- For Intelligent Configuration Sensors: No. 6 Spade Terminals
  - Optional No.6 Spade Terminals available for Standard Configuration Sensors

**Measurement Range:**
- pH: 2 to 12 pH
- ORP: ±2000 mV

**Automatic Temperature Compensation:**
- For Standard Configuration Sensor: 2 wire platinum RTD, 100 ohm.
- For Intelligent Configuration Sensors:
  - 871A-3 Version: 2 wire platinum RTD, 1000 ohm
  - 871A-4 Version: 3 wire platinum RTD, 1000 ohm

**Analyzer/Transmitter Compatibility:**
- 873PH: 871A-1, 871A-2
- 873APH: 871A-1, 871A-2
- 870ITPH: 871A-1, 871A-3, 871A-4
  - Note: 871A-2 is compatible but some diagnostics are not available.
- 875PH: 871A-1, 871A-3, 871A-4
  - Note: 871A-2 is compatible but some diagnostics are not available.
How to Order—Specify model number 871A followed by order code for each selection

Signal Conditioning

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Configuration, No Preamp</td>
<td>1</td>
</tr>
<tr>
<td>Standard Configuration, Integral Preamp(^1)</td>
<td>2</td>
</tr>
<tr>
<td>Intelligent Configuration, No Preamp(^2)</td>
<td>3</td>
</tr>
<tr>
<td>Intelligent Configuration, Integral Preamp(^2)</td>
<td>4</td>
</tr>
</tbody>
</table>

Measuring Electrode and Material

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH, flat glass</td>
<td>F</td>
</tr>
<tr>
<td>ORP, platinum</td>
<td>D</td>
</tr>
<tr>
<td>ORP, gold</td>
<td>E</td>
</tr>
</tbody>
</table>

Optional Features

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leads terminated with No. 6 spade terminals for Standard Configuration Sensors only(^3), 4, 5, 10</td>
<td>1</td>
</tr>
<tr>
<td>Nonstandard integral cable length(^4), 6</td>
<td>3</td>
</tr>
<tr>
<td>Nonstandard length integral cable, terminated in male connector Specify length(^7), 8, 9</td>
<td>5</td>
</tr>
<tr>
<td>Standard length 3 m (10 ft) integral cable, terminated in male connector(^7), 8, 9</td>
<td>7</td>
</tr>
</tbody>
</table>

Specify cable length if nonstandard

Specify mounting hardware, junction box, and extension cable, if required. (Refer to PSS 6-1C2 B for details.)

Specify information for instrument tag

Notes

1. Compatible with 876PH Transmitter and 875PH, but some diagnostics are not available.
2. Compatible with 876PH Transmitter and 875PH.
3. All cables that do not have connectors, have leads terminated with straight pin lugs and are now compatible with all Foxboro transmitters. Option code -3 does not provide spade length. Option -1 is included for customers who automatically order it.
4. Except for the possible combination "-13", only one optional selection may be chosen. Optional Selections "1" and "-3" may each be selected individually or as a combination.
5. Not available with Intelligent Configuration Sensors. Their standard termination is #6 spade terminals.
6. Maximum integral cable length is 15 m (50 ft).
7. For use with 871-2 only.
8. Not compatible with ball valve assembly mountings.
9. Requires patch cable ordered separately.
10. New cables and cable terminations are being phased in. New lead termination will be crimped, straight-pin lugs, suitable for use with all analyzers and transmitters. Pin-lug terminations will replace both #6 spade lugs and stripped and tinned leads.
The 871PH Series pH and ORP Sensors, when coupled with 873PH and 875PH Series Analyzers or 876PH Series Transmitters, provide pH or ORP measurements of process solutions. For complete specifications, refer to Product Specification Sheet PSS 6-1C2 A.

**Physical Specifications:**
- **Materials:** Ryton or CPVC housing; Viton O-rings. See How to Order table for electrodes and metallic wetted parts.
- **Mounting:** Refer to Product Specification Sheet PSS 6-1C2 A for mounting options.

**Functional Specifications**
- **Pressure/Temperature Ratings:**

<table>
<thead>
<tr>
<th>Measuring Electrode Type</th>
<th>Ball Valve or Submersible Installation</th>
<th>In-Line Installation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum Pressure</td>
<td>Temperature Range</td>
</tr>
<tr>
<td>Spherical Glass pH</td>
<td>0.7 MPa (100 psi)</td>
<td>-5 to + 80°C (20 to 175°F)</td>
</tr>
<tr>
<td>Flat Glass pH</td>
<td>1 MPa (150 psi)</td>
<td>-5 to + 80°C (20 to 175°F)</td>
</tr>
<tr>
<td>Domed Dolphin Glass pH</td>
<td>0.7 MPa (100 psi)</td>
<td>0 to + 80°C (32 to 175°F)</td>
</tr>
<tr>
<td>Antimony pH</td>
<td>1 MPa (150 psi)</td>
<td>-5 to + 80°C (20 to 175°F)</td>
</tr>
<tr>
<td>ORP</td>
<td>1 MPa (150 psi)</td>
<td>-5 to + 80°C (20 to 175°F)</td>
</tr>
</tbody>
</table>

**CPVC Body**

<table>
<thead>
<tr>
<th>Measuring Electrode Type</th>
<th>Ball Valve or Submersible Installation</th>
<th>In-Line Installation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum Pressure at Operating Temperature</td>
<td>Maximum Pressure at Operating Temperature</td>
</tr>
<tr>
<td>Spherical Glass pH(a)</td>
<td>0.9 MPa (125 psi) at -5°C (20°F)</td>
<td>0.9 MPa (125 psi) at -5°C (20°F)</td>
</tr>
<tr>
<td>Flat Glass pH</td>
<td>0.6 MPa (90 psi) at 50°C (120°F)</td>
<td>0.6 MPa (90 psi) at 50°C (120°F)</td>
</tr>
<tr>
<td>Domed Dolphin Glass pH</td>
<td>0.3 MPa (50 psi) at 80°C (175°F)</td>
<td>0.3 MPa (50 psi) at 80°C (175°F)</td>
</tr>
<tr>
<td>Antimony pH</td>
<td>0.3 MPa (15 psi) at 100°C (212°F)</td>
<td>0.3 MPa (15 psi) at 100°C (212°F)</td>
</tr>
</tbody>
</table>

(a) Maximum Pressure at -5°C (20°F) for Spherical Glass pH electrode is 0.7 MPa (100 psi).

**Temperature Compensation:** Sensor includes encapsulated automatic temperature compensator which covers range -5°C to + 125°C (20 to 255°F).

**Analyzer/Transmitter Compatibility:**
- 873PH: 871PH-1, -2
- 876PH: 871PH-3, -4, -5, -6

**New Feature Highlights**
- Rebuildable Sensor Design
  - replaceable plug-in electrodes provide extended sensor life
  - low-cost electrode and reference junction kits help control replacement costs
  - one probe fits all applications
  - changeable mounting minimizes spare parts
- Versatile Mounting
  - twist lock
  - easy installation and removal
  - for submersion, insertion, and flowthrough applications
- Choice of Electrodes
  - pH: spherical, flat, or domed glass, antimony
  - ORP: gold, platinum
- Functional Specifications
  - **Pressure/Temperature Ratings:**
    - **Ryton Body**
      - Spherical Glass pH: 0.7 MPa (100 psi) at -5°C to + 80°C (20 to 175°F), 0.7 MPa (100 psi) at -5°C to + 100°C (20 to 212°F)
      - Flat Glass pH: 1 MPa (150 psi) at -5°C to + 80°C (20 to 175°F), 1 MPa (150 psi) at -5°C to + 85°C (20 to 185°F)
      - Domed Dolphin Glass pH: 0.7 MPa (100 psi) at 0°C to + 80°C (32 to 175°F), 0.7 MPa (100 psi) at 0°C to + 121°C (32 to 250°F)
      - Antimony pH: 1 MPa (150 psi) at -5°C to + 80°C (20 to 175°F), 1 MPa (150 psi) at -5°C to + 125°C (20 to 255°F)
      - ORP: 1 MPa (150 psi) at -5°C to + 80°C (20 to 175°F), 1 MPa (150 psi) at -5°C to + 125°C (20 to 255°F)
    - **CPVC Body**
      - Spherical Glass pH(a): 0.9 MPa (125 psi) at -5°C (20°F), 0.6 MPa (90 psi) at 50°C (120°F), 0.3 MPa (50 psi) at 80°C (175°F)
      - Flat Glass pH: 0.9 MPa (125 psi) at -5°C (20°F), 0.6 MPa (90 psi) at 50°C (120°F), 0.3 MPa (50 psi) at 80°C (175°F)
      - Domed Dolphin Glass pH: 0.3 MPa (15 psi) at 100°C (212°F)
      - Antimony pH: 0.3 MPa (15 psi) at 100°C (212°F)

**Reference Electrode:** Non flowing, with Ag/AgCl internals and potassium chloride (KCl) saturated with AgCl electrolyte. Process junction is ceramic and now available with patented double junction with Nafion ion barrier.
How to Order—Specify model number 871PH followed by order code for each selection.

Sensor Body Material and Diagnostic Configuration

<table>
<thead>
<tr>
<th>Sensor Material</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryton, Standard Configuration, Integral Preamp</td>
<td>-1</td>
</tr>
<tr>
<td>CPVC, Standard Configuration, Integral Preamp</td>
<td>-2</td>
</tr>
<tr>
<td>Ryton, Intelligent Configuration, Integral Preamp</td>
<td>-3</td>
</tr>
<tr>
<td>CPVC, Intelligent Configuration, Integral Preamp</td>
<td>-4</td>
</tr>
<tr>
<td>Ryton, Intelligent Configuration, No Preamp</td>
<td>-5</td>
</tr>
<tr>
<td>CPVC, Intelligent Configuration, No Preamp</td>
<td>-6</td>
</tr>
</tbody>
</table>

Measuring Electrode and Body Material

<table>
<thead>
<tr>
<th>Electrode Type</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spherical Glass pH, Ryton</td>
<td>A</td>
</tr>
<tr>
<td>Antimony pH, Ryton</td>
<td>B</td>
</tr>
<tr>
<td>Platinum ORP, Ryton</td>
<td>D</td>
</tr>
<tr>
<td>Gold ORP, Ryton</td>
<td>E</td>
</tr>
<tr>
<td>Flat Ruggedized Glass pH, Ryton</td>
<td>F</td>
</tr>
<tr>
<td>Dolphi™ High Temperature Glass pH, Ryton</td>
<td>G</td>
</tr>
<tr>
<td>Spherical Glass pH, ptfe</td>
<td>P</td>
</tr>
<tr>
<td>Antimony pH, ctef</td>
<td>Q</td>
</tr>
<tr>
<td>Platinum ORP, ctef</td>
<td>R</td>
</tr>
<tr>
<td>Gold ORP, ctef</td>
<td>S</td>
</tr>
<tr>
<td>Flat Ruggedized Glass pH, ctef3</td>
<td>T</td>
</tr>
<tr>
<td>Dolphi™ High Temperature Glass pH, ptfe</td>
<td>U</td>
</tr>
<tr>
<td>None</td>
<td>X</td>
</tr>
</tbody>
</table>

Sensor Wetted Metallic Parts Material

<table>
<thead>
<tr>
<th>Part Material</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium</td>
<td>1</td>
</tr>
<tr>
<td>Carpenter 20 Cb</td>
<td>2</td>
</tr>
<tr>
<td>AISI Type 316L stainless steel</td>
<td>3</td>
</tr>
<tr>
<td>Monel</td>
<td>5</td>
</tr>
<tr>
<td>Tantalum</td>
<td>6</td>
</tr>
</tbody>
</table>

Reference Junction and Body Material

<table>
<thead>
<tr>
<th>Junction Material</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceramic, Ryton</td>
<td>A</td>
</tr>
<tr>
<td>Ceramic, ptfe</td>
<td>B</td>
</tr>
<tr>
<td>Ceramic, Double Junction, Ion Barrier, pvdf</td>
<td>D</td>
</tr>
</tbody>
</table>

Optional Features

- Nonstandard Cable Length (not available with Option -Q)
  - Standard length 6 m (20 ft) integral cable, terminated in male connector. Specify length. (not available with Option -4, -B, -Q, -H)
  - Integral High Temperature Cable (With Sensor Body -5, -6; not avail. with Options -5, -7, -Q)
  - Integral Cable Terminated with Variopin Quick Connector (not avail. with Options -4, -5, -7)
  - Variopin Quick Connector Integral to Sensor (not avail. with Options -3, -4, -5, -7)
  - EPDM O-Rings (standard o-rings are Viton)
  - Chemraz O-Rings (standard o-rings are Viton)
  - No spade lug terminals attached to end of cable (not avail. with Options -5, -7, -B, -Q)
  - Teflon Collar, ptfe

Specify cable length, if nonstandard.
Specify information for instrument tag
Specify sensor mounting option
Specify replacement electrodes, if desired

Notes

1. Does not support the sensor diagnostic features of 876PH Transmitter and 875PH Analyzer.
2. Compatible with 876PH Transmitter and 875PH Analyzer only.
3. Optimum accuracy is in the range of 2 to 12 pH. It can be used with pH instruments that are ranged from 0 to 14 pH.
4. Standard cable length if not specified = 6 m (20 ft).
5. Maximum integral cable length = 33 m (100 ft) for 870PH pH/ORP transmitters.
6. Integral length integral cable, terminated in male connector. Specify length. (not available with Option -4, -B, -Q, -H)
7. Integral High Temperature Cable (With Sensor Body -5, -6; not avail. with Options -5, -7, -Q)
8. Integral Cable Terminated with Variopin Quick Connector (not avail. with Options -4, -5, -7)
9. Variopin Quick Connector Integral to Sensor (not avail. with Options -3, -4, -5, -7)
10. EPDM O-Rings (standard o-rings are Viton)
11. Chemraz O-Rings (standard o-rings are Viton)
12. No spade lug terminals attached to end of cable (not avail. with Options -5, -7, -B, -Q)
13. Teflon Collar, ptfe
DolpHin™ Series pH Sensors

The DolpHin™ Series pH sensor provides highly accurate and stable pH measurements in process applications. Sensors address process applications from routine to the most severe pressure, temperature, and chemical conditions. A comprehensive suite of mounting and wiring accessories make the DolpHin™ Series the easiest to install, calibrate, and service. The sensors are compatible with older analyzers and are fully compatible with the Intelligent Models 875PH and 876PH Transmitters. DolpHin™ Series delivers breakthrough performance in a rugged easy-to-use design.

**Performance (at Reference Conditions)**

- **Accuracy:** ± 0.02 pH Domed High Temp Glass Electrode
- **Repeatability:** ± 0.02 pH Domed High Temp Glass Electrode
- **Stability:** ± 0.02 pH/24 Hours Domed High Temp Glass Electrode

**Model Description**

Model PH10 DolpHin Series are a family of high performance pH sensors with extensive features and accessories. Breakthrough performance in stability, accuracy, and long life makes DolpHin the premier pH sensor for on-line process application.

Laboratory testing and extensive field trials have proven DolpHin’s superior performance. It outlasts other sensors in high temperature and temperature cycling applications up to 121°C (250°F). It remains fast and accurate, while conventional pH sensors lose sensitivity and are slow to respond to pH changes. Foxboro engineers have formulated a unique pH glass formulation which makes DolpHin exceptionally stable, accurate, and long lasting, even in the harshest process applications. Every component of the DolpHin sensor has been designed to maximize ease-of-use, long life, and accuracy, including: the precision reference junction, high temperature electrolyte, reference electrode with Nafion ion barrier, ultra fast automatic temperature compensation, and a single rugged body that fits the widest variety of mounting accessories. The elegance of the DolpHin design delivers a single, easy-to-use sensor with unmatched pH measurement performance.

**Standard Specifications**

**Measuring Electrode:**
- Domed High Temperature Glass pH with and without protective guard
- Flat Glass pH
- Antimony pH

**Reference Electrode:**
- Precision double junction with ceramic external process wetted junction and ion-barrier internal junction high temperature Gel Electrolyte. Ag/AgCl half cell.

**Measurement Range:**
- Domed High Temperature Glass pH electrode: 0 - 14 pH
- Flat Glass pH electrode: 2. & 12 pH
- Antimony pH electrode: 1 - 11 pH

**Preamplifier:**
- Available with Model Code Selection -P
- Integral, encapsulated, differential high impedance

**Automatic Temperature Compensation:**
- For use with Model 873PH and older Analyzers
- 2-wire platinum RTD, 100 ohm
- For use with 876PH and 875PH Analyzers
- 3-wire platinum RTD, 1000 ohm
- For use with non-Foxboro Analyzers that require 2-wire. 3K Balco RTD. 3000 ohm
- Enhanced response: Both 100 ohm and 1000 ohm Pt RTD selections are available in an enhanced speed of response configuration, response, for applications requiring fast temperature response.

**Wetted Parts:**
- Body: PVDF (Kynar)
- Measuring Electrode: Glass or Antimony as specified in Model Code
- Reference Junction: Ceramic
- O-Rings: Viton is standard, Chemraz or EPDM are optional selections
- Solution Ground: Conductive PVDF

**Sensor Mounting:**
- ¾ inch NPT on both ends of sensor for direct process connection or submersion.
- Split-ring grooves located in two places on the sensor allow for adapter mounting at two different insertion depths.
A comprehensive suite of mounting accessories is available for DolpHin™ Series pH sensors, see Product Specification Sheet and Auxiliary Specifications.

**Cable Length:**
- Model Code Selection -Q does not include cable
- Standard cable length is 10 feet for Model Code Selections -A and -B
- Longer cable lengths are available in increments of 10 feet up to 50 feet maximum length may be optionally selected. Junction box and extension cable are available for longer than 50 feet cable requirements.

**Sensor Termination:**
- Model Code Selection -A provides 10' integral cable with individual leads terminated with straight-pin, crimped-on lugs.
- Model Code Selection -B provides 10' integral cable terminated with a threaded “quick” connector. This selection requires an extension cable with mating connector.
- Model Code Selection -Q provides a threaded “quick” connector integral to the sensor. This selection requires an extension cable with mating connector.

### How to Order—Specify model number PH10 followed by order code for each selection

**pH Electrode Type:**
- Domed Glass High Temperature Bulb with Protective Guard.
- Domed Glass High Temperature Bulb without Protective Guard.
- Flat Ruggedized Glass
- Antimony

**Preamplifier:**
- None
- Internal Preamplifier

**Temperature Compensation:**
- 2-Wire, 100 Ω Platinum RTD
- 3-Wire, 1000 Ω Platinum RTD
- 2-Wire, 100 Ω Platinum RTD, Enhanced Response Speed
- 2-Wire, 3 kΩ Balco RTD
- 2-Wire, 100 Ω Platinum RTD, Enhanced Response Speed
- 3-Wire, 1000 Ω Platinum RTD
- 2-Wire, 100 Ω Platinum RTD
- 3-Wire, 1000 Ω Platinum RTD

**Sensor Termination:**
- 10 ft (3.05 m) Integral Cable Terminated w/Crimped-on Straight Pin Lugs
- 10 ft (3.05 m) Integral Cable Terminated w/ Variopin “Quick” Connector
- Variopin “Quick” Connector integral to Sensor

**Optional Selections:**
- Specify One
- EPDM O-Rings
- Chemraz O-Rings
- Integral Sensor Cable, 20 ft (6.1 m) long
- Integral Sensor Cable, 30 ft (9.1 m) long
- Integral Sensor Cable, 40 ft (12.2 m) long
- Integral Sensor Cable, 50 ft (15.2 m) long
- Integral High-Temp Sensor Cable, 10 ft (3.05 m) long
- Integral High-Temp Sensor Cable, 20 ft (6.1 m) long
- Integral High-Temp Sensor Cable, 30 ft (9.1 m) long
- Integral High-Temp Sensor Cable, 40 ft (12.2 m) long
- Integral High-Temp Sensor Cable, 50 ft (15.2 m) long

**Notes:**
1. High Temperature cable not available with Preamplifier Code “P”
2. Not valid with combination of Preamplifier Code “P” and Temperature Compensation Codes 2 or 4
3. Requires mating patch cord with integral Variopin connector, if not customer supplied
4. Standard O-Ring material is Viton
5. EPDM is Ethylene-Propylene Terpolymer, also known as EPR (Ethylene-Propylene Rubber)

**Analyzer/Transmitter Compatibility:**
- 875PH: all DolpHin™ pH Sensors
- 876PH: all DolpHin™ pH Sensors
- 873PH: all DolpHin™ pH Sensors, except Temp Comp Types -2, 4, and 5
- 873APH: all DolpHin™ pH Sensors, except Antimony electrodes and temp comp types -2, 4 and 5
- 873DUX: all DolpHin™ pH Sensors, except Temp Comp types -2, 4 and 5
- 870PH and other older transmitters: Contact Foxboro

**Temperature/Pressure Rating:**
- 121°C / 100 psi Domed High Temperature Electrode (Electrode Type 1, 2, 4)
- 85°C / 100 psi Flat Glass Electrode (Electrode Type 3)

**NOTE:** Preamplifier Selection "P" will derate temperature specification to 85°C when sensor is mounted in submersion or insertion type installation. For in-line installation, no derating applies.

Dolphin™ Series ORP Sensors

The Dolphin™ Series ORP sensor provides highly accurate and stable ORP measurements in process applications. Sensors address process applications from routine to the most severe temperature, and chemical conditions. A comprehensive suite of mounting and wiring accessories make the Dolphin™ Series the easiest to install, calibrate, and service. The sensors are compatible with older analyzers and are fully compatible with the Intelligent Models 875PH & 876PH Transmitters. Dolphin™ Series delivers breakthrough performance in a rugged easy-to-use design.

Performance (at Reference Conditions)
Repeatability: ± 3.0 mV

Model Description
Model ORP10 Dolphin Series are a family of high performance ORP sensors with extensive features and accessories. Breakthrough performance in stability, accuracy, and long life makes Dolphin the premier ORP sensor for on-line process application.

High purity precious metal, gold and platinum electrodes with large surface area, makes Dolphin exceptionally stable, accurate, and long lasting, even in the harshest process applications. Every component of the Dolphin sensor has been designed to maximize ease-of-use, long life, and accuracy, including: the precision reference electrode with Naflon ion barrier, ultra fast automatic temperature compensation, and a single rugged body that fits the widest variety of mounting accessories. The elegance of the Dolphin design delivers a single, easy-to-use sensor with unmatched ORP measurement performance.

Standard Specifications
Measuring Electrode:
Platinum ORP, 99.99% Purity
Gold ORP, 99.5 % Purity

Reference Electrode:
Precision double junction with ceramic external process wetted junction and ion-barrier internal junction high temperature Electrolyte Gel. Ag/AgCl half cell.

Measurement Range: ± 1500 mV

Preamplifier:
Available with Model Code Selection -P; (not required for ORP) Integral, encapsulated, differential high impedance

Integral Temperature Element:
For use with Model 873PH and older Analyzers
2-wire platinum RTD, 100 ohm
For use with 876PH and 875PH Analyzers
3-wire platinum RTD, 1000 ohm
For use with non-Foxboro Analyzers that require Balco 2-wire, 3K Balco RTD, 3000 ohm
Enhanced response: Both 100 ohm and 1000 ohm Pt RTD selections are available in an enhanced speed of response configuration, for applications requiring fast temperature response.

Wetted Parts:
Body: PVDF (Kynar)
Measuring Electrode: Platinum or Gold as specified in Model Code
Reference Junction: Ceramic
O-Rings: Viton is standard; Chemraz or EPDM are optional selections
Solution Ground: Conductive PVDF

Sensor Mounting:
¼ inch NPT on both ends of sensor for direct process connection or submersion.
Split-ring grooves located in two places on the sensor allow for adapter mounting at two different insertion depths. A comprehensive suite of mounting accessories is available for Dolphin™ Series ORP sensors, see Product Specification Sheet and Auxiliary Specifications.

Cable Length:
Model Code Selection -Q does not include cable
Standard cable length is 10 feet for Model Code Selections -A and -B
Longer cable lengths are available in increments of 10 feet up to 50 feet maximum length may be optionally selected. Junction box and extension cable are available for longer
How to Order—Specify model number 875 followed by order code for each selection

**ORP Electrode Type:**
- Platinum ............................................................................. -1
- Gold ........................................................................................ -2

**Preamplifier:**
- None ...................................................................................... N
- Internal Preamplifier1 ................................................................ P

**Integral Temperature Compensation:**
- 2-Wire, 100 Ω Platinum RTD ...................................................... 1
- 3-Wire, 1000 Ω Platinum RTD ................................................... 2
- 2-Wire, 100 Ω Platinum RTD, Enhanced Response Speed .......... 3
- 3-Wire, 1000 Ω Platinum RTD, Enhanced Response Speed ........ 4
- 2-Wire, 3 kΩ Balco RTD .......................................................... 5

**Sensor Termination:**
- 10 ft (3.05 m) Integral Cable Terminated w/Crimped-on Straight Pin Lugs ......................................................... A
- 10 ft (3.05 m) Integral Cable Terminated w/ Variopin “Quick” Connector2, 3 ............................................................... B
- Variopin “Quick” Connector integral to Sensor2, 3 ................... Q

**Optional Selections:**
Specify One
- EPDM O-Rings4 ...................................................................... -E
- Chemraz O-Rings4 .................................................................. -C

Specify One
- Integral Sensor Cable, 20 ft (6.1 m) long5 ................................ -2
- Integral Sensor Cable, 30 ft (9.1 m) long5 ............................... -3
- Integral Sensor Cable, 40 ft (12.2 m) long5 ............................ -4
- Integral Sensor Cable, 50 ft (15.2 m) long5 ........................... -5
- Integral High-Temp Sensor Cable, 10 ft (3.05 m) long1, 5 ............ -1H
- Integral High-Temp Sensor Cable, 20 ft (6.1 m) long1, 5 .......... -2H
- Integral High-Temp Sensor Cable, 30 ft (9.1 m) long1, 5 .......... -3H
- Integral High-Temp Sensor Cable, 40 ft (12.2 m) long1, 5 ...... -4H
- Integral High-Temp Sensor Cable, 50 ft (15.2 m) long1, 5 ....... -5H

**Notes**
1 High Temperature cable not available with Preamplifier Code “P”
2 Not valid with combination of Preamplifier Code “P” and Temperature Compensation Codes 2 or 4
3 Requires mating patch cord with integral Variopin connector, if not customer supplied
4 Standard O-Ring material is Viton
5 Cable Options applicable to Sensor Termination Codes “A” and “B” only

**Analyzer/Transmitter Compatibility:**
- 875PH: all DolpHin™ ORP Sensors
- 876PH: all DolpHin™ ORP Sensors
- 873PH: all DolpHin™ ORP Sensors, except Temp Element types -2, 4, and 5
- 873APH: Not Compatible
- 873DPX: all DolpHin™ ORP Sensors, except Temp Element types -2, 4 and 5

**Temperature/Pressure Rating:**
121°C / 100 psi

**NOTE:** Preamplifier Selection “P” will derate temperature specification to 85°C when sensor is mounted in submersion or insertion type installation. For in-line installations, no derating applies. Preamp is not usually required for ORP applications.

The Foxboro brand PH12 Series is a family of rugged, yet cost effective pH sensors in the widely used 12 mm form factor. These sensors provide unique design features, such as a built-in nonmetallic solution ground (allowing for sensor diagnostics), available PEEK body and available flat membrane sensing electrode. PH12 sensors provide fast response, long life, and high accuracy and stability. They are used with a popular set of Model FIT12 mounting accessories.

**Performance (at reference conditions):**
- Accuracy and stability: ±0.02 pH/24 hours
- EMF Efficiency: 98.5 ±1.5%

**Standard Specifications:**
- **Measuring Electrode:** Domed Glass or Flat Ruggedlzed
- **Reference Electrode:** Precision double junction with ceramic external process wetted junction and ion-barrier internal junction high temperature gel electrolyte. Ag/AgCl half cell.
- **Measurement Range:** Domed Glass pH Electrode: 0-14 pH
  - Flat Glass pH Electrode: 0-12 pH
- **Preamplifier:** All PH12 Sensors contain no integral preamplifier
- **Automatic Temperature Compensation:**
  - 3 Wire 100 Ω Platinum RTD
  - 3 Wire 1000 Ω Platinum RTD
- **Sensor Termination:** Variopin quick connector integral to sensor. Requires an extension cable with mating connector.
- **Analyzer/Transmitter Compatibility:** 875PH, 876PH, 873PH(a), 873APH(a), 873DPX(a), 870PH and other older transmitters(b)
- **Wetted Parts:** Sensor Body: PEEK or Glass, as specified
- **Measuring Electrode:** Domed Glass or Flat Glass
- **Reference Junction:** Ceramic
- **Outer Reference Solution:** Gelled KCI Electrolyte
- **Process O-Ring and Process Electrode Seal:** Vion standard; EPDM optional
- **Sensor Mounting:** Sensor contains integral PG 13.5 threads which permit it to be assembled to a variety of NPT adapters, flanges and sanitary fittings. Refer to FIT12 accessories.
- **Cable Length:** Extension cables with mating Varopin connectors are available from 10’ to 50’. A Junction box with amplifier and extension cable are available for longer than 50’ cable requirements.
- **Temperature Rating:** -25 to +125° C
- **Pressure Rating:** 0 to 150 psig

**Notes**
- a Use temperature compensation selection -1 (100 Ω RTD).
- b Contact Foxboro.
### How to Order—Specify model number PH12 followed by order code for each selection

#### Model
- **PH12 pH and ORP Sensor - 12 mm Diameter, PG 13.5 Process Connection**
- **pH Electrode Type**
  - pH, 0 to 14 pH, Wide Temperature Range Domed Glass, -25 to +125°C (-13 to +257°F)  
  - pH, 0 to 14 pH, High-Temperature Domed Glass, 0 to 140°C (32 to 284°F)  
  - pH, 0 to 12 pH, Flat Ruggedized Glass, -15 to +125°C (5 to 257°F)  
  - ORP, Platinum, -25 to +125°C (-13 to +257°F)  
  - pH/ORP Combination, 0 to 14 pH and ORP, Wide Temperature Range Domed Glass and Platinum, -25 to +125°C (-13 to +257°F)  
  - pH/ORP Combination, 0 to 14 pH and ORP, High-Temp Domed Glass and Platinum, 0 to 140°C (32 to 284°F)  
  - pH/ORP Combination, 0 to 12 pH and ORP, Flat Ruggedized Glass and Platinum, -15 to +125°C (5 to 257°F)  
- **Sensor Body Material and Length**
  - Glass Body, 120 mm (4.7 in)  
  - PEEK Body 120 mm (4.7 in)  
  - Additional lengths under PEEK Body, 120 mm (4.7 in)  
  - PEEK Body, 225 mm (8.9 in)  
  - PEEK Body, 360 mm (14.2 in)  
  - PEEK Body, 425 mm (16.7 in)  
- **Temperature Compensation**
  - 100 Ω Platinum RID, 3-wire(c)  
  - 1000 Ω Platinum RID, 3-wire(c)  
- **Sensor Termination**
  - Variopin Quick Connector integral to Sensor Body(a)  
- **Optional Selections**
  - EPDM Process O-Ring Seal and Process Electrode Seal(b)  
  - Autoclave Cap(d)  
  - Detailed Instruction Manual(e)  
  - 3-A Compliant(g)  
  - PSS Biocompatibility  
  - Per Fluoroelastomer O-Ring Seal & Process Electrode, Seal(b)  

**Examples:** PH12-3G12Q-E; PH12-2G21Q-MS

**Notes**
- a Mating Patch Cord with an integral Variopin Quick Connector on one end is required. Refer to the PSS for a selection of Patch Cords and extension cables offered.  
- b The standard process seals are Viton.  
- c Compatible with Analyzers and Transmitters that accept either 2-wire or 3-wire temperature elements.  
- d Autoclave cap protects the variopin connections during steam sterilization and autoclaving. The cap is shipped separate from the sensor.  
- e A CD-ROM and a “Quick-Start” pamphlet are shipped as standard with each sensor.  
- f High-Temperature domed glass electrode only available with Sensor Body Material Code P (PEEK).  
- g Electrode Type Codes -1, -2, -3, and -4, when used with option -S, use a stainless steel solution ground.
**pH Sensors for Pure Water Applications**

- EP462A pH sensor for pure water applications down to 1µS/cm
- EP462 Series incorporates features perfect for low conductivity applications

- **Features/Benefits**
  - Twist-lock style process connection allows quick and efficient installation and removal of pH sensor
  - Low-impedence bulb option for low-conductivity process streams, 1–10 µS/cm
  - Double junction reference with self-pressurizing electrolyte resists contamination
  - Kynar twist-lock body with integral bulb guard for tough applications

### Physical Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Special Feature</th>
<th>Mounting</th>
<th>Wetted Materials</th>
<th>pH range</th>
<th>Temperature Limit</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>EP462A</td>
<td>✓ Twist lock mount&lt;br&gt; ✓ Double junction reference&lt;br&gt; ✓ EP462A &amp; C for low conductivity&lt;br&gt; ✓ Integral solution ground</td>
<td>✓ ¾ or 1NPT connection via twist lock adapter</td>
<td>PVDF Body/low impedance glass/EPR &amp; Viton O-ring</td>
<td>0-12</td>
<td>100°C</td>
<td>120 psig</td>
</tr>
<tr>
<td>EP462B</td>
<td>✓ Twist lock mount&lt;br&gt; ✓ Double junction reference&lt;br&gt; ✓ EP462A &amp; C for low conductivity&lt;br&gt; ✓ Integral solution ground</td>
<td></td>
<td>PVDF Body, Domed glass, EPR &amp; Viton O-ring</td>
<td>0-14</td>
<td>100°C</td>
<td>120 psig</td>
</tr>
<tr>
<td>EP462C</td>
<td>✓ Twist lock mount&lt;br&gt; ✓ Double junction reference&lt;br&gt; ✓ EP462A &amp; C for low conductivity&lt;br&gt; ✓ Integral solution ground</td>
<td></td>
<td>PVDF Body/low impedance glass, KALREZ O-ring</td>
<td>0-12</td>
<td>100°C</td>
<td>120 psig</td>
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<tr>
<td>EP462D</td>
<td>✓ Twist lock mount&lt;br&gt; ✓ Double junction reference&lt;br&gt; ✓ EP462A &amp; C for low conductivity&lt;br&gt; ✓ Integral solution ground</td>
<td></td>
<td>PVDF Body, Domed glass, KALREZ O-ring</td>
<td>0-14</td>
<td>100°C</td>
<td>120 psig</td>
</tr>
</tbody>
</table>
Special Purpose pH Sensors

Compatible with:

- 876PH Transmitter (including all diagnostics)
- 873PH and DPX Analyzer
- 875PH Analyzer

All sensors have PVDF bodies 100 ohm 3-wire RTDs

How to Order

Specify Model Number EP462-

pH Sensors (for pure water applications to 1µS/cm)
Low conductivity applications, low impedance bulb, 0-12 pH range,
EPR/Viton O-rings

Specify Mounting Accessories

Twist-lock Mounting Adapter
- Kynar twist-lock adapter, ¾ inch NPT
- Kynar twist-lock adapter, 1 inch NPT
- 316SS twist-lock adapter, ¾ inch NPT (required for pure water)
- 316SS twist-lock adapter, 1inch NPT

Twist-lock Mounting Adapter Cap
- 316SS locking cap (non-wetted) for EP463 Series Adapter (recommended)

Flow Chamber (125mL/min maximum flow)
- 316SS, accepts EP463C adapter
  - ¼ NPT inlet/outlet (required for pure water)
  - Twist-lock flow chamber (see note and figure below)

Note

Note
EP463C and 0051180 are still available.
Special Purpose pH Sensors

EP460 Series features easy installations for tough applications
EP466 Series permits an adjustable insertion depth

### Physical Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Special Feature</th>
<th>Mounting</th>
<th>Wetted Materials</th>
<th>pH range</th>
<th>Temperature Limit</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>EP460-</td>
<td>✔ Universal mount</td>
<td>✔ Universal mount</td>
<td>PVDF Body, pH glass, EPR &amp; Viton O-ring, KALREZ O-ring available</td>
<td>0-14</td>
<td>100°C</td>
<td>125 psig</td>
</tr>
<tr>
<td>Series</td>
<td>✔ Triple reference junction</td>
<td>✔ 1 NPT integral thread</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>✔ Integral solution ground</td>
<td>✔ 1½ NPT process connection with adapter</td>
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<tr>
<td></td>
<td>✔ Refer to computer model</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>0-13 Flat Glass</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>EP466A</td>
<td>✔ Insertion/Retractable when used with EP465A ball valve assembly</td>
<td></td>
<td>PVDF Body, Domed glass, EPR &amp; Viton O-ring</td>
<td>0-14</td>
<td>100°C</td>
<td>100 psig</td>
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<tr>
<td>EP465B</td>
<td></td>
<td></td>
<td>PVDF Body, Flat glass, EPR &amp; Viton O-ring</td>
<td>0-13</td>
<td>100°C</td>
<td>100 psig</td>
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<tr>
<td>EP465C</td>
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<td>PVDF Body, Domed glass, KALREZ O-ring</td>
<td>0-14</td>
<td>100°C</td>
<td>100 psig</td>
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<tr>
<td>EP465D</td>
<td></td>
<td></td>
<td>PVDF Body, flat glass, KALREZ O-ring</td>
<td>0-13</td>
<td>100°C</td>
<td>100 psig</td>
</tr>
</tbody>
</table>
Special Purpose pH Sensors

Compatible with:
✓ 876PH Transmitter (including all diagnostics)
✓ 873PH and DPX Analyzer
✓ 875PH Analyzer

All sensors have PVDF bodies 100 ohm 3-wire RTDs

How to Order

Specify Model Number EP460-

Measuring Electrode and O-Rings:
- Full range, domed bulb, 0-14 pH range, EPR and Viton O-rings .......................................................... A
- Ruggedized flat glass, 0-13 pH range, EPR and Viton O-rings ................................................................. B
- Full range, domed glass, 0-14 pH range, Kalrez O-rings ........................................................................ C
- Ruggedized flat glass, 0-13 pH range, Kalrez O-rings ........................................................................... D
- Platinum ORP electrode, EPR and Viton o-rings .................................................................................. F
- Platinum ORP electrode, Kalrez o-rings ................................................................................................. G

Signal Conditioning:
- No preamplifier ................................................................................................................................. N
- Integral Preamplifier ........................................................................................................................... P

Optional Features:
- Optional 30 foot integral cable .......................................................................................................... 3
- Optional 40 foot integral cable .......................................................................................................... 4
- Optional 50 foot integral cable .......................................................................................................... 5
- No integral mounting flange and o-rings (required for use in ball valve assembly) ................................. A

Optional Mounting Adapter
- Kynar body, with 1½ NPT process connection and 316SS (non-wetted) locking cap (not compatible with sensor option -A) .................................................. EP461A
- Same as EP461A with all 316SS (not compatible with sensor option -A) ............................................... EP461B

Specify Model Number EP466-

pH Sensors (Insertion Type):
- Full range, domed bulb, 0-14 pH range, EPR/Viton O-rings, 2ft cable .................................................. A
- Ruggedized flat glass, 0-13 pH range, EPR/Viton O-rings, 2ft cable ......................................................... B
- Full range, domed glass, 0-14 pH range, Kalrez O-rings, 2ft cable ....................................................... C
- Ruggedized flat glass, 0-13 pH range, Kalrez O-rings, 2ft cable ............................................................ D

Specify Mounting Accessories

Ball Valve Insertion Assembly
- Ball Valve Insertion Assembly for use with EP466 Series sensors includes junction box, and provides adjustable insertion depth up to 7½ in ................................................................. EP465A
The 871 EC Series Electrodeless Conductivity Sensors, when coupled with 875 Series, Intelligent Analyzer, or 876EC Series Intelligent Transmitters, or 873EC Series Analyzers, measure conductivity of process solutions.

### Specifications

#### PEEK Sensors, Standard Temperature Versions. Up To 120°C (250°F):

<table>
<thead>
<tr>
<th>Sensor Body Code</th>
<th>Applications</th>
<th>Full Scale Limits</th>
<th>Wetted Parts</th>
<th>Temperature Limits</th>
<th>Pressure Limits</th>
<th>Temperature Compensator (integral)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>This small bore sensor is suitable for the majority of all electrodeless conductivity applications. Its compact size enables it to be mounted in a multitude of methods, including insertion (flange, bushing), retractable, and in situ.</td>
<td>1.0 mS/cm (1000 µS/cm) minimum, 2000 mS/cm maximum</td>
<td>Glass-filled PEEK (polyetherketone), EPDM or Viton or Kalrez O-rings or Chemraz O-rings, as specified</td>
<td>-5 and +120°C (20 and 250°F)</td>
<td>-0.1 and +1.75 MPa (-15 and +250 psi)</td>
<td>100K thermistor for use with 875EC, or 873EC Series Analyzer, 870EC Series, or 876EC Series Transmitter</td>
</tr>
<tr>
<td>RE</td>
<td>This large bore sensor is recommended as a substitute for 871EC-EV Series sensors, both for new and existing installations. Its large bore makes it particularly suitable for measurements with very high levels of fouling materials. (see also “AB” sensors)</td>
<td>1.0 mS/cm (1000 µS/cm) minimum, 1000 mS/cm maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LB</td>
<td>This large bore sensor is used for low conductivity measurements where a sensitive range is required. It is often used in place of a conventional contacting conductivity measurement system to reduce maintenance, since fouling from oil, water treatment chemicals, particulates, etc., renders a contacting sensor inoperative.</td>
<td>0.05 mS/cm (50 µS/cm) minimum, 50 mS/cm maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### PEEK Sensors, High Temperature Versions, Up To 200°C (392°F):

<table>
<thead>
<tr>
<th>Sensor Body Code</th>
<th>Applications</th>
<th>Full Scale Limits</th>
<th>Wetted Parts</th>
<th>Temperature Limits</th>
<th>Pressure Limits</th>
<th>Temperature Compensator (integral)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP</td>
<td>This small bore sensor is identical in size and appearance to the SP sensor above, and may be applied to any of the SP applications which have intermittent or continuously high temperatures.</td>
<td>1.0 mS/cm (1000 µS/cm) minimum, 2000 mS/cm maximum</td>
<td>Glass-filled PEEK (polyetherketone), EPDM or Viton or Kalrez O-rings or Chemraz O-rings, as specified</td>
<td>-5 and +200°C (20 and 392°F)</td>
<td>-0.1 and +1.75 MPa (-15 and +250 psi)</td>
<td>100 ohm platinum RTD for use with 875EC, 873EC Series Analyzer, 870EC Series, or 876EC Series Transmitter</td>
</tr>
<tr>
<td>BW</td>
<td>This highly specialized, large bore sensor is intended for use in applications with a combination of both high temperatures and very high levels of fouling materials.</td>
<td>1.0 mS/cm (1000 µS/cm) minimum, 1000 mS/cm maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UT</td>
<td>This large bore sensor is identical in physical size and appearance to the LB sensor above.</td>
<td>0.05 mS/cm (50 µS/cm) minimum, 50 mS/cm maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- For complete specifications, refer to product specification sheet PSS 6-3C4A.
Non-Peek Sensor:

<table>
<thead>
<tr>
<th>Sensor Body Code</th>
<th>Applications</th>
<th>Full Scale Limits</th>
<th>Wetted Parts</th>
<th>Temperature Limits</th>
<th>Pressure Limits</th>
<th>Temperature Compensator (integral)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NL</td>
<td>This general purpose, small bore sensor may be used for most routine applications involving low (less than 5%) concentrations of inorganic acids (hydrochloric, nitric, sulfuric, etc.), bases (caustic, calcium hydroxide, etc.), and salts (sodium chloride, calcium chloride, sodium sulfate, etc.). Not recommended where organic solvents are present. Not recommended in caustic applications above 50°C (122°F). When doubtful about the effect of high levels of chemicals, temperatures, or abrasion on the NL sensor, specify a type SP PEEK sensor as a preferred alternative.</td>
<td>1.0 mS/cm (1000 µS/cm) minimum to 2000 mS/cm maximum</td>
<td>Glass-filled Noryl EPDM O-rings</td>
<td>-5 and +65°C (20 and 150°F)</td>
<td>-0.1 and +1.4 MPa (-15 and +200 psi)</td>
<td>100K Thermistor for use with 875EC Intelligent Analyzer, or 870EC Series Transmitter or 873 EC Series Analyzer or, 876EC Series Transmitter.</td>
</tr>
<tr>
<td>TF</td>
<td>Used in oleum and concentrated (greater than 93%) sulfuric acid applications. A sanitary mounting is available as a 2.0 inch Triclamp.</td>
<td>0.2 mS/cm (200 µS/cm) minimum to 2000 mS/cm maximum</td>
<td>Fluorocarbon head; 316 ss; or Carpenter 20Cb8 Hsq., as specified; EPDM or Viton® O-rings or Kalrez or Chemraz O-ring as specified</td>
<td>-5 and +105°C (20 and 225°F)</td>
<td>-0.1 and +0.7 MPa (-15 and +100 psi)</td>
<td>100 K Thermistor</td>
</tr>
<tr>
<td>EV</td>
<td>This large bore sensor has been superseded by PEEK sensor type RE. However, it should still be specified in beet sugar carbonation applications and in pulp and paper applications where a larger bore may prove advantageous.</td>
<td>1.0 mS/cm (1000 µS/cm) minimum to 2000 mS/cm maximum</td>
<td>Epoxy head; 316 ss extension; EPDM O-rings</td>
<td>0 and +105°C (32 and 220°F)</td>
<td>200psi @ 80°C linearly derated to 150 psi @ 121°C</td>
<td>100 Ω RTD</td>
</tr>
<tr>
<td>PP</td>
<td>This small bore sensor may be used for most routine applications and for some applications where e.g. PEEK would be unsuitable.</td>
<td></td>
<td>Virgin Polypropylene, EPDM, Viton, or Kalrez or Chemraz O-ring</td>
<td>0 and +105°C (32 and 220°F)</td>
<td>200psi @ 80°C linearly derated to 150 psi @ 121°C</td>
<td>100K Thermistor for use with 875EC Int. Analyzer, 876EC Int. Transmitter, 873 EC Series Analyzer or 876EC Series Transmitter.</td>
</tr>
<tr>
<td>PT</td>
<td>Large bore sensor with LinaTer rubber coating. Typical use: mining applications where highly abrasive slurries are encountered.</td>
<td></td>
<td>Linatex rubber coated epoxy sensor with 316 ss extension EPDM O-ring</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Cable:** Integral 6 m (20 ft) multiscreened (multishielded) cable. Irradiated polyolefin jacket for SP, PP, PT, RE, LB, NL, TF, EV and AB; ptfe jacket for HP, BW, and UT.

**Mounting:** In-line via threaded bushing, flange, or ball valve assembly. Bushing or flange seals against sensor O-ring. In-situ via user-supplied DN 20 or ¾ in pipe. Sensors have ¾ inch connection for mating to user-supplied pipe. ¾ in coupling. Refer to Product Specification Sheet PSS 6-3C4 A

**Notes**
1. In process fluids at electrical potentials above 30 V rms or 60 V dc, refer to Foxboro for applicable sensor
2. The low end conductivity full scale is for sensors used with 875EC Series Intelligent Analyzer or 873EC Series Analyzers and 876EC Series Transmitters
3. Maximum span for -RE or -BW sensor when used with 873EC is 1000 mS/cm
4. If -HP, -BW, or -UT sensor is to be used with 870EC Series Transmitter, no temperature compensation can be applied, so Temperature Compensation code A must be specified. on 870EC (Analog)
5. This minimum span is for sensors used with 875EC Series Intelligent Analyzer or 873EC Series Analyzers and 876EC Series Transmitters. For minimum spans for sensors used with 870EC Series Transmitters, refer to PSS 6-3C3 A
6. Maximum span for -EV sensor when used with 873EC is 1000 mS/cm
7. AISI Type 316 stainless steel
8. For sulfuric acid (99.5 to 93%) and oleum ranges, use optional Carpenter 20 Cb Housing
9. For sulfuric acid (99.5 to 93%), oleum ranges, and petroleum applications use optional Viton® O-rings
10. Foxboro three toroid patent
11. Demountable tri clamp - SP, HP, PP, PT only - other sizes/materials available (see accessories)
12. Demountable tri clamp - LB, RE - contact Foxboro
**How to Order**—Specify model number 871EC followed by order code for each selection

### Sensor Body
- Standard Temperature PEEK
- Standard Temperature PEEK
- Standard Temperature PEEK
- High Temperature PEEK
- High Temperature PEEK
- High Temperature PEEK
- NON-PEEK: Noryl
- NON-PEEK: Fluorocarbon
- NON-PEEK: Epoxy
- NON-PEEK: Virgin Polypropylene
- NON-PEEK: Virgin Polypropylene
- NON-PEEK: LinaTex Rubber Coated

<table>
<thead>
<tr>
<th>Sensor Body Type</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Temperature PEEK</td>
<td>SP</td>
</tr>
<tr>
<td>Standard Temperature PEEK</td>
<td>RE</td>
</tr>
<tr>
<td>Standard Temperature PEEK</td>
<td>LB</td>
</tr>
<tr>
<td>High Temperature PEEK</td>
<td>HP</td>
</tr>
<tr>
<td>High Temperature PEEK</td>
<td>BW</td>
</tr>
<tr>
<td>High Temperature PEEK</td>
<td>UT</td>
</tr>
<tr>
<td>NON-PEEK: Noryl</td>
<td>NL</td>
</tr>
<tr>
<td>NON-PEEK: Fluorocarbon</td>
<td>TF</td>
</tr>
<tr>
<td>NON-PEEK: Epoxy</td>
<td>EV</td>
</tr>
<tr>
<td>NON-PEEK: Virgin Polypropylene</td>
<td>PP</td>
</tr>
<tr>
<td>NON-PEEK: Virgin Polypropylene</td>
<td>PT</td>
</tr>
<tr>
<td>NON-PEEK: LinaTex Rubber Coated</td>
<td>AB</td>
</tr>
</tbody>
</table>

### Metallic Wetted Parts
- None. For all sensors except TF, EV and AB
- Carpenter 20 Cb (TF only)
- 316 ss (TF, EV and AB only)
- 316 ss, Sanitary Flange, 2 in integral Tri-Clamp fitting (TF only)
- 316 ss, 2 inch Tri-Clamp fitting, demountable

<table>
<thead>
<tr>
<th>Metallic Wetted Parts</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>None. For all sensors except TF, EV and AB</td>
<td>0</td>
</tr>
<tr>
<td>Carpenter 20 Cb (TF only)</td>
<td>2</td>
</tr>
<tr>
<td>316 ss (TF, EV and AB only)</td>
<td>3</td>
</tr>
<tr>
<td>316 ss, Sanitary Flange, 2 in integral Tri-Clamp fitting (TF only)</td>
<td>7</td>
</tr>
<tr>
<td>316 ss, 2 inch Tri-Clamp fitting, demountable</td>
<td>7</td>
</tr>
</tbody>
</table>

### Optional Features
- Nonstandard cable length. Recommended limits 1 and 30 m (3 and 100 ft)
- Viton O-Ring. For all sensors except NL and EV
- Kalrez O-Ring. For all sensors except NL, EV
- Chemraz O-Ring. For all sensors except NL, EV

<table>
<thead>
<tr>
<th>Optional Features</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonstandard cable length. Recommended limits 1 and 30 m (3 and 100 ft)</td>
<td>3</td>
</tr>
<tr>
<td>Viton O-Ring. For all sensors except NL and EV</td>
<td>V</td>
</tr>
<tr>
<td>Kalrez O-Ring. For all sensors except NL, EV</td>
<td>K</td>
</tr>
<tr>
<td>Chemraz O-Ring. For all sensors except NL, EV</td>
<td>C</td>
</tr>
</tbody>
</table>

### Specify Cable Length, if non-standard
- Specify information for instrument tag
- Specify mounting option

This product and its components are protected by one or more of the following U.S. Patents 3,806,798 and 5,157,332. Corresponding patents have been issued or are pending in other countries.

### Related Products
- EP 485 Calibration Plugs
- EP 307 Virgin PFA or Virgin PVDF Sensors
871FT Series Non-invasive Sanitary and Industrial Flow-through Conductivity Sensor

The 871FT Toroidal Flow-through Sensors are a family of in-line, non-invasive Sanitary or Industrial sensors that measure the conductivity of virtually any conductive liquid. The 871FT Sensors are available in several common line sizes from 0.5 to 4.0 inches, and offer a selection of materials of construction to accommodate a wide range of sanitary and industrial applications.

- 871FT—Sanitary (3A) approved (74-02) (FDA Compliant)
  - Selection of Bore Sizes from 0.5 in, 0.75 in, 1.0 in, 1.5 in, 2.0 in, 3.0 in, or 4.0 in
  - Sanitary 100 ohm or 1000 ohm RTD sensor(s) optional

- 871FT—Industrial
  - Selection of Bore Sizes from 0.5 in, 1.0 in, 1.5 in, 2.0 in, 3.0 in, or 4.0 in
  - Industrial 100 ohm or 1000 ohm RTD (½ in NPT) sensors optional

### Specifications

#### SANITARY

**871FT—Sanitary Full Scale Range Settings**

871FT-1 Sanitary High Range, 871FT-2 Sanitary Low Range:

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>µs/</th>
<th>50</th>
<th>100</th>
<th>200</th>
<th>500</th>
<th>1000</th>
<th>50</th>
<th>100</th>
<th>200</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>871FT-1 E, C, D</td>
<td>yes</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>==</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>871FT-1 F</td>
<td>yes</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>= =</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>871FT-1 G, 2H</td>
<td>yes</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>= =</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>871FT-1 J</td>
<td>yes</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>= =</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>871FT-1 H</td>
<td>yes</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>= =</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

871FT Flow-through—Standard Specifications:

<table>
<thead>
<tr>
<th>Wetted Bore pc.</th>
<th>O-rings</th>
<th>Pressure (psi)</th>
<th>Temperature °F</th>
<th>°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virgin <em>PEEK</em>¹</td>
<td>N/A</td>
<td>225</td>
<td>14 to 250°F</td>
<td>-10 to 121°C (140°C)³⁰¹</td>
</tr>
<tr>
<td>PCTFE²</td>
<td>N/A</td>
<td>60*</td>
<td>14 to 140°F</td>
<td>-10 to 60°C</td>
</tr>
</tbody>
</table>

*Linearity derated to 10 psi at 250°F (121°C)

**End to End Dimensions³:**

<table>
<thead>
<tr>
<th>Line Size Mounting (inches)</th>
<th>Bore Size (inches)</th>
<th>Sanitary face to face (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>0.375</td>
<td>3.0</td>
</tr>
<tr>
<td>0.75</td>
<td>0.625</td>
<td>3.0</td>
</tr>
<tr>
<td>1.0</td>
<td>0.87</td>
<td>3.6</td>
</tr>
<tr>
<td>1.5</td>
<td>1.37</td>
<td>3.6</td>
</tr>
<tr>
<td>2.0</td>
<td>1.87</td>
<td>3.6</td>
</tr>
<tr>
<td>3.0</td>
<td>2.87</td>
<td>5.0</td>
</tr>
<tr>
<td>4.0</td>
<td>3.83</td>
<td>5.0</td>
</tr>
</tbody>
</table>

**Notes**

1. PEEK—PolyetheretherKetone (virgin) (FDA compliant) (3A Approved)
2. PCTFE—PolyChloroTriFluoroethylene (3A Approved)
3. Gasket dimension not included, user supplied

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
871FT—Industrial—Full Scale Range Settings

871FT-3 Industrial High Range, 871FT-4 Industrial Low Range:

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>µs/cm 50</th>
<th>ms/cm 50</th>
<th>µs/cm 100</th>
<th>ms/cm 100</th>
<th>µs/cm 200</th>
<th>ms/cm 200</th>
<th>µs/cm 500</th>
<th>ms/cm 500</th>
<th>µs/cm 1000</th>
<th>ms/cm 1000</th>
<th>µs/cm 2000</th>
<th>ms/cm 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>4E</td>
<td>yes</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4F, 4G</td>
<td>yes</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>yes</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3E, 3F, 3G</td>
<td>yes</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4H, 4J</td>
<td>yes</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

End to End Dimensions:

<table>
<thead>
<tr>
<th>Line Size Mounting(inches)</th>
<th>Bore Size (inches)</th>
<th>Industrial face to face 3 (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>0.62</td>
<td>4.93</td>
</tr>
<tr>
<td>1.0</td>
<td>1.049</td>
<td>4.93</td>
</tr>
<tr>
<td>1.5</td>
<td>1.61</td>
<td>4.93</td>
</tr>
<tr>
<td>2.0</td>
<td>2.067</td>
<td>5.18</td>
</tr>
<tr>
<td>3.0</td>
<td>3.068</td>
<td>5.89</td>
</tr>
<tr>
<td>4.0</td>
<td>4.026</td>
<td>6.86</td>
</tr>
</tbody>
</table>

Advantages:

- Advantages to Sanitary Non-Invasive Conductivity
- Advantages to Industrial Non-Invasive Conductivity

- <16 Micro-inch Interior Bore Finish
- Crevice Free Design
- Simplifies Clean In Place (CIP)
- No Obstruction of Process Flow
- Eliminates Need to Open Line to the Environment to Extract Sensor(s)
- In-Line Calibration
- Not Flow Rate Sensitive
- Significantly Reduces Coatings or Fouling
- Reduces Installation Cost
- Eliminates "Sidewall Effect" Issue
- Eliminates Exposure of Personnel to Hazardous Chemicals
- Broader Selection of Sensor Material
- Not Flow Direction Sensitive

Notes:

4 Optionally either Viton or Chemraz
5 316 ss, Carp 20 CB3, or Hast C 276
6 PEEK—PolyetheretherKetone (glass filled)
7 PVDF—PolyVinylideneDiFluoroethylene
8 PCTFE—PolyChloroTrifluoroethylene
9 Gasket dimension not included, user supplied
How to Order—Specify model number 871FT followed by order code for each selection

Flow-through Conductivity Sensor: Use with 875EC Intelligent Analyzer, or 876EC Series Intelligent Transmitter, or 873EC or 873AEC Series Analyzers

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanitary, High Range Conductivity</td>
<td>-1</td>
</tr>
<tr>
<td>Sanitary, Low Range Conductivity</td>
<td>-2</td>
</tr>
<tr>
<td>Industrial, High Range Conductivity</td>
<td>-3</td>
</tr>
<tr>
<td>Industrial, Low Range Conductivity</td>
<td>-4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nominal Line Size</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>English (USA)</td>
<td></td>
</tr>
<tr>
<td>½ in</td>
<td>C</td>
</tr>
<tr>
<td>¾ in Sanitary only</td>
<td>D</td>
</tr>
<tr>
<td>1.0 in</td>
<td>E</td>
</tr>
<tr>
<td>1.5 in</td>
<td>F</td>
</tr>
<tr>
<td>2.0 in</td>
<td>G</td>
</tr>
<tr>
<td>3.0 in</td>
<td>H</td>
</tr>
<tr>
<td>4.0 in</td>
<td>J</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>End Connection Material</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>None (One-piece Insulator—Sanitary)</td>
<td>-1</td>
</tr>
<tr>
<td>Hastelloy C-276</td>
<td>-2</td>
</tr>
<tr>
<td>316 ss</td>
<td>-3</td>
</tr>
<tr>
<td>Carp 20—CB3</td>
<td>-4</td>
</tr>
<tr>
<td>90 Cu/10 Ni (per UNS C70600)</td>
<td>-9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Insulator Material</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virgin ‘PEEK’ (Sanitary)</td>
<td>A</td>
</tr>
<tr>
<td>PVDF</td>
<td>B</td>
</tr>
<tr>
<td>PCTFE</td>
<td>C</td>
</tr>
<tr>
<td>Glass-filled ‘PEEK’</td>
<td>D</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>End Connection Form</th>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>Tri-Clamp</td>
<td>-1</td>
</tr>
<tr>
<td>Pipe, NTP</td>
<td>-2</td>
</tr>
<tr>
<td>Flange, ANSI Class 150</td>
<td>-3</td>
</tr>
<tr>
<td>Flange, ANSI Class 300</td>
<td>-4</td>
</tr>
<tr>
<td>Flange, Flat Face</td>
<td>-7</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>RTD</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>C</td>
</tr>
<tr>
<td>1000 ohm RTD (for use with 870ITEC and 875EC)</td>
<td>R</td>
</tr>
<tr>
<td>100 ohm RTD</td>
<td>T</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable Options</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable length per Sales Order (100 ft maximum recommended length)</td>
<td>-3</td>
</tr>
<tr>
<td>Cable with Lugless Termination (e.g. use with 873 Analyzers)</td>
<td>-4</td>
</tr>
<tr>
<td>Shielded Teflon Cable</td>
<td>-9</td>
</tr>
<tr>
<td>Low Smoke Cable</td>
<td>-N</td>
</tr>
<tr>
<td>Quick Disconnect, Patch cord cable connection</td>
<td>-Q</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>O-Ring Options</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perfluoroelastomer (Chemraz)</td>
<td>-P</td>
</tr>
<tr>
<td>Viton</td>
<td>-V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Calibration Cable</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibration Cable</td>
<td>-C</td>
</tr>
</tbody>
</table>
Notes
11 Sanitary—½ inch line uses ¼ inch Tri-clover mounting flange and clamp. 1.0 inch and 1.5 inch line sizes use 1.5 inch Tri-clover mounting flange and clamp.
12 1.0 inch, 1.5 inch and 2.0 inch Industrial may use Flange/NPT pipe adapter (available from Foxboro).
13 Sanitary only (3A approved material and design).
14 Industrial only.
15 3.0 inch and 4.0 inch not available in NPT mounting.
16 Industrial sleeves are Alloy 20, ASTM A-351, Grade CN-7M.
17 FDA compliant.
18 Consider for High Concentration Sulfuric acid or Oleum applications. Choose Carpenter 20 end connection material and Viton O-Ring.
19 Either Sanitary or Industrial (3A Approved for Sanitary).
20 Note that ANSI Temp./psi rating of 275 psi at 140°F (60°C) is linearly de-rated to 190 psi @ 411°F (210°C).
21 Standard O-ring material is EPDM.
22 In-line calibration. (Note: Range specific precision resistance calibration plugs recommended. EP485 Series)
23 Temp./psi rating for 300 lb. ANSI Flange 400 psi to 411°F
24 Sanitary only.
25 Provides RFI/EMI protection when used with 875EC Intelligent Analyzer, or 870TEC Intelligent Transmitter
26 EP485A – Calibration plug, recommended
27 Requires Patch Cord, order separately
28 Contact Foxboro for status
29 For cable lengths > 100 feet, contact Foxboro

Related Products

EP 485 Calibration Plugs
FT10 Series Non-invasive, Non-metallic Flow-through Electrodeless Conductivity Sensor

The FT10 all PFA, multi-toroid1 non-metallic electrodeless conductivity sensors are a family of in-line, non-invasive sensors that provide an accurate measurement of virtually any conductive liquid. The FT10 sensors are offered in industry common line sizes - ½", ¾" and 1.0" and offer Flaretek or Nippon Super Pillar 300 end connections. The FT10 is ideal for, but not limited to, the semiconductor and specialty chemical industries.

- FT10 all PFA2 - non-metallic flowthrough
- All welded seams3 - no o-ring or gaskets
- Ideal for e.g. high purity aggressive acids, etc.
- Unique calibration feature - Foxboro patent
- Unique multi-toroid design feature - Foxboro patent
- Unique integrated RTD feature - Foxboro patent

**Specifications**

**FT10 Full-Scale Range Settings**

<table>
<thead>
<tr>
<th>FT10-MT</th>
<th>08 (½ inch)</th>
<th>2000 microsiemen/cm to 2000 millisiemen/cm (ms/cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12 (¾ inch)</td>
<td>500 microsiemen/cm to 2000 millisiemen/cm (ms/cm)</td>
</tr>
<tr>
<td></td>
<td>16 (1 inch)</td>
<td>500 microsiemen/cm to 2000 millisiemen/cm (ms/cm)</td>
</tr>
</tbody>
</table>

1 millisiemen/cm = 1000 microsiemen/cm (ms/cm)

**FT10 Wetted material**

PFA - Perfluoroalkoxy Fluorocarbon

**FT10 PFA Tubing Sizes**

<table>
<thead>
<tr>
<th>FT10</th>
<th>½ inch</th>
<th>process pressure limits: 0 to 100 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>¾ inch</td>
<td>process temperature limits:</td>
</tr>
<tr>
<td></td>
<td>1.0 inch</td>
<td>21 to 284 F (-5 to +140C) *6</td>
</tr>
</tbody>
</table>

*6 line size specific, linearly derated

**FT10 End Connection Types**

<table>
<thead>
<tr>
<th>Flaretek</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nippon Super Pillar 300</td>
</tr>
<tr>
<td>Bare End Connection (Accessory)</td>
</tr>
</tbody>
</table>

**Notes**

1. Foxboro patented design
2. PFA - perfluoroalkoxy fluorocarbon
3. Helium leak checked
4. Vendor material certificate provided
5. Vendor pressure certificate
6. Pressure ratings line size specific and linearly derated
**How to Order**—Specify model number FT10 followed by order code for each selection

**FT10 - Noninvasive, nonmetallic, Electrodeless Flow-through conductivity sensor**

for use with 875EC series Intelligent analyzer and 876EC Intelligent Transmitter

---

### Advantages

<table>
<thead>
<tr>
<th>Non-Invasive Flow-through Design</th>
<th>Isolates measurement and calibration eliminating exposure of personnel to high purity and/or aggressive chemicals.</th>
</tr>
</thead>
<tbody>
<tr>
<td>All PFA Wetted Material</td>
<td>Ideal for high purity applications e.g. encountered in semiconductor and specialty chemical applications.</td>
</tr>
<tr>
<td>All Welded Seams</td>
<td>No reliance on O-ring or gasket seals or threads, helium leak checked for validation.</td>
</tr>
<tr>
<td>Multi-Turoid Design</td>
<td>Foxboro patent design provides conductivity measurements from double digit to 2,000,000 microsiemen/cm</td>
</tr>
<tr>
<td>Unique Calibration Feature</td>
<td>Foxboro patent design provides a high precision in-line calibration with a shirt pocket tool.</td>
</tr>
<tr>
<td>Unique RTD Placement Design</td>
<td>Foxboro patent provides an accurate temperature measurement in a design integral to the sensor.</td>
</tr>
<tr>
<td>Low Liquid Volume Flow-through Design</td>
<td>Minimal volume of process liquid required for accurate measurement.</td>
</tr>
</tbody>
</table>

### How to Order—Specify model number FT10 followed by order code for each selection

**FT10 - Noninvasive, nonmetallic, Electrodeless Flow-through conductivity sensor**

for use with 875EC series Intelligent analyzer and 876EC Intelligent Transmitter

---

#### Description

FT10 = Noninvasive, nonmetallic Flow-through sensors

**Electrodeless Conductivity**

All Teflon Multi-toroid Flow Through Sensor

**Line Sizes**

- ½ inch ........................................................................ 8
- ¾ inch ........................................................................ 12
- 1 inch ......................................................................... 16

**End Connection Form**(a)

- Flare Tube Fitting ....................................................... F
- Nippon Tube Fitting ..................................................... N

**Termination**

- Integral Sensor Cable(c) .............................................. 1
- Integral High Temp Sensor Cable(d) ......................... 2
- Integral Connector(d) ................................................... 6

**RTD**

- 3 - Wire 100Ohm¹ ......................................................... T
- 3 - Wire 1000 Ohm¹ ..................................................... R

**Options**

- Wall Mounting Kit(b) .................................................. 1
- Pipe Mounting Kit(b) .................................................. 2
- Cable Length per S/O(g) .............................................. 3
- Specific sensor Geometric Cell Factor(g) .................. 4

#### Notes

(a) This selection provides the corresponding connection size for the line size selected. For example, selecting Line Size Code 8 (½ inch sizes) and End Connection Form N (Nippon Super Pillar 300) results in a ½ inch Nippon Super Pillar 300 Connector.

(b) A bare Teflon PFA tube can be provided for use with the Flare Tube or Nippon Fittings as an accessory. Contact Foxboro.

(c) Standard length integral cable is 10 foot (3m). Specify option -3 for non-standard cable lengths.

(d) Matching patch cord required with integral connector selection. See accessories.

(e) Selecting this option provides the standard mounting kit.

(f) Cable lengths up to 100 foot (30m) may be selected when termination selection 1 or 2 is selected. Not applicable Termination selection 6 (integral connector).

(g) The specific Sensor Geometric Cell factor is determined experimentally at Foxboro. Contact Foxboro.

(h) Selecting this option provides the standard mounting kit with two-inch pipe mounting hardware.
The following chapter contains reduced Product Specifications of the instruments:

**SRD960**  
Intelligent Positioner with HART, PROFIBUS or FOUNDATION Fieldbus  
– EEx d Explosion Proof

**SRD991**  
Intelligent Positioner with HART, PROFIBUS or FOUNDATION Fieldbus  
– EEx ia Intrinsically Safe

**DTM**  
SRD991 and SRD960 DTM (Valve Monitor) for configuration and diagnostics. Valve Health Report generator

**PST**  
Partial Stroke Testing for SRD991 and SRD960  
LCP960 Local Control Panel for PST monitoring

**SRI990**  
Analog Positioner

**SRI986**  
Electro-Pneumatic Positioner

**SRI983**  
Electro-Pneumatic Positioner  
– Explosion Proof or EEx d version

**SRP981**  
Pneumatic Positioner

**SMI983**  
Electrical Position Transmitter

**SMP981**  
Pneumatic Position Transmitter

**SGE985**  
Inductive Limit Switch

**FRS**  
Filters regulators

**IP24**  
IP Transducer for field service  
Accessories for Positioners

For detailed technical specifications, visit our homepage www.foxboro-eckardt.com or ask your local distributor for the requested Product Specifications PSS.
The intelligent positioner SRD960 is designed to control pneumatic valve actuators and is available in the version EEx d (flame-proof)/explosion-proof. It can be operated from any control systems (e.g. the Foxboro I/A Series System).

All the diagnostics features can be easily configured and displayed by the Positioner DTM (Valve Monitor). Moreover, the Positioner DTM enables to editing of a complete “health” report of the valve with all configuration data and diagnostics.

The positioner is available with HART, Profibus PA or Foundation Fieldbus H1 communication protocols.

The SRD960 also has the capability to control a Partial Stroke Test (PST) that offers operators a tool to identify the trouble-proof function of ESD (Emergency Shut Down) valves.

For complete specifications, refer to Product Specification Sheet PSS EVE0109 A-(en).
Positioners

Mounting types

NAMUR mounting – left hand

NAMUR mounting – right hand

Direct mounting

Mounting to rotary actuators
**Positioners**

**FOUNDATION Fieldbus H1**
- Data transfer: FF Specification Rev. 1.4, Link-Master (LAS)
- Function blocks: PID, AO, 2x DI, DO, IS, OS, AI, MAI

**Response characteristic**
- Sensitivity: <0.1% of travel span
- Non-linearity (terminal based adjustment): <0.4% of travel span
- Hysteresis: <0.3% of travel span
- Supply air dependence: <0.1%/1 bar (15 psi)
- Temperature effect: <0.3%/10 K
- Mechanical vibration: 10 to 60 Hz up to 0.14 mm, 60 to 500 Hz up to 2 g, <0.25% of travel span

**Pneumatic connection**
- NAMUR mounting: 3x female threads 1/4-18 NPT or G1/4 for pipe diameter 6 to 12 mm (0.24 to 0.47 in)
- Direct mounting: Instead of the output y1 an air connection on the backside with O-ring is used (closed at NAMUR mounting).

**How to Order — Specify model number SRD960**

| Version                        |  
|-------------------------------|---|
| Single Acting.                | -B|
| Double Acting.                | -C|
| Position Transmitter (w/o pneumatic components). | -T|
| Local Control Panel b(LCP960) for PST monitoring. | -L|

**Input/Communication**
- HART (4-20 mA) (g)(p)
- Profibus PA based on IEC 1158-2 (MBP) according to FISCO (Fieldbus) (g)(p)
- FOUNDATION Fieldbus H1 based on IEC 1158-2 (MBP) according to FISCO (Fieldbus) (g)(p)
- (not applicable)(f)

**Additional Inputs/Outputs**
- Without Additional Inputs/Outputs(n)(p)
- Binary Input – integrated(g)(p)
- Binary Output – integrated(g)(p)
- Binary Inputs/Outputs (mandatory for ESD application) (g)(p)
- Analog Position Feedback (4-20 mA) (g)(p)
- Potentiometer Input (for remote mounting – main unit) (g)(p)
- Limit Switches (standard version SJ2-N) (g)(p)
- Limit Switches (security version SJ2-SN) (g)(p)
- Limit Switch (three-wire version) (g)(p)
- Mechanical Switches (Micro-Switches) (g)(p)

**Display/Indication**
- LEDs (cover without window and without external pushbuttons) (g)(p)
- Grafcical LCD (cover with window and with external pushbuttons) (g)(p)
- LEDs (cover with window and with external pushbuttons) (g)(p)

**Gauges**
- Without Gauges (g)(p)
- Built-In Gauges with scale in bar/psi (g)(p)

**Electrical connection**
- Line entry: 1 or 2 cable glands M20 x 1.5 or ½-14 NPT (others with Adapter AD-...)
- Cable diameter: 6 to 12 mm (0.24 to 0.47 in)
- Screw terminals: 2 terminals for input, 4 terminals for additional inputs/outputs
- Wire cross section: 0.3 to 2.5 mm² (AWG 22-14)
- Test Sockets: for connection of communicator

**Supply**
- Supply air pressure: 1.4 to 6 bar (29 to 90 psig) with spool valve, 1.4 to 7 bar (20 to 105 psig)
- Supply Air quality: according to ISO 8573-1
  - Max. particle size and -density: Class 2
  - Max. oil contents: Class 3

---

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
### Positioners

#### SRD960

<table>
<thead>
<tr>
<th>Pneumatical Connection</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1⁄4-18 NPT (w/o cable glands or plugs for certified SRD960).</td>
<td>N</td>
</tr>
<tr>
<td>G</td>
<td>G</td>
</tr>
<tr>
<td>not applicable</td>
<td>X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical Connection</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1⁄4-14 NPT (w/o cable glands or plugs for certified SRD960).</td>
<td>6</td>
</tr>
<tr>
<td>M20 x 1.5 (w/o cable glands or plugs for certified SRD960).</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical Certification/Explosion Protection</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Flameproof II G EEx d IIB/IEC T4/T5/T6 according to ATEX (w/o cable glands or plugs).</td>
<td>EDZ</td>
</tr>
<tr>
<td>Explosion-proof according to FM (w/o cable glands or plugs).</td>
<td>FDZ</td>
</tr>
<tr>
<td>GOST Approved for Explosion-proof (w/o cable glands or plugs).</td>
<td>GDZ</td>
</tr>
<tr>
<td>Without Ex (with cable glands and plugs).</td>
<td>ZZZ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mounting Preparation on Positioner</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NAMUR acc. to IEC 534-6/direct mounting to Flowserve actuators FlowPak and FlowTop/Rotary Actuators according to VDI/VDE 3845.</td>
<td>N</td>
</tr>
<tr>
<td>Rotary actuators according to VDI/VDE 3845.</td>
<td>R</td>
</tr>
<tr>
<td>Integrated attachment with air channels on back/rotary actuators according to VDI/VDE 3845.</td>
<td>T</td>
</tr>
<tr>
<td>Direct mounting acc. to NAMUR VDI/VDE 3847/rotary actuators according to VDI/VDE 3845.</td>
<td>D</td>
</tr>
<tr>
<td>NAMUR acc. to IEC 534-6/rotary actuators according to VDI/VDE 3845.</td>
<td>F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Language</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LCD Language in English/German/French</td>
<td>A</td>
</tr>
<tr>
<td>LCD Language in English/German/Spanish</td>
<td>B</td>
</tr>
<tr>
<td>LCD Language in English/German/Portuguese</td>
<td>C</td>
</tr>
<tr>
<td>LCD Language in English/German/Polish</td>
<td>D</td>
</tr>
<tr>
<td>LCD Language in English/German/Czeck</td>
<td>E</td>
</tr>
<tr>
<td>LCD Language in English/German/Italian</td>
<td>F</td>
</tr>
<tr>
<td>LCD Language in English/German/Turkish</td>
<td>G</td>
</tr>
<tr>
<td>LCD Language in English/German/ Swedish</td>
<td>H</td>
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<tr>
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<td>LCD Language in English/German/Hungarian</td>
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<tr>
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<td>LCD Language in English/German/Dutch</td>
<td>O</td>
</tr>
<tr>
<td>LCD Language in English/German/Romanian</td>
<td>P</td>
</tr>
<tr>
<td>Without</td>
<td>S</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Options</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diaphragm amplifier for double acting positioner</td>
<td>M</td>
</tr>
<tr>
<td>Premium diagnostics features (made with built-in pressure sensors) (HART);</td>
<td>B</td>
</tr>
<tr>
<td>Built-in pressure sensors (FF, Profibus)</td>
<td>I</td>
</tr>
<tr>
<td>Infrared Interface for communication by means of IRCOM</td>
<td>X</td>
</tr>
<tr>
<td>Cover for protection of local push buttons</td>
<td>K</td>
</tr>
<tr>
<td>Approved for SIL2/SIL3 application</td>
<td>Q</td>
</tr>
<tr>
<td>Custom Configuration</td>
<td>T</td>
</tr>
<tr>
<td>ATEX application down to -40°C</td>
<td>F</td>
</tr>
<tr>
<td>Certificate EN 10204-2.1 – certificate of compliance with order</td>
<td>W</td>
</tr>
<tr>
<td>Cage Clamp Connection (WAGO) instead of screw terminals</td>
<td>Y</td>
</tr>
<tr>
<td>Feedback-unit for remote mounting – version of position transmitter only with a potentiometer</td>
<td>H</td>
</tr>
<tr>
<td>Version for ESD valve with PST functionality</td>
<td>E</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tag No. Labeling</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stamped With Weather Resistant Color</td>
<td>G</td>
</tr>
<tr>
<td>Stainless Steel Label Fixed With Wire</td>
<td>L</td>
</tr>
</tbody>
</table>

---

### Notes

- a: Not released
- b: Only with (additional inputs/ inputs E) and (optional feature -B)
- c: Not available with Input/Communication D
- d: Only with Display/Indication D
- e: Not with Version B, Version C
- f: Not available with Version -T
- g: Not available with Display/Indication D
- h: Only available for (additional inputs/ inputs E) and (optional feature -B)
- i: Only with Version single-acting -B in connection with Input/Communication D and H
- j: Only with Version -L
- k: Only with Version B, C
- l: Only with Version -T and Input/Communication D
- m: Not available with Version -T and Input/Communication D
- n: Only with Display/Indication D
- o: Not with Version -L
- p: Only with Display/Indication D

---

Accessories for Positioners – see EVE9902
Accessories for Instruments – see EOO9001

---

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
SRD991 Intelligent Positioner with HART, PROFIBUS PA or FOUNDATION Fieldbus H1 for EEx ia Intrinsically Safe Applications

The intelligent positioner SRD991 is designed to control pneumatic valve actuators and is available in the version EEx ia (Intrinsic Safety) and can be operated from any control systems (e.g., the Foxboro I/A Series system).

All the diagnostics features can be easily configured and displayed by the Positioner DTM (Valve Monitor). Moreover, the Positioner DTM enables editing a complete “health” report of the valve with all configuration and diagnostics data.

The positioner is available with different communication protocols. This includes versions with analog setpoint (4 to 20 mA) and superimposed HART signal; digital with Profibus communication according to PROFIBUS-PA or FOUNDATION fieldbus H1 according to IEC 1158-2 based on FISCO.

The SRD991 also has the capability to control a Partial Stroke Test (PST) that offers operators a tool to identify the trouble-proof function of ESD (Emergency Shut Down) valves.

For complete specifications, refer to Product Specification Sheet PSS EVE0105 A-(en) or PSS EVE0105 E-(en).

Version “Intelligent”
- Autostart with self-calibration
- Self diagnostic, status and diagnostic messages

Version “Intelligent with Communication”
- Communication HART, FOUNDATION Fieldbus H1 or PROFIBUS-PA
- Configuration by means of local keys, Hand Held Terminal, PC or I/A Series system

Version “Intelligent without Communication”
- Input signal 4-20 mA

For all Versions
- Stroke range 8 to 260 mm (0.3 to 10.2 in)
- Angle range up to 95°
- Supply air pressure up to 6 bar (90 psig), with “Spool Valve” up to 7 bar (105 psig)
- Single or double acting
- Mounting on linear actuators according to NAMUR:
  - IEC 534 Part 6
  - VDI/VDE 3847
- Direct mounting on actuators FlowPak and FlowTop
- Mounting on rotary actuators acc. to VDI/VDE 3845
- Protection class IP 66, NEMA 4X
- Explosion protection:
  - II 2 G EEx i / II 2 G EEx n (intrinsic safety) according to ATEX
  - Intrinsic safety according to FM and CSA
- Ambient temperature -40 to 80°C (-40 to 176°F)
- Display and Local User Interface:
  - Multilingual Full-Text Graphic LCD
  - Status- and Diagnostic-Messages displayed on LCD
  - Easy configuration by means of 3 pushbuttons

- Autostart with self-calibration
- Diagnostics capabilities
- Self-diagnostic, status and diagnostic messages
- Advanced diagnostics for valve predictive maintenance
- Premium diagnostics for valve footprint, online friction, ...
- DTM (Valve Monitor) (see page 7-10)
- Suitable for safety applications up to SIL 3
- Partial Stroke Test (PST) for Emergency Shut Down applications
- Infrared Interface for wireless communication
- Stainless Steel housing for Offshore or Food and Beverage applications
- Additional Inputs/outputs (optional):
  - 2 binary outputs (limits)
  - Position feedback 4 to 20 mA, 1 Alarm output
  - 2 binary inputs
  - Built-in independent inductive limit switches (2- 3-wire) or micro switches
  - Sensors for supply air pressure and output pressure
  - Binary Inputs/Outputs dedicated to SIS logic solvers
- Accessories
  - Booster relay to minimize stroke time
  - Gauge Manifold
Positioners

**Input**

**With HART communication**
- Two-wire system
- Reverse polarity protection ... built-in standard feature
- Signal range ............... 4 to 20 mA
- Operating range ........... 3.6 to 21 mA
- Voltage ................... DC 12 to 36 V (unloaded circuit)
- Max. load ................ 420 Ohms (8.4 V at 20 mA)
- Communication signal .... HART, 1200 Baud, FSK modulated on 4 to 20 mA

**With Fieldbus communication (acc. to FISCO)**
- Input signal ................ digital fieldbus
- Supply voltage ............. DC 9 to 32 V
- Operating current ........ 10.5 mA ±0.5 mA (base current)
- Current amplitude ........ ±8 mA
- Fault current ............. base current +0 mA (+4 mA by means of independent FDE-safety circuit)

**PROFIBUS-PA**
- Data transfer ............ acc. to PROFIBUS-PA profile class B based on EN 50170 and DIN 19245 part 4

**FOUNDATION Fieldbus H1**
- Data transfer ............ FF Specification Rev. 1.4, Link-Master (LAS)
- Function blocks .......... PID, AO, 2xDI, DO, IS, OS, AI, MAI

**Without communication 4 to 20 mA**
- Two-wire system
- Reverse polarity protection ... built-in standard feature
- Signal range ............... 4 to 20 mA
- Operating range ........... 3.8 to 21.5 mA
- Voltage ................... DC 8 to 36 V (unloaded circuit)
- Max. load ................ 300 Ohms (6 V at 20 mA)

**Common data for all versions**

**Supply**
- Supply air pressure ........ 1.4 to 6 bar (29 to 90 psig)
- with spool valve .......... 1.4 to 7 bar (20 to 105 psig)
- Supply air quality ........ according to ISO 8573-1
  - Max. particle size and density .... Class 2
  - Max. oil contents ........ Class 3

**Response characteristics**
- Min. Sensitivity ........... <0.1% of travel span
- Non-linearity
  - terminal based adjustment <0.4% of travel span
  - Hysteresis ..................<0.3% of travel span
- Supply air dependence ..... <0.1%/1 bar (15 psi)
- Temperature effect ......<0.3%/10 K
- Mechanical effect
  - 10 to 60 Hz up to 0.14 mm,
  - 60 to 500 Hz up to 2 g ....<0.25 of travel span

**Pneumatic connection**
- NAMUR mounting .......... 3x female threads ½-18 NPT or G½ for pipe diameter 6 to 12 mm (0.24 to 0.47 in)
- Direct mounting .......... Instead of output y1 an air connection on the backside with O-ring is used (closed at NAMUR mounting).

**Electrical connection**
- Line entry ................ 1 or 2 cable glands M20 x 1.5 or ½-14 NPT (with Adapter) (for additional Adapter see AD-...)
- Cable diameter ............ 6 to 12 mm (0.24 to 0.47 in)
- Screw terminals .......... 2 terminals for input, 4 terminals for additional inputs/outputs
- Wire cross section .......... 0.3 to 2.5 mm² (AWG 22-14)
- Test Sockets ............. for connection of communicator

**Technical Data for Stainless Steel Housing**
- Material Stainless Steel .... 1.4404/316, 1.25 mm
- Protection Class ........... IP 66 acc. to EN 60529
- Impact Resistance .......... 7 Joule acc. to EN 50014
- Seals ....................... VMQ (Silicone)
- Weight (Complete Positioner) ........ 3.5 kg
- Pneumatic Connection ...... 1/4-18 NPT on manifold, prepared for gauges (option)
- Electrical Connection ...... M20 x 1.5 (others with Adapter AD...)
### Positioners

#### How to Order – Specify model number SRD991

**Version**
- Single Acting
- Double Acting

**Input/Communication**
- Intelligent without communication (4 - 20 mA)
- HART Communication (4 - 20 mA)
- PROFIBUS-PA (acc. to FISCO)
- FOUNDATION Fieldbus H1 (including PID-Function Block, acc. to FISCO)

**Additional Inputs/Outputs**
- Prepared For Additional In-/Outputs
- Two Binary Outputs
- Position Feedback 4 - 20 mA and one binary output for alarm
- Binary Inputs
- Binary Inputs-Outputs (mandatory for ESD application)

**Built-In Limit Switch**
- Without Built-In Limit Switch
- Inductive Limit Switch – Intrinsically Safe (Standard Version SJ2-N)
- Inductive Limit Switch – Intrinsically Safe (Security Version SJ2-SN)
- Inductive Limit Switch – Three wire version
- Mechanical Switches (Micro-Switches)/UL- and CSA-approved
- Potentiometer Input – CEM Filter (for remote mounting – main unit)

**Cable Entry**
- M20 x 1.5 Without cable gland
- 1/2"-14 NPT (with adapter(s) M20 x 1.5 to 1/2"-14 NPT)
- M20 x 1.5 With one plastic cable gland

**Electrical Classification**
- Without Ex: for Input/Communication D, H
- EEx ia IIC T4 according to ATEX
- II 2 G Ex ia IIC T6 according to ATEX
- II 2 G Ex ia IIC T4 according to ATEX + Zone 20 Dust
- FM Nonincendive For Class I, Division 2, Groups A, B, C, D,
- Hazardous Locations Indoors and Outdoors, NEMA 4X
- for Input/Communication D, H
- FM Approved For Intrinsic Safety Class I, Division 1, Groups A, B, C, D,
- CSA Approved for Intrinsic Safety Class I, Division 1, Groups A, B, C, D,
- GOST Approved for Intrinsic Safety Exia II CT4
- GOST Approved for Intrinsic Safety Exia II CT6
Attachment Kit
Order as Auxiliary

Manifold
Pneumatic connection ½-18 NPT made of an additional manifold
Pneumatic connection G ½

Options
Premium diagnostics made with built-in Pressure Sensors
Position free of copper and its alloys
Infrared interface for communication by means of IRCOM
Pneumatic amplifier in the "Spool Valve" version
Approved for SIL2/IL3 application
Custom configuration
Version of positioner according to VDI/VDE 3847
Version for ESD Valve with PST functionalities
Stainless Steel Housing
Stainless Steel Housing without SST gauges
Top Mounting Version
LCD with Menu-Language in English/German/French
LCD with Menu-Language in English/German/Spanish
LCD with Menu-Language in English/German/Portuguese
LCD with Menu-Language in English/German/Polish
LCD with Menu-Language in English/German/Czech
LCD with Menu-Language in English/German/Italian
LCD with Menu-Language in English/German/Turkish
LCD with Menu-Language in English/German/Swedish
LCD with Menu-Language in English/German/Finnish
LCD with Menu-Language in English/German/Chinese
LCD with Menu-Language in English/German/Russian
LCD with Menu-Language in English/German/Hungarian
LCD with Menu-Language in English/German/Serbian
LCD with Menu-Language in English/German/Dutch
LCD with Menu-Language in English/German/Romanian

Tag No. Labeling
Stamped with weather resistant color
Stainless steel label fixed with wire

Notes
a Only with (Version: B) and (additional Inputs/Outputs: E) and (Optional Feature: -B)
b Not released
c Only with Input/Communication D, H
d Only with Input/Communication H, P and Q
f Available with (Version: C) and (Built-in Limit Switch: S) and (Electrical Classification: ZZZ, EA4, EAA, GA4, GAA) and (Manifold: Y)
and (Optional Features: S) or with (Version: B) and (Built-in Limit Switch: S) and (Electrical Classification: ZZZ, EA4, EAA, GA4, GAA) and (Manifold: Y)
h Available with (Version: B) or with (Version: C) and (Optional Features: S)
k Only with Electrical Classification EA4, EAA, ZZZ
n Only with Version -C
s Only available with Optional Feature LCD (-V01 to -Vxx)
t Not with additional Input/Outputs D
v Only available for (Input/Communication F, H, P, Q) and (Electrical Classification ZZZ, FAA, NFM, EAA, CAA, GAA)
w Only available for (Version single-acting -B) and (Input/Communication D, H)
x Only in connection with Optional Features -B
y Not with Optional Features -B
z Not available with Electrical Classification FAA, NFM, CAA

Accessories for Positioners — see EVE9902
Accessories for Instruments — see EOO9001
Positioners

SRD991 and SRD960 DTM (Valve Monitor) for configuration and diagnostics. Valve Health Report generator

Intelligent Valve Diagnostics for Predictive Maintenance

The valve diagnostic software VALcare™ is available as Device Type Manager (DTM) for integration into control systems based on the Field Device Tool (FDT) technology such as the Foxboro I/A Series system. It is designed to support methods for evaluation of the valve health, operation and configuration. The DTMs support the communication protocols HART, Profibus PA and FOUNDATION Fieldbus H1.

- Data stored inside positioner memory, up to 5 years
- Determination of Stem Friction to prevent leakage and stuck stem
- On Line Friction Histograms
- Partial Stroke Test function for ESD applications
- Diagnosis for failed PST or stuck valve
- Predictive Maintenance capabilities
- Intelligent Alarm Management
- Self surveillance in accordance with NE107
- Service Management
- Histograms for Valve Position and Response History

All in one glance!
Ease of use and easy to understand are the principal characteristic of the new VALcare DTM interlace. With one glance, users can identify if the equipment is running well (in green), needs maintenance (in blue), or indicates a failure (in red). The color code complies with NAMUR NE107 standard.

Simple Configuration
The easiest way to configure a valve positioner. All configuration screens have been optimized with intuitive input and graphical elements that make it easy for anyone to configure a valve positioner while minimizing configuration errors.
Positioners

Valve Footprints
Valve Footprint is an off-line function that defines a reference behavior of the valve/actuator/positioner entity. Several types of signatures are available to define precisely the overall characteristic of the final control element:

• Valve Footprint
• Ramping Signature
• Stepping Signature
• Sensitivity Signature
• On-Line Friction Signature

On Line Friction
An innovative On-Line Friction signature and a Friction calculation are also available to check the valve without disturbing the running process.

With an easy, friendly interface, it is possible to highlight unusual friction.

Valve Health Report Generator
With only one click, you can generate a comprehensive and functional valve/positioner report. The 8-page report covers all information regarding the identification, configuration, status, diagnostic state of the positioner-valve combination and of course the valve signature, ramping/stepping/sensitivity signature. For ease of portability and archiving, this report can be printed or stored in PDF format for future reference.

How to order
Advanced Diagnostics is available in every intelligent positioner.

Premium Diagnostics must be selected in the Model code of the device (option -B).

The DTM (Valve Monitor) to configure and read the diagnostics is available free of charge to download from our website.

Eventually the DTM can be ordered (CD-rom) too.
Partial Stroke Testing with SRD991 and SRD960
LCP960 Local Control Panel for PST monitoring

Final control elements in ESD applications such as ON/OFF-, Blow Down- and Venting-Valves remain in one position over a longer time without any mechanical movement. These valves can show the tendency to get stuck and in result might not operate upon demand. This can have a severe impact to the functionality of a Safety System and in result to the operating personnel, plant equipment and the environment. The Partial Stroke Test (PST) offers operators a tool to identify the trouble proof function of such ESD valves. The test can be easily executed via the FDT-DTM based configuration and diagnostic tool ValCare™ and Valve Monitor.

For complete specifications, refer to technical document Ti EVE0105 PST.

PST made with intelligent positioners SRD991 for Intrinsically Safe application or SRD960 for Explosion Proof application with specific functionality of PST.

- Supply 24VDC or 4-20mA
- Communication protocols HART, PROFIBUS PA, FOUNDATION Fieldbus H1
- Additional binary inputs and outputs for request from SIS logic solver and feedback status
- FDT-DTM software for configuration and advanced diagnostics (see page 7-10)

Benefits
- Partial Stroke Test (PST) function
- Manual or automatic activation of test
- Freely definable stroke ranges
- On-Line Testing and Diagnosis
- PST Signature by mean of SRD’s DTM
- Status- and diagnostic messages displayed on multilingual graphical LCD
- Maintenance alarm in the event of a stuck valve
- Break Pressure trend and Re-inflate time trend for predictive maintenance
- Positioner suitable for use in SIL applications
- Diagnosis date stored in positioner memory
- Positioners can be mounted onto all actuators
- Safety up to SIL 3
- SOV Monitoring with pressure dip detection
- FST (Full Stroke Test) monitoring with trigger capabilities

Activation of Test
- Manually (locally on push button with LCD display or remote)
- Automatic
- Through separate binary input for SIS logic solver
- By means of the LCP960

Testing Status
- Not Done
- Running
- Restricted
- OK

Status to be visualized on the LCP960.

Configuration
- Test Interval (Hours)
- Setpoint Change (%) – Limited at maximum 30%
- Setpoint Change (%) can be fixed or random
Positioners

High Safety of the PST
- Maximum Wait Time (Seconds)
- Minimum Pressure (bar) – Minimum pressure between 0 to 6 bars
- Soft PST (Seconds) – Ramp freely configurable up to 100s
- SIL (Safety Integrity Level) – SRD991 and SRD 960 are suitable for use in a safety related application up to SIL 3 according to IEC 61511-1. Certificate released by Exida
- Configuration Fail Open or Fail Close

Environment Integration
- Full integration into I/A Series system (FBM214 for HART communication) and Avantis CM
- Full integration into any other DCS that supports FDT-DTM standard
- Full integration with Triconex SIS logic solver (Tricon and Trident)
- Full integration with any other SIS logic solver
- Full integration with a HART multiplexer and DCS or stand-alone PC network
- SR991 and SRD960 can be mounted easily onto any ESD (Emergency Shut Down) or ESV (Emergency Shut Vent) valves. Both offer a wide range of mounting kits.

LCP960 Local Control Panel for PST activation and monitoring
- One push button for PST launch
- Backlighted LCD for a better reading in any weather condition
- LCP960 with Explosion Proof certification.
- Can be mounted directly on the near on the Safety valve in the Explosion Proof area.
- Timer to visualized when was done last PST

How to order LCP960
Order under SRD960-LXEDSXXXXXX
Positioners

SRI990 Analog Positioner

The Analog Positioner SRI990 with analog input 4 to 20 mA is designed to control pneumatic valve actuators. The modular structure of the SRI990 and SRD991 product lines enables conversion from an analog to an “intelligent” positioner with HART or Fieldbus. It offers an easy adjustment by means of switches and potentiometers.

For complete specification, refer to Product Specification Sheet PSS EVE0107A-(en).

- Ambient temperature -40 to 80°C (-40 to 176°F)
- Additional inputs/outputs (optional):
  - Position feedback 4 to 20 mA
  - Built-in independent inductive limit switches (2-/3-wire) or micro switches
- Accessories
  - Booster relay to minimize stroke time
  - Fail Freeze/Fail in place relay
  - Gauge Manifold
- Configuration by means of switches and potentiometers
- Load 300 Ohms
- Low air consumption
- Stroke 8 to 260 mm (0.3 to 10.2 in)
- Angle range up to 95 degree
- Supply air pressure up to 6 bar (20 - 90 psig), with “Spool Valve” up to 7 bar (105 psig)
- Single acting or double acting
- Mechanical travel indicator
- Reverse polarity protection and interlock diode
- Switch for Pneumatic Test
- Mounting on linear actuators according to NAMUR:
  - IEC 534 Part 6
  - VDI/VDE 3847
- Direct mounting on actuators FlowPak and FlowTop
- Mounting on rotary actuators acc. to VDI/VDE 3845
- Protection class IP 66 with ATEX and NEMA 4X with FM and CSA
- Explosion protection:
  - II 2 G Ex i/II 2 G Ex n (intrinsic safety) according to ATEX
  - Intrinsic safety according to FM and CSA
- Stainless Steel housing for Offshore or Food and Beverage applications
### How to Order — Specify model number SRI990

**Version**
- Single Acting...
- Double Acting...
- Position Transmitter (without pneumatic components)...

**Input**
- Signal Range 4 - 20 mA
- Not applicable (without Input Signal or Pneumatics)

**Additional Inputs/Outputs**
- Without Additional Inputs/Outputs
- Position Feedback 4 - 20 mA

**Built-In Limit Switch**
- Without Built-In Limit Switch
- Inductive Limit Switch – Intrinsic Safe (Standard Version SJ2-N)
- Inductive Limit Switch – Intrinsic Safe (Security Version SJ2-SN)
- Inductive Limit Switch (Three Wire Version)
- Mechanical Switches (Micro Switches) / UL- and CSA-approved
- Potentiometer Input (for Remote Mounting – main unit)

**Cable Entry**
- ½”-14 NPT (with Adapter(s) M20x1.5 to ½”-14 NPT)
- M20 x 1.5 With One Plastic Cable Gland.

**Electrical Classification**
- Without Ex.
- II 2 G Ex ia IIC T6 according to ATEX
- II 3 G Ex ia IIC T6 according to ATEX + Zone 20 Dust
- FM Approved Nonincendive For Class I, Division 2, Groups A, B, C, D, E, F & G
- Hazardous Locations Indoors And Outdoors, NEMA 4X
- FM Approved For Intrinsic Safety Class I, Division 1, Groups A, B, C, D, E, F & G
- Hazardous Locations Indoors And Outdoors, NEMA 4X
- CSA Approved For Intrinsic Safety Class I, Division 1, Groups A, B, C, D,
- Hazardous Locations Indoors And Outdoors, NEMA 4X
- GOST Approved For Intrinsic Safety

**Options**
- Pneumatic connection 1/4-18 NPT made of an additional manifold
- Pneumatic connection G 1/4
- Positioner free of copper and its alloys
- Pneumatic Amplifier in the Version "Spool Valve"
- Approved for SIL2/SIL3 application
- Version of Positioner according to VDI/VDE 3847
- Feedback-Unit for Remote Mounting – Version of Position Transmitter only with a potentiometer
- Version of Position Transmitter with additional cable connections for solenoid-valve-connection
- Certificate EN 10204-2.1 – Certificate of compliance with the order.
- Stainless Steel Housing
- Stainless Steel Housing without SST gauges
- Top Mounting version

**Tag No. Labeling**
- Stamped With Weather Resistant Color
- Stainless Steel Label Fixed With Wire

**Notes**
- Only available for Version single-acting
- Available WITH (Version C) AND (Built-in Limit Switch: S)
- AND (Electrical Classification: ZZZ, EAA, GAA) AND (Optional Features: S) OR WITH (Version: T) AND (Built-in Limit Switch: S) AND (Electrical Classification: ZZZ, EAA, GAA) OR WITH (Version: B) A
- One of the option -Y or _R is mandatory to be select
- WITH (Version: B, C) OR WITH (Version:T) AND (Input: X)
- AND (Optional Features: H) OR WITH (Version: T) AND (Input: X) AND (Built-in Limit Switch: T, U, R, V)
- Not available with Electrical Classification FAA, NFM, CAA

<table>
<thead>
<tr>
<th>Tag No. Labeling</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stamped With Weather Resistant Color</td>
<td><strong>b</strong> On request</td>
</tr>
<tr>
<td>Stainless Steel Label Fixed With Wire</td>
<td><strong>d</strong> Not released</td>
</tr>
<tr>
<td></td>
<td><strong>e</strong> Only with Version -C</td>
</tr>
<tr>
<td></td>
<td><strong>f</strong> Only with Version -T</td>
</tr>
<tr>
<td></td>
<td><strong>g</strong> Not available with Electrical Classification EAA, ED3, NFM, FAA, CAA, GAA</td>
</tr>
<tr>
<td></td>
<td><strong>h</strong> Not available with Version -T</td>
</tr>
<tr>
<td></td>
<td><strong>i</strong> Available WITH (Version: B) OR WITH (Version: C) AND (Optional Features: S)</td>
</tr>
<tr>
<td></td>
<td><strong>j</strong> Not available with Additional Inputs/Outputs Q</td>
</tr>
<tr>
<td></td>
<td><strong>k</strong> Not available with Electrical Classification FAA, NFM, CAA</td>
</tr>
</tbody>
</table>

**Contact Information**
- Contact Swanson Flo | www.swansonflo.com | 800-288-7926
SRI986 Electro-Pneumatic Positioner

The SRI986 Positioner is designed to control pneumatic valve actuators from control systems and electrical controllers with electric control signals. It is used to reduce the adverse effects of valve friction, for higher thrust and shorter positioning time. It offers an easy adjustment by two mechanical screws. For complete specification, refer to Product Specification Sheet PSS EVE0102 A-(en).

- Independent adjustment of stroke range and zero
- Adjustable amplification and damping
- Split range up to 3-fold possible
- Input Signal from 0 to 20 mA or 4 to 20 mA
- Supply pressure up to 6 bar (90 psig)
- Single or double acting
- Low vibration effect in all directions
- Mounting on linear actuators according to NAMUR: IEC 534 Part 6
  Stroke range 8 to 100 mm (0.3 to 4 in)
  (larger strokes on request)
- Mounting on rotary actuators acc. to VDI/VDE 3845
  for rotation angles up to 120°
  • Angular range
    linear: 30° to 120°
    equal percentage: 90°; linear from 70°
- Protection class IP54 or IP65
- Explosion protection:
  • II 2 G Ex i (intrinsic safety) according to ATEX
  • Intrinsic safety according to FM and CSA
- Ambient temperature* -40 to 80°C (-40 to 176°F)
- EMC in accordance with the international standards and laws (CE)
- Additional Inputs / outputs (optional):
  • Position feedback 4 to 20 mA
  • Built-in independent inductive limit switches
    (2-/3-wire) or micro switches
- Accessories
  • Booster relay to minimize stroke time
  • Fail Freeze/Fail in place relay
  • Gauge Manifold

Input
- Signal range ...........0 to 20 mA/4 to 20 mA
- Input resistance ........< 200 Ohms at 20°C

Supply
- Supply air pressure .......1.4 to 6 bar (20 to 90 psig)
- Supply air ..............free of oil, dust, water
  according to IEC 654-2

Pneumatic connection
- Female threads ..........G 1/8 acc. to ISO 228

Response characteristic
- Amplification.............adjustable
- Sensitivity................<0.1% F.S.
- Non-linearity (terminal
  based adjustment)........<1.0% F.S.
- Hysteresis................<0.3% F.S.
- Supply air dependency....<0.3%/0.1 bar (1.5 psi)
- Temperature effect ......<0.5%/10 K
- Mechanical vibration
  10-60 Hz up to 0.14 mm,
  60-500 Hz up to 2 g......<0.25% of travel span

* dependent on Ambient Temperature classes
## Positioners

### How to Order – Specify model number SRI986

<table>
<thead>
<tr>
<th>Version</th>
<th>Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Acting</td>
<td>-B</td>
</tr>
<tr>
<td>Double Acting</td>
<td>-C</td>
</tr>
</tbody>
</table>

#### Input

<table>
<thead>
<tr>
<th>Signal Range</th>
<th>Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 - 20 mA</td>
<td>-I</td>
</tr>
</tbody>
</table>

#### Mode of Action

<table>
<thead>
<tr>
<th>Mode of Action</th>
<th>Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Version Increasing Input Increases Output</td>
<td>-D</td>
</tr>
<tr>
<td>Universal Version Set To Increasing Input Decreases Output</td>
<td>-R</td>
</tr>
</tbody>
</table>

#### Built-In Limit Switch/Position Transmitter

- Without: -S
- Inductive Limit Switch Three-Wire Technique, Without Explosion Protection: -R
- Inductive Limit Switch (Standard Version): -T
- Inductive Limit Switch (Security Version): -U
- Two Micro Switches, Without Explosion Protection: -V
- Position Transmitter 4-20 mA: -F

#### Cable Entry

<table>
<thead>
<tr>
<th>Cable Entry</th>
<th>Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1⁄2&quot;-14 NPT (with Adapter(s) M20x1.5 to 1⁄2&quot;-14 NPT)</td>
<td>-6</td>
</tr>
<tr>
<td>M20 x 1.5 With One Plastic Cable Gland, Color Gray</td>
<td>-7</td>
</tr>
</tbody>
</table>

#### Electrical Certification: (Only Standard Device)

- II 2 G EEx ia IIC T6 according to ATEX: -EAA
- FM Approved For Intrinsic Safety Class I, Division 1, Groups A,B,C,D Hazardous Locations Indoors: -FAA
- CSA Approved For Intrinsic Safety Class I, Division 1, Groups A,B,C,D Hazardous Locations Indoors: -CAA
- GOST Approved for Intrinsic Safety: -GAA
- Without: -ZZZ

#### Attachment Kit

<table>
<thead>
<tr>
<th>Kit Description</th>
<th>Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order as Auxiliary</td>
<td>-N</td>
</tr>
</tbody>
</table>

#### Manifold

<table>
<thead>
<tr>
<th>Kit Description</th>
<th>Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order as Auxiliary</td>
<td>-A</td>
</tr>
</tbody>
</table>

#### Options

- Amplifier Free Of Nonferrous Metals: -C
- Protection Class IP65: -F
- Designed For Auxiliary Energy Oxygen Max 6 Bar: -S

#### Tag No. Labeling

- Stamped With Weather Resistant Color: -G
- Stainless Steel Label Fixed With Wire: -L

#### Notes

- a Not available with FAA & CAA
- b Only available with Version -B
- d Not available with Limit Switch Codes R, V

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
The SRI983 Positioner is designed to control pneumatic valve actuators from control systems and electrical controllers with electric control signals. It is used to reduce the adverse effects of valve friction, for higher thrust and shorter positioning time. It offers an easy adjustment by two mechanical screws. For complete specification, refer to Product Specification Sheet PSS EVE0103 A-(en).

- Independent adjustment of stroke range and zero
- Adjustable amplification and damping
- Split range up to 3-fold possible
- Input Signal from 0 to 20 mA or 4 to 20 mA
- Supply pressure up to 6 bar (90 psig)
- Single or double acting
- Low vibration effect in all directions
- Mounting on linear actuators according to NAMUR: IEC 534 Part 6
  Stroke range 8 to 100 mm (0.3 to 4 in) (larger strokes on request)
- Mounting on rotary actuators acc. to VDI/VDE 3845 for rotation angles up to 120°
  - Angular range linear: 30° to 120°
  - Equal percentage: 90°; linear from 70°
- Protection class
  - Pneumatic Unit IP54 or IP65
  - Electrical Unit IP65 with ATEX and NEMA 4 with FM and CSA
- Explosion protection:
  - II 2 G EEx d (flameproof) according to ATEX explosion proof according to FM and CSA
- Ambient temperature* -40 to 80°C (-40 to 176°F)
- EMC in accordance with the international standards and laws (CE)

* dependent on Ambient Temperature classes

**Input**
- Signal range .............. .0 to 20 mA / 4 to 20 mA
- Input resistance ............. <260 Ohms
- Stroke range ............. .8 to 100 mm (0.3 to 4 in)
- Angular range
  - Linear: .................. 30° to 120°
  - Equal percentage: ....... 90°; from 70° linear

**Response characteristic**
- Amplification .............. adjustable
- Sensitivity .................. <0.1% F.S.
- Non-linearity (terminal based adjustment) <1.0% F.S.
- Hysteresis .................. <0.3% F.S.
- Supply air dependency ....... <0.3%/0.1 bar (1.5 psi)
- Temperature effect ......... <0.5%/10 K
- Mechanical vibration
  - 10-60 Hz up to 0.14 mm,
  - 60-500 Hz up to 2 g ...... <0.25% of travel span

**Supply**
- Supply air pressure ........ 1.4 to 6 bar (20 to 90 psig)

**Pneumatic connection**
- Female threads ............. .Q ¼-18 NPT acc. to DIN 45 141

**Materials**
- Base plate, manifold, I/P-housing, rotation adapter ........ Aluminum (Alloy No. 230) finished with DD-varnish
- Cover ...................... impact resistant polyester
- All moving parts of:
  - feedback system .......... 1.4305/1.4571
  - mounting bracket .......... 1.4301
Positioners

How to Order – Specify model number SRI983

Version
- Single Acting.
- Double Acting.

Input
- Signal Range 4 - 20 mA

Mode of Action
- Increasing Input Increases Output
- Increasing Input Decreases Output

Gauges
- Without Gauges
- Two Built-In Gauges (bar/psi)(a)
- Two Built-In Gauges (kPa/psi)(a)

Electrical Certification
- II 2 G Ex d IIC T6
- FM Approved For Explosionproof Class I, Division 1, Groups B,C,D
- Dust-Ignitionproof, Class II, Division 1, Groups E,F,G Hazardous Locations
- CSA Approved For Explosionproof Class I, Division 1, Groups B,C,D
- Dust-Ignitionproof, Class II, Division 1, Groups E,F,G Hazardous Locations

Pneumatic Connection
- Rear Facing NPT 1/4, Prepared For Linear Actuators
- Down Facing NPT 1/4, Prepared For Rotary Actuators

Tag No. Labeling
- Stamped With Weather Resistant Color
- Stainless Steel Label Fixed With Wire

Note
- a Only available with Version -B

Auxiliary – see EVE9902
Fittings – see EOO9001
The SRP981 Positioner is designed to control pneumatic valve actuators with pneumatic control signals. It is used to reduce the adverse effects of valve friction, for higher thrust and shorter positioning time. It offers an easy adjustment by two mechanical screws. For complete specification, refer to Product Specification Sheet PSS EVE0101 A-(en).

- Independent adjustment of stroke range and zero
- Adjustable amplification and damping
- Split range up to 4-fold possible
- Input Signal from 0.2 ... 1 bar (3 ... 15 psig)
- Supply pressure up to 6 bar (90 psig)
- Single or double acting
- Low vibration effect in all directions
- Mounting on linear actuators according to NAMUR: IEC 534 Part 6
  Stroke range 8 to 100 mm (0.3 to 4 in)
  (larger strokes on request)
- Mounting on rotary actuators acc. to VDI/VDE 3845 for rotation angles up to 120°
  - Angular range
    - linear: 30° to 120°
    - equal percentage: 90°; linear from 70°
  - Ambient temperature -40 to 80°C (-40 tp 176°F)
- Protection class IP54 or IP65
- Explosion protection:
  II 2 G Ex c (constructive safety) + Accessories in
  II 2 G Ex i according to ATEX
- Stainless Steel housing (optional)
- Additional Inputs/outputs (optional):
  - Position feedback 4 to 20 mA
  - Built-in independent inductive limit switches
    (2-/3-wire) or micro switches
- Accessories
  - Booster relay to minimize stroke time
  - Lock-in relay (in case of lost air supply)
  - Gauge Manifold
- Gauges (optional)
  - External gauge manifolds
  - Integrated gauges
    Indicating ranges:
    - Input 0 to 1.6 bar (0 to 23 psig)
    - Output 0 to 10 bar (0 to 150 psig)

**Input**
Signal range ............ 0.2 to 1 bar (3 to 15 psig) or
split range down to
Δw 0.2 bar (3 psi)

**Response characteristic**
Amplification ............ adjustable
Sensitivity ............ <0.1% F.S.
Non-linearity
  (terminal based adjustment) ............ <1.0% F.S.
Hysteresis ............ <0.3% F.S.
Supply air dependency .... <0.3% / 0.1 bar (1.5 psi)
Temperature effect ....... <0.5% / 10 K
Mechanical vibration
  10-60 Hz up to 0.14 mm,
  60-500 Hz up to 2 g ........ <0.25% of travel span

**Supply**
Supply air pressure ....... 1.4 to 6 bar (20 to 90 psig)
Supply air ............ free of oil, dust, water
  according to IEC 654-2

**Connection**
Pneumatic ............ Female threads G ¼ acc.
                   to ISO 228

**Materials**
Base plate ............ Aluminum (Alloy No. 230)
                   finished with DD-varnish
All moving parts of:
  feedback system ........ 1.4305/1.4571
  mounting bracket ........ 1.4301
## Positioners

### SRP981

**How to Order – Specify model number SRP981**

<table>
<thead>
<tr>
<th>Version</th>
<th>Single Acting</th>
<th>Double Acting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-B</td>
<td>-C</td>
</tr>
</tbody>
</table>

**Input**

- Signal Range: 0.2 to 1 bar/3 to 15 psi/ 20 - 100 kPa;
- Split-Range: Up To 4-Fold Possible, Must Be Specified

**Mode of Action**

- Increasing Input Increases Output: -D
- Increasing Input Decreases Output: -R

**Gauges**

- Without Gauges: -L
- Two Built-In Gauges (bar/psi)(a): -M
- Two Built-In Gauges (kPa/psi)(a): -N

**Built-In Limit Switch/Position Transmitter**

- Without: -S
- Inductive Limit Switch Three-Wire Technique, Without Explosion Protection(b): -R
- Inductive Limit Switch (Standard Version) with Expl. Prot. II 2 G EEx ia IIC T6 acc. to ATEX(b): -T
- Inductive Limit Switch (Security Version) with Expl. Prot. II 2 G EEx ia IIC T6 acc. to ATEX(b): -U
- Two Micro Switches, Without Explosion Protection(b): -V
- Position Transmitter 4-20 mA, with Expl. Prot. II 2 G EEx ia IIC T6 acc. to ATEX(b): -W

**Cable Entry**

- Without Cable Gland: -1
- M20 x 1.5 With One Plastic Cable Gland, Color Gray(c): -7

**Attachment Kit**

- Order as Auxiliary: -N

**Manifold**

- Order as Auxiliary: -A

**Options**

- Amplifier Free Of Nonferrous Metals(a): -C
- Manual Bypass Switch(a): -T
- Protection Class IP65(b): -F
- Assembled Free Of Oil And Grease / Designed for Aux. Energy Oxygen: -S

**Tag No. Labeling**

- Stamped With Weather Resistant Color: -G
- Stainless Steel Label Fixed With Wire: -L

**Notes**

- a Only available with Version -B
- b Not available with Gauge Code M or N
- c Not available with Built-In Limit Switch / Position Transmitter Code S

---

**Auxiliary – see EVE9902**

**Fittings – see EOO9001**
SMI983 Electrical Position Transmitter

The electrical position transmitter SMI983 converts the linear or rotary movement of a valve/actuator into a 4 to 20 mA standard electrical signal. The configuration of the feedback signal in correspondence to the position of the actuator is easily performed by the two push-buttons.

For complete specifications, refer to Product Specification Sheet PSS EVE0202 A-(en).

- Non-reactive conversion of valve-/actuator-position into a load-independent 4 to 20 mA DC signal
- Two-wire circuit
- Easy adjustment of zero and span by two push buttons
- Operating condition is displayed by two LEDs
- Easy configuration of the feedback signal from ‘direct’ to ‘reverse’
- The feedback signal can be randomly adjusted between 4 to 20 mA
- Wear-free, high linear scanning with conductive plastic precision potentiometer
- Mounting on linear actuators according to NAMUR: IEC 534 Part 6
- Mounting on rotary actuators acc. to VDI/VDE 3845 for rotation angles up to 120°
  - Angular range
    - linear: 30° to 120°
    - equal percentage: 90°; linear from 70°
- Explosion protection:
  - II 2 G EEx ia IIC T6 according to ATEX
  - Intrinsic safety according to FM (in preparation)
- Ambient temperature*: -40 to 80°C (-40 to 176°F)
- EMC in accordance with international standards and laws (CE)
  - * dependent on Ambient Temperature classes

How to Order – Specify model number SMI983

Output
- Signal Range 4 - 20 mA

Cable Entry
- M20 x 1.5 With One Plastic Cable Gland, Color Gray

Explosion Protection
- II 2 G EEx ia IIC T6 according to ATEX
- Without

Attachment Kit
- Order as Auxiliary

Options
- Tag No. Labeling
  - Stamped With Weather Resistant Color
  - Stainless Steel Label Fixed With Wire

Auxiliary – see EVE9902
Fittings – see EOO9001

Power supply
- Supply voltage ................. 12 to 36 V dc
- Permitted ripple ............... <10% p.p.
- Supply voltage dependency .... <0.2%
- Supply (via signal circuit) ....... e.g. FOXBORO ECKARDT-Power supply unit

Response characteristic
- Non-linearity (terminal based adjustment) ....... <1% F.S.
- Hysteresis ....................... <0.5% F.S.
- Load dependency ............... <0.2%/RBmax.
- Temperature effect ............. <0.3%/10 K
- Mechanical vibration
  - 10-60 Hz up to 0.14 mm,
  - 60-500 Hz up to 2 g ........... <0.25% of travel span

Electrical connection
- Line entry ..................... 1 cable gland M20 x 1.5
- Cable diameter ............... 6 to 12 mm (0.24 to 0.47 in)
- Screw terminals ............. 3 terminals for additional
- Wire cross section .......... 0.3 to 2.5 mm² (AWG 22-14)
SMP981 Pneumatic Position Transmitter

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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<tbody>
<tr>
<td>Force balance system</td>
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<tr>
<td>Additional limit signaling by means of inductive alarm units</td>
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<tr>
<td>Mounting kits for linear and rotary movements actuators</td>
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<tr>
<td>Universal matching to all strokes by means of differing range springs</td>
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<tr>
<td>Simple installation and adjustment. Zero and range settings non-interactive</td>
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<tr>
<td>Robust, corrosion-protected design, protection class IP54 or IP65</td>
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<tr>
<td>Ambient temperature -25 to 80°C (-13 to 176°F)</td>
<td></td>
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<tr>
<td>Explosion protection II2 G EEx c (constructive safety)</td>
<td></td>
</tr>
</tbody>
</table>

**Input**
- Stroke: 8 to 115 mm
- Angle: 30 to 120 degree

**Output**
- Signal range: 0.2 to 1 bar (3 to 15 psi) or split range

**Performance characteristics**
- Non-linearity (terminal based adjustment): <±1% of final value
- Hysteresis: <1%
- Supply press. dependency: <0.2%/0.1 bar
- Sensitivity: <0.05%
- Temperature effect: <0.3%/10 K
- Air capacity: 2200 l/hr

**How to Order – Specify model number SMP981**

**Output**
- Signal range 0.2-1 bar/3-15 PS/20-100 kPa

**Attachment kit**
- Order as auxiliary

**Options**
**Tag.No. Labeling**
- Stamped with weather resistant color
- Stainless steel label fixed with wire

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Auxiliary – see EVE9902
Fittings – see EOO9001

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
SGE985 Inductive Limit Switch

- Inductive sensors acc. to DIN19234 or respective NAMUR or in three-wire-technology
- Inductive sensors for security application (self monitoring)
- Mechanical Switches (Micro switches)
- Exact switching point due to adjustable transmission
- Switching points freely definable
- Rugged design. Low vibration effect in all directions
- Mounting on linear actuators according to NAMUR:
  IEC 534 Part 6
  Stroke range 8 to 100 mm (0.3 to 4 in)
  (larger strokes on request)
- Mounting on rotary actuators according to VDI/VDE 3845 For rotation angles up to 120°
  • Angular range
    linear: 30° to 120°
    equal percentage: 90°; linear from 70°
- Protection class IP54 or IP65
- Explosion protection*:
  • II 2 G Ex i (intrinsic safety) according to ATEX
- Ambient temperature** –40 to 80°C (-40 to 176°F)
- EMC according to international standards and laws (CE)
- SIL3/SIL2 for inductive limit switch (optional)
- Double cable entries (optional)
  * not for mechanical switches
  ** dependent on Ambient Temperature classes

How to Order – Specify model number SGE985

Version
Inductive Limit Switch (Standard Version) .......................................................... -S
Inductive Limit Switch (Security Version) ........................................................... -T
Inductive Limit Switch (Three-Wire Version), Without Explosion Protection(b) ...... -U
Two Micro Switches, Without Explosion Protection(b) ....................................... -V

Cable Entry
M20 x 1.5 With One Plastic Cable Gland, Color Gray ........................................... -7

Explosion Protection
II 2 G Ex ia IIC T6 according to ATEX ..................................................-EAA
Without .....................................-ZZZ

Attachment Kit
Order as Auxiliary .........................................................-N

Options
SIL3 for Inductive Limit switches .......................................................-Q

Tag No. Labeling
Stamped With Weather Resistant Color ..............................................-G
Stainless Steel Label Fixed With Wire ...................................................-L

Input
Stroke
  with diaphragm actuators up to 100 mm
  with rotary actuators up to 120°

Response characteristic
Gain ..................................................................continuously adjustable from 1:1 to approx. 7:1
Switching point repeatability ..........................................<0.2%

Electrical connection
Line entry .................................................1 cable gland M20 x 1.5
Cable diameter .....................6 to 12 mm (0.24 to 0.47 in)
Screw terminals .................3 terminals for additional
Wire cross section ..................0.3 to 2.5mm² (AWG 22-14)

Note
  b Only available with ZZZ

Auxiliary – see EVE9902
Fittings – see E009001
FRS Filters Regulators

- Minimal effect of upstream pressure fluctuation
- Low inherent air consumption
- Control of instrument supply air pressure, and removal by filtration of dust particles and water content.
- Explosion protection II2 G EEx c (constructive safety)
- Compact attachment
- Stainless steel housing for Offshore and Food & Beverage applications

Pneumatic equipment and instrumentation such as positioners can only function efficiently when provided with an air supply which is dust-, oil- and moisture-free. The supply air pressure has also to be maintained within close limits, unaffected by changes in the rate of consumption.

Filters regulators FRS923, FRS02 and FRS03 provide the necessary control to the desired pressure with an additional filtration up to 30µm.

For complete specification, refer to Product Specification Sheet PSS EVE0301 A-(en) and TI EVE0302 A-(en).

FRS923 – FRS02 – FRS03

**Input**
- Max .........................10 bar/1 MPa/150 psig
- Air throughput (FRS923) . . . . max. 24 Nm3/h
- Air throughput (FRS02/03) . . . . max. 18 Nm3/h
- Upstream pressure dependency ..................<1 mbar/0.1 bar
- Max. inherent air consumption ..................<0.001m3/h
- Ambient temperature range (FRS923) ..............-40 to +80°C
- Ambient temperature range (FRS02/03) ..............-20 to +60°C
- Pneum. connections ........ internal thread 1/4–18 NPT

**Materials**
- Filter .......................Sintered bronze, diffusion tinned, filter grade 30 mm
- Filter bowl (FRS923) .......Diecast aluminum
- Filter bowl (FRS02) .............Diecast aluminum
- Filter bowl (FRS03) ..............Stainless Steel 316
- Gauge for standard version (FRS923) ..........Housing: plastic
- Gauge for standard version (FRS02/03) .........Housing: stainless steel
- Measuring system ..............brass
- Gauge for version without nonferrous metal (FRS923) . . . 1.4571
Positioners

Attachment Kits
Tube for direct mounting FRS to positioner (1/4 NPT connection)

Filter regulator bracket in Stainless Steel 316

How to Order
Specify model number FRS02 Filter regulator FRS02
Specify model number FRS03 Stainless Steel filter regulator
Specify model number FRS923 Filter regulator FRS923

Control range
0 to 2.5 bar; 0 to 35 psi
0 to 6 bar; 0 to 90 psi

Version
Pressure Regulator without Filter
Pressure Regulator with Filter

Gauges
Without(a)
Gauge With Plastic Housing(b, d)
Gauge With Housing in 1.4571(c)

Optional Features
Indication Range In kg/cm
Indication Range In kPa
Version Free Of Non Ferrous Metal
Protection Class IP65
Assembled free of oil and grease / Designed for Auxilliary Energy Oxygen

Tag No. Labeling
Stamped With Weather Resistant Color
Stainless Steel Label Fixed With Wire

Notes
a Not available with Optional Features -A, -B
b Not available with Optional Features -C
c Not available with Optional Features -A
d Not available with Optional Features -B

Fittings – see E009001
IP24 IP Transducer for Field Service

**Input**
- Signal range: 4 to 20 mA / 0 to 20 mA / 0 to 10 mA / 0 to 10 V
- Input resistance (at 20 °C)
  - Normal Version and
  - Version II 2 G EEx ia IIC T6 acc. to ATEX: <220 Ohms
- Signal Range
  - 0 to 10 mA / 0 to 10 V: <1000 Ohms

**Output**
- Signal range normal: 0.2 to 1 bar, 3 to 15 psi, 20 to 100 kPa, 0.2 to 4 bar
- Signal Range reverse: 1 to 0.2 bar, 15 to 3 psi, 100 to 20 kPa, 4 to 0.2 bar
- Supply air: 1.4 ±0.1 bar (20 ±1.4 psi)
- Air consumption: <100 l/h
- Supply air free of oil, dust, water according to ISO 8573-1
  - Max. particle-size and -density: Class 2
  - Max. oil contents: Class 3

**Transmission performance**
- Non-linearity (terminal based): <0.3% of final value
- Hysteresis: <0.1%
- Supply pressure dependence: <0.25% / 0.1 bar
- Temperature influence
  - Output normal: <0.3% / 10 K
  - Output reverse: <0.5% / 10 K
- Sensitivity level: <0.02%

**Housing**
- Material: Aluminum casting, finished
- Protection Class: IP54 or IP65

**How to Order – Specify model number IP24**

**Input**
- Signal Range 0 - 20 mA
- Signal Range 4 - 20 mA
- Signal Range 0 - 10 mA (a)
- Signal Range 0 - 10 V (a)

**Output**
- Signal Range 0 - 1 bar
- Signal Range 3 - 15 psi
- Signal Range 20 - 100 kPa
- Signal Range 0.2 - 4 bar (a)
- Signal Range 0.2 - 5 bar (a)
- Signal Range 0.2 - 6 bar (a)

**Mode of Action**
- Normal (For Version ZZZ)
- Normal (For Version EAA according to ATEX)
- Reverse

- High air capacity
- Low input resistance
- Easy adaptation of the Converter to ranges 0 to 20 mA or 4 to 20 mA
- Easy change of the output signal from bar to psi
- Mode of action normal or reverse
- Protection Class IP54 or IP65
- Version in II 2 G EEx ia IIC T6 acc. to ATEX
- Stainless Steel housing (optional)
**Positioner**

**Electrical Certification**
- II 2 G Ex ia IIC T6
- Without

**Options**
- Attachment Kit For Pipe Mounting
- Protection Class IP65
- Calibration In kp/cm
- Assembled free of oil and Grease / Designed for Aux. Energy Oxygen

**Tag No. Labeling**
- Stamped With Weather Resistant Color
- Stainless Steel Label Fixed With Wire

**Note**
- a Only available with Mode of Action Code D
## Accessories for Positioners

Adapter AD made of stainless steel, brass zinc plated, or plastic, for connection of different threads.

Cable glands BUSG made of stainless steel, brass zinc plated, or plastic guide the electrical connection into the device and guarantee a centered, stress relieved and secure fit of the cable.

Attachment-Kits EBZG are customized and include all required parts to mount a positioner onto a specific valve/actuator.

Manifolds LEXG allow, depending on the positioner version, different pneumatic connections or the option to include a manifold with gauges.

Booster-Relays deliver a higher air capacity, to reduce the stroke time for very large actuators:

- Direct mounted to the positioner LEXG (for SRD960, SRD991, SR990)
- or VKXG (for SR986 and SRP981)
- Remote mounted acc. to NAMUR LEXG (for all Positioners)

Technical Data for AD and BUSG, refer to Product Specification PSS EOO9001 A-{en}.

For complete specification of the EBZG, LEXG and VKXG, refer to Product Specification for the individual positioner.

### Adapter

- Adapter ½” NPT to ¾” NPT (stainless steel) .................................................. A3
- Adapter M20 x 1.5 to G½” (internal thread) (stainless steel) .......................... A8
- Adapter M20 x 1.5 to ¼”-14 NPT (internal thread) (brass with nickel coating)  A5
- Adapter M20 x 1.5 to ¼”-14 NPT (internal thread) (stainless steel) ............. A6
- Adapter (plastic) M20 x 1.5 to PG13.5 (internal thread) .............................. A9

### Cable glands and plugs

- M20 x 1.5 plastics, color blue ................................................................. K7
- M20 x 1.5 plastics, color white ............................................................... K9
- M20 x 1.5 stainless steel ........................................................................ S6
- M20 x 1.5 plastics, color gray ................................................................. K6
- M20 x 1.5 HF-cable gland for Fieldbus .................................................. P4
- M20 x 1.5 Plug-connector for Fieldbus (ss/threaded connection ½-UN) .... F2
- M20 x 1.5 Plug-connector for Fieldbus (ss/threaded connection M12) .... P3
- M20 x 1.5 stainless steel EEx d ............................................................... S7
- M20 x 1.5 brass zink plated EEx d ............................................................ S8
- ¼” NPT cable gland 6…12 mm, Stainless steel, EEx d ............................ N1
- ¼” NPT cable gland 6…12 mm, Steel zink plated, EEx d .......................... N2
- ¼” NPT, brass zink plated, EEx d ............................................................. N3
- M20 x 1.5 plug, plastic ........................................................................... V3
- M20 x 1.5 plug, Stainless steel, EEx d .................................................... V4
- ¼” NPT plug, Stainless Steel, EEx d ......................................................... V5
- M20 x 1.5 plug, brass zink plated, EEx d ................................................ V6
- ¼” NPT plug, brass zink plated, EEx d ..................................................... V7
Positioner – Accessories

Attachment Kit

For diaphragm actuators with casting yoke acc. NAMUR. (incl. standard Couple Lever)
   (for SRP981, SRI983, SMP981, SMI983, SGE985)

For diaphragm actuators with casting yoke acc. NAMUR. (incl. standard Couple lever) (for SRI986)

For diaphragm actuators with pillar yoke acc. NAMUR. (incl. standard Couple lever)
   (for SRP981, SRI983, SMP981, SMI983, SGE985)

For diaphragm actuators with pillar yoke acc. NAMUR. (incl. standard Couple lever) (for SRI986)

For rotary actuators, without flange, 3 drill holes 6.5 mm
   (for SRP981, SRI983, SRI986, SMP981, SM983, SGE985)

For rotary actuators, without flange, 4 threads M6 (e.g. for Petras actuators)
   (for SRP981, SRI983, SRI986, SMP981, SM983, SGE985)

For rotary actuators, with flange (for SRP981, SRI983, SRI986, SMP981, SM983, SGE985)

For rotary actuators acc. to VDI/VDE 3845, with shaft
   (for SRP981, SRI983, SRI986, SMP981, SM983, SGE985)

For Masoneilan type Camflex II (for SRP981, SRI983, SRI986, SMP981, SM983, SGE985)

For Masoneilan type Sigma F (for SRI986, SRP981, SRI983)

For Masoneilan type 37/38, Fisher Elliott type 656, 667 (for SRP981, SRI983, SGE985, SM983, SMP981)

For Guide type P (for SRP981, SRI983)

For Masoneilan type 87/88 (for SRI986)

For Masoneilan type 87/88 (for SRP981, SRI983, SMP981, SM983, SGE985)

For Masoneilan VariPak (for SRI986)

For Masoneilan type 37/38, Fisher Elliott type 656, 667, (SRI986)

For IAL actuators (for SRP981, SRI983, SGE985, SM983, SMP981)

For IAL actuators (for SRI986)

For Velan - Sart von Rohr(9)

Brackets VDI/VDE 3845 (A = 130 mm/5.12 in; B = 50 mm/1.97 in)
   (for SRP981, SRI983, SRI986, SGE985, SM983, SMP981)

Brackets VDI/VDE 3845 (A = 80 mm/3.15 in; B = 30 mm/1.18 in)
   (for SRP981, SRI983, SRI986, SGE985, SM983, SMP981)

Brackets VDI/VDE 3845 (A = 80 mm/3.15 in; B = 20 mm/0.79 in)
   (for SRP981, SRI983, SRI986, SGE985, SM983, SMP981)

Couple Lever/Cam

Standard (a = 72 mm) (for SRP981, SRI983, SRI986, SMP981, SM983, SGE985)

Extended (a = 91 mm) (for SRP981, SRI983, SRI986, SMP981, SM983, SGE985)

Inverse equal percentage cam for rotary actuators (for SRP981, SRI983, SRI986).

Spring Set

Range-Springs (4 pc.) (for SRP981, SRI983, SRI986)

Manifold (Connection ½-18 NPT)

Staggered connections (for SRP981, SRI986)

Connections same level (for SRP981, SRI986)

Staggered connections for ⅛"-thread pneum. tube-connections
   (e.g. tube-diameter: 8 mm / 0.3 in) (for SRP981, SRI986)

With gauges for supply air, y, for version single acting (for SRP981, SRI986)

With gauges for supply air, w, for version single acting (for SRP981)

With gauges for supply air, w, y, for version single acting (for SRP981)

With gauges for supply air, y1, y2, for version double acting (for SRP981, SRI986)

With gauges for w, y1, y2, for version double acting (for SRP981)

Gauge manifold without gauge (for SRP981, SRI986)

Gauge manifold without gauge, for supply air, y1, y2, for version double acting (for SRP981, SRI986)

Gauge manifold without gauge, for w, y1, y2, for version double acting (for SRP981)\(^{(f)}\)

Booster (Connection ½-18 NPT)

For version single acting (for SRP981, SRI986)

For version double acting (for SRP981, SRI986)

For version single acting with doubled output capacity (for SRP981, SRI986)
## Positioner – Accessories

### ACCESSORIES FOR POSITIONER (SRD991, SRD992, SRI990, SRD960)

**Filter Regulator**
- Filter Regulator FRS923-2SK for -40°C to +80°C
- Filter Regulator for -20°C to +70°C
- Nipple for direct mounting Filter regulator 1/4 NPT both sides

**Communication/Modem/DTM**
- HART USB Modem (made by Itak) with ATEX IS Certification
- DTM for SRD Serie for HART / FF / Proibus
- ATEX IS Barrier Rail Mounted Module, 1 Channel, ATEX EEex ia IIC / FM Intrinsically Safe (TV228-SEGX)

### Attachment Kits

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<td>For Diaphragm Actuators With Casting Yoke Acc. NAMUR (Includes Standard Couple Lever)</td>
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<tr>
<td><strong>EBZG</strong></td>
<td>For Diaphragm Actuators With Pillar Yoke Acc. NAMUR (Includes Standard Couple Lever)</td>
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<tr>
<td><strong>EBZG</strong></td>
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<tr>
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<tr>
<td><strong>EBZG</strong></td>
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<tr>
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<td>For Badger Meter – Research Control Series 754 And 755 Size ¾-Inch</td>
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<tr>
<td><strong>C1</strong></td>
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</tr>
<tr>
<td><strong>C2</strong></td>
<td>Attach Kit-Brackets VDI/VDE 3845 (A=80mm/3.15in Attachment Kit – Brackets VDI/VDE 3845 (A=80 mm/3.15 in; B=30 mm/1.18 in))</td>
</tr>
<tr>
<td><strong>C3</strong></td>
<td>Attach Kit-Brackets VDI/VDE 3845 (A=130 mm/5.12 in Attachment Kit – Brackets VDI/VDE 3845 (A=130 mm/5.12 in; B=50 mm/1.97 in))</td>
</tr>
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<td><strong>C4</strong></td>
<td>Attach Kit-Brackets VDI/VDE 3845 (A=130 mm/5.12 in Attachment Kit – Brackets VDI/VDE 3845 (A=130 mm/5.12 in; B=30 mm/1.18 in))</td>
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<td><strong>D</strong></td>
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<td><strong>F2</strong></td>
<td>For Fisher 1051, 1052, 1061 size 40</td>
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<tr>
<td><strong>F3</strong></td>
<td>For Fisher 657, 667 size 40 and 60</td>
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<td><strong>F4</strong></td>
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<tr>
<td><strong>F5</strong></td>
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<td><strong>F6</strong></td>
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<td><strong>K3</strong></td>
<td>For Kinetrol (Actuator Size 07)</td>
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<td>For Kinetrol (Actuator Size 09)</td>
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<td><strong>K5</strong></td>
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For Masoneilan Type Camflex II ................................................................. -L7
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For Masoneilan Type 87/88 All Size ............................................................ -M3
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## Positioner – Accessories

### Couple Lever
- Standard Couple Lever (Stroke 8 to 70 mm) .................................................. A
- Extended Couple Lever, Max 260 mm Extended Couple Lever; Stroke Maximum 260 mm A1
- Extra Short Stroke Couple Lever (Stroke 5 to 15 mm) ........................................... A2
- Fold Feedback Couple Lever (Stroke 8 to 70 mm) .............................................. A3
- Short Stroke Couple Lever (Stroke 8 to 35 mm) ................................................ A4
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### Carrier Bolts
- Carrier Bolt Extra Short 23 mm .......................................................... A
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- Adjustable Carrier Bolt 20 to 37 mm ...................................................... C
- Carrier Bolt 47 mm ........................................................................ D
- Carrier Bolt 57 mm ........................................................................ E
- Carrier Bolt 65 mm ........................................................................ F
- Adjustable Carrier Bolt with Fixing System for Stem Diameter up to 21 mm G
- Adjustable Carrier Bolt with Fixing System centered for Stem Diameter up to 21 mm G1
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- Adjustable Carrier Bolt with Fixing System for Stem Diameter up to 34 mm H
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- Adjustable Carrier Bolt for thread ⅜” ...................................................... J
- Adjustable Carrier Bolt for thread ⅝” ...................................................... K
- Extension for Carrier Bolt .................................................................... L
- Adjustable Carrier Bolt with Fixing System centered for Stem Diameter up to 64 mm M

### Manifold
- Manifold – staggered connections in ¼” for pneumatic tube-connections (e.g. diameter: 8 mm/0.3 in) D
- Manifold – staggered connections for connection G ¼ NPT (e.g. diameter: 8 mm/0.3 in) D1
- Manifold w/connection G ¼ ........................................................................... K
- Manifold w/connection ¼-18 NPT .................................................................. L

### Gauges Manifold
- Manifold w/gauges with connection ¼-18 NPT ........................................... J
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- Manifold w/o gauges with connection G ¼ ..................................................... N1

### Booster Relay
- Booster Relay w/connection ¼-18 NPT ......................................................... F
- Booster Relay w/connection G ¼ .................................................................... F1
- Booster Relay w/connection ¼-18 NPT. Approved for SIL3 application FQ
- Booster Relay w/connection G ¼. Approved for SIL3 application FQ1
- Booster Relay w/connection ¼-18 NPT ......................................................... G
- Booster Relay w/connection G ¼ ................................................................. G1
- Booster Relay w/connection 1/2-18 NPT with double output capacity ............ H
- Booster Relay w/connection G ¼ with doubled output capacity H1
- Booster Relay w/connection ¼-18 NPT with double output capacity. Approved for SIL3 application HQ
- Booster Relay w/connection G ¼ with doubled output capacity. Approved for SIL3 application HQ1
- Booster Relay Type EIL-100 ¼ NPT made by SMC (one piece for single acting) W11
- Booster Relay Type EIL-100 ¼ NPT made by SMC (two pieces for double acting) W12
- Booster Relay Type XB100 ¼ NPT made by HIC (one piece for single acting) (e) W21
- Booster Relay Type XB-100 ¼ NPT made by HIC (two pieces for double acting) (c) W22
- Booster Relay w/connection G ¼ (for NAMUR mounting) X1
- Booster Relay w/connection G ¼ (for NAMUR mounting) Y1
- Booster Relay w/connection G ¼ with doubled output capacity (for NAMUR mounting) Z1
Positioner – Accessories

Surge/Lightning Protection
- Surge/Lightning Protection for 4-20 mA with or without HART type TP48-N-NDI - L1
- Surge/Lightning Protection for FF/Profibus type TP32-N-NDI - L4

Cable Gland
- Cable Gland, M20x1.5 Plug-Connector For Fieldbus (ss/Threaded Connection 7/8 – UN) - F2
- Cable Gland, M20x1.5 Plastics, Color Gray/Black - K6
- Cable Gland, M20x1.5 Plastics, Color Blue - K7
- Cable Gland, M20x1.5 Plastics, Color White - K9
- Cable Gland, M20x1.5 Plug-Connector For Fieldbus (ss/Threaded Connection M12) - P3
- Cable Gland, M20x1.5 HF For Fieldbus - P4
- Cable Gland, M20x1.5 Stainless Steel - S6

Tube Fitting
- Tube Fittings, G 1⁄4A, 6x1mm, 1 pc. - VG-01
- Tube Fittings, G 1⁄4A, 6x1mm, 2 pc. - VG-02
- Tube Fittings, G 1⁄4A, 6x1mm, 3 pc. - VG-03
- Tube Fittings, ¼ NPT, 6x1mm, 2 pc. - VG-52
- Tube Fittings, ¼ NPT, 6x1mm, 3 pc. - VG-53

Adapter
- Adapter (Brass With Nickel Coating) M20 x 1.5 To ½-14 NPT (Internal Thread) - AD-A5
- Adapter (ss) M20 x 1.5 To ½-14 NPT (Internal Thread) - AD-A6
- Adapter (ss) M20 x 1.5 To G ¾” (Internal Thread) - AD-A8
- Adapter (Plastic) M20 x 1.5 To PG13.5 (Internal Thread) - AD-A9

Lock-In Relays
- Lock-In Relay for loss of air supply for single acting/NAMUR mounting - VR1
- Lock-In Relay (Fall Freeze) for loss of air supply and electric power for single and double acting/SRI990 direct mounting - VR6

LEXG-M3: Sandwich Manifold with gauges, to be mounted together with Booster LEXG-Fx or Gx

Notes
a After 1, July 2003 in the region of validity for ATEX this version with Electrical Classification according to CENELE
b Not released
c Not released
d Please consult Eckardt production before ordering
e Not released
f Only available with Version -C
g Only available for SRI986

* We recommend to contact our field service before selection of these mounting kits.
Further Attachment kits on request.
See also http://www.foxboro-eckardt.com/pdf/TI_FoxEck/Attachment-kits.pdf.
The following chapter contains reduced Product Specifications of the instruments:

- **244LD**  LevelStar Buoyancy Transmitter with Torque Tube for Liquid Level, Interface and Density
- **244LVP**  LevelStar Buoyancy Transmitter for Liquid Level, Interface and Density
- **167LP**  Pneumatic Buoyancy Transmitter with Torque Tube for Liquid Level, Interface and Density
- **204xx**  Accessories for Buoyancy Transmitters

For detailed technical specifications visit our homepage www.foxboro-eckardt.com or ask your local distributor for the requested Product Specifications PSS.
244LD LevelStar Buoyancy Transmitter with Torque Tube for Liquid Level, Interface and Density

- Communication HART, PROFINET or FOUNDATION Fieldbus
- Configuration via FDT-DTM
- Conventional operation with local keys
- Easy adaptation to the measuring point without calibration at the workshop
- Backdocumentation of measuring point
- Continuous self-diagnostics
- Configurable safety value
- Software lock for local keys and reconfiguration
- Approved for SIL applications
- Simulation of analog output for loop-check
- Local full graphic display in %, mA or physical units
- Signal noise suppression by Smart Smoothing
- Linear or customized characteristic
- Process temperature from -196°C to +500°C
- Materials for use with aggressive media
- Micro sintermetal sensor technology
- Separate mounting of sensor and amplifier with remote amplifier mounting kit

Input
- Measuring span .................. 2 to 20 N contin. adjustable
- Measuring ranges ............... 50 mm to 50 m
- Density range .................. 100 < ρ < 2000 kg/m³
- Displacer 204DE
- Standard length ................. 350 to 3000 mm
  (14 to 120 inch)
- Weight of displacer ............. max. 25 N
- Characteristic .................. linear or customized with up to 32 setpoints

Output
- HART, 4 to 20 mA
  - Lower range value ............ continuously adjustable within the measuring limits
  - Turn-down .................. 1:1 to 1:20
  - Signal range ............... 4 to 20 mA/20 to 4 mA
  - Operating range .......... 3.8 to 20.5 mA
  - Admissible load ............ R_L_max = \frac{U_S - 12V}{0.023A}
  - (U_S = supply voltage)
  - Accuracy .................. ± 0.2 %
  - Transfer function ........ linear

Communication HART
- Connection .................. Two-wire system
- Supply voltage U_S ........... > 12 V + R_b * 0.025 A, < 42 V
  (≤ 30V with ex-proof device)
- Current sink ................. max. 23 mA
- Signal range .................. 4 to 20 mA
- Operating range ............. 3.8 to 20.5 mA (acc. NE43)
- Digital communication ....... HART Protocol, 1200 Baud

The buoyancy transmitter 244LD LevelStar is designed to perform continuous measurements for liquid level, interface or density of liquids in the process of all industrial applications. The measurement is based on the proven Archimedes buoyancy principle and thus extremely robust and durable. Measuring values can be transferred analog and digital. Digital communication facilitates complete operation and configuration via PC or control system. Despite extreme temperatures, high process pressure and corrosive liquids, the 244LD LevelStar measures with consistent reliability and high precision. For installations in contact with explosive atmospheres up to Zone 0, certificates are available.

For complete specifications, refer to Product Specification Sheet PSS EML 0710 G-(en).

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
Operating conditions

Process temperature: -196°C to +500°C

Pressure rating
- acc. DIN: PN 16, 40, 63, 100, 160, 250
- acc. ANSI: Class 150, 300, 600, 900, 1500

with heating jacket: wafer body, max. PN 250/Class 1500; heating jacket PN 40/Class 300, heating with saturated steam or thermal oils

Ambient temperature: -40°C to +70°C
Relative humidity: up to 100%
Condensation: permitted
Transportation:
- storage temperature: -40°C to +85°C
- Protection class: IP 66 (acc. DIN 40 050)

How to Order – Specify model number 244LD LevelStar

Wafer Body Material (Process Wetted)
- Carbon Steel 1.0460 (~A 105), application from -10°C to +350°C: K
- 1.4404 equivalent to 316L / 1.4435, application from -60°C to +400°C: S
- (material is 1.4435 when Wafer Body Pressure Rating codes H1 and H2 selected)
- 1.4404 equivalent to 316L / 1.4435, application from -196°C to +400°C: U
- 1.4404 equivalent to 316L / 1.4435, application from -60°C to +500°C: T
- Duplex – 1.4462, application from -10°C to +280°C: N
- Inconel 625 – 2.4856, application from -10°C to +450°C (no PED Certification): I
- Inconel 825 – 2.4858, application from -10°C to +450°C (no PED Certification): P
- Hastelloy C – 2.4811, application from -196°C to +400°C: C

Torque Tube Material (Process Wetted)
- 1.4404 equivalent to 316L: S
- Hastelloy C: C
- Inconel 600 – 2.4816: I
- Monel K500 – 2.4375: M

Wafer Body Flange Size
- DN70 (available with Wafer Body Material S, U, T, and Torque Tube Material S and C): 0
- DN80: 1
- DN100: 2
- 3-Inch: 3
- 4-Inch: 4

Wafer Body Pressure Rating & Contact Face
- PN40 (PN16 to PN40) B1/B1 (Contact Face DIN EN 1092-1)(a): B1
- PN250 (PN16 to PN250) D/C (Contact Face DIN EN 1092-1) (Draft DIN EN 1092 1:2005 04)(a): DC
- PN250 (PN16 to PN250) D/D (Contact Face DIN EN 1092-1) (Draft DIN EN 1092 1:2005 04)(a): DD
- PN250 (PN16 to PN250) F/F (Contact Face DIN EN 1092-1) (Draft DIN EN 1092 1:2005 04)(a): FF
- PN250 (PN16 to PN250) F/E (Contact Face DIN EN 1092-1) (Draft DIN EN 1092 1:2005 04)(a): FE

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
Wafer Body Pressure Rating & Contact Face (continued)
PN250 (PN16 to PN250) L/L (Contact Face DIN 2696)[a] ........................................ L1
PN400 L/L Lense (Contact Face DIN 2696)[a][b] .................................................. H1
PN500 L/L Lense (IG-Norm High Pressure Version)[a][b] ........................................ H2
ANSI Class 150 RF/RF[b] .................................................................................. R1
ANSI Class 900 (300/600/900) RF/RF[b] .............................................................. R2
ANSI Class 1500 RF/RF[b] .............................................................................. R3
ANSI Class 150 SF/SF[b] ................................................................................. S1
ANSI Class 900 (300/600/900) SF/SF[b] .............................................................. S2
ANSI Class 1500 SF/SF[b] .............................................................................. S3
ANSI Class 150 RJF/RJF[b] ............................................................................... J1
ANSI Class 900 (300/600/900) RJF/RJF[b] ........................................................... J2
ANSI Class 1500 RJF/RJF[b] ............................................................................. J3
ANSI Class 300 to 1500, Form LF/LM[b] .............................................................. LM
ANSI Class 300 to 1500, Form LF/LF[b] .............................................................. LF
ANSI Class 300 to 1500, Form LG/LT[b] ............................................................... LT
ANSI Class 300 to 1500, Form LG/LG[b] ............................................................... LG
ANSI Class 150, Form SG/ST[b] ......................................................................... ST
ANSI Class 150, Form SG/SG[b] ....................................................................... SG
ANSI Class 300 to 1500, Form SG/SG[b] ............................................................... SG

Wafer Body Mounting Direction (Amplifier to body)
Right Hand mounted .......................................................................................... R
Right Hand mounted w/heating jacket – connecting flanges B1 / DN15, PN40 (DIN EN 1092-1)[m][o] .................................................. A
Right Hand mounted w/heating jacket – connecting flanges B1 / DN25, PN40 (DIN EN 1092-1)[m][o] .................................................. B
Right Hand mounted w/heating jacket – connecting flanges B2 / DN15, PN40 (DIN EN 1092-1)[m][o] .................................................. C
Right Hand mounted w/heating jacket – connecting flanges B2 / DN25, PN40 (DIN EN 1092-1)[m][o] .................................................. D
Right Hand mounted w/heating jacket – connecting flanges RF/SF, 1/2 in, Class 300[m][o] ................................................................. E
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Left Hand mounted ............................................................................................ L
Left Hand mounted w/heating jacket – connecting flanges B1 / DN15, PN40 (DIN EN 1092-1)[m][o] ..................................................... M
Left Hand mounted w/heating jacket – connecting flanges B1 / DN25, PN40 (DIN EN 1092-1)[m][o] ..................................................... N
Left Hand mounted w/heating jacket – connecting flanges B2 / DN15, PN40 (DIN EN 1092-1)[m][o] ..................................................... O
Left Hand mounted w/heating jacket – connecting flanges B2 / DN25, PN40 (DIN EN 1092-1)[m][o] ..................................................... P
Left Hand mounted w/heating jacket – connecting flanges RF/SF, 1/2 in, Class 300[m][o] ................................................................. S
Left Hand mounted w/heating jacket – connecting flanges RF/SF, 1 in, Class 300[m][o] ................................................................. T
Left Hand mounted w/heating jacket - connecting flanges RJF, 1/2 in, Class 300[m][o] ................................................................. U
Left Hand mounted w/heating jacket - connecting flanges RJF, 1 in, Class 300[m][o] ................................................................. V

Version
Base VERSION – TRANSSTAR (244LD) ............................................................. B
Base VERSION – LEVELSTAR (244LD)[x][a] ..................................................... N
Base (B) + Displacer (244LD + 204DE) .............................................................. S
Base (N) + Displacer (244LD + 204DE)[x][a] ...................................................... T
Base (B) + Displacer + Displacer Camber + Flange combination + Flange (244LD + 204DE + 204DC + 204FK + 204BCF)[x][c] ............... C
Base (N) + Displacer + Displacer Camber + Flange combination + Flange (244LD + 204DE + 204DC + 204FK + 204BCF)[x][c] ............... D

Cable Entry
M20x1.5 without cable gland .............................................................................. M
1/2-14 NPT without cable gland ........................................................................ N

Communication
HART ............................................................................................................... H
PROFIBUS-PA ................................................................................................. P
FOUNDATION Fieldbus H1 ............................................................................ B
## Electrical Classification

<table>
<thead>
<tr>
<th>Classification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX intrinsic safe, Zone 0, IIC T4 (HART)</td>
<td>Zone 0, IIC T6 (PROFIBUS or FOUNDATION Fieldbus)</td>
</tr>
<tr>
<td>ATEX intrinsic safe, Zone 0, IIC T6 (HART)</td>
<td>Zone 0, IIC T6 (PROFIBUS or FOUNDATION Fieldbus)</td>
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<tr>
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<td>Zone 1, IIC T6 (HART)</td>
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<td>Zone 1, IIC T6 (HART)</td>
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<tr>
<td>ATEX intrinsic safe, Zone 2, IIC T4 (HART)</td>
<td>Zone 2, IIC T6 (HART)</td>
</tr>
<tr>
<td>ATEX intrinsic safe, Zone 2, IIC T6 (PROFIBUS or FOUNDATION Fieldbus)</td>
<td>Zone 2, IIC T6 (PROFIBUS or FOUNDATION Fieldbus)</td>
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<tr>
<td>ATEX explosionproof, Zone 0, IIC T6</td>
<td>Zone 0, IIC T6</td>
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<td>ATEX explosionproof, Zone 1, IIC T6</td>
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<tr>
<td>FM Nonincendive, HART</td>
<td>PROFIBUS or FOUNDATION Fieldbus</td>
</tr>
<tr>
<td>FM Explosionproof</td>
<td>PROFIBUS or FOUNDATION Fieldbus(c)</td>
</tr>
<tr>
<td>CSA Explosionproof</td>
<td>PROFIBUS or FOUNDATION Fieldbus(c)</td>
</tr>
<tr>
<td>FM Intrinsically Safe, HART</td>
<td>PROFIBUS or FOUNDATION Fieldbus(c)</td>
</tr>
<tr>
<td>CSA Intrinsically Safe</td>
<td>PROFIBUS or FOUNDATION Fieldbus(c)</td>
</tr>
<tr>
<td>GOST-R intrinsically safe, T4 (HART)</td>
<td>GOST-R intrinsically safe, T6</td>
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<tr>
<td>GOST-R intrinsically safe, T6</td>
<td>GOST-R intrinsically safe, T6</td>
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<tr>
<td>GOST-R explosion proof, Zone 1 − IIC T6</td>
<td>GOST-R explosion proof, Zone 1 − IIC T6</td>
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<tr>
<td>GOST-R intrinsically Safe, Zone 0 − IIC T6 (HART)</td>
<td>GOST-R intrinsically Safe, Zone 0 − IIC T6 (HART)</td>
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<td>GOST-R intrinsically Safe, Zone 1 − IIC T6 (HART)</td>
<td>GOST-R intrinsically Safe, Zone 1 − IIC T6 (HART)</td>
</tr>
<tr>
<td>GOST-R intrinsically Safe, Zone 2 − IIC T6 (HART)</td>
<td>GOST-R intrinsically Safe, Zone 2 − IIC T6 (HART)</td>
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<tr>
<td>GOST-R explosion proof, Zone 0 − IIC T6</td>
<td>GOST-R explosion proof, Zone 1 − IIC T6</td>
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<td>GOST-R explosion proof, Zone 1 − IIC T6</td>
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<tr>
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<td>NEPSI Intrinsically Safe, T6</td>
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<tr>
<td>NEPSI Explosionproof, Ex d IIC T4-T6</td>
<td>For General Purpose Areas, Not Explosionproof</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Overview Accessories

For Displacer Element 204DE, Displacer Chamber 204DC, Flange combination 204FK, Flange Kit 204BCF see 204xx or Product Specifications PSS EML0901 A-(en), 204. Accessories for Buoyancy Transmitter.
**Optional Features**

- Housing Complete Stainless Steel without external Pushbuttons (not available with Wafer Body Material codes K)...-H
- Remote Amplifier Mounting Kit (3m), Mounted ...-R
- Remote Amplifier Mounting Kit (10m), Mounted ...-B

**Tag No. Labeling**

- Stainless Steel Label Fixed With Wire ...-L
- Stainless Steel Label Fixed On Amplifier ...-F

**National Certificates**

- TA-Luft ..........................................................-K
- ABSA (Canada). ...................................................-A
- Germanischer Lloyd (G) .......................................-G

**Certificates**

- EN 10204-2.1, Certificate Of Compliance .................................................................-1
- EN 10204-2.2, Specific Test Report (Calibration) ..........................................................-2
- EN 10204-3.1, Inspection Certificate Of Process Wetted Material ..................................-3
- PED 97/23/EC additional unit verification, according to module F/G
  (Not available with Wafer Body Material codes N and I) ...........................................-4
- Comply With NACE Standard MR-0175 (available with Torque Tube Material I, M or C) ...-6
  with Wafer Body Material codes S, U, T, N, I, C
  with Wafer Body Material codes K, L, O, P .........................................................-6
- SIL 2 Certificate ...................................................-Q

**Material Test**

- X-Ray And Isotope Test For Weldings .................................................................-7
- Dye Penetration Test .......................................................................................-8
- PMI - Test .....................................................................................................-5

**Subassemblies**

- Torque Tube for selected code (244LD-********-W) ..................................................-W
- Amplifier for selected code (244LD-********-X) ....................................................-X
- Complete Sensor for selected code (244LD-********-Y) ...........................................-Y
- Wafer body for selected code (244LD-********-Z) ....................................................-Z

**Notes**

- a Available with Wafer Body Flange Size 1 or 2
- b Available with Wafer Body Flange Size 1 or 4
- c Pending
- d Not available with Wafer Body Pressure Rating & Contact Face codes L1, J1, J2, J3, H1, H2, DD
- e Not available with Electrical Classification FDZ, CDZ, 0C6, D0C, D1C, GDZ, NDZ or Optional Features -H
- f Restrictions concerning the limit of application for the used materials are to considering (NACE Standard MR-0175/2003, bzw. ISO 15156-3)
- g Pending, order separately at this time.
- h Available with Wafer Body Flange Size 0
- i Available with Wafer Body Flange Size 1
- j Not available with Wafer Body Pressure Rating code J3
- k Not available with Wafer Body Material codes K, L, O, P, N, I, C or Torque Tube Material codes I and M
- l Not available with Wafer Body Material codes K, L, O, P, U, N, I, C
- m on request
- n Available with HART
- o D at top
- p F at top
- q Not applicable with Version N, T, D
- r Pending Electrical Classifications FDZ, CDZ, GA4, GA8, GDZ
- s Available with version N, T, D
Liquid Level, Density, or Interface

244LVP LevelStar Buoyancy Transmitter for Liquid Level, Interface and Density

- Communication HART (4-20 mA)
- Configuration via FDT-DTM
- Multilingual full text graphic LCD
- IR communication as a standard
- Conventional operation with local keys
- Easy adaptation to the measuring point without calibration at the workshop
- Backdocumentation of measuring point
- Configurable safety value
- Software lock against unauthorized operation
- Simulation of analog output for loop-check
- Local display in %, mA or physical units
- Signal noise suppression by Smart Smoothing
- Continuous self-diagnostics
- Linear or customized characteristic
- Process temperature from -50°C to +150°C
- Static pressure up to PN 40
- Micro sintermetal sensor technology

The buoyancy transmitter 244LVP LevelStar is designed to perform continuous measurements for liquid level, interface or density of liquids in the process of all industrial applications. The measurement is based on the proven Archimedes buoyancy principle and thus extremely robust and durable. Measuring values can be transferred analog and digital. Digital communication facilitates complete operation and configuration via PC or control system. The 244LVP LevelStar measures with consistent reliability and high precision. For installations in contact with explosive atmospheres up to Zone 0, certificates are available.

For complete specifications, refer to Product Specification Sheet PSS EML1710 G-(en).

### Input/Output
- Measuring span ........... 2 to 20 N, continuously adjustable
- Measuring ranges ....... 0-50 mm to 0-3 m, cont. adjustable
- Density range ............. 100 <p <2000 kg/m³
- Displacer (204DE)
  - Standard length ........ 350 to 3000 mm, 14 to 120 inch
  - Weight of displacer ....... max. 25 N
- Characteristic ............ linear oder customized with up to 32 setpoints
- Span ratio
  - Turn-down ............... 1:1 to 1:10 (1:20 on request)
  - Accuracy ................ ±0.2%; increased accuracy with customized adjustment
- Transfer function ......... linear or customized with up to 32 setpoints

### Configuration
- Digital via communication
- Digital via IrCom as a standard
- With local push buttons and LCD

### Local display
- Multilingual, full graphic LCD, configurable in %, mA or phys. units, & messages in clear text

### Load
- \( R_{\text{min}} = \frac{U_S - 12V}{24 \text{ mA}} - 100 \text{ Ohm} \)

### Communication HART
- Connection ............... Two-wire system
- Supply voltage \( U_S \) ............. 12 to 42 V dc, Vpp <1%
- Current sink .............. max. 24 mA
- Signal range ............ 4 to 20 mA
- Operating range ....... 3.8 to 20.5 mA (NE43)
- Digital communication .. HART Protocol, 1200 Baud
- Handheld Terminal ...... HT 375/475
- PC Software ............. WINxx and FDT/DTM
- Hardware ................. HART Modem
- Min. load ................ 250 Ohms
- Failure handling
  - Substitute value ........ last value or safety value
  - Safety value ............ 3.6 to 23 mA, adjustable

### Operating conditions
- Process temperature ....... -50°C to +150°C
- Pressure rating
  - acc. to DIN ............... PN 40
  - acc. to ANSI ............. Class 150, 300
- Ambient temperature ....... -40°C to +85°C
- Relative humidity ......... up to 100%
- Condensation .......... permitted
- Transportation
- Storage temperature ...... -50°C to +85°C
- Protection .............. IP 66 (acc. DIN EN 60 529)
### How to Order – Specify model number 244LVP

**Flange Material (Process wetted)**
- 1.4571 (316Ti) .......................................................... S
- Titan 3.7025 / 3.7035 \( ^{(h)} \) ........................................... T

**Sensor Material (Process wetted)**
- 316L / 1.4435 / 1.4404 .................................................. S
- Titan 3.7025 / 3.7035 \( ^{(h)} \) ........................................... T

**Flange Size**
- DN50 ................................................................. 5
- DN80 ................................................................. 8
- 2-Inch ............................................................. 2
- 3-Inch ............................................................. 3

**Flange Pressure Rating & Contact Face**
- PN16 to PN40, B1 (DIN EN1092-1) \( ^{(a)} \) .................... B1
- PN16 to PN40, B2 (DIN EN1092-1) \( ^{(a)} \) .................... B2
- PN16 to PN40, D (DIN EN1092-1) \( ^{(a)} \) .................... D1
- ANSI Class 150, RF RF/SF (RF125) \( ^{(b)} \) .................. R1
- ANSI Class 300, RF RF/SF (RF125) \( ^{(c)} \) .................. R2
- ANSI Class 150, RJF \( ^{(b)} \) ........................................... J1
- ANSI Class 300, RJF \( ^{(c)} \) ........................................... J2

**Version**
- Base ................................................................. B

**Cable Entry**
- M20x1.5 Without Cable Gland .................................. M
- 1/2-14 NPT Without Cable Gland ............................. N

**Communication**
- HART .............................................................. H

**Electrical Classification**
- ATEX intrinsic safe, Zone 1 – IIC T4 ............................... 1C4
- ATEX intrinsic safe, Zone 1 – IIC T6 ............................... 1C6
- ATEX intrinsic safe, Zone 2 – IIC T4 ......................... 2C4
- ATEX intrinsic safe, Zone 1 – IIIB T6 ............................... D1B
- ATEX explosion proof, Zone 1 – IIC T6 ....................... D1C
- FM Nonincendive ...................................................... NFM
- FM explosion proof \( ^{(d)} \) \( ^{(m)} \) .............................................. FDZ
- GOST-R intrinsically safe, Zone 1 – IIC T6 ................. GA1
- GOST-R intrinsically safe, Zone 2 – IIC T6 ................. GA2
- GOST-R explosion proof, Zone 1 – IIC T6 ................. GD1
- Nepsi intrinsically safe T6 \( ^{(d)} \) ................................. NA6
- Nepsi explosion proof \( ^{(d)} \) ........................................... NDZ
- Brasil intrinsically safe T6 \( ^{(d)} \) ................................. BA6
- Brasil explosion proof \( ^{(d)} \) ........................................... BDZ
- CSA explosion proof \( ^{(d)} \) \( ^{(m)} \) ........................................ CDZ
- FM Intrinsically Safe ...................................................... FAA
- CSA intrinsically safe \( ^{(d)} \) \( ^{(x)} \) ........................................... CAA
- For General Purpose Areas, not explosion proof .......... ZZZ
Optional Features

Housing Complete Stainless Steel Without External Push buttons ..................................... H

Tag No. Labeling

Stainless Steel Label Fixed With Wire .................................................................................. L
Stainless Steel Label Fixed On Amplifier ............................................................................... F

Certificates

EN 10204-2.1, Certificate Of Compliance .............................................................................. 1
EN 10204-2.2, Specific Test Report (Calibration) ..................................................................... 2
EN 10204-3.1, Inspection Certificate Of Process Wetted Metallic Material ............................... 3
Comply With NACE Standard MR-01-75 ................................................................................... 6
EN 10204-3.1, Inspection Certificate Of Process Wetted Material with Copy of Original individual Material certificate ................................................................. 9
SIL 2 Certificate .................................................................................................................... Q

Notes

a Available with Flange Size 5 or 8
b Available with Flange Size 2 or 3
c Available with Flange Size 3
d Pending
e Only with Sensor Material N
f Restrictions concerning the limit of application for the used materials are considerable (NACE Standard MR-0175/2003, or ISO 15156-3)
g Not with Electrical Classification 0B4 and 0C4
h On request
i Only with Electrical Classification 1 C4, 1C6, D1B, D1C, 2C4, G A1, GA2, GD1, NA6, NDZ, BA6, BDZ, ZZZ
j Pending for Version N 1C6, 1B6
k Only Version B

Required Tags

Calibrated Range
Ranges: 0 to 100% or
0 to 2kg or
0 to 19.6N or
0 to 2 kgf
Span Limits: 10 to 100% or
0.2 to 2 kg or
2 to 19.6 N or
0.2 to 2 kgf
Lower Density: user input
Upper Density: user input
Tag No. Labeling S: user input
Tag No. Labeling L: user input
Tag No. Labeling F: user input

Overview Accessories

For Displacer 204DE, Displacer Chamber 204DC,
Flange combination 204FK, Flange Kit 204BCF
see 204xx, or Product Specifications PSS EML0901 A-(en),
204.. Accessories for Buoyancy Transmitter.
This transmitter is designed to perform measurements for liquid level, interface and density of liquids. The measurement is based on the Archimedes buoyancy principle.

For complete specification, refer to Product Specification Sheet PSS EML0110 A-(en)

Input
Measuring span ........... 3 to 15 N
Density range ............... 100 <p <1600 kg/m³
Standard lengths of displacers 204DE ............ 350 to 3000 mm
14 to 120 inch
Weight of displacer .......... max. 25 N
Output ..................... 0.2 to 1 bar/3 to 15 psi/20 to 100 kPa/0.2 to 1 kp/cm²
Supply air ................ 1.4 ±0.1 bar or 20 ±1.4 psi

Transitional Behavior
Relative error .............. <1%
Sensitivity ................. <0.1%
Ambient temperature influence ......................... <0.2%/10 K
Process temperature influence ......................... <0.1%/10 K
Supply air influence .......... <0.2%/0.1 bar
Air consumption ........... <200 l/h
Air capacity ............... 1200 l/h
Load effect
(measured at 0.6 bar) ....... -3% for 400 l/h exhausted flow
-3% for 400 l/h delivered flow

Operating conditions
Process temperature .......... -196°C to +400°C
Pressure rating
acc. to DIN ............... PN 16, 40, 63, 100, 160, 250
acc. to ANSI ............... Class 150, 300, 600, 900, 1500
with heating jacket .......... wafer body
max. PN 160/Class 900;
heating jacket PN 25,
heating with saturated steam or thermal oils
Ambient temperature .......... -40 to +90°C
Relative humidity .......... <100%
Condensation ............... permitted
Transportation and storage temperature .......... -40 to +90°C
Protection class ............. IP 55 (acc. to DIN 40 050)
The device can be operated at a class D2 location in accordance with DIN IEC 654, part 1.

Mounting
Mounting method .......... sandwich mounted
acc. to DIN ................ DN 80, DN 100
acc. to ANSI ............... 3 inch, 4 inch
Pneum. connections .......... internal thread
DIN 45 141-Q %-18 NPT
How to Order – Specify model number 167LP
Wafer Body with Indicator (Flange Size and Pressure Rating)

<table>
<thead>
<tr>
<th>Flange Size</th>
<th>Pressure Rating</th>
<th>Contact Face Type</th>
</tr>
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<tbody>
<tr>
<td>DN80</td>
<td>PN16-40</td>
<td>C</td>
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<tr>
<td>DN80</td>
<td>PN16-160</td>
<td>U</td>
</tr>
<tr>
<td>DN80</td>
<td>PN16-250</td>
<td>E</td>
</tr>
<tr>
<td>DN100</td>
<td>PN16-160</td>
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<td>3-Inch</td>
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<td>4-Inch</td>
<td>ANSI Class 1500</td>
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Wafer Body Contact Face

<table>
<thead>
<tr>
<th>Contact Face Type</th>
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<tbody>
<tr>
<td>C</td>
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<tr>
<td>N</td>
</tr>
<tr>
<td>L</td>
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<td>R</td>
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</table>

Wafer Body Material (Process Wetted)

<table>
<thead>
<tr>
<th>Material Type</th>
</tr>
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<tbody>
<tr>
<td>Carbon Steel 1.0460 (A-105)</td>
</tr>
<tr>
<td>1.4404 (316L)</td>
</tr>
<tr>
<td>Hastelloy C</td>
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</table>

Wafer Body Mounting Direction (Transmitter on body)

<table>
<thead>
<tr>
<th>Mounting Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Hand Mounted</td>
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<tr>
<td>Left Hand Mounted</td>
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Torque Tube Material (Process Wetted)

<table>
<thead>
<tr>
<th>Material Type</th>
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<tbody>
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<td>316 (1.4571/1.4404/1.4435)</td>
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<tr>
<td>Hastelloy C</td>
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<tr>
<td>Inconel 600</td>
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<tr>
<td>Monel</td>
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Signal Range

<table>
<thead>
<tr>
<th>Signal Range</th>
</tr>
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<tbody>
<tr>
<td>0.2 To 1.0 bar</td>
</tr>
<tr>
<td>3 To 15 psi</td>
</tr>
<tr>
<td>20 To 100 kPa</td>
</tr>
<tr>
<td>0.2 To 1.0 kp/cm²</td>
</tr>
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</table>
Optional Features
Oil Damping

Electrical Certificates
ATEX – II 1/2 G c IIC (Zone 0) for media AI, All, B
ATEX – II 2 G c IIC (Zone 1) for media AI, All, B
Overfill Protection Per WHG For Environmental Pollution Fluids

Certificates
EN 10204-2.1
EN 10204-2.2 Specific Test Report (Calibration)
EN 10204-3.1 Inspection Certificate of Process Wetted Metallic Material
PED 97/23/EC additional unit verification, according to module F/G
Comply with NACE Standard MR-01-75 (available with Wafer Body Material Code S and Torque Tube Material Code C, I or M only)

Material Test
X-Ray And Isotope Test For Weldings
Dye Penetrate Test

Tag No. Labeling
Stainless Steel Label Fixed With Wire

Notes
c Available with Contact Face E, N, R & S
e Not available with Wafer Body -33, -34, -43 & -44
Buoyancy transmitters to measure liquid level, interface and density are used for open or closed vessels or containers. They can be mounted directly on top of the vessel, or if the application requires, on a side mounted cage. Depending on application and vessel design various installation accessories and the applicable displacer have to be selected.

For complete specification, refer to Product Specification Sheet PSS EML0901 A-(en)

- Universally applicable for all FOXBORO ECKARDT buoyancy transmitters with displacers
- Standards according to DIN and ANSI
- Various connections, dimensions and materials
- Displacers with custom dimensions and material
- Certification according to “Pressure Equipment Directive” (PED)
- Certified as part of an overfill protection according to WHG
- Certified for use in Zone 0
Liquid Level, Density, or Interface

How to Order – Specify model Displacer Element 204DE
Displacer for Buoyancy Transmitters from 2N buoyancy up to 20N

Range of Application(a)
- Liquid Level – Media: Liquid/Gas or Air
  (Density difference = 9x10^3 lbm/in^3 to 72.2x10^3 lbm/in^3)
  (Density difference = 250 kg/M^3 to 2000 kg/M^3)
- Interface Level/Density – Media: Liquid 1/Liquid 2
  (Density difference = 3.6x10^3 lbm/in^3 to 22.7x10^3 lbm/in^3).

Displacer Material
- 316L (1.4404 / 1.4435 / 1.4571) ............................................................... S
- PTFE (not for application in Zone 0) ......................................................... P
- PTFE With 25% Carbon ...................................................................... O
- Hastelloy C ......................................................................................... C
- Inconel 600 (2.4816) ......................................................................... L
- Monel 400 (2.4360) ........................................................................... M
- Titan (3.7035) .................................................................................... T

Pressure Rating
- Up to PN 100/Class 600 ..................................................................... D
- Up to PN 160/Class 900 ..................................................................... E
- Up to PN 250/Class 1500 ................................................................. F
- Up to PN 500/Class 2500 ................................................................. G

Suitable for Flange Size (at top of vessel/chamber)
- DN50 ..................................................................................................... 0
- DN70 ..................................................................................................... 1
- DN80 ..................................................................................................... 2
- DN100 ................................................................................................... 3
- DN150 ................................................................................................... 4
- 2 inch ..................................................................................................... 5
- 3 inch ..................................................................................................... 6
- 4 inch ..................................................................................................... 7
- 6 inch ..................................................................................................... 8

Displacer Length “L” (inches are approximate)
for Displacer Material Codes P and O
- 300 mm (12 in) to 2000 mm (79 in) without partitioning .......... A
- 2001 mm (79 in) to 4000 mm (157 in) One partition point ... B
- 4001 mm (157 in) to 6000 mm (236 in) Two partition points . C
- 6001 mm (236 in) to 8000 mm (315 in) Three partition points . D
- 8001 mm (315 in) to 10000 mm (394 in) Four partition points .. E
- 10001 mm (394 in) to 12000 mm (472 in) Five partition points ... F

for Displacer Material S, C, I, M, and T
- 300 mm (12 in) to 3000 mm (118 in) without partitioning .......... K
- 3001 mm (118 in) to 6000 mm (236 in) One partition point .... L
- 6001 mm (236 in) to 9000 mm (354 in) Two partition points ... M
- 9001 mm (354 in) to 12000 mm (472 in) Three partition points . N
- 12001 mm (472 in) to 15000 mm (591 in) Four partition points ... O

Material and Length of the Suspension (Length “b”)(a)
- 316L / 1.4404 / ...Standard length of Suspension(b) .................... S1
- 316L / 1.4404 / ...Customized Suspension Length(c) ............... S2
- Hastelloy C Standard length of Suspension(b) ............................ C1
- Hastelloy C Customized Suspension Length(c) .......................... C2
- Inconel Standard length of Suspension(b) ................................. I1
- Inconel Customized Suspension Length(c) ............................... J2
- Monel Standard length of Suspension(b) ................................. M1
- Monel Customized Suspension Length(b) ................................. M2
- Titan Standard length of Suspension(b) ................................. T1
- Titan Customized Suspension Length ................................. T2
Optional Features
for application in Zone 0 (Additional grounding rope) (not available with Displacer Material: P) ...................... E
Damping Spring (Mat. 1.4301, Max. 250° C [482° F])(f) ............................................................ D
Damping Spring (Mat. HC, Max. 350° C [662° F]) ............................................................... C
Degreased ................................................ O

Tag No. Labeling
Stainless Steel Label Fixed With Wire (Text required) ................................................................. L

Certificates
EN 10204-2.1, Certificate Of Compliance ................................................................. 1
EN 10204-3.1, Inspection Certificate Of Process Wetted Metallic Material
(not available with Displacer Material: P and 0) ......................................................... 3
PMI – Test (not available with Displacer Material: P and 0) .............................................. 5

Notes
a Upper and Lower Medium Density required (at operating temperature)
b Only in connection with Modelcode 204DC
c Exact length required (Contact face of flange to upper end of displacer)
d All ±8mm (0.3inch)
e Pending
f Required for 244LD Option -G

Tags
Length "b": required for Material & Suspension Length codes S2, C2, 12, M2, T2

Press. Rating Chamber: required for Material & Suspension Length codes S2, C2, 12, M2, T2
List = PN16; PN40; PN63; PN100; PN160; PN250; PN400; PN500; Cl.150; Cl.300; Cl.600; Cl.900; Cl.1500; Cl.2500

Length "L": required
300 to 2000 mm or 11.81 to 78.74 in – for Displacer Length code A
2001 to 4000 mm or 78.78 to 157.48 in – for Displacer Length code B
4001 to 6000 mm or 157.52 to 236.22 in – for Displacer Length code C
6001 to 8000 mm or 236.26 to 314.96 in – for Displacer Length code D
8001 to 10000 mm or 315.70 to 393.70 in – for Displacer Length code E
10001 to 12000 mm or 393.74 to 472.44 in – for Displacer Length code F
300 to 3000 mm or 11.81 to 118.11 in – for Displacer Length code K
3001 to 6000 mm or 118.15 to 236.22 in – for Displacer Length code L
6001 to 9000 mm or 236.26 to 354.33 in – for Displacer Length code M
9001 to 12000 mm or 354.37 to 472.44 in – for Displacer Length code N
12001 to 15000 mm or 472.48 to 590.55 in – for Displacer Length code 0

Lower Density: required; select kg/m3 or lbm/in3

Upper Density: required; select kg/m3 or lbm/in3

Static Pressure (actual): required
-1 to 100 bar; -14.5 to 600 psig – for Pressure Rating code D
-1 to 160 bar; -14.5 to 900 psig – for Pressure Rating code E
-1 to 250 bar; -14.5 to 1200 psig – for Pressure Rating code F
-1 to 500 bar; -14.5 to 2500 psig – for Pressure Rating code G

Tag No. Labeling: required with Optional Feature codes -L and -S

Use with Transmitter: required List = 144LD; 144LVD; 244LD; 244LVP; 167LP
**DISPLACER CHAMBER 204DC**

Displacer chambers are offered in four vessel mounting arrangements. The length L between the connection flanges corresponds to the displacer element length. For use as a part of an overfill protection the same length of displacer element and chamber is required.

<table>
<thead>
<tr>
<th>Connection</th>
<th>144LVD 244LVP</th>
<th>144LD 244LD 167LP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side-Side</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Side-Bottom</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Side-Top</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Top-Bottom</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>with heating jacket</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

**Materials, Pressure Ratings, Flange Sizes, Contact Faces, Pipe Sizes, Drain Types:** Flange, Screw, Pipe piece for welding

**Heating Jacket**

see Model Codes on the following pages

---

**Displacer chamber 204DC; Connections**

<table>
<thead>
<tr>
<th></th>
<th>without heating jacket</th>
<th>with heating jacket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side – Side</td>
<td>Side – Bottom</td>
<td>Side – Top</td>
</tr>
</tbody>
</table>

---

1. Connecting flange #1 to transmitter (See model code: Flange size & pressure rating)
2. Process connection flange #2 (See model code: Flanges to vessel)
3. Drain flange #3
4. Drain plug #4
5. Flange combination 204FK (only 244LD or 167LP)
7. Connection flange for heating jacket DN 15, PN 40, DIN 2135, max. working pressure 25 bar / 362 psi
8. Flushing connector

L = Length of displacer element = max. span
### How to Order – Specify model Displacer Chamber 204DC
Allows the pneumatic and Electronic Buoyancy Transmitters to be easily mounted to a wide array of tanks and vessels

#### Mounting Type (Flanges to Vessel)
- Side - Side ................................................................. -SS
- Side - Bottom ......................................................... -SB
- Side - Top (not for LVD and LVP) ............................. -ST
- Top - Bottom (not for LVD and LVP) ......................... -TB

#### Material
- Carbon Steel – Flanges 1.0460; – Pipes 1.0345 (application from -10° C to 350° C) .......... K
- 1.4571 (316 TO (application from -60° C to 400° C) .............................................. E
- 1.4571 (316 Ti) (application from -196° C to 400° C) ................................................. F
- 1.4571 (316 Ti) (application from -60° C to 500° C) .................................................... G
- 1.4404 (316 L) (application from -60° C to 400° C) ..................................................... S
- 1.4404 (316 L) (application from -196° C to 400° C) .................................................... U
- 1.4404 (316 L) (application from -60° C to 500° C) ..................................................... T
- 1.4541 (application from -60° C to 400° C) ................................................................. H
- 1.4541 (application from -196° C to 400° C) ............................................................... Q
- 1.4541 (application from -60° C to 500° C) ................................................................. J
- DUPLEX – 1.4462 (application from -10° C to 280° C) .............................................. N
- INCONEL 600 – 2.4816 (application from -10° C to 450° C) .................................... R
- INCONEL 825 – 2.4858 (application from -10° C to 450° C) ..................................... I
- Hastelloy C (application from 196° C to 400° C) ......................................................... C

#### Pressure Rating
- PN16 ................................................................................. A
- PN40 ................................................................................ B
- PN63 ................................................................................ C
- PN100 .............................................................................. D
- PN160 ............................................................................... E
- PN250 ............................................................................... F
- Class 150 ............................................................................ I
- Class 300 ............................................................................ J
- Class 600 ............................................................................ K
- Class 900 ............................................................................ L
- Class 1500 ........................................................................... M

#### Flange Size (to transmitter)
- DN50(h) ................................................................. 0
- DN80(d) ................................................................. 1
- DN100(b) ................................................................. 2
- DN150(e) ................................................................. 3
- 2 inch(g) ................................................................. 4
- 3 inch(f) ................................................................. 5
- 4 inch(f) ................................................................. 6
- 6 inch(c)(g) ............................................................ 7
### Contact Face (Transmitter Mounting Flange)
- Type B1 according DIN EN 1092-1
- Type B2 according DIN EN 1092-1
- Type C according DIN EN 1092-1
- Type D according DIN EN 1092-1
- Type L Lens according DIN EN 1092-1
- Type RF/SF (RA = 125 µm) Face according ANSI B16.5
- Type RJF Ring Joint Face according ANSI B16.5
- Type E Spigot according DIN EN 1092-1
- Type F Recess according DIN EN 1092-1
- Type LM Large Male according ANSI B16.5
- Type LF Large Female according ANSI B16.5
- Type LT Large Tongue according ANSI B16.5
- Type LG Large Groove according ANSI B16.5
- Type ST Small Tongue according ANSI B16.5
- Type SG Small Groove according ANSI B16.5

### Flange Size/Pipe Size (to Vessel)
- DN15
- DN15 Connection pipe 60 mm extended
- DN25
- DN25 Connection pipe 60 mm extended
- DN40
- DN40 Connection pipe 60 mm extended
- DN50
- DN50 Connection pipe 60 mm extended
- ½-inch
- ½-inch Connection pipe 60 mm extended
- 1-inch
- 1-inch Connection pipe 60 mm extended
- 1½-inch
- 1½-inch Connection pipe 60 mm extended
- 2-inch
- 2-inch Connection pipe 60 mm extended

### Contact Face (Flanges to Vessel)
- Type B1 according DIN EN 1092-1
- Type B2 according DIN EN 1092-1
- Type C according DIN EN 1092-1
- Type D according DIN EN 1092-1
- Type L Lens according DIN EN 1092-1
- Type RF/SF (RA = 125 µm) Face according ANSI B16.5
- Type RJF Ring Joint Face according ANSI B16.5
- Type E Spigot according DIN EN 1092-1
- Type F Recess according DIN EN 1092-1
- Type LM Large Male according ANSI B16.5
- Type LF Large Female according ANSI B16.5
- Type LT Large Tongue according ANSI B16.5
- Type LG Large Groove according ANSI B16.5
- Type ST Small Tongue according ANSI B16.5
- Type SG Small Groove according ANSI B16.5
- Pipe piece for welding

---

**Liquid Level, Density, or Interface**

8-18

[Logo: Foxboro by Schneider Electric]

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
### Drain (Flange, Screw, Pipe Piece for Welding)

<table>
<thead>
<tr>
<th>Size</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN15</td>
<td>A</td>
</tr>
<tr>
<td>DN20</td>
<td>B</td>
</tr>
<tr>
<td>DN25</td>
<td>C</td>
</tr>
<tr>
<td>DN40</td>
<td>D</td>
</tr>
<tr>
<td>DN50</td>
<td>E</td>
</tr>
<tr>
<td>½-inch</td>
<td>F</td>
</tr>
<tr>
<td>¾-inch</td>
<td>G</td>
</tr>
<tr>
<td>1-inch</td>
<td>H</td>
</tr>
<tr>
<td>1¼-inch</td>
<td>I</td>
</tr>
<tr>
<td>2-inch</td>
<td>J</td>
</tr>
<tr>
<td>¾-14NPT</td>
<td>K</td>
</tr>
<tr>
<td>Without</td>
<td>L</td>
</tr>
<tr>
<td>G x female thread</td>
<td>M</td>
</tr>
<tr>
<td>½-14NPT female thread</td>
<td>N</td>
</tr>
</tbody>
</table>

### Drain Contact face

- Type B1 according DIN EN 1092-1
- Type B2 according DIN EN 1092-1
- Type C according DIN EN 1092-1
- Type D according DIN EN 1092-1
- Type L Lens according DIN2696
- Type RF/SF (RA = 125 mcm inch) Face according ANSI B16.5
- Type RJF Ring Joint Face according ANSI B16.5
- Type E Spigot according DIN EN 1092-1
- Type F Recess according DIN EN 1092-1
- Type LM Large Male according ANSI B16.5
- Type LF Large Female according ANSI B16.5
- Type LT Large Tongue according ANSI B16.5
- Type LG Large Groove according ANSI B16.5
- Type ST Small Tongue according ANSI B16.5
- Type SG Small Groove according ANSI B16.5
- Type RF/SF (RA = 125 mcm inch) Face according ANSI B16.5
- Type RJF Ring Joint Face according ANSI B16.5
- Type E Spigot according DIN EN 1092-1
- Type F Recess according DIN EN 1092-1
- Type LM Large Male according ANSI B16.5
- Type LF Large Female according ANSI B16.5
- Type LT Large Tongue according ANSI B16.5
- Type LG Large Groove according ANSI B16.5
- Type ST Small Tongue according ANSI B16.5
- Type SG Small Groove according ANSI B16.5
- Type RF/SF (RA = 125 mcm inch) Face according ANSI B16.5
- Type RJF Ring Joint Face according ANSI B16.5
- Type E Spigot according DIN EN 1092-1
- Type F Recess according DIN EN 1092-1
- Type LM Large Male according ANSI B16.5
- Type LF Large Female according ANSI B16.5
- Type LT Large Tongue according ANSI B16.5
- Type LG Large Groove according ANSI B16.5
- Type ST Small Tongue according ANSI B16.5
- Type SG Small Groove according ANSI B16.5
- Type RF/SF (RA = 125 mcm inch) Face according ANSI B16.5
- Type RJF Ring Joint Face according ANSI B16.5
- Type E Spigot according DIN EN 1092-1
- Type F Recess according DIN EN 1092-1
- Type LM Large Male according ANSI B16.5
- Type LF Large Female according ANSI B16.5
- Type LT Large Tongue according ANSI B16.5
- Type LG Large Groove according ANSI B16.5
- Type ST Small Tongue according ANSI B16.5
- Type SG Small Groove according ANSI B16.5

### Type of Arrangement

- Standard
- Additional partition point with Bolts and Nuts, Spiralgasket Steel/Graphite
- Flange Face (acc Transmitter Mounting Flange):
  - Flanges acc. DIN EN – Form B1 resp. B2
  - Flanges acc. ANSI – Form RF/SF.
- Additional partition point with Bolts and Nuts, Spiralgasket 1.4571/Graphite
- Flange Face (acc Transmitter Mounting Flange):
  - Flanges acc. DIN EN – Form B1 resp. B2
  - Flanges acc. ANSI – Form RF/SF.
- Additional partition point with Bolts and Nuts, Spiralgasket Hastelloy C/Graphite
- Flange Face (acc Transmitter Mounting Flange):
  - Flanges acc. DIN EN – Form B1 resp. B2
  - Flanges acc. ANSI – Form RF/SF.
- With heating jacket made of 1.4571 (316Ti); 1.4404 (316L) – connecting flanges B1/DN15, PN40 (DIN EN 1092-1)
- With heating jacket made of 1.4571 (316Ti); 1.4404 (316L) – connecting flanges B1/DN25, PN40 (DIN EN 1092-1)
- With heating jacket made of 1.4571 (316Ti); 1.4404 (316L) – connecting flanges B2/DN15, PN40 (DIN EN 1092-1)
Type of Arrangement (continued)

With heating jacket made of 1.4571 (316Ti); 1.4404 (316L) – connecting flanges B2/DN25, PN40 (DIN EN 1092-1) .................................................. 9

With heating jacket made of 1.4571 (316Ti); 1.4404 (316L) – connecting flanges RF/SF, ½ in, class 300 ........................................... S

With heating jacket made of 1.4571 (316Ti); 1.4404 (316L) – connecting flanges RF/SF, 1 in, class 300 ........................................... T

With heating jacket made of 1.4571 (316Ti); 1.4404 (316L) – connecting flanges RJF, ½ in, class 300 ........................................... U

With heating jacket made of 1.4571 (316Ti); 1.4404 (316L) – connecting flanges RJF, 1 in, class 300 ........................................... V

Chamber for Length of Displacer “L” (indicate exact measure of L when ordering)

For Code SS “L” = Distance between center of flanges to Vessel

For length range

“L” >300 mm to 1000 mm (>12 inch to 40 inch) ........................................... A

“L” >1000 mm to 2000 mm (>40 inch to 79 inch) ........................................... B

“L” >2000 mm to 3000 mm (>79 inch to 118.5 inch) ....................................... C

“L” >3000 mm to 4000 mm (>118.5 inch to 157.5 inch)[w] .............................. D

“L” >4000 mm to 5000 mm (>157.5 inch to 197 inch)[w] .............................. E

“L” >5000 mm to 6000 mm (>197 inch to 236 inch)[w] .............................. F

Optional Features

Unit Degreased (no Material Factor) .......................................................... O

Corrosion addition 2-3 mm[o] .................................................................... Z

Drain valve with welding tap and ¼-NPT female[p] ........................................... V

Drain valve with welding tap and ¼-NPT male[p] .......................................... W

Additional flushing connector on top DN15 or ¼” (contact face same as flange to vessel) .......................................................... X

Additional flushing connector on top DN25 or 1” (contact face same as flange to vessel) .......................................................... Y

Tag No. Labeling:

Stainless Steel Label fixed with wire (no Material-Factor) .......................................................... L

Certificates:

EN 10204-2.1 Certificate of Compliance (no Material-Factor) .............................. 1

EN 10204-3.1 Inspection Certificate of process wetted metallic material (no Material-Factor) .............................. 3

PED 97/23/EC additional unit verification, according to Module F/G (no Material-Factor)[q] .............................. 4

Comply with NACE Standard MR-01-75 (requires Option -3) (no Material-Factor)[x,y,z] .............................. 6

Wasserstand 100 (no Material-Factor)[r] .......................................................... 9

Material Tests:

X-Ray & Isotope test for weldings (no Material-Factor) ........................................... 7

Dye penetrate test (no Material-Factor) ............................................................ 8

PMI - Test (no Material-Factor) ................................................................. 5

Notes

- pending
- Not with TYPE OF ARRANGEMENT: 6, 7, 8, 9, S, T, U, V
- Not with PRESSURE RATING CODE: I, J, K, L, M
- Not with PRESSURE RATING CODE: D, E, F, I, J, K, L, M
- Not with PRESSURE RATING CODE: A, B, C, D, E, F
- Not with PRESSURE RATING CODE: A, B, C, D, E, F, K, L, M
- Not with PRESSURE RATING CODE: A, B, I, J, K, L, M
- Not with PRESSURE RATING CODE: A, B, C, D, I, J, K, L, M
- Available with DRAIN: K & L
- Available with DRAIN CONTACT FACE S

q Restrictions concerning the limit of application for the used materials are considering (NACE Standard MR 0175/2003; bzw. ISO 15156)
r Available with Mounting Type Code SS, ST and Drain Code B, C, G, H
s Not available with DRAIN: K & L
t Not with MOUNTING TYPE: SS, ST
u Not with MOUNTING TYPE: -B, -TB
v Not with FLANGE SIZE (to Transmitter) 0 or 4
w With TYPE OF ARRANGEMENT A, B, C or D
x Not with MATERIAL K or L
y With MATERIAL K or L
z Price for carbon steel is for amount of one chamber. For more amounts contact factory.
** COVER FLANGE KIT **
The cover flange kit is necessary for the sandwich type torque tube transmitters 244LD and 167LP.

Two seals, studs and nuts are included. Vent plug is optional.

** BLIND FLANGE KIT **
The Blind Flange kit is required to close both the drain flange and the top mounted flange combination, if no other additional equipment is connected.

One seal, studs and nuts are included. Vent plug is optional.

Material,
Flange Size,
Pressure Rating,
Contact Face,
Gaskets,
Bolts and Nuts
see Model Codes on the following pages

---

** How to Order – Specify model Cover Flange Kit 204BCF (Flange, Gasket, Nuts and Bolts) **

<table>
<thead>
<tr>
<th>Material</th>
<th>Flange Size</th>
<th>Pressure Rating</th>
<th>Contact Face</th>
<th>Gaskets</th>
<th>Bolts and Nuts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Steel 1.0460/P25OGH (A-105) (application from -60° C to 460 ° C)((d)</td>
<td>DN15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16Mo3 (1.5415) (application from -10° C to 500 ° C)((d)</td>
<td>DN20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4571 (316 Ti) (application from 200° C to 500 ° C)((d)</td>
<td>DN25</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4404 (316L) (1.4435 with FLANGE SIZE 15.16 and CONTACT FACE H) (application from -200° C</td>
<td>DN50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4541 (application from -200° C bis 500 ° C)((d)</td>
<td>DN70</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4462 (DUPLEX) (application from -10° C bis 280 ° C)((d)</td>
<td>DN80</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1.4816 (INCONEL 600) (application from -10° C bis 450 ° C)((d)</td>
<td>DN100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4858 (INCONEL 825) (application from -10° C bis 450 ° C)((d)</td>
<td>1/2-inch(b)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hastelloy C (application from -200° C bis 450 ° C)((d)</td>
<td>3/4-inch(b)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Notes
1. Flange  
2. Gaskets  
3. Bolts and nuts  
4. Venting plug with G 3/4 A (DIN ISO 228) or 3/4 NPT
### Pressure Rating

- **PN 16** (with FLANGE SIZE -11, -12, -13, -14, -16, -17) ............................................. .A
- **PN 40** (with FLANGE SIZE -11, -12, -13, -14, -16, -17) ............................................. .B
- **PN 63** (with FLANGE SIZE -14, -16, -17) ................................................................. .C
- **PN 100** (with FLANGE SIZE -11, -13, -14, -16, -17) ................................................. .D
- **PN 160** (with FLANGE SIZE -11, -13, -14, -16, -17) ................................................ .E
- **PN 250** (with FLANGE SIZE -11, -13, -14, -16, -17) ................................................ .F
- **PN 400** (with FLANGE SIZE -16) ................................................................. .G
- **PN 500** (with FLANGE SIZE -15) ................................................................. .H
- **Class 150** (with FLANGE SIZE -18 to -23) ................................................................. .I
- **Class 300** (with FLANGE SIZE -18 to -23) ................................................................. .J
- **Class 600** (with FLANGE SIZE -18 to -23) ................................................................. .K
- **Class 900** (with FLANGE SIZE -18 to -23) ................................................................. .L
- **Class 1500** (with FLANGE SIZE -18 to -23) ............................................................... .M

### Contact Face

- **Type B1** according DIN EN 1092-1 (available with pressure rating A, B) ...................... M
- **Type B2** according DIN EN 1092-1 (available with pressure rating A to G) ................ O
- **Type C** according DIN EN 1092-1 (available with pressure rating A to G) .................. P
- **Type D** according DIN EN 1092-1 (available with pressure rating A to G) ................ Q
- **Type E Spigot** according DIN EN 1092-1 (available with pressure rating A to G) ......... X
- **Type F Recess** according DIN EN 1092-1 (available with pressure rating A to G) ......... Y
- **Type L** (available with pressure rating D, E, F, G) .................................................. .L
- **Type L Lens High pressure** (available with IG- Standard for PRESSURE RATING H and Lens acc. DIN 2596 with NENNDRUCK G) ............................................................... H
- **Type RF/SF** (available with pressure rating I to M) – RF Raised Face per ANSI B16.5 .................................................. R
- **Type RJF** (available with pressure rating I to M) – RJF Ring Joint Face per ANSI B16.5 by flange size -18 and -19 and pressure rating “I” not with contact face “J” ........................................... J
- **Type LM Large Male** according ANSI B16.5 .......................................................... W
- **Type LF Large Female** according ANSI B16.5 ......................................................... Z
- **Type LT Large Tongue** according ANSI B16.5 ......................................................... A
- **Type LG Large Groove** according ANSI B16.5 .......................................................... B
- **Type ST Small Tongue** according ANSI B16.5 .......................................................... G
- **Type SO Small Groove** according ANSI B16.5 .......................................................... U

### Gaskets

- **Graphite** ................................................. .G
- **Carbon Steel** ........................................... K
- **16Mo3** .................................................. O
- **1.4571 (316 Ti)** ...................................... E
- **1.4404 (316 L)** ........................................ S
- **1.4541** .................................................. H
- **1.4462 (DUPLEX)** .................................. N
- **1.4816 (INCONEL 600)** ......................... R
- **1.4858 (INCONEL 825)** ........................ I
- **Hastelloy C** .......................................... C

Without gasket with CONTACT FACE H ................................................. X
### Liquid Level, Density, or Interface

#### Bolts and Nuts

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolts (long) with reduced shank and nuts for transm. sandwich mounting a.</td>
<td>1</td>
</tr>
<tr>
<td>product temp. &gt; -10°C (Steel)</td>
<td></td>
</tr>
<tr>
<td>Bolts (long) with reduced shank and nuts for transm. sandwich mounting a.</td>
<td>2</td>
</tr>
<tr>
<td>product temp. &gt; -196°C (SS)</td>
<td></td>
</tr>
<tr>
<td>Bolts (short) with reduced shank and nuts for flange connection and product temp. &gt; -10°C (Steel)</td>
<td>3</td>
</tr>
<tr>
<td>Bolts (short) with reduced shank and nuts for flange connection and product temp. &gt; 196°C (SS)</td>
<td>4</td>
</tr>
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</table>

#### Optional Features

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaned by oil and fat.</td>
<td>-O</td>
</tr>
<tr>
<td>Vent Plug G ¾</td>
<td>-A</td>
</tr>
<tr>
<td>Vent Plug NPT ¾</td>
<td>-B</td>
</tr>
</tbody>
</table>

#### Tag No. Labeling

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless Steel Label Fixed With Wire</td>
<td>-L</td>
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</table>

#### Certificates

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 10204-2.1, Certificate Of Compliance</td>
<td>-1</td>
</tr>
<tr>
<td>EN 10204-3.1, Inspection Certificate Of Process Wetted Metallic Material</td>
<td>-3</td>
</tr>
<tr>
<td>Comply With NACE Standard MR-0175(a)</td>
<td>-6</td>
</tr>
</tbody>
</table>

#### Notes

- a Restrictions concerning the limit of application for the used materials are
  considering (NACE Standard MR 0175/2003, resp. ISO 15156)
- b Not with OPTION -A, -B
- c Spiral gaskets including Graphite
- d Not CONTACT FACE H
- f Flange size -15, -16, -17, -22, -23 only
- h Not FLANGE SIZE 15
- k Only GASKET: G
- l Not released
For flange mounting
e.g. top mounting on chambers or vessels

For sandwich mounted transmitters
e.g. top-bottom or top-side chambers

Materials, Flange Size #1,
Flange Size #2,
Static Pressure Rating,
Contact Face
see Model Codes on the following pages

How to Order – Specify model Cover Flange Combination 204FK (Includes Gaskets, Nuts & Bolts)

Material
Carbon Steel – Flanges 1.0460 (P25OGH); – Pipes 1.0345 (P235GH) application from -10° C to 350° C .................. -K
1.4571 (316 Ti) application from -60° C to 400° C .......................................................... -E
1.4571 (316 Ti) application from -196° C to 400° C .......................................................... -F
1.4571 (316 Ti) application from -60° C to 500° C .......................................................... -G
1.4404 (316 L) application from -60° C to 400° C .......................................................... -S
1.4404 (316 L) application from -196° C to 400° C .......................................................... -U
1.4404 (316 L) application from -60° C to 500° C .......................................................... -T
1.4541 application from -60° C to 400° C .......................................................... -H
1.4541 application from -196° C to 400° C .......................................................... -Q
1.4541 application from -60° C to 500° C .......................................................... -J
DUPLEX – 1.4462 application from -10° C to 280° C .......................................................... -N
INCONEL 600 – 2.4816 application from -10° C to 450° C .......................................................... -R
INCONEL 825 – 2.4858 application from -10° C to 450° C .......................................................... -I
Hastelloy C application from -196° C to 400° C .......................................................... -L

Pressure Rating
PN16 ....................................................................................................................................... A
PN40 ....................................................................................................................................... B
PN63 ....................................................................................................................................... C
PN100 ...................................................................................................................................... D
PN160 ...................................................................................................................................... E
PN250 ...................................................................................................................................... F
Class 150 .................................................................................................................................. I
Class 300 .................................................................................................................................. J
Class 600 .................................................................................................................................. K
Class 900 .................................................................................................................................. L
Class 1500 ................................................................................................................................. M

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
### Flange Size #1

<table>
<thead>
<tr>
<th>Flange Size</th>
<th>Description</th>
<th>Pressure Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN50</td>
<td>(with PRESSURE RATING A, B, C, D, E, F)</td>
<td>0</td>
</tr>
<tr>
<td>DN80</td>
<td>(with PRESSURE RATING A, B, C, D, E, F)</td>
<td>1</td>
</tr>
<tr>
<td>DN100</td>
<td>(with PRESSURE RATING A, B, C, D, E, F)</td>
<td>2</td>
</tr>
<tr>
<td>DN150</td>
<td>(with PRESSURE RATING A, B, C, D, E, F)</td>
<td>3</td>
</tr>
<tr>
<td>2 Inch</td>
<td>(with PRESSURE RATING I, J, K, L, M)</td>
<td>4</td>
</tr>
<tr>
<td>3 Inch</td>
<td>(with PRESSURE RATING I, J, K, L, M)</td>
<td>5</td>
</tr>
<tr>
<td>4 Inch</td>
<td>(with PRESSURE RATING I, J, K, L, M)</td>
<td>6</td>
</tr>
<tr>
<td>6 Inch</td>
<td>(with PRESSURE RATING I, J, K, L, M)</td>
<td>7</td>
</tr>
</tbody>
</table>

### Contact Face #1

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Pressure Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type B1</td>
<td>according DIN EN 1092-1 only with PRESSURE RATING A, B</td>
<td>M</td>
</tr>
<tr>
<td>Type B2</td>
<td>according DIN EN 1092-1 only with PRESSURE RATING A, B, C, D, E, F</td>
<td>O</td>
</tr>
<tr>
<td>Type C</td>
<td>according DIN EN 1092-1 only with PRESSURE RATING A, B, C, D, E, F</td>
<td>P</td>
</tr>
<tr>
<td>Type D</td>
<td>according DIN EN 1092-1 only with PRESSURE RATING A, B, C, D, E, F</td>
<td>Q</td>
</tr>
<tr>
<td>Type E</td>
<td>Spigot according DIN EN 1092-1 only with PRESSURE RATING A, B, C, D, E, F</td>
<td>X</td>
</tr>
<tr>
<td>Type F</td>
<td>Recess according DIN EN 1092-1 only with PRESSURE RATING A, B, C, D, E, F</td>
<td>Y</td>
</tr>
<tr>
<td>Type L</td>
<td>Lens according DIN2696 only with PRESSURE RATING D, E, F</td>
<td>L</td>
</tr>
<tr>
<td>Type RF/SF</td>
<td>(RA = 125 µm) according ANSI 1316.5 only with PRESSURE RATING I, J, K, L, M</td>
<td>R</td>
</tr>
<tr>
<td>Type RJF</td>
<td>Ring Joint Face according ANSI B16.5 only with PRESSURE RATING I, J, K, L, M</td>
<td>J</td>
</tr>
<tr>
<td>Type LM</td>
<td>Large Male according ANSI B16.5 only with PRESSURE RATING I, J, K, L, M</td>
<td>W</td>
</tr>
<tr>
<td>Type LF</td>
<td>Large Female according ANSI B16.5 only with PRESSURE RATING I, J, K, L, M</td>
<td>Z</td>
</tr>
<tr>
<td>Type LT</td>
<td>Large Tongue according ANSI B16.5 only with PRESSURE RATING I, J, K, L, M</td>
<td>A</td>
</tr>
<tr>
<td>Type LG</td>
<td>Large Groove according ANSI B16.5 only with PRESSURE RATING I, J, K, L, M</td>
<td>B</td>
</tr>
<tr>
<td>Type ST</td>
<td>Small Tongue according ANSI B16.5 only with PRESSURE RATING I, J, K, L, M</td>
<td>G</td>
</tr>
<tr>
<td>Type SG</td>
<td>Small Groove according ANSI B16.5 only with PRESSURE RATING I, J, K, L, M</td>
<td>U</td>
</tr>
</tbody>
</table>

### Flange Size #2

<table>
<thead>
<tr>
<th>Flange Size</th>
<th>Description</th>
<th>Pressure Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN15</td>
<td>(with flange size #1 1 and 2)</td>
<td>A</td>
</tr>
<tr>
<td>DN20</td>
<td>(with flange size #1 1 and 2) not PRESSURE RATING E, F</td>
<td>B</td>
</tr>
<tr>
<td>DN25</td>
<td>(with flange size #1 1 and 2)</td>
<td>C</td>
</tr>
<tr>
<td>DN50</td>
<td>(with flange size #1 0, 1, 2 and 3)</td>
<td>D</td>
</tr>
<tr>
<td>DN80</td>
<td>(with flange size #1 0, 1, 2 and 3)</td>
<td>E</td>
</tr>
<tr>
<td>DN100</td>
<td>(with flange size #1 0, 1, 2 and 3)</td>
<td>F</td>
</tr>
<tr>
<td>½-inch</td>
<td>(with flange size #1 5 and 6) not PRESSURE RATING I with CONTACT FLANGE J</td>
<td>H</td>
</tr>
<tr>
<td>¼-inch</td>
<td>(with flange size #1 5 and 6) not PRESSURE RATING I with CONTACT FLANGE J</td>
<td>I</td>
</tr>
<tr>
<td>1-inch</td>
<td>(with flange size #1 5 and 6)</td>
<td>J</td>
</tr>
<tr>
<td>2-inch</td>
<td>(with flange size #1 4, 5, 6 and 7)</td>
<td>K</td>
</tr>
<tr>
<td>3-inch</td>
<td>(with flange size #1 4, 5, 6 and 7)</td>
<td>L</td>
</tr>
<tr>
<td>4-inch</td>
<td>(with flange size #1 4, 5, 6 and 7)</td>
<td>M</td>
</tr>
</tbody>
</table>

### Contact Face #2

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Pressure Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type B1</td>
<td>according DIN EN 1092-1 with PRESSURE RATING A, B</td>
<td>M</td>
</tr>
<tr>
<td>Type B2</td>
<td>according DIN EN 1092-1 with PRESSURE RATING A, B, C, D, E, F</td>
<td>O</td>
</tr>
<tr>
<td>Type C</td>
<td>according DIN EN 1092-1 with PRESSURE RATING A, B, C, D, E, F</td>
<td>P</td>
</tr>
<tr>
<td>Type D</td>
<td>according DIN EN 1092-1 with PRESSURE RATING A, B, C, D, E, F</td>
<td>Q</td>
</tr>
<tr>
<td>Type E</td>
<td>Spigot according DIN EN 1092-1 with PRESSURE RATING A, B, C, D, E, F</td>
<td>X</td>
</tr>
<tr>
<td>Type F</td>
<td>Recess according DIN EN 1092-1 with PRESSURE RATING A, B, C, D, E, F</td>
<td>Y</td>
</tr>
<tr>
<td>Type L</td>
<td>Lens according DIN2696 with PRESSURE RATING D, E, F</td>
<td>L</td>
</tr>
<tr>
<td>Type RF/SF</td>
<td>(RA = 125 µm) according ANSI 1316.5 with PRESSURE RATING I, J, K, L, M</td>
<td>R</td>
</tr>
<tr>
<td>Type RJF</td>
<td>Ring Joint Face according ANSI B16.5 with PRESSURE RATING I, J, K, L, M</td>
<td>J</td>
</tr>
<tr>
<td>Type LM</td>
<td>Large Male according ANSI B16.5 with PRESSURE RATING I, J, K, L, M</td>
<td>W</td>
</tr>
<tr>
<td>Type LF</td>
<td>Large Female according ANSI B16.5 with PRESSURE RATING I, J, K, L, M</td>
<td>Z</td>
</tr>
<tr>
<td>Type LT</td>
<td>Large Tongue according ANSI B16.5 with PRESSURE RATING I, J, K, L, M</td>
<td>A</td>
</tr>
<tr>
<td>Type LG</td>
<td>Large Groove according ANSI B16.5 with PRESSURE RATING I, J, K, L, M</td>
<td>B</td>
</tr>
<tr>
<td>Type ST</td>
<td>Small Tongue according ANSI B16.5 with PRESSURE RATING I, J, K, L, M</td>
<td>G</td>
</tr>
<tr>
<td>Type SG</td>
<td>Small Groove according ANSI B16.5 with PRESSURE RATING I, J, K, L, M</td>
<td>U</td>
</tr>
</tbody>
</table>
Gaskets for Flange Size #1
Graphite with CONTACT FACE #1 P, Q, A, B, G, U .......................................................... G
Carbon Steel (b) ................................................................................................................. K
1.4571 (316 Ti) (b) .............................................................................................................. E
1.4404 (316 L) (b) .............................................................................................................. S
1.4541 (b) .......................................................................................................................... H
1.4462 (DUPLEX) (b) ......................................................................................................... N
1.4816 (INCONEL 600) (b) ................................................................................................. R
1.4858 (INCONEL 825) (b) ................................................................................................. I
Hastelloy C (b) ..................................................................................................................... C

Bolts and Nuts
Steel Bolts (long) with reduced shank, nuts and 2 gaskets for transm. sandwich mounting.
Product temp. > -10° C for FLANGE SIZE #1 1, 2, 5 and 6 ............................................. 1
SS Bolts (long) with reduced shank, nuts and 2 gaskets for transm. sandwich mounting.
Product temp. > -196° C for FLANGE SIZE #1 1, 2, 5 and 6 ............................................ 2
Steel Bolts (short) with reduced shank, nuts and #1 gasket for flange connection.
Product temp. > -10° C for FLANGE SIZE D 0 to 7 with FLANGE SIZE #2 D, E, F, K, L, M ......................................................................................................................... 3
Steel Bolts (short) with reduced shank, nuts and #1 gasket for flange connection.
Product temp. > -196° C for FLANGE SIZE D 0 to 7 with FLANGE SIZE #2 D, E, F, K, L, M ......................................................................................................................... 4

Optional Features
Oxygen Service cleaned ...................................................................................................... -O
Tag. No. Labeling
Stainless steel label fixed with wire .................................................................................. -L

Certificates
EN 10204-2.1 ...................................................................................................................... -1
EN 10204-3.1 ...................................................................................................................... -3
PED 97/23/EC additional unit verification, according to module F/G ............................................................................................................. -4
Comply with NACE standard MR-0175(a) .......................................................................... -6

Material Test
PMI Test ............................................................................................................................. -5
X-Ray and Isotope test for weldings .................................................................................. -7
Dye penetrate test ............................................................................................................. -8

Notes
a Restrictions concerning the limit of application for the used materials are considering
   (NACE Standard MR 0175/2003, bzw. ISO 15156)
b Spiral gaskets including Graphite (d) for PRESSURE RATING I, J, K, D, L, M
d Not Contact Face H
e Flange Size -15, -16, -17, -22, -23 only
The following chapter contains Product Specifications of the Instruments:

- **E27R** Series Electronic Indicating Recorders
- **740R** Series Digital Circular Chart Recorders
- **6100AF** Paperless Graphic Recorders
- **6180AF** Paperless Graphic Recorders
The E27R Series Electronic Indicating Recorder continuously indicates and records up to three separate electronic analog signals. For complete specifications, refer to Product Specification Sheet PSS 2A-3A1 D.

**Performance Specifications**
Accuracy: ±0.5% of calibrated span.
Repeatability: 0.15% of calibrated span.

**Physical Specifications**
Mounting: Flush in panels 3 to 25 mm (1/8 to 1 in) thick using 202S Series Shelves. Require 1 unit width of mounting capacity.
Mounting Angle: Recorders may be mounted in panels inclined forward up to 15° or inclined backward up to 75° from vertical.
Indicating Scales: 1, 2, or 3 separate transparent process scales with black numerals and graduations located in front of ribbon type indicators.

**Functional Specifications**
Input Signal: 4 to 20 mA dc into 250 ohm; 1 to 5 or 0 to 10 V dc (jumper selectable) into 100 kohm minimum for each pen.
Chart Drive Speed: 20 mm/h.
Electrical Classification: These instruments are designed for use in ordinary locations and Class I, Groups A, B, C, and D, Division 2 hazardous locations.
Pens: 1, 2, or 3, as specified:
Red Pen: Located in center position.
Green Pen: Located in inner position.
Blue Pen: Located in outer position.
Inking: Disposable fiber-tip snap-in pen cartridges. Each pen provides approximately a 3-month supply.
Supply Voltage and Frequency: 100, 120, 220, or 240 V ac +10%, -15%, 50 or 60 Hz, as specified.

**Optional Features**
Chart Drives: The following optional chart drives are available for either 50 or 60 Hz operation:
- Single Speed: 10, 40, 80, and 120 mm/h.
- Dual Speed: 20 mm/h and 20 mm/min or 20 mm/h and 40 mm/min.
Recorders

E27R

How to Order—Specify model number E27R followed by order code for each selection

Number of Pens
1 S .......................................................... 1R
2 S .......................................................... 2R
3 S .......................................................... 3R

Supply Voltage
120 V ac ................................................. A
220 V ac ................................................. B
240 V ac ................................................. C
100 V ac ................................................. D

Frequency
50 Hz ...................................................... 5
60 Hz ...................................................... 6

Optional Alarm Lamps
Three Light Emitting Diode (LED) alarm lamps, operated by an external contact ................................................................. L

Specify Optional Features

Specify chart and dial ranges—refer to Chart and Dial Catalog 600

Specify mounting equipment (202S Series Shelves)

Specify nameplate and information for instrument tag
The 740R Digital Circular Chart Recorder indicates and continuously records up to four electronic analog signals on a 12-inch circular chart. This microprocessor-based unit also offers a wide variety of user-configurable process supporting functions such as alarms, totalizers, calculations, and curve characterizers. Refer to Product Specifications sheet PSS 2C-1A8 A for complete description and specifications.

**Physical Specifications**

- **Environmental Protection:** Completely watertight and dust-tight, reinforced polyester enclosure. Conforms to the stringent requirements of NEMA Type 4.
- **Dimensions:** Nominal 15.6 in wide by 17.3 in high by 7.9 in deep
- **Mounting:** Surface, panel, or pipe
- **Display Format:** Blue-green, fluorescent panel with 40 dot matrix characters

**Functional Specifications**

- **Pens:** 1, 2, 3, or 4 as specified. Pen 1 (inner position) is red, pen 2 is violet, pen 3 is green, pen 4 (outer position) is blue.
- **Supply Power:** 90 to 132 V or 180 to 264 V ac, as specified, 45 and 65 Hz, 30 watts (90 watts with optional enclosure heater coded)
- **Ambient Temperature Limits:** 0 to 50°C (32 to 122°F)
- **Relative Humidity Limits:** 5 and 95%, noncondensing
- **Input Signals:** 0 to 20 mV through 0 to 100 V dc; RTD, ANSI, or IEC 100 ohm platinum, 10 ohm copper, 120 ohm nickel; thermocouple, ISA or ANSI Types T, J, E, C, L, K, N, R, S, and B. All inputs are fully isolated from line power, ground, and each other.
- **Signal Conditioning:** Square root, 3/2 and 5/2 power; log 10
- **Chart Speed:** Configurable from 1 to 4096 hours for each revolution
- **Charts:** Approximately 10 complimentary, 24-hour charts with 0 to 100% graduations are supplied with the recorder. Order quantity and range of charts desired separately
- **Sample Rate:** Two samples per second on each channel
- **Alarms:** Up to 4 alarms with individual set points on each channel. Configurable for high, low, deadband, and rate-of-change alarm action.

**Optional Features**

- **Transmitter Power Supply:** 29 V dc for up to four 2-wire transmitters
- **Totalizer:** Up to four fully scalable totalizers. Configurable reset and preload functions
- **Calculations and Characterizer:** Standard arithmetic functions plus preconfigured specialized applications
- **Contact Outputs:** Dry relay contacts for alarm status and remote counter drivers
- **NEMA 4X:** Provides additional corrosion resistance in conformance with NEMA Type 4X requirements
How to Order—Specify model number 740RA followed by order code for each selection

**Nominal Supply Voltage and Frequency**
- AC, 50/60 Hz
- 240 V AC, 50/60 Hz

<table>
<thead>
<tr>
<th>Channel One</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>0 to 20 mV/5V, TC</td>
</tr>
<tr>
<td></td>
<td>4 to 20 mA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Channel Two</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>0 to 20 mV/5V, TC</td>
</tr>
<tr>
<td></td>
<td>4 to 20 mA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Channel Three</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>0 to 20 mV/5V, TC</td>
</tr>
<tr>
<td></td>
<td>4 to 20 mA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Channel Four</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>0 to 20 mV/5V, TC</td>
</tr>
<tr>
<td></td>
<td>4 to 20 mA</td>
</tr>
</tbody>
</table>

**Optional Selections**
- 28 V Transmitter Power Supply
- Calculated Variables and Custom Curve
- One Totalizer
- Two Totalizers
- Three Totalizers
- Four Totalizers
- Dual Ramp Generator
- Tamper-Evident Feature
- NEMA 4X Enclosure
- Polycarbonate Door Windows
- Pipe Mounting
- Four Relay Outputs
- Eight Relay Outputs
- Eight Contact Inputs
- Sixteen Contact Inputs

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Remote Totalizer Outputs

One Output ................................................................. 1
Two Outputs ..................................................................... 2
Three Outputs ............................................................. 3
Four Outputs ................................................................. 4
One 4 to 20 mA Retransmission Output ........................... 5
Two 4 to 20 mA Retransmission Outputs .......................... 6
Three 4 to 20 mA Retransmission Outputs ....................... 7
Four 4 to 20 mA Retransmission Outputs .......................... 8

This product and its components are protected by one or both of the following U.S. patents D333,631 and RE33,267. Corresponding patents have been issued or are pending in other countries.
### 6100AF and 6180AF Paperless Graphic Recorders

The Foxboro brand 6000 Series Paperless Graphic Recorders offer unrivaled input accuracy with a 125 ms total sample rate for up to 18 or up to 48 input channels, depending on the model selected. Input channels are freely configurable to suit your process requirements. Each instrument has an intuitive, touch screen display to enable operators to clearly view process data in varying formats. All have onboard Flash data storage capability, Ethernet communication, and a choice of removable media size and type, secure digital (SD) cards, and USB memory sticks. Data is stored in a tamper resistant binary format that can be used for secure, long term records of your process. The 6000 Series is truly designed for today’s networked world and can be accessed via a Local Area Network (LAN), dial up connection, intranet, or internet.

- Color touchscreen display
- USB plug-and-play
- Up to 96 MB nonvolatile flash memory
- Ethernet TCP/ICP (Transmission Control Protocol/Internet Protocol)
- 125 ms parallel sampling
- Web Server allows “read only” remote access to recorder
- Data logging and archiving
- Auditor meets requirements of FDA Regulation 21 CFR
- Modbus RTU (Remote Terminal Unit)
- Supports Simple Network Time Protocol (SNTP)
- Batch Recording
- ASCII printer output
- Event Input selection to initiate internal actions
- Dynamic Host Configuration Protocol (DHCP)

- Foxboro broad range of field instrument measurement solutions:
  - Pressure measurements
  - Temperature measurements
  - Flow measurements
  - Level measurements
  - Conductivity measurements
  - pH measurements
  - User defined screens with Screen Builder
  - Remote monitoring using Bridge software
  - Review and Review/QuickChart software
  - Easy mounting to a vertical panel or to a panel sloped up to 45°, upward or downward
  - Password controlled electronic front panel media flap lock
  - EMC approved — CE and cUL
  - Electrical Safety per BS EN61010

### Standard Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>6100AF</th>
<th>6180AF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>1/4VGA, 5.5 inch</td>
<td>XGA, 12.1 inch</td>
</tr>
<tr>
<td>Channels</td>
<td>Up to 18</td>
<td>Up to 48</td>
</tr>
<tr>
<td>Relays</td>
<td>Up to 16</td>
<td>Up to 36</td>
</tr>
<tr>
<td>Events Inputs</td>
<td>24 (6 per option card)</td>
<td></td>
</tr>
<tr>
<td>Groups</td>
<td>6 Standard (12 optional)</td>
<td></td>
</tr>
<tr>
<td>Auditor Features</td>
<td>Auditor or audit trail</td>
<td></td>
</tr>
<tr>
<td>Virtual Channels</td>
<td>36, 96, 128</td>
<td></td>
</tr>
<tr>
<td>Timers</td>
<td>12 fitted as standard</td>
<td></td>
</tr>
<tr>
<td>Alarms</td>
<td>4 per channel</td>
<td></td>
</tr>
<tr>
<td>Batch</td>
<td>Optional selection</td>
<td></td>
</tr>
</tbody>
</table>

### Notes

- Refer to PSS 2C-1C1 A for complete specifications
- Virtual channels can be configured as maths, totalizers, counters, or comms

Contact Swanson Flo | www.swansonflo.com | 800-288-7926
**Recorders**

**How to Order** — Specify model number 6100AF followed by order code for each selection

<table>
<thead>
<tr>
<th>Number of Input Channels&lt;sup&gt;a&lt;/sup&gt;</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Input Channels — 4 Option Boards allowed with this Selection</td>
<td>0</td>
</tr>
<tr>
<td>6 Input Channels — 4 Option Boards allowed with this Selection</td>
<td>1</td>
</tr>
<tr>
<td>12 Input Channels — 4 Option Boards allowed with this Selection</td>
<td>2</td>
</tr>
<tr>
<td>18 Input Channels — 2 Option Boards allowed with this Selection</td>
<td>3</td>
</tr>
</tbody>
</table>

**Password Controlled Electronic Media Flap Lock**

| None | N |
| Electronic Lock on Media Flap | L |

**Power Supply**

| 90 to 264 V ac, 45 to 65 Hz; or 110 to 370 V dc | 1 |

**24 V Isolated Transmitter Power Supply**

| None | N |
| 110 to 120 V ac, 3 Channel TPS | A |
| 220 to 240 V ac, 3 Channel TPS | B |

**Internal Memory**

| 96 Mbyte for History — Typically 12 million samples | 2 |

**Memory Card Size**

| None | N |
| 4 Gbyte CF Card | E |
| 8 Gbyte CF Card | F |

**USB Memory Stick Size**

| None | N |
| 2 Gbyte USB Memory Stick | 5 |
| 4 Gbyte USB Memory Stick | 6 |
| 8 Gbyte USB Memory Stick | 7 |

**USB Ports on Rear Surface**

| None | N |
| 2 USB Ports on Rear Surface | R |

**Serial Communication Ports on Rear Surface**

| None | N |
| 2 EIA 232/485/422 Serial Communication Ports on Rear Surface | R |

**Form C Relays<sup>a</sup>**

| None | N |
| 3 Form C Relays (Comprises 1 Option Board) | A |
| 6 Form C Relays (Comprises 2 Option Boards) | B |
| 9 Form C Relays (Comprises 3 Option Boards) | C |
| 12 Form C Relays (Comprises 4 Option Boards) | D |

**Event Inputs<sup>a</sup>**

| None | N |
| 6 Event Inputs (Comprises 1 Option Board) | 1 |
| 12 Event Inputs (Comprises 2 Option Boards) | 2 |
| 18 Event Inputs (Comprises 3 Option Boards) | 3 |
| 24 Event Inputs (Comprises 4 Option Boards) | 4 |
### Analog Outputs (required selection even if not available)

- None

### Bridge Remote Viewing Software

- Bridge Lite (Standard)
- Bridge Full

### Review and Review/QuickChart Software

- Review Lite and Review/QuickChart Lite (Standard)
- Review Full and Review/QuickChart Full

### Auditor

- None
- Audit Trail
- Auditor

### Security Manager

- None
- Auditor

### Groups

- 6 Groups (Standard)
- 12 Groups

### Maths, Totalizers, and Counters

- None
- 36 Virtual Channels
- 96 Virtual Channels
- 128 Virtual Channels

### Batch

- None
- Batch

### Screen Builder

- None
- Advanced Screen Builder

### Master Communications

- None
- Modbus Master Communications for 16 Slaves
- Modbus Master Communications for 32 Slaves

### Notes

- The total combined option boards allowed for Form C Relays plus Even Inputs is 4 for Input Channel Selections 0, 1 and 2; however for Input Channel Selection 3, the number of combined option boards is 2. For example, when selecting Input Channel 2, you can have:
  - 4 Form C Relay Boards (Selection Code D), and
  - 0 Event Input Boards (Selection Code 0)
- Or you can have:
  - 2 Form C Relay Boards (Selection Code B), and
  - 2 Event Input Boards (Selection Code 2). 

Specify required auxiliary spec: number of 250 ohm shunts – one required for each 4 to 20 mA input signal.
### How to Order – Specify model number 6180AF followed by order code for each selection

#### Number of Input Channels

<table>
<thead>
<tr>
<th>Channels</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>24</td>
<td>4</td>
</tr>
<tr>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>42</td>
<td>7</td>
</tr>
<tr>
<td>48</td>
<td>8</td>
</tr>
</tbody>
</table>

#### Password Controlled Electronic Media Flap Lock

- None: N
- Electronic Lock on Media Flap: L

#### Power Supply

- 90 to 264 V ac, 45 to 65 Hz; or 110 to 370 V dc: 1

#### 24 V Isolated Transmitter Power Supply (required selection even though not used)

- Not used on Model 6180AF (available with Model 6100AF only): N

#### Internal Memory

- 96 Mbyte for History – Typically 12 million samples: 2

#### Memory Card Size

- None: N
- 4 Gbyte CF Card: E
- 8 Gbyte CF Card: F

#### USB Memory Stick Size

- None: 0
- 2 Gbyte USB Memory Slick: 5
- 4 Gbyte USB Memory Stick: 6
- 8 Gbyte USB Memory Stick: 7

#### USB Ports on Rear Surface

- None: N
- 2 USB Ports on Rear Surface: R

#### Serial Communication Ports on Rear Surface

- None: 0
- 2 EIA 232/485/422 Serial Communication Ports on Rear Surface: 1

#### Form C Relays

- None: N
- 3 Form C Relays (Comprises 1 Option Board): A
- 6 Form C Relays (Comprises 2 Option Boards): B
- 9 Form C Relays (Comprises 3 Option Boards): C
- 12 Form C Relays (Comprises 4 Option Boards): D
- 15 Form C Relays (Comprises 5 Option Boards): E
- 18 Form C Relays (Comprises 6 Option Board): F
- 21 Form C Relays (Comprises 7 Option Boards): G
- 24 Form C Relays (Comprises 8 Option Boards): H
- 27 Form C Relays (Comprises 9 Option Boards): J
## Recorders

<table>
<thead>
<tr>
<th>Event Inputs (^{(a)})</th>
<th>None</th>
<th>6 Event Inputs (Comprises 1 Option Board)</th>
<th>12 Event Inputs (Comprises 2 Option Boards)</th>
<th>18 Event Inputs (Comprises 3 Option Boards)</th>
<th>24 Event Inputs (Comprises 4 Option Boards)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

### Analog Outputs (required selection even if not available)

<table>
<thead>
<tr>
<th>None</th>
<th>N</th>
</tr>
</thead>
</table>

### Bridge Remote Viewing Software

<table>
<thead>
<tr>
<th>Bridge Lite (Standard)</th>
<th>Bridge Full</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

### Review and Review/QuickChart Software

<table>
<thead>
<tr>
<th>Review Lite and Review/QuickChart Lite (Standard)</th>
<th>Review Full and Review/QuickChart Full</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
</tr>
</tbody>
</table>

### Auditor

<table>
<thead>
<tr>
<th>None</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audit Trail</td>
<td>1</td>
</tr>
<tr>
<td>Auditor</td>
<td>2</td>
</tr>
</tbody>
</table>

### Security Manager

<table>
<thead>
<tr>
<th>None</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security Manager</td>
<td>S</td>
</tr>
</tbody>
</table>

### Groups

<table>
<thead>
<tr>
<th>6 Groups (Standard)</th>
<th>12 Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

### Maths, Totalizers, and Counters

<table>
<thead>
<tr>
<th>None</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>36 Virtual Channels</td>
<td>A</td>
</tr>
<tr>
<td>96 Virtual Channels</td>
<td>B</td>
</tr>
<tr>
<td>128 Virtual Channels</td>
<td>C</td>
</tr>
</tbody>
</table>

### Batch

<table>
<thead>
<tr>
<th>None</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batch</td>
<td>1</td>
</tr>
</tbody>
</table>

### Screen Builder

<table>
<thead>
<tr>
<th>None</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Screen Builder</td>
<td>A</td>
</tr>
</tbody>
</table>

### Master Communications

<table>
<thead>
<tr>
<th>None</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modbus Master Communications for 16 Slaves</td>
<td>1</td>
</tr>
<tr>
<td>Modbus Master Communications for 32 Slaves</td>
<td>2</td>
</tr>
</tbody>
</table>

### Notes

\(^{(a)}\) The maximum number of Option Boards available is 9; the nine combines the Form C Relay plus the Event Input. For example, selection could be:

- 6 Form C Relay Option Boards (18 Form C Relays – Selection Code F)
- 3 Event Input Option Boards (18 Event Inputs – Selection Code 3)

Specify required auxillary spec: number of 250 ohm shunts – one required for each 4 to 20 mA input signal.
The following chapter contains Product Specifications of the Instruments:

**718TC, 716C**  Controllers 1/8 DIN and 1/16 DIN

**740C**  Series Digital Circular Chart Recording Controller

**743CB**  Series Field Station Micro Controller

**762C**  Series Single Station Micro Controller
Controllers ¹⁄₈ and ¹⁄₁₆ DIN

These space-saving ¹⁄₈ and ¹⁄₁₆ DIN size controllers are a cost-effective solution for single loop applications. In addition, they are specifically designed for connectivity to small systems. The Modbus RS-485 interface provides a low-cost I/O solution with local display for PC-based applications running under Windows 3.10 or higher and, when connected to an I/A Series System for Windows NT, allows you to start small and expand as your process expands. 718 Series ¹⁄₈ DIN (48mm x 96mm) and 716 Series ¹⁄₁₆ DIN (48mm x 48mm) controllers include state-of-the-art self-tuning/adaptive tuning that keeps your process in control and enables quick and easy start-ups. Configuring controllers with fuzzy logic takes time and requires in-depth process knowledge. With 718/716 Series controllers, start-ups are as simple as (1) wiring the instrument, (2) configuring set points and alarms, and (3) initiating the autotune function. Refer to Product Specifications sheets for complete descriptions and specifications: PSS 2C-1B3A (718T) and PSS 2C-1B5A (716C).

- A Soft Start function for continuous output limiting, allowing configuration of the maximum output rate and duration, preventing thermal shock, and providing safe operation
- An Anti-windup function for safe operation during batch changes
- A Ramp-and-Soak function controls the rate at which your process changes
- Logic inputs for remote operation

Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>718TC</th>
<th>716C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opto-isolated RS-485 Modbus serial communication interface</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>PID control with programmable ramp and soak function, 40 to 20 mA or 0</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>to 20 mA control signal, or time proportional control with relay outputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto-tuning, SMART adaptive tuning</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Anti-windup</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Independent set points selectable from external input contacts</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Analog Outputs</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Relay Outputs</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Inputs: Universal, TC type, mV, V, mA, and RTD, fully selectable and keyboard programmable</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Output “Turn Off” function allows controller to be used as indicator</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Lock-out function prevents unauthorized configuration</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>NEMA 4X</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Accurate to 0.2% full scale (Measurement)</td>
<td>✗</td>
<td>✗</td>
</tr>
</tbody>
</table>
### Controllers

**718TC**

**How to Order – Specify Model Code 718TC**

<table>
<thead>
<tr>
<th>% DIN Process Controllers with Universal Input</th>
<th>718TC</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Digits Temperature Controller with Universal Input and Local Set Point</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outputs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>One mA output + Three Relays + Two Digital Inputs + Auxiliary Power Supply</td>
<td>-71</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communication</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No Communication</td>
<td>2</td>
</tr>
<tr>
<td>RS-485, Modbus Communication</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power Supply</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>100 to 240 V ac</td>
<td>3</td>
</tr>
<tr>
<td>24 V dc</td>
<td>5</td>
</tr>
</tbody>
</table>

### 716C

**How to Order – Specify Model Code 716C**

<table>
<thead>
<tr>
<th>% DIN Temperature Controllers with Universal Input</th>
<th>716C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual 4-digit display Temperature Controller</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Control Action</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PID or SMART Adaptive Control</td>
<td>-0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output Analog Type</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>mA linear Control Output as heating, cooling, or analog retransmission</td>
<td>-7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output Relay Type</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Two Relay Outputs</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alarms and Communication</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm 2</td>
<td>1</td>
</tr>
<tr>
<td>Alarm 2 + opto-isolated RS 485</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power Supply</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>100 to 240 V ac</td>
<td>3</td>
</tr>
<tr>
<td>24 V ac or dc</td>
<td>5</td>
</tr>
</tbody>
</table>
**740C Series Digital Circular Chart Recording Controller**

The 740C Digital Circular Chart Recording Controller controls up to two variables and continuously records up to four electronic analog signals on a 12-inch circular chart. This microprocessor-based unit also offers a wide variety of user-configurable process supporting functions such as alarms, totalizers, calculations, and curve characterizers.

Refer to Product Specifications sheet PSS 2C-1A7 A for complete description and specifications.

### Physical Specifications

**Environmental Protection:** Completely water-tight and dust-tight, reinforced polyester enclosure. Conforms to the stringent requirements of NEMA Type 4

**Dimensions:** Nominal 15.6 in wide by 17.3 in high by 7.9 in deep

**Mounting:** Surface, panel, or pipe

**Display Format:** Blue-green, fluorescent panel with 40 dot matrix characters

### Functional Specifications

**Pens:** 1, 2, 3, or 4 as specified. Pen 1 (inner position) is red, pen 2 is violet, pen 3 is green, pen 4 (outer position) is blue.

**Supply Power:** 90 to 132 V or 180 to 264 V ac, as specified, 45 and 65 Hz, 30 watts

**Ambient Temperature Limits:** 0 to 50°C (32 to 122°F).

**Relative Humidity Limits:** 5 and 95%, noncondensing.

**Input Signals:** 0 to 20 mV through 0 to 100 V dc; RTD, ANSI, or IEC 100 ohm platinum, 10 ohm copper, 120 ohm nickel; thermocouple, ISA or ANSI Types T, J, E, C, L, K, N, R, S, and B. All inputs are fully isolated from line power, ground, and each other.

**Signal Conditioning:** Square root, 3/2 and 5/2 power; log 10

**Chart Speed:** Configurable from 1 to 4096 hours for each revolution.

**Charts:** Approximately 10 complimentary, 24-hour charts with 0 to 100% graduations are supplied with the recorder. Order quantity and range of charts desired separately.

**Sample Rate:** Two samples per second on each channel.

**Alarms:** Up to 4 alarms with individual set points on each channel. Configurable for high, low, deadband, and rate-of-change alarm action.

### Optional Features

**Transmitter Power Supply:** 29 V dc for up to four 2-wire transmitters.

**Totalizer:** Up to four fully scalable totalizers. Configurable reset and preread functions.

**Calculations and Characterizer:** Standard arithmetic functions plus preconfigured specialized applications.

**Contact Inputs:** Up to 16 contact inputs for manipulating controller functions from external events.

**Contact Outputs:** Dry relay contacts for alarm status and remote counter drivers.

**NEMA 4X:** Provides additional corrosion resistance in conformance with NEMA Type 4X requirements.
### How to Order – Specify model number 740CA followed by order code for each selection

#### Nominal Supply Voltage and Frequency
- 120 V ac, 50/60 Hz.
- 240 V ac, 50/60 Hz.

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 V ac</td>
<td>A</td>
</tr>
<tr>
<td>240 V ac</td>
<td>C</td>
</tr>
</tbody>
</table>

#### Input Channel One
- 0 to 20 mV through 0 to 5 V, RTD and TC
- 4 to 20 mA

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 20 mV through 0 to 5 V, RTD and TC</td>
<td>1</td>
</tr>
<tr>
<td>4 to 20 mA</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Input Channel Two
- None
- 0 to 20 mV through 0 to 5 V, RTD and TC
- 4 to 20 mA

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>0 to 20 mV through 0 to 5 V, RTD and TC</td>
<td>1</td>
</tr>
<tr>
<td>4 to 20 mA</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Input Channel Three
- None
- 0 to 20 mV through 0 to 5 V, RTD and TC
- 4 to 20 mA

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>0 to 20 mV through 0 to 5 V, RTD and TC</td>
<td>1</td>
</tr>
<tr>
<td>4 to 20 mA</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Input Channel Four
- None
- 0 to 20 mV through 0 to 5 V, RTD and TC
- 4 to 20 mA

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>0 to 20 mV through 0 to 5 V, RTD and TC</td>
<td>1</td>
</tr>
<tr>
<td>4 to 20 mA</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Control Type
- One PID without EXACT Tuning
- One PID with EXACT Tuning
- Two PIDs without EXACT Tuning
- Two PIDs, one with EXACT Tuning
- Two PIDs, both with EXACT Tuning

<table>
<thead>
<tr>
<th>Type</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>One PID without EXACT Tuning</td>
<td>A</td>
</tr>
<tr>
<td>One PID with EXACT Tuning</td>
<td>B</td>
</tr>
<tr>
<td>Two PIDs without EXACT Tuning</td>
<td>C</td>
</tr>
<tr>
<td>Two PIDs, one with EXACT Tuning</td>
<td>D</td>
</tr>
<tr>
<td>Two PIDs, both with EXACT Tuning</td>
<td>E</td>
</tr>
</tbody>
</table>

#### Output Type
- Single 4 to 20 mA Output for one Controller
- Duplex 4 to 20 mA Outputs for one Controller
- Two Single 4 to 20 mA Outputs for two Controllers
- Two Duplex 4 to 20 mA Outputs for two Controllers
- Single 4 to 20 mA Output for one Controller, and Duplex 4 to 20 mA Output for second Controller
- Single Time Duration, Relay Output for one Controller
- Duplex Time Duration, Relay Outputs for one Controller
- Two Single Time Duration, Relay Outputs for two Controllers
- Two Duplex Time Duration, Relay Outputs for two Controllers
- Single Time Duration, Relay Output for one Controller, and Duplex Time Duration, Relay Output for second Controller

<table>
<thead>
<tr>
<th>Type</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single 4 to 20 mA Output for one Controller</td>
<td>A</td>
</tr>
<tr>
<td>Duplex 4 to 20 mA Outputs for one Controller</td>
<td>B</td>
</tr>
<tr>
<td>Two Single 4 to 20 mA Outputs for two Controllers</td>
<td>C</td>
</tr>
<tr>
<td>Two Duplex 4 to 20 mA Outputs for two Controllers</td>
<td>D</td>
</tr>
<tr>
<td>Single 4 to 20 mA Output for one Controller, and Duplex 4 to 20 mA Output for second Controller</td>
<td>E</td>
</tr>
<tr>
<td>Single Time Duration, Relay Output for one Controller</td>
<td>F</td>
</tr>
<tr>
<td>Duplex Time Duration, Relay Outputs for one Controller</td>
<td>G</td>
</tr>
<tr>
<td>Two Single Time Duration, Relay Outputs for two Controllers</td>
<td>H</td>
</tr>
<tr>
<td>Two Duplex Time Duration, Relay Outputs for two Controllers</td>
<td>I</td>
</tr>
<tr>
<td>Single Time Duration, Relay Output for one Controller, and Duplex Time Duration, Relay Output for second Controller</td>
<td>J</td>
</tr>
</tbody>
</table>
Controllers

Optional Selections
- Nominal 28 V dc Transmitter Power Supply ................................................................. A
- One Integral Totalizer ................................................................................................. B
- Two Integral Totalizers .............................................................................................. C
- Three Integral Totalizers ............................................................................................ D
- Four Integral Totalizers ............................................................................................... E
- Dual Ramp Generator .................................................................................................. F
- Tamper-Evident Feature .............................................................................................. G
- NEMA 4X Enclosure(2) ................................................................................................. H
- Polycarbonate Chart and User Interface Windows ..................................................... I
- Pipe Mounting(2) .......................................................................................................... J
- Eight Relay Outputs ..................................................................................................... K
- Eight Contact Inputs(3) ................................................................................................. L
- Sixteen Contact Inputs(3) ............................................................................................. M
- One Remote Totalizer and Retransmission Outputs
  - One Remote Totalizer Output(4) ................................................................................... N
  - Two Remote Totalizer Outputs(4) ................................................................................ N
  - Three Remote Totalizer Outputs(4) ............................................................................... N
  - Four Remote Totalizer Outputs(4) ................................................................................ N
  - One 4 to 20 mA Retransmission Output(5, 6) .............................................................. O
  - Two 4 to 20 mA Retransmission Outputs(5, 6) .............................................................. O
  - Three 4 to 20 mA Retransmission Outputs(5, 6) .......................................................... O
  - Four 4 to 20 mA Retransmission Outputs(5, 6) ............................................................ O

Notes
1. Operating ranges are field-configurable
2. NEMA 4X is standard with pipe mounting code N
3. The available of Relay Output, Contact Input, and Retransmission Output Options is space-dependent and therefore contingent upon previously selected functions. The instrument will accommodate a maximum of three function PWAs, with each PWA loaded as shown in Table 1
4. A totalizer and at least one relay output must be selected for each totalizer output selected
5. The available of Relay Output, Contact Input, and Retransmission Output Options is space-dependent and therefore contingent upon previously selected functions. The instrument will accommodate a maximum of three function PWAs, with each PWA loaded as shown in Table 1
6. The total number of 4 to 20 mA outputs is limited to four including controller outputs. The number of Retransmission Outputs available therefore depends on the Output Type previously specified as shown in Table 2

Table 1 PWA Functions and Capability

<table>
<thead>
<tr>
<th>Number of PWAs Required</th>
<th>Selected Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>One or Two Single 4 to 20 mA Control Outputs</td>
</tr>
<tr>
<td>1</td>
<td>One or Two 4 to 20 mA Retransmission Outputs</td>
</tr>
<tr>
<td>1</td>
<td>Each Duplex 4 to 20 mA Control Output</td>
</tr>
<tr>
<td>1</td>
<td>Two or Four Relay Outputs</td>
</tr>
<tr>
<td>1</td>
<td>Eight contact Inputs Plus One or Two Single 4 to 20 mA Control or Retransmission Outputs</td>
</tr>
<tr>
<td>1</td>
<td>Eight Contact Inputs Plus One Duplex 4 to 20 mA Control Output</td>
</tr>
</tbody>
</table>

Table 2 4 to 20 mA Outputs

<table>
<thead>
<tr>
<th>Output Type Code</th>
<th>Max. Number of Retransmission Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
</tr>
<tr>
<td>D</td>
<td>0</td>
</tr>
<tr>
<td>E</td>
<td>1</td>
</tr>
<tr>
<td>F through J</td>
<td>4</td>
</tr>
</tbody>
</table>

This product and its components are protected by one or more of the following U.S. patents: D333,631 and RE33,267. Corresponding patents have been issued or are pending in other countries.
The 743CB Series FIELD STATION MICRO controller is functionally identical to the 762C controller and is completely protected by a corrosion resistant, weatherproof NEMA 4X enclosure. It combines user simplicity with broad capability making it ideal for all applications, from the simplest to the most advanced. Refer to Product Specifications sheet PSS 2C-1A9 B for complete description and specifications.

**Functional Specifications**

- **Control Modes:** P, PI, PD, PID, Nonlinear and EXACT Self Tuning.
- **Functions:** External Integral (Reset), Output Limits, Output Tracking, Output Summing, Output Multiplying, Ratio, Dynamic Compensation, Signal Selection, Cascade Control, Arithmetic Calculations, Logic Gates.
- **Signal Conditioning:** Square, Square Root, Filter, Characterizer, Bias and Gain.
- **Discrete Inputs:** 2 Contact or Transistor Switch Inputs for remote status changes such as Auto/Manual, Remote/Local Setpoint, Output Track, etc. 5 Vdc nominal open circuit voltage, 1 mA maximum current.
- **Analog Inputs:** any or all of the following 6 proportional inputs: 4 Voltage or Current; 1-5 Vdc, 4-20 mA or 10-50 mA. Standard is 4 20 mA using a 250 Ohm resistor. Uses 100 Ohm for 10-50 mA. Remove resistor for 1-5 Vdc. 2 Frequency; 1-9999 Hz, compatible with typical flow meter rate pulse signals.
- **Discrete Outputs:** 2 Open Collector Transistor Switch outputs for status indication of Auto/Manual, Remote/Local Setpoint, Alarms and Gates, etc. 50 Vdc maximum at 250 mA dc maximum.
- **Analog Outputs:** Output 1; 4-20 mA into 500 Ohms (isolation is optional for this output) Output 2; 4-20 mA or 1-5 Vdc jumper selectable.
- **Alarms:** 4 dual level alarms, each with an adjustable dead band and 1 Boolean output. Each is configurable for Absolute, Deviation or Rate of Change. High/High, Low/Low or High/Low types and Nonlatching, Latching and permissive are available. Each alarm can be attached to any of the internal analog signals.
- **Nominal Supply Voltage and Frequency:** 24, 100, 120, 220 or 240 Vac, 50/60 Hz or 24 Vdc, as specified.
- **Power Consumption:** 15 VA, (27VA with optional heater)
- **Electrical Classifications:**
  - CSA/FM Ordinary Locations
  - CSA/FM Class 1, Division 2, Groups A, B, C & D

**Standard Features**

- Highly corrosion resistant and weather proof NEMA 4X enclosure
- Ambient Temperature Limits -10°C(14°F) to 60°C(140°F)
- Brilliant, fully interactive fluorescent display
- Two 4-20 mA analog outputs
- Large, easy-to-use operator keypad
- Two independent EXACT PID Control Functions
- Two 7 Digit Process totalizers
- Single Station Cascade Control
- Single Station Auto-Selector Control
- Two 3 Variable Indicator Stations
- Two Auto/Manual Transfer Stations
- Split Range Valve Outputs

**Optional Features**

- Output Isolation for one 4-20 mA Output
- Platinum RTD Input
- Enclosure Heater for -20°C(-14°F) lower temperature limit available on Vac Supply Voltage only

**Physical Specifications**

- 762CSA for retrofit into existing shelves, 20 or 30 Pin I/O
- 762CNA for New Panel installations, 32 Screw Terminals
- Dimensions: Nominal 10.3” wide by 12.6” high by 5.2” deep
- Surface, Panel or 2” Pipe mount

Reference: PSS 2C-1A9 B for complete specifications.

Note: The 743CB application and configuration structure is available in a Panel mounted package under Model Code 762C
Controllers

How to Order — Specify model number 743CB (Field Station Micro Controller) followed by order code for each selection

**Supply Voltage Frequency**
- 120 V ac, 50/60 Hz .................................................. A
- 220 V ac, 50/60 Hz .................................................. B
- 240 V ac, 50/60 Hz .................................................. C
- 24 V dc .................................................................... D
- 24 V ac, 50/60 Hz .................................................. E
- 100 V ac, 50/60 Hz .................................................. J

**Mounting**
- Pipe Mounting ........................................................ F
- Flush or Surface Mounting ........................................ P

**Optional Selections**
- Isolated Control Output ........................................... 1
- RTD Temperature Input(1) ........................................ 2
- Enclosure Heater(2) ................................................. 3
Example: 743CB-AF-1

**Optional Electrical Classification**
CS-E/CN-Z CSA certified for use in class I, groups A,B,C,D, Division 2 locations.
CS-E/FN-Z FM certified for use in class I, groups A,B,C,D, Division 2 locations.

**Optional Features**
- Circuit Board Coating: A conformal sealant applied to the circuit board and a special oil added to connectors to improve corrosion resistance ........................................ CBC
- Surge Suppressor: For use with serial communication input when external wiring is located near transient producing sources such as motors, solenoids, high voltages, etc. ........................................ SURSUP

**Accessories**
- Copy Accessory: All of the operating configuration is stored in a nonvolatile, random access memory (NOVRAM) module. The copy accessory permits the entire contents of the memory module to be quickly copied into another memory module, either a spare or one from another controller. ........................ K0143DV
- Refer to instruction sheet MI 018-900
- Spare Memory Module ............................................. L0122RJ

**Notes**
1. 100 ohm platinum RTD, 200°F (111°C) minimum span. Factory calibrated for 0° to 400°F unless specified otherwise.
2. Required for operating temperatures below 14°F (-10°C). Not available with voltage code D, 24 V dc power.

This product and its components are protected by one or more of the following U.S. patents 3,798,426; 4,616,332; 4,658,348; 4,704,676; and RE33,267. Corresponding patents have been issued or are pending in other countries.
The 762C Series Controller is a multi-purpose station with the ability to accomplish one or two independent control strategies concurrently. It can also be configured as one or two 3-variable indicator stations and one or two auto/manual transfer stations. Control, indicator, and auto/manual functions are intermixable. As symbolized by the “CE” marking, these controllers conform to the European Union directives.

**Standard Features**
- Brilliant, fully interactive fluorescent display
- Two 4-20 mA analog outputs
- Easy to use operator keypad
- Two independent EXACT PID Control Functions
- Two 7-Digit Process totalizers
- Single Station Cascade Control
- Single Station Auto-Selector Control
- Two 3-Variable Indicator Stations
- Two Auto/Manual Transfer Stations
- Split Range Valve Outputs

**Optional Features**
- Output Isolation for one 4-20 mA Output
- Platinum RTD Input

**Physical Specifications**
- 762CSA for retrofit into existing shelves, 20 or 30 Pin I/O
- 762CNA for New Panel installations, 32 Screw Terminals
- Mounting dimensions: 5.5” high, 2.7” wide Panel Cutout, 13.0” deep

**Functional Specifications**

**Control Modes:** P, P1, PD, PID, Nonlinear and EXACT Self Tuning.

**Functions:** External Integral (Reset), Output Limits, Output Tracking, Output Summing, Output Multiplying, Ratio, Dynamic Compensation, Signal Selection, Cascade Control, Arithmetic Calculations, Logic Gates.

**Signal Conditioning:** Square, Square Root, Filter, Characterizer, Bias and Gain.

**Discrete Inputs:** 2 Contact or Transistor Switch Inputs for remote status changes such as Auto/Manual, Remote/Local Setpoint, Output Track, etc. 5 Vdc nominal open circuit voltage, 1 mA maximum current.

**Analog Inputs:** any or all of the following 6 proportional inputs: 4 Voltage or Current; 1-5 Vdc, 4-20 mA or 10-50 mA. Standard is 4-20 mA using a 250 Ohm resistor. Uses 100 Ohm for 10-50 mA. Remove resistor for 1-5 Vdc. 2 Frequency; 1-9999 Hz, compatible with typical flow meter rate pulse signals.

**Discrete Outputs:** 2 Open Collector Transistor Switch outputs for status indication of Auto/Manual, Remote/Local Setpoint, Alarms and Gates, etc. 50 Vdc maximum at 250 mA dc maximum.

**Analog Outputs:** Output 1; 4-20 mA into 500 Ohms (isolation is optional for this output) Output 2; 4-20 mA or 1-5 Vdc jumper selectable.

**Alarms:** 4 dual level alarms, each with an adjustable dead band and 1 Boolean output. Each is configurable for Absolute, Deviation or Rate of Change. High/High, Low/Low or High/Low types and Nonlatching, Latching and permissive are available. Each alarm can attached to any of the internal analog signals.

**Nominal Supply Voltage and Frequency:** 24, 100, 120, 220 or 240 Vac, 50/60 Hz or 24 Vdc, as specified.

**Power Consumption:** 15 VA

**Electrical Classifications:**
- CSA/FM Ordinary Locations
- CSMF Class 1, Division 2, Groups A, B, C & D

**Reference:** PSS 2C 1A1 D for complete specifications.

**Note:** The 762C application and configuration structure is available in a NEMA 4 field mounted package under Model Code 743CB
How to Order — Specify model number 762CNA (Single Station Micro Controller, Housing-Mounted) followed by order code for each selection

Nominal Supply Voltage and Frequency

- 120 V ac, 50/60 Hz
- 220 V ac, 50/60 Hz
- 240 V ac, 50/60 Hz
- 24 V dc
- 24 V ac, 50/60 Hz
- 100 V ac, 50/60 Hz

Housing and Signal Connections

- 32-Position Terminal Blocks on Rear of Housing
- Controller Chassis without Housing

Optional Selections

- Output Isolation, 4 to 20 mA (Output 1 only)
- Platinum RTD Input (Input 1 only)

Example: 762CNA-AT

Notes

- Minimum span with platinum RTD input is 110°C (198°F).

How to Order — Specify model number 762CSA (Single Station Micro Controller, Shelf-Mounted) followed by order code for each selection

Signal Connector

- 20-Pin Signal Connector, Quick Disconnect
- 30-Pin Signal Connector, Quick Disconnect

Nominal Supply Voltage and Frequency

- 120 V ac, 50/60 Hz
- 220 V ac, 50/60 Hz
- 240 V ac, 50/60 Hz
- 24 V dc
- 24 V ac, 50/60 Hz
- 100 V ac, 50/60 Hz

Optional Selections

- Output Isolation, 4 to 20 mA (Output 1 only)
- Platinum RTD Input (Input 1 only)

Example: 762CSA-3E-12

Accessories

Copy Accessory: All of the operating configuration is stored in a nonvolatile, random access memory (NOVRAM) module. The copy accessory permits the entire contents of the memory module to be quickly copied into another memory module, either a spare or one from another controller. Refer to instruction sheet MI 018-885

Spare Memory Module

Notes

- The following controller features cannot be accessed when the 20-pin signal connector is used: Analog Input 3, frequency inputs, pulse inputs, RTD input option, 28 V dc field power to one transmitter (power can be supplied to one transmitter only).
- Minimum span with platinum RTD input is 110°C (198°F).
## Auxiliary Specifications

- Unless otherwise specified, all 743CB and 762C controllers are shipped with a Factory Default configuration consisting of a single measurement input, a local set point, PID EXACT control with EXACT turned off and scale ranges of 0 to 100 percent.

- The Optional Factory Configurations that follow provide solutions for some of the basic applications commonly encountered. They represent only a very limited number of possibilities that can be accomplished by this extremely powerful controller and should not in any way be considered the only possibilities.

- Because any list of standard configurations cannot be all inclusive, users should select the arrangement that most closely meets their needs. Any changes that are necessary to meet specific needs can easily be accomplished in the field. It will usually be necessary to at least change the loop tag, the scale ranges and the PID controller tuning parameters to suit process requirements.

### How to Order

Specify one of the Auxiliary Specification Reference described below. There is no increase in the base price for any of these configurations. When specified, the Auxiliary Specification Reference will be displayed in the loop tag to assist in initial field identification.

### Auxiliary Specifications

<table>
<thead>
<tr>
<th>Controller Type</th>
<th>Specification</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Loop Controller</td>
<td>With Hi/Lo Measurement Alarm</td>
<td>SINGL C</td>
</tr>
<tr>
<td></td>
<td>With One Totalizer</td>
<td>SINGL C1</td>
</tr>
<tr>
<td></td>
<td>With Hi/Lo Alarm and Totalizer</td>
<td>SINGL C2</td>
</tr>
<tr>
<td></td>
<td>With Split Range Outputs</td>
<td>SINGL C3</td>
</tr>
<tr>
<td></td>
<td>With 3-Variable Indicator Station</td>
<td>SINGL C4</td>
</tr>
<tr>
<td></td>
<td>With Auto Manual Transfer Station</td>
<td>SINGL C6</td>
</tr>
<tr>
<td>Dual Loop Controller</td>
<td>With Hi/Lo Measurement Alarms</td>
<td>DUAL C</td>
</tr>
<tr>
<td></td>
<td>With Two Totalizers</td>
<td>DUAL C1</td>
</tr>
<tr>
<td></td>
<td>With Alarms and Totalizers</td>
<td>DUAL C2</td>
</tr>
<tr>
<td></td>
<td>3-Variable Indicator Station</td>
<td>DUAL C3</td>
</tr>
<tr>
<td></td>
<td>With Three Hi/Lo Alarms</td>
<td>IND S</td>
</tr>
<tr>
<td></td>
<td>With Two Totalizers</td>
<td>IND S1</td>
</tr>
<tr>
<td></td>
<td>With Alarms and Totalizers</td>
<td>IND S2</td>
</tr>
<tr>
<td></td>
<td>With Second 3-Variable Indicator Station</td>
<td>IND S3</td>
</tr>
<tr>
<td></td>
<td>With Second 3-Variable Indicator Station, Hi/Low Alarms and Totalizers</td>
<td>IND S4</td>
</tr>
<tr>
<td></td>
<td>With Auto Manual Transfer Station</td>
<td>IND S6</td>
</tr>
<tr>
<td>Auto Manual Transfer Station</td>
<td>With Hi/Low Alarm</td>
<td>A/M S</td>
</tr>
<tr>
<td></td>
<td>With Totalizer</td>
<td>A/M S1</td>
</tr>
<tr>
<td></td>
<td>With Alarm and Totalizer</td>
<td>A/M S2</td>
</tr>
<tr>
<td></td>
<td>With Second Auto Manual Transfer Station</td>
<td>A/M S3</td>
</tr>
<tr>
<td></td>
<td>With Second Auto Manual Transfer Station, Hi/Low Alarms and Totalizers</td>
<td>A/M S4</td>
</tr>
<tr>
<td></td>
<td>With Split Range Outputs</td>
<td>A/M S5</td>
</tr>
<tr>
<td></td>
<td>Single Loop Flow Ratio Controller, 0 to 2 Ratio Range, square root inputs</td>
<td>A/M S6</td>
</tr>
<tr>
<td></td>
<td>With Hi/Lo Alarm</td>
<td>RATIO C</td>
</tr>
<tr>
<td></td>
<td>With One Totalizer</td>
<td>RATIO C1</td>
</tr>
<tr>
<td></td>
<td>With Hi/Lo Alarm and Totalizer</td>
<td>RATIO C2</td>
</tr>
<tr>
<td></td>
<td>With Split Range Outputs</td>
<td>RATIO C3</td>
</tr>
<tr>
<td></td>
<td>With 3-Variable Indicator Station</td>
<td>RATIO C4</td>
</tr>
<tr>
<td></td>
<td>with Auto Manual Transfer Station</td>
<td>RATIO C5</td>
</tr>
<tr>
<td></td>
<td>Cascade Controller</td>
<td>RATIO C6</td>
</tr>
<tr>
<td></td>
<td>With Hi/Lo Primary Alarm</td>
<td>CASCDE C</td>
</tr>
<tr>
<td></td>
<td>With One Totalizer</td>
<td>CASCDE C1</td>
</tr>
<tr>
<td></td>
<td>With Hi/Lo Alarm and Totalizer</td>
<td>CASCDE C2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CASCDE C3</td>
</tr>
<tr>
<td></td>
<td>Auto Selector Controller, low select</td>
<td>A SEL C</td>
</tr>
<tr>
<td></td>
<td>With Hi/Lo Alarms</td>
<td>A SEL C1</td>
</tr>
<tr>
<td></td>
<td>With Totalizer</td>
<td>A SEL C2</td>
</tr>
<tr>
<td></td>
<td>With Alarms and Totalizer</td>
<td>A SEL C3</td>
</tr>
<tr>
<td></td>
<td>With High Select</td>
<td>A SEL C4</td>
</tr>
<tr>
<td></td>
<td>Single Loop Controller with Pulse or contact driven set point</td>
<td>PULSE SP</td>
</tr>
<tr>
<td></td>
<td>Single Loop Controller with output freeze from external contact input</td>
<td>FREEZE</td>
</tr>
<tr>
<td></td>
<td>Single Loop Controller with output switching to a preset value from external contact Input</td>
<td>PRESET</td>
</tr>
</tbody>
</table>
The following chapter contains Product Specifications of the Instruments:

**710D**  I/A Series® Digital Indicator 1/8 DIN
The Foxboro 710D microprocessor-based indicator offers outstanding performance features in a cost-effective package. Designed specifically for equipment manufacturers who demand tight process monitoring, the 710D has a variety of standard features commonly found as options on our competitors’ indicators. The IP54 faceplate allows this unit to be used in applications where dust conditions exist.

The 710D high-quality display station expands performance and functionality. Features such as 10-segment characterizers, transmitter power supply, analog retransmission, and advanced alarming give you the tools needed for low-cost, reliable indication and alarming. Modbus RS-485 serial interface provides communication when data collection capabilities and remote operation are needed.

The man/machine interface provides a three-color customized display with two alphanumeric tiers, one four-digit process display, and six status indicators. Refer to Product Specifications sheet PSS 2C-1B2A for complete description and specifications.

**Specifications**

**Display:**
- Numeric Display (4 digits): Shows the actual measured value or (during configuration) used in conjunction with the alphanumeric display to show the parameter name and its setting.
- Alphanumeric Display (2 digits): Shows the engineering units of the measured value or (during configuration) used in conjunction with the numeric display to show the parameter name and its setting.

**Housing:**
- Material: ABS black. Self-extinguishing degree V-O according to UL, VDE, and CSA.
- Front Panel: Designed and tested for IP54 according to IEC 529 and CEI 70-1
- Installation: Panel mounting by means of brackets
- Dimensions: 48 x96 mm (1.890 x 3.780 in) according to DIN 43700; 149 mm (5.866 in) deep
- Weight: 600 grams (21 ounces) maximum.

**Operating Limits:**
- Operating Temperature: From 0 to +50°C (32 to 122°F)
- Storage Temperature: From -20 to +70°C (-4 to 158°F)
- Humidity: From 20% to 85% RH non-condensing

**Electrical Requirements:**
- Power Supply (Switch Mode): 100 to 240 V ac. 50/60 Hz (+10%/-15% of the nominal value)
- Power Consumption: 8VA maximum
- Insulation Resistance: >100Mohm; according to IEC 348.
- Dielectric Strength: 1500 Vrms according to IEC 348.
- Noise Immunity: Electrical fast transient/burst requirements: Severity Level 3 (according to IEC 801-4)
- Agency Classification: Conforms to European Union Directives symbolized by CE

**Auxiliary Transmitter Power Supply**
- Voltage Output: Isolated 5, 10, 12 or 24 V dc (jumper selectable)
- Maximum Current: 25 mA dc
- Alarms: Up to 2 independent alarms available
- Alarm Outputs: Two SPST relays, NO or NC (jumper selectable)
- Contact Ratings: 2 Amps/30 V dc on a resistive load. 0.6 Amps/110V dc on a resistive load. 0.5 Amps/250V ac on a resistive load. 0.3 Amps/110 V on an inductive load
- Software Key: A programmable 4-digit code for protecting alarm setpoints
Performance Specifications

Analog Input:
Input Type: Universal Inputs, TC, RTD, mA, Volts
  Accuracy: ±0.1% full scale span or ±1 digit, @ 25°C and nominal power supply voltage
  Calibration: According to DIN 43760
  Temperature Drift: <200 ppm/°C of full scale (reference junction excluded)
  Common Mode Rejection Ratio: 120 dB @ 50/60 Hz
  Normal Mode Rejection Ratio: 60 dB @ 50/60 Hz
  Sampling Time: 100 ms typical

Outputs:
  Analog Retransmission Output:
    Isolated 0-20 mA; 4-20 mA; or 0-10 Volts (programmable). (Not available with Digital Communications.)
  Digital Communications: Modbus protocol with Opto-isolated RS-485

How to Order – Specify model number 710D (Dual 4-digit display indicator) followed by order code for each selection

Power Supply
  100-240 V ac ................................................................. -3
  24 V ac/dc ..................................................................... -5

Input
  TC, mV, mA, RTD .......................................................... 9

Alarms
  Two Alarms .................................................................. 11

Accessories
  Auxiliary Power Supply ................................................... 1
  mA Analog retransmission and Auxiliary Power Supply .......... 2
  RS-485 and Auxiliary Power Supply .................................. 3
  RS-485 ......................................................................... 4
  mA Analog retransmission .............................................. 5
The following chapter contains Product Specifications of the Instruments:

**Humitex® Circular and Strip Charts**

**Pens and Pen Arms**
HumitexÆ Circular and Strip Charts

Foxboro also prints circular charts for American Meter, Arcco-Anubis, Bailey, Bristol, Gotham (Ametek), Honeywell (Brown), Mercury, Palmer, Ranarex (Permutit), Rockwell, Taylor, UGC Industries, Warren Controls (Tagliabue), and Weksler which are made to their specifications.

Options for 300m (12in) circular charts:

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy Paper</td>
<td>-HP</td>
</tr>
<tr>
<td>Backprinting</td>
<td>-BP</td>
</tr>
<tr>
<td>Mullins Slotting</td>
<td>-MS-HP</td>
</tr>
<tr>
<td>Read-Out Holes</td>
<td>-ROH-HP</td>
</tr>
<tr>
<td>Tejas Chart Changer Hole</td>
<td>-TCH-HP</td>
</tr>
<tr>
<td>Overprinting of Two-Color Charts</td>
<td>-OP</td>
</tr>
</tbody>
</table>

Color of Ink on Chart:
- Green: -GRN
- Scanner Blue Ink: -BLU-SBI
- Black: -BLK
- Aqua: -AQUA
- Dark Blue: -DBLU
- Shrink Wrap: -SW

Circular Charts Specifications

Standard circular charts are printed with gray ink, 1 side only, on 0.122 mm (0.0048 in) thick paper. Circular charts with heavy paper are printed on 0.178 mm (0.0070 in) paper. Charts are packaged 100 to a box.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Chart Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>125 mm (5 in) Side-Mounted Recorder</td>
<td>125 mm (5 in)1</td>
</tr>
<tr>
<td>12 Series Recorders</td>
<td>300 mm (12 in)</td>
</tr>
<tr>
<td>40/740 Series Recorders</td>
<td>300 mm (12 in)</td>
</tr>
<tr>
<td>39A Series Flow Recorders</td>
<td>300 mm (12 in)1</td>
</tr>
<tr>
<td>39 B Series Flow Recorders</td>
<td>MW Series 300mm (12in)1</td>
</tr>
<tr>
<td>740R Series Recorders</td>
<td>300 mm (12 in)</td>
</tr>
</tbody>
</table>

Notes
1. Always printed on heavy paper.
2. Add as suffix to circular chart number.
3. Add Foxboro backprint number.
4. Specify drop time and/or day of the week.
5. Specify time.
6. Must be available as an existing chart; see Catalog 600.

Strip Chart Specifications

4 in Roll, 100 mm Roll, and SCAN-FOLD charts can be supplied with or without time mark numbering. Standard time mark numbering is the hour of the day printed on the left side of the chart at 2-hour intervals (on the even hour). The standard speed for the 4 in Roll and SCAN-FOLD is 3/4 in/h which coincides with the chart drive speed. The standard speed for the 100 mm Roll is 20 mm/h. A large selection of non-standard time mark numbering is available to match the chart speeds of your recorders. Refer to Catalog 600 for a listing.

<table>
<thead>
<tr>
<th>Records</th>
<th>Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>E20S</td>
<td>For 4 in Roll, specify chart number</td>
</tr>
<tr>
<td>53</td>
<td>suffix - T if time numbering is required.</td>
</tr>
<tr>
<td>54</td>
<td>For SCAN-FOLD, specify chart number</td>
</tr>
<tr>
<td>64</td>
<td>number suffix -6TX if time numbering is required.</td>
</tr>
<tr>
<td>120</td>
<td>is required.</td>
</tr>
<tr>
<td>220S</td>
<td></td>
</tr>
<tr>
<td>E27R</td>
<td>Specify chart number suffix -T if time numbering is required.</td>
</tr>
<tr>
<td>126S, 127S</td>
<td>numbering is required.</td>
</tr>
<tr>
<td>226S, 227S</td>
<td></td>
</tr>
<tr>
<td>761R</td>
<td>Fold - L0122RQ 50 Divisions</td>
</tr>
<tr>
<td>760R</td>
<td>- L0122RS 0-100 Linear</td>
</tr>
<tr>
<td>762R</td>
<td>Roll - L0122RR 50 Divisions</td>
</tr>
<tr>
<td>751R</td>
<td>- L0122RT 0-100 Linear</td>
</tr>
<tr>
<td></td>
<td>Fold - L0122RS 0-100 Linear</td>
</tr>
<tr>
<td></td>
<td>Roll - L0122RT 0-100 Linear</td>
</tr>
</tbody>
</table>
How to Order
Follow the steps below, then contact your Foxboro representative, or call, in North America: 1-888-FOXBORO (1-888-369-2676), or International: 011-508-543-8750.

Toll Free Number
To order charts, contact your Foxboro representative or call (in the U.S.A.) 1-800-343-1198. In Massachusetts, call 1-800-322-2322.

Types of Calibration Charts Available for Circular and Strip Charts
Uniform, Differential Pressure, Flow (Type 27), Vacuum Pressure, Square Root, Vapor Pressure, Dairy Charts, Dew Point, Thermocouple, Thermopile, Flow-Open Channel Weir and Flume, Log Function, Specific Gravity, and Balsbaugh.
Accessories and Supplies

Pens and Pen Arms

Specifications

Recorders:

<table>
<thead>
<tr>
<th>Pen Location</th>
<th>Pen Arm, Item 1</th>
<th>Fiber Tip Pens (Package of 6), Item 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Part Number</td>
<td>Identification Holes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>40, 40M, 40P, and 39 Series Rectangular Case Recorders</td>
<td>0044897</td>
<td></td>
</tr>
<tr>
<td>1-Pen</td>
<td>M0122AC</td>
<td>1</td>
</tr>
<tr>
<td>2-Pen</td>
<td>M0122AC</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>M0122AC</td>
<td>1</td>
</tr>
<tr>
<td>3-Pen</td>
<td>M0122AB</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>M0122AB</td>
<td>3</td>
</tr>
<tr>
<td>4-Pen</td>
<td>M0122AC</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>M0122AB</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>M0122AB</td>
<td>3</td>
</tr>
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<td></td>
<td>M0122AA</td>
<td>0</td>
</tr>
<tr>
<td>12R Series Round Case Recorders</td>
<td>0044899</td>
<td></td>
</tr>
<tr>
<td>1-Pen</td>
<td>M0122AC</td>
<td>1</td>
</tr>
<tr>
<td>2-Pen</td>
<td>M0122AC</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>M0122AB</td>
<td>1</td>
</tr>
<tr>
<td>3-Pen</td>
<td>M0122AB</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>M0122AB</td>
<td>3</td>
</tr>
</tbody>
</table>

Recording Controllers:
Disposable Fiber Tip Pen Cartridges for 40P/40M/12 and 740 Chart Recorders

<table>
<thead>
<tr>
<th>A-Length</th>
<th>Red</th>
<th>Violet</th>
<th>Green</th>
<th>Blue</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>L0121CJ</td>
<td>L0121CM</td>
<td>L0121CK</td>
<td>L0121CL</td>
<td>L0121CN</td>
</tr>
<tr>
<td>12</td>
<td>L0121CH</td>
<td>L0121CR</td>
<td>L0121CP</td>
<td>L0121CQ</td>
<td>L0121CS</td>
</tr>
<tr>
<td>18</td>
<td>L0121CT</td>
<td>L0121CW</td>
<td>L0121CU</td>
<td>L0121CV</td>
<td>L0121CX</td>
</tr>
<tr>
<td>24</td>
<td>L0121CY</td>
<td>L0121DB</td>
<td>L0121CZ</td>
<td>L0121DA</td>
<td>L0121DC</td>
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</tbody>
</table>
### Specifications (continued)

Recording Controllers: 40, 40M, and 40P Series Rectangular Case Recording Controllers:¹,²,³

<table>
<thead>
<tr>
<th>Controller Type</th>
<th>Pen Arm, Item 1</th>
<th>Fiber Tip Pens (Package of 6), Item 2</th>
<th>A-Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pen Location</td>
<td>Part Number</td>
<td>Identification</td>
</tr>
<tr>
<td>Single Action</td>
<td>1-Pen Index</td>
<td>0044897</td>
<td>2</td>
</tr>
<tr>
<td>Single Action with Additional Pen</td>
<td>inner M0122AC</td>
<td>0044897</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>outer M0122AB</td>
<td>0044897</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Index M0122LT</td>
<td></td>
<td>Red</td>
</tr>
<tr>
<td>Single Action with 2 Additional Pens</td>
<td>inner M0122AC</td>
<td>0044897</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>center M0122LT</td>
<td>0044897</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>outer M0122MA</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Triple Setting</td>
<td>1-Pen Index</td>
<td>0044897</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>inner M0122LS</td>
<td></td>
<td>Violet</td>
</tr>
<tr>
<td></td>
<td>center M0122LT</td>
<td></td>
<td>Red</td>
</tr>
<tr>
<td></td>
<td>outer M0122MA</td>
<td></td>
<td>Green</td>
</tr>
<tr>
<td>Ratio</td>
<td>2-Pen Index</td>
<td>0044897</td>
<td>2</td>
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<tr>
<td></td>
<td>inner M0122AC</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>outer M0122AB</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Index M0122LS</td>
<td></td>
<td>Violet</td>
</tr>
<tr>
<td>Ratio with inner Additional Pen</td>
<td>3-Pen Index</td>
<td>0044897</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>inner M0122AC</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>center M0122AB</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>outer M0122MA</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Duplex</td>
<td>1-Pen Index</td>
<td>0044897</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>inner M0122LT</td>
<td></td>
<td>Red</td>
</tr>
<tr>
<td></td>
<td>outer M0122LS</td>
<td></td>
<td>Violet</td>
</tr>
<tr>
<td>Auto-Selector, Dual, or Duplex with Additional Pen</td>
<td>2-Pen Index</td>
<td>0044897</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>inner M0122AC</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>outer M0122AB</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

### Notes

¹ On multiple pen recorders, if pens L0121CR (Violet), LC 121CS (Black), L0121CP (Green), or L012 CQ (Blue) are used as arcing pens, then the red inner pen (L0121CJ) must be used. Its length is 6 mm (0.24 in).

² Black pens may be substituted for red or violet as follows:
   - Use L0121CN for pen arm lengths of 6 mm (0.24 in)
   - Use L0121CS for pen arm lengths of 12 mm (0.47 in)

³ If replacing box pens with fiber tip pens, the color dot on the pen arm (Item 1 in drawing) must be removed.
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<th>Balsbaugh</th>
<th>EXACT</th>
<th>Low Profile Pressure Transmitter</th>
</tr>
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<tbody>
<tr>
<td>CONSOTROL</td>
<td>FIELD STATION MICRO</td>
<td>MINOX</td>
</tr>
<tr>
<td>d/p cell</td>
<td>FlowExpert</td>
<td>SCANFOLD</td>
</tr>
<tr>
<td>DEWCEL</td>
<td>FOX</td>
<td>SINGLE STATION MICRO</td>
</tr>
<tr>
<td>DolPHin</td>
<td>FoxCom</td>
<td>TankExpert</td>
</tr>
<tr>
<td>DYNATHERM</td>
<td>HUMITEX</td>
<td></td>
</tr>
</tbody>
</table>
Foxboro, Massachusetts 02035-2099
U.S.A.

Your Foxboro representative:
Your Foxboro Representative:

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October 2015

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PN FD-CT-001 Rel. 11/15

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