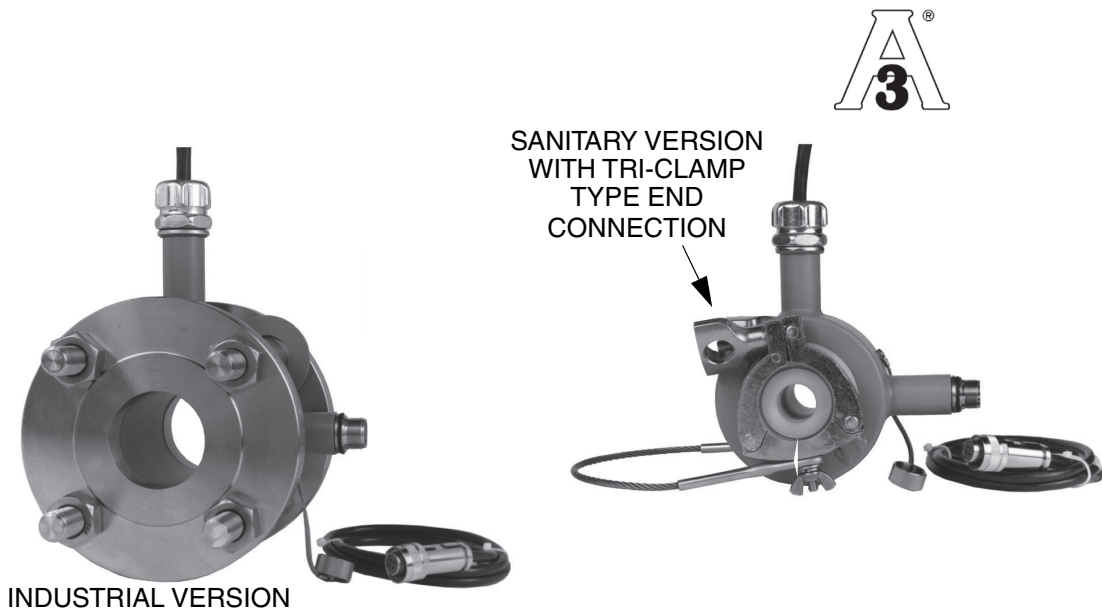


**871FT Series Non-Invasive Sanitary and Industrial Flow-Through Conductivity Sensors**



*The 871FT Series Non-Invasive Sanitary and Industrial Flow-Through Sensors are a family of in-line sensors that measure the conductivity of virtually any conductive liquid. They are offered in many common line sizes from 0.5 to 4.0 inches. A selection of construction materials to accommodate a wide range of sanitary and industrial applications is also offered.*

**FEATURES**

- ▶ Vaaler Award from *Chemical Processing Magazine* for industrial version; top honors from Food Processing for sanitary version.
- ▶ Compatible with intelligent and analog transmitters and analyzers.
- ▶ Non-invasive modular design permits ease of installation, and removal from process line without need to open line.
- ▶ Unique patented sensor and toroid design.
- ▶ No obstruction of process flow.
- ▶ In-line calibration minimizes issues.
- ▶ Sanitary sensor with virgin PEEK insulator complies with 3-A Sanitary Standard 74-xx. The virgin PEEK insulator used in these sensors is FDA compliant. The virgin PEEK insulator has a crevice-free design, interior bore surface finish <math><16 \mu\text{inch}</math>, and provides quick-disconnect construction.

*Equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising from the use of this material.*

- ▶ Industrial sensor with a wide selection of materials. Significantly reduces coatings or foulings, helps eliminate sidewall effects, and also helps eliminate exposure of personnel to hazardous chemicals.
- ▶ Sanitary sensors are offered with the traditional Tri-Clamp type, quick-disconnect end connections.
- ▶ Conforms to Applicable European Union Directives (product marked with “CE” logo)
- ▶ Pressure Equipment Directive compliance per PED 97/23/EC for most versions (contact Global Customer Support).
- ▶ Numerous options and accessories offered.

### NON-INVASIVE FLOW-THROUGH DESIGN

The 871FT Flow-Through Sensors provide a totally non-invasive measurement of conductivity and significantly reduce the influence of coatings and deposits on conductivity measurements. For example:

- ▶ Where the process solution contains solids that cause fouling, the tubular design of the flow cell promotes self-cleaning and helps prevent obstruction. Measurement inaccuracies and downtime associated with this are significantly reduced.
- ▶ Installation complications, such as cavitation, pipe-wall effects, and probe orientation, associated with traditional conductivity insertion methods, often create measurement inaccuracies, and therefore, over-compensation within the control loop. The non-invasive design helps eliminate:
  - Wasted chemical feedstock in chemical dilution processes
  - Over-utilization of water purification systems
  - Loss of expensive, recoverable product in decanting applications
  - Excessive loading and reagent costs in waste neutralization processes
  - Out-of-specification product caused by incorrect caustic or acid strength.

- ▶ For important processes in the pharmaceutical and biotechnology industries that involve solutions with proteins and other physically sensitive species, the non-invasive flow-through measurement helps eliminate damage to these sensitive and typically expensive media. For those industries requiring sanitary designs with smooth bore finishes, the 871FT Sanitary version is compliant with 3-A Sanitary Standard.

The non-invasive modular design permits ease of installation and removal from process lines.

### PRINCIPLE OF OPERATION

These sensors consist of inductive toroids mounted on an electrically nonconductive (insulator) section coaxial with the piping system. The primary toroids induce an electric current in the process fluid as it passes through the insulator (bore piece). The voltage created, which varies with process fluid conductivity, is detected by secondary toroid(s)<sup>(1)</sup> and converted to a conductivity measurement.

### SANITARY SENSORS

This unique non-invasive Sanitary Sensor VPEEK material is 3-A compliant per Sanitary 74-xx. The sensor is offered in materials consistent with U.S. Food and Drug Administration regulations for Food Service. The assembly complies with 3-A Sanitary standards of design for dairy equipment, and may be completely disassembled for total sanitation. A Sensor is provided with virgin PEEK<sup>(2)</sup> insulator (bore piece) providing a 16 µinch or better interior bore finish in line sizes from 0.5 to 4.0 inches. Completely crevice-free flow-through construction facilitates CIP operations. Industry standard Tri-Clamp type end connection mountings permit ease of flow-through installation and removal.

### The Sanitary Non-invasive Advantage

The Non-Invasive Sanitary 871FT Sensors provide a unique conductivity measurement for numerous Food and Pharmaceutical applications, including the monitoring and control of beverage products (such as juices, beer, milk, wine, soft drinks, and bottled water) and their associated CIP requirements.

1. This product is protected by Patent No. 5157332, and others.

2. PEEK = polyetheretherketone (virgin or glass-filled); PCTFE = polychlorotrifluoroethylene.

Also, these sensors permit dramatic savings in product otherwise lost to drain, and provide significant savings in maintenance time and in manually monitored and/or lost CIP solution(s). In addition, the capability of in-line calibration obviates the need to open the process line to the environment, which then often requires a process line recertification. Calibration may be completed without stopping the process flow. The simple Tri-Clamp type end connection permits ease of installation for conventional applications.

## INDUSTRIAL SENSORS

The Industrial Sensor is offered in a choice of process-wetted materials to satisfy a wide array of chemical concentration and control applications, from aggressive to benign, of high or low conductivity. These flow-through sensors provide ANSI Class 150/300 flanges or NPT pipe mounting, in either 316 ss, Carpenter 20, or nickel alloy<sup>(3)</sup>. Insulator materials of glass-filled PEEK, PCTFE, or PVDF<sup>(4)</sup> in line sizes from 1/2 to 4.0 inches may be selected to satisfy a multitude of applications. See the Model Code section for the numerous industrial sensor configurations offered.

### The Industrial Non-invasive Advantage

These Industrial Sensors provide a non-invasive conductivity measurement for innumerable aqueous and/or chemical concentration monitoring and control applications (such as condensate and boiler water, acid or caustic concentration control, waste stream monitoring, leak detection, and interface detection).

The Industrial Sensors may often be calibrated in line, thus significantly reducing scheduled maintenance time, and helping eliminate the need for exposure of personnel to potentially hazardous chemicals. Simple design, and ANSI Class 150 or 300 flange mounting, facilitates both installation and removal of the sensor from the process line.

### Externally Accessible Calibration Port

In controlling and measuring solutions that are hazardous to personnel, or where explosive environments are common, traditional conductivity calibration is tedious, risky, and costly. Obtaining

permits, suiting up, testing for gas, pulling the probe, capping the line, final calibration, and cleaning up can take as much as several hours per installation. In a medium-sized chemical plant, this can easily consume several hundred man hours of a maintenance budget. With the 871FT Calibration Port, breaking into the line is unnecessary, calibration is accomplished in-situ, and the associated costs diminish appreciably.

### Rugged Design, Robust, Environmentally Isolated Sensor

871FT Industrial Sensors are housed in a tough epoxy-painted aluminum housing that provides NEMA 4, CSA Enclosure 4, and IP65 protection ratings. The housing can be provided as a special, using 316 ss material. Contact Global Customer Support for further details.

The most common challenge of conventional insertion sensors is process ingress due to loss of seal integrity, and/or degradation and breakdown of the housing material. The toroids of the 871FT are electrically and physically isolated from process fluid contact. In addition, the insulator is available in many more chemically compatible materials than those available in conventional sensors. Downtime and production losses associated with sensor maintenance are minimized.

## EASE OF INSTALLATION

The Sensor's "wafer" design permits it to literally replace a small section of process piping, while its industry standard end connections permit ease of installation to, and removal from, process lines. The unique compact sensor design provides an end-to-end dimension which does not exceed seven inches in any bore size. "Dimensions—Nominal" on page 20 depicts and lists the exact measurements for each sensor type vs. line size. Take normal precautions relative to pipeline support (see Table 2) and alignment of the flow-through; and helps eliminate cantilever or bending loads on the sensor.

3. Equivalent to Hastelloy® C. Hastelloy is a registered trademark of Haynes International, Inc.

4. PVDF = polyvinylidene difluoride.

### **WETTED MATERIALS**

The Sanitary Sensor provides only the Insulator (bore piece) as a wetted part. This may be either FDA/3-A compliant or PCTFE. Gaskets are provided by the user. Refer to “Standard Specifications” on page 6 and Table 10.

The Industrial Sensor provides a choice of application suitable metals, insulator (bore piece), and O-ring materials. Also refer to “Standard Specifications” on page 6 and Table 10.

### **TEMPERATURE COMPENSATION**

The 871FT Flow-Through Sensor offers a choice of field-replaceable temperature sensor elements of either 1000 Ohm RTD (for use with the 875EC Analyzer or 870ITEC Transmitter), or 100 Ohm RTD (compatible with either the 870ITEC Transmitter, or 875EC, 873EC, or 873AEC Analyzers). These RTDs provide the fastest temperature response practical by inserting into the process stream through a user-supplied, industry-standard tee.

### **LOCATION IN PROCESS LINE**

Sensors can be installed in any nonmagnetic metal piping, and are neither flow-direction, nor flow-rate sensitive. They can be mounted in any convenient orientation (horizontal, vertical, or sloping) which encourages continuous capacity of the bore, and includes normal precautions (separation by 3 to 5 pipe diameters) for upstream or downstream disturbances (for example, valves or elbows).

Avoidance of entrained air or the formation of voids supports a more accurate measurement. Refer to MI 611-202 for information relating to the 871FT Sensors.

### **WIDE RANGE CAPABILITY**

These sensors are capable of providing measurements of virtually any conductive liquid by selecting either a “Low” (full scale range as low as 50  $\mu$ S/cm) or “High” conductivity (full scale range as high as 2000 mS/cm) version relative to bore size. Table 1 identifies these ranges vs. bore sizes.

### **CABLE**

The 871FT includes an integral PVC 20 foot (6 meter) cable, or an optional shielded Teflon, RFI/EMI protected cable. The Teflon cable helps eliminate the need for placing the cable in conduit in many typical installations. Extension cable(s), as well as the appropriate junction boxes, are available and are described in “Accessories” on page 13. The maximum recommended cable length, as with any toroidal conductivity sensor, is 100 feet (30 meters).

### **COMPATIBLE INSTRUMENTATION**

These sensors are ideal for use with 876EC or 870ITEC Transmitters, or the 875EC, 873EC, or 873AEC Analyzers. They are not easily compatible to the older instrumentation (for example, 870EC Transmitter or 872-20 Monitor).

Table 1. 871FT Sensor Full Scale Range Settings - Minimum to Maximum Values Shown for Each Sensor Type and Inch Bore Size (a)

mS/cm	–	0.1	0.2	0.5	1	2	5	10	20	50	100	200	500	1000	2000
µS/cm	50	100	200	500	1000	2000	5000	–	–	–	–	–	–	–	–
871FT-1C					X	X	X	X	X	X	X	X	X	X	X
871FT-2C				X	X	X	X	X	X	X	X	X	X	X	X
871FT-1D				X	X	X	X	X	X	X	X	X	X	X	X
871FT-2D				X	X	X	X	X	X	X	X	X	X	X	
871FT-1E				X	X	X	X	X	X	X	X	X	X	X	X
871FT-2E			X	X	X	X	X	X	X	X	X	X	X		
871FT-1F			X	X	X	X	X	X	X	X	X	X	X	X	
871FT-2F	X	X	X	X	X	X	X	X	X	X	X	X			
871FT-1G			X	X	X	X	X	X	X	X	X	X	X	X	
871FT-2G	X	X	X	X	X	X	X	X	X	X	X				
871FT-1H		X	X	X	X	X	X	X	X	X	X	X	X		
871FT-2H	X	X	X	X	X	X	X	X	X	X	X				
871FT-1J	X	X	X	X	X	X	X	X	X	X	X	X	X		
871FT-2J	X	X	X	X	X	X	X	X	X	X					
871FT-3C				X	X	X	X	X	X	X	X	X	X	X	X
871FT-4C		X	X	X	X	X	X	X	X	X	X	X	X		
871FT-3E					X	X	X	X	X	X	X	X	X	X	X
871FT-4E	X	X	X	X	X	X	X	X	X	X	X	X			
871FT-3F					X	X	X	X	X	X	X	X	X	X	X
871FT-4F	X	X	X	X	X	X	X	X	X	X	X				
871FT-3G					X	X	X	X	X	X	X	X	X	X	X
871FT-4G	X	X	X	X	X	X	X	X	X	X	X				
871FT-3H			X	X	X	X	X	X	X	X	X	X	X	X	
871FT-4H	X	X	X	X	X	X	X	X	X	X					
871FT-3J			X	X	X	X	X	X	X	X	X	X	X	X	
871FT-4J	X	X	X	X	X	X	X	X	X	X					

a. Refer to the Model Codes for a description of the Model Number in the first column. For example, 871FT-1C is Sanitary, High Range, with a 1/2-inch line size.

## STANDARD SPECIFICATIONS

**End Connection Materials**

316 ss, Carpenter 20-CB3, or nickel alloy<sup>(5)</sup>; applicable to industrial versions only. Sanitary versions utilize a one-piece insulator of VPEEK or PCTFE material; the traditional Tri-Clamp type end connection is used with either of these materials.

**Pressure-Temperature Ratings, Wetted Materials**

See Tables 3 to 9 for pressure-temperature ratings applicable to PCTFE, GFPEEK, VPEEK, and PVDF materials when used with various end connections.

**Wetted Material Compatibility with Process Solutions**

Refer to Table 10.

**Sanitary Sensor – Wetted Bore Piece****VPEEK - FDA and 3-A Compliant***O-Ring Material*

Not applicable

*Maximum Pressure<sup>(6)</sup>*

225 psi (1550 kPa); Tri-Clamp with 1/2-, 3/4-, and 2-inch line sizes

150 psi (1034 kPa); Tri-Clamp with 1-, 1 1/2-, and 3-inch line sizes

100 psi (690 kPa); Tri-Clamp with 4-inch line size

*Temperature Limits<sup>(6)</sup>*

14 to 250°F (–10 to +121°C)

**PCTFE***O-Ring Material*

Not applicable

*Maximum Pressure<sup>(6)</sup>*

60 psi (414 kPa)

*Temperature Limits<sup>(6)</sup>*

14 to 250°F (–10 to +121°C)

**Industrial Sensor – Wetted Bore Piece****Glass-Filled PEEK (GFPEEK)***O-Ring Material*

EPDM<sup>(7)</sup> standard; Viton and Chemraz<sup>(7)</sup> optional.

*Maximum Pressure<sup>(6)</sup>*

275 psi (1896 kPa) for ANSI Cl. 150 Flange  
400 psi (2758 kPa) for ANSI Cl. 300 Flange

*Temperature Limits<sup>(6)</sup>*

14 to 411°F (–10 to +211°C)  
with both ANSI Class 150 and 300 Flanges

**PVDF***O-Ring Material*

EPDM standard; Viton and Chemraz optional.

*Maximum Pressure<sup>(8)</sup>*

100 psi (690 kPa) with ANSI Class 150 Flange

365 psi (2517 kPa) with ANSI Class 300 Flange

*Temperature<sup>(8)</sup>*

14 to 250°F (–10 to +121°C) with ANSI Class 150 Flanges

–13 to +250°F (–25 to +121°C) with ANSI Class 300 Flanges

**PCTFE***O-Ring Material*

EPDM standard; Viton and Chemraz optional.

5. Equivalent to Hastelloy® C-276.

6. Refer to "Pressure-Temperature Ratings" on page 8.

7. EPDM is Ethylene Propylene Terpolymer; Chemraz is a Perfluoro Elastomer.

8. Refer to the Pressure-Temperature Ratings section for exceptions.

*Maximum Pressure<sup>(8)</sup>*

100 psi (690 kPa) with ANSI Class 150 Flanges

*Temperature Limits<sup>(8)</sup>*

14 to 250°F (−10 to +121°C) with ANSI Class 150 Flanges

**Sensor Approximate Mass**

Table 2 lists approximate masses for each sensor line size and applicable end connection.

**Sensor Dimensions**

Refer to Dimensions-Nominal section.

**Table 2. Inch Size Sensors - Approximate Mass**

Line Size		Approximate Mass in Pounds			
Model Code	in	Sanitary Versions	Industrial Versions		
			ANSI Class 150	ANSI Class 300	NPT Adapter (a)
C	1/2	2.5	11	15	14
D	3/4	2.5	N/A	N/A	N/A
E	1	7.5	10	14	18.5
F	1 1/2	7	12	15	17.5
G	2	6.5	17	20	28.5
H	3	9.3	32	40	N/A
J	4	8.8	41	60	N/A

a. NPT adapters available with ANSI Class 150 flanges only.

PRESSURE-TEMPERATURE RATINGS

**Table 3. Nominal Pressure-Temperature Ratings Sanitary Sensor with VPEEK Insulator Material and Tri-Clamp Type End Connection**

Line Size	Process Press.	Maximum Temp. (a)
1/2, 3/4, and 2 inch	225 psi	14 to 250°F
1, 1 1/2, and 3 inch	150 psi	14 to 250°F
4 inch	100 psi	14 to 250°F

a. For applications to 284°F, contact Global Customer Support.

**Table 4. Nominal Pressure-Temperature Ratings Sanitary Sensor with PCTFE Insulator Material and Tri-Clamp Type End Connection**

Line Size (a)	Process Press.	Maximum Temp.
1/2, 1, 1 1/2, 2, and 3 inch	60 psi (b) (c)	140°F (c)
	55 psi	150°F
	50.5 psi	160°F
	46 psi	170°F
	41.5 psi	180°F
	37 psi	190°F
	32.5 psi	200°F
	28 psi	210°F
	23.5 psi	220°F
	19 psi	230°F
14.5 psi	240°F	
10 psi (c)	250°F (c) (d)	

- a. 3/4 inch line size not available with PCTFE material. Also, for 4 inch line size, contact Global Customer Support.
- b. 60 psi from 14 to 140°F.
- c. 60 psi at 140°F linearly derated to 10 psi at 250°F.
- d. Pressure of 15.3 psi at 250°F can be used for up to 2 hours for hot water or steam sterilization. For periods longer than 2 hours, contact Global Customer Support.

**Table 5. Nominal Pressure-Temperature Ratings Industrial Sensor with GFPEEK Insulator Material**

Line Size	Process Press.	Maximum Temp.
All Line Sizes	275 psi (a) (b)	100°F (a) (b)
ANSI Cl. 150	268 psi	118°F
Flange or NPT	259 psi	140°F
End	249 psi	165°F
Connection	240 psi	188°F
	231 psi	220°F
	225 psi	250°F
	212 psi	315°F
	206 psi	345°F
	195 psi	400°F
	192 psi	411°F

- a. 275 psi from 14 to 100°F
- b. 275 psi at 100°F linearly derated to 192 psi at 411°F

**Table 6. Nominal Pressure-Temperature Ratings Industrial Sensor with PVDF Insulator Material (a)**

Line Size	Process Press.	Maximum Temp.
All Line Sizes	100 psi (b) (c)	140°F (a) (c)
ANSI Cl. 150	96 psi	150°F
Flange or NPT	89 psi	170°F
End	82 psi	190°F
Connection	78 psi	200°F
	74.5 psi	210°F
	71 psi	220°F
	63 psi	240°F
	60 psi (c)	250°F (c)

- a. The 2-inch version with ANSI flange is rated to 150 psig (1034 kPag) from 14 to 212 °F (-10 to 100 °C).
- b. 100 psi from 14 to 140°F
- c. 100 psi at 140°F linearly derated to 60 psi at 250°F.

**Table 7. Nominal Pressure-Temperature Ratings Industrial Sensor with PCTFE Insulator Material**

Line Size	Process Press.	Maximum Temp.
All Line Sizes	100 psi (a) (b)	140°F (b) (c)
ANSI Cl. 150	90 psi	150°F
Flange or NPT	74 psi	170°F
End	58 psi	190°F
Connection	50 psi	200°F
	34 psi	220°F
	18 psi	240°F
	10 psi (c)	250°F (c)

- a. 100 psi from 14 to 140°F.
- b. 100 psi at 140°F linearly derated to 10 psi at 250°F.



**Table 8. Nominal Pressure-Temperature Ratings Industrial Sensor with GFPEEK Insulator Material and 316 ss ANSI Class 300 Flange**

Line Size	Process Press.	Maximum Temp.
All Line Sizes	400 psi (a)	411°F (a)

a. 400 psi from 14 to 411°F.

**Table 9. Nominal Pressure-Temperature Ratings Industrial Sensor with PVDF Insulator Material and Nickel Alloy (a) ANSI Class 300 Flange**

Line Size	Process Press.	Maximum Temp.
1/2 in only	365 psi (b) (c)	150°F (b) (c)
	334.5 psi	160°F
	304 psi	170°F
	273.5 psi	180°F
	243 psi	190°F
	212.5 psi	200°F
	182 psi	210°F
	151.5 psi	220°F
	121 psi	230°F
	90.5 psi	240°F
	60 psi (c)	250°F (c)

a. Equivalent to Hastelloy® C-276.

b. 365 psi from -13 to 150°F.

c. 365 psi at 150°F linearly derated to 60 psi at 250°F.

**NOTE**

Use the values in the tables to determine field installation requirements, even though the ratings of sanitary or flanged end connections by themselves may be greater. Linear interpolation of the values is acceptable.

Table 10. Wetted Material Compatibility with Process Solutions (a)

Standard Curves (Ref Temp.) (b)	Temperature Compensation Range	Sanitary Sensors		Industrial Sensors								
		VPEEK	PCTFE (c)	GF PEEK	PVDF	EPDM	Viton	Chem-raz	316 ss	Carp 20	Hast C	Ti
NaCl (25°C) 0 to 25%	32 to 392°F	A 212°F	R 347°F	A 212°F	R 270°F	R 130°F	R 190°F	R 400°F	G 350°F	G 210°F	G 210°F	E 210°F
H3PO4 (25°C) 0 to 35%	40 to 200°F	A 392°F	R 347°F	A 392°F	R 250°F	R 140°F	R 190°F	R 400°F	G 200°F	E 160°F G 210°F	E 150°F G 210°F	S 120°F
HCl (25°C) 0 to 15%	14 to 252°F	A 212°F	R @ the BP	A 212°F	R 280°F	R 100°F	R 350°F	R 400°F	NO	NO	E 90 G 150°F	NO
H2SO4 (25°C) 0 to 25%	14 to 249°F	A 212°F	R 77°F	A 212°F	R 220°F	R 140°F	R 350°F	R 400°F	NO	E 110°F G 210°F	E 130°F G 190°F	NO
H2SO4 (50°C) 99.5 to 93%	14 to 249°F	NO	R >302°F	NO	R 210°F	NO	R 350°F	R 400°F	NO	E 100°F G 210°F	E 140°F G 240°F	NO
H2SO4 (30°C) 96 to 93%	50 to 194°F	NO	R >302°F	NO	R 210°F	NO	R 350°F	R 400°F	NO	E 100°F G 210°F	E 140°F G 240°F	NO
H2SO4 80%	Custom	NO	Not Rated	NO	R 190°F	NO	R 340°F	R 380°F	NO	E 110°F S 150°F	E 240°F	NO
H2SO4 70%	Custom	NO	Not Rated	NO	R 210°F	NO	R 340°F	R 380°F	NO	E 110°F S 150°F	G 190°F	NO
H2SO4 60%	Custom	NO	Not Rated	NO	R 220°F	R 130°F	R 320°F	R 380°F	NO	E 130°F S 160°F	E 130°F G 230°F	NO
Oleum (65°C) 42 to 18%	89 to 249°F	NO	R @ 100% 77°F	NO	NO	NO	R 190°F	R 390°F	G 250°F	G 110°F	E 140°F	NO
Oleum (65°C) 0 to 10%	89 to 249°F	NO	R @ 100% 77°F	NO	NO	NO	R 190°F	R 390°F	G 250°F	G 110°F	E 140°F	NO
HNO3 (25°C) 0 to 10%	14 to 249°F	A 212°F	R 158°F	A 212°F	R 200°F	NO	R 400°F	R 400°F	E 210°F	E 210°F	E 210°F	E 240°F G 400°F
NaOH (25°C) 0 to 15%	31 to 250°F	A 392°F	R >302°F	A 392°F	R 210°F	R 210°F	NO	R 400°F	E 150°F G 300°F	E 170°F G 300°F	G 210°F	E 210°F
NaOH (50°C) 0 to 15%	32 to 212°F	A 392°F	R >302°F	A 392°F	R 210°F	R 210°F	NO	R 400°F	E 150°F G 300°F	E 170°F G 300°F	G 210°F	E 210°F
NaOH (100°C) 0 to 20%	12 to 252°F	A 392°F	R >302°F	A 392°F	R 210°F	R 210°F	NO	R 400°F	E 170°F G 210°F	E 110°F G 300°F	G 210°F	E 210°F
KOH (25°C) 0 to 6%	50 to 104°F	A 77°F	R 176°F	A 77°F	R 210°F	R 250°F	NO	R 400°F	G 350°F	G 210°F	G 210°F	E 200°F
KCl (20°C) 0 to 16%	32 to 77°F	A 212°F	No Data	A 212°F	R 280°F	R 300°F	R 400°F	R 400°F	G 350°F	G 210°F	G 210°F	E 210°F
CH3COOH (25°C) 0 to 8%	40 to 250°F	A 212°F	R 347°F	A 212°F	R 300°F	R 140°F	R 190°F	R 400°F	E 400°F	E 220°F	E 300°F	E 260°F
HF (25°C) 0 to 30%	94 to 204°F	NO	R 77°F	NO	R 260°F	NO	R 210°F	R 300°F	NO	G 190°F	G 210°F	NO
HF (0°C) 90 to 99.9%	-4 to +406°F	NO	R 77°F	NO	R 200°F	NO	NO	R 400°F	G 80°F	G 80°F	G 210°F	NO
Na2CO3 (85°C) Green Liquor	94 to 204°F	A	No Data	A 212°F	R 280°F	R 300°F	R 190°F	R 400°F	G 350°F	E 200°F G >450°F	G 210°F	E 210°F
Na2O (160°C) Black Liquor	115 to 411°F	A	No Data	A	-	-	-	-	-	-	-	-
White/Brown Liq.	-	A	NO	A	-	-	-	-	-	-	-	-

- a. The wetted materials compatibility for the solutions listed at a specified temperature are rated as follows:  
 For Nonmetallic Materials: A = No attack, little or no absorption; R = Recommended - Resistant to Solution; NO = Not Recommended  
 For Metallic Material: E = Excellent, <2 mils per year; G = Good, <20 mils per year; S = Satisfactory, <50 mils per year; NO = Not Recommended.
- b. The standard curves of the solutions listed are resident in the 870ITEC Intelligent Transmitter and 875EC Intelligent Analyzer memories.
- c. PCTFE is also used for Industrial Sensors.

PRESSURE-TEMPERATURE RATINGS

Table 11. 871FT Sensor Full Scale Range Settings - Minimum to Maximum Values Shown for Each Sensor Type and Inch Bore Size (a)

mS/cm	–	0.1	0.2	0.5	1	2	5	10	20	50	100	200	500	1000	2000
µS/cm	50	100	200	500	1000	2000	5000	–	–	–	–	–	–	–	–
871FT-1C					X	X	X	X	X	X	X	X	X	X	X
871FT-2C				X	X	X	X	X	X	X	X	X	X	X	X
871FT-1D				X	X	X	X	X	X	X	X	X	X	X	X
871FT-2D				X	X	X	X	X	X	X	X	X	X	X	
871FT-1E				X	X	X	X	X	X	X	X	X	X	X	X
871FT-2E			X	X	X	X	X	X	X	X	X	X	X		
871FT-1F			X	X	X	X	X	X	X	X	X	X	X	X	
871FT-2F	X	X	X	X	X	X	X	X	X	X	X	X			
871FT-1G			X	X	X	X	X	X	X	X	X	X	X	X	
871FT-2G	X	X	X	X	X	X	X	X	X	X	X				
871FT-1H		X	X	X	X	X	X	X	X	X	X	X	X		
871FT-2H	X	X	X	X	X	X	X	X	X	X	X				
871FT-1J	X	X	X	X	X	X	X	X	X	X	X	X	X		
871FT-2J	X	X	X	X	X	X	X	X	X	X					
871FT-3C				X	X	X	X	X	X	X	X	X	X	X	X
871FT-4C		X	X	X	X	X	X	X	X	X	X	X	X		
871FT-3E					X	X	X	X	X	X	X	X	X	X	X
871FT-4E	X	X	X	X	X	X	X	X	X	X	X	X			
871FT-3F					X	X	X	X	X	X	X	X	X	X	X
871FT-4F	X	X	X	X	X	X	X	X	X	X	X				
871FT-3G					X	X	X	X	X	X	X	X	X	X	X
871FT-4G	X	X	X	X	X	X	X	X	X	X	X				
871FT-3H			X	X	X	X	X	X	X	X	X	X	X	X	
871FT-4H	X	X	X	X	X	X	X	X	X	X					
871FT-3J			X	X	X	X	X	X	X	X	X	X	X	X	
871FT-4J	X	X	X	X	X	X	X	X	X	X					

a. Data relating to the compatibility of PCTFE material is based on information available from 3M.

The material compatibility data provided in this table has been taken from data published by recognized experts, and can vary depending on the expert source. Therefore, the table is provided as a reference only, and the ultimate material selection is the responsibility of the user.

For material compatibility/solution concentrations other than those in the table above, contact Global Customer Support.

**ELECTRICAL SAFETY SPECIFICATIONS**

These sensors have been designed to meet the electrical safety descriptions noted in the table below. For detailed information, contact Global Customer Support.

Testing Laboratory, Type of Protection, and Area Classification	Condition of Certificate	Electrical Safety Design Code
<b>FM</b> , Nonincendive, Class I, Division 2, Groups A, B, C, and D; Class I, Zone 2, IIC	Connect to approved 876EC Transmitter, per MI 611-206. Temperature ClassT4 Ta = -20°C to +60°C	FN

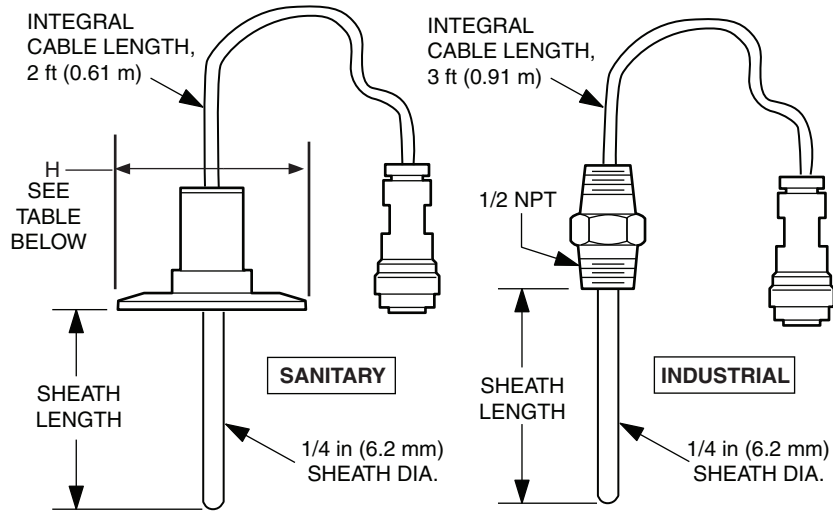
**ACCESSORIES LISTING**

For details relating to the Accessories listed in the table below, refer to “Accessories” below.

Part Numbers	Description	Comments
BS807BD	Calibration Cable	Required for In-line Calibration
EP485A EP485N	Calibration Plugs, High Precision	Sensor/Range Specific. Contact Global Customer Support.
BS807DY	Junction Box, 9 conductor	Use with Teflon, 9 conductor cable
BS807NS	Junction Box, 8 conductor	Use with PVC, 8 conductor cable
BS807PA	Extension Cable, Teflon, lugs/lugs termination	Use with 870ITEC and 875EC
BS807PB	Extension Cable, Teflon, lugs/lugless termination	Use with 873EC, 873AEC, and 875EC
BS807PC	Extension Cable, PVC, lugs/lugs termination	Use with 870ITEC and 875EC
BS807PD	Extension Cable, PVC, lugs/lugless termination	Use with 873EC, 873AEC, and 875EC
BS809UN	RTD Patch Cable, 10 ft (3 m) long	Use with RTD Assembly
BS809UP	RTD Patch Cable, Length per Sales Order	Use with RTD Assembly
P0170RB	Cable, Teflon, not terminated, nor dressed	Use with 870ITEC, 873EC, 873AEC, and 875EC
P0170RG	Cable, PVC, not terminated, nor dressed	Use with 870ITEC, 873EC, and 875EC
Tees	For Temperature Compensation Sensors (RTD)	User Supplied
Clamps	For Temperature Compensation Sensors (RTD)	User Supplied
See Accessories section	Temperature Compensation Sensor Elements	Sanitary and Industrial RTDs are used as Temperature Compensation Sensor Elements.

ACCESSORIES

Figure 1. Temperature Compensation Sensor Elements (RTDs)



Sanitary RTDs - Inch Sizes (a)

Line Size	Dimension H	RTD Value	RTD Assembly Part No.
1/2	0.98 in	100 Ω	BS807VR
		1000 Ω	BS807VS
3/4 (b)	0.98 in	100 Ω	BS807VR
		1000 Ω	BS807VS
1 (b)	0.98 in	100 Ω	BS807VR
		1000 Ω	BS807VS
1 1/2 (b)	0.98 in	100 Ω	BS807VR
		1000 Ω	BS807VS
2	2.52 in	100 Ω	BS807VT
		1000 Ω	BS807VU
3 (b)	2.52 in	100 Ω	BS807VT
		1000 Ω	BS807VU
4	4.68 in	100 Ω	BS807VV
		1000 Ω	BS807VW

- a. For Sanitary 871FT, the RTD sheath material is 316 ss.
- b. Reducing tees are required with the 3/4, 1, 1 1/2, and 3 inch line sizes. See RTD sanitary tees in DIMENSIONS-NOMINAL section.

Industrial RTDs - Inch Sizes (a)

Size (in)	Value	Material	Part No.
1/2 and 1	100 Ω	Nickel alloy (b)	BS807WP
		316 ss	BS807WR
		C-20Cb3	BS807WT
	1000 Ω	Nickel alloy (b)	BS807WQ
		316 ss	BS807WS
		C-20Cb3	BS807WU
1 1/2 and 2	100 Ω	Nickel alloy (b)	BS807VH
		316 ss	BS807VX
		C-20Cb3	BS807WF
	1000 Ω	Nickel alloy (b)	BS807VJ
		316 ss	BS807VY
		C-20Cb3	BS807WG
3 and 4	100 Ω	Nickel alloy (b)	BS807VM
		316 ss	BS807WB
		C-20Cb3	BS807WK
	1000 Ω	Nickel alloy (b)	BS807VN
		316 ss	BS807WC
		C-20Cb3	BS807WL

- a. For Industrial 871FT, when the RTD is ordered as part of the 871FT Model Code, the wetted material is the same as the flange material selected.
- b. Equivalent to Hastelloy® C.

**Sheath Length, Protrusion into Tee, and Tri-Clamp Type End Connection Size (Inch Sizes)**

Line Size	Sanitary RTDs, 100 or 1000 Ω			Industrial RTDs, 100 or 1000 Ω	
	Sheath Length	Protrusion	Tri-Clamp	Sheath Length	Protrusion (a)
1/2 in	2.5 in	1/8 in	3/4 in	3.38 in	0.56 in
3/4 in	2.5 in	1/8 in	3/4 in	—	—
1 in	2.5 in	1/8 in	1 1/2 in	3.38 in	0.56 in
1 1/2 in	2.5 in	1/8 in	1 1/2 in	3.88 in	0.56 in
2 in	3.25 in	1/4 in	2 in	3.88 in	0.19 in
3 in	3.25 in	3/16 in	3 in	5.44 in	0.65 in
4 in	4.5 in	Center	4 in	5.44 in	0.25 in

a. Nominal dimension based on use of ANSI Class 150 flange; and a flange thickness of 0.1 inch beyond the I.D. of a Schedule 40 pipe.

Figure 2. Junction Box Wiring with 9-Conductor Teflon-Jacketed Cable

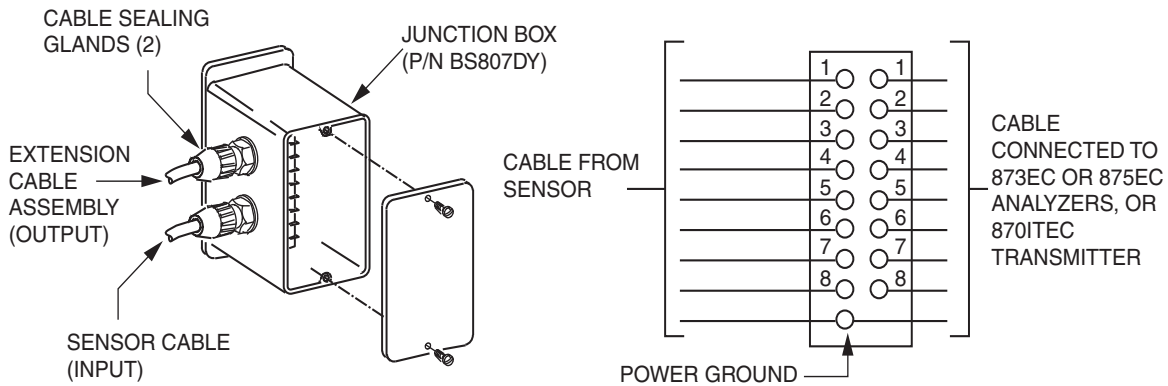
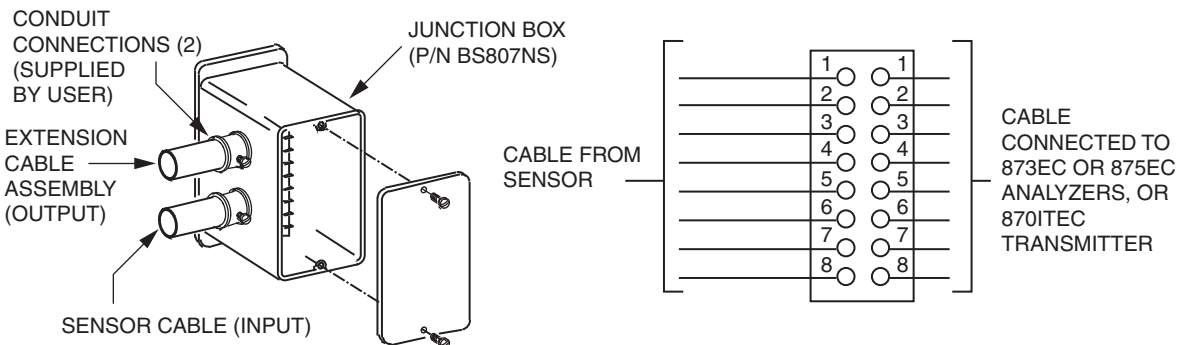


Figure 3. Junction Box Wiring with 8-Conductor PVC-Jacketed Cable



## ACCESSORIES

**RTD Patch Cable**

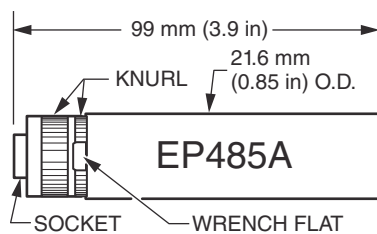
This cable is used with RTD assemblies. Specify Part Number BS809UN for the standard 10 ft (3 m) length, and Part Number BS809UP for special lengths. Contact Global Customer Support for special length restrictions.

**Calibration Cable**

Calibration Cable (Part Number BS807BD) is required for any in-line calibration of the 871FT sensors. For high precision, low end conductivity ranges, a specific calibration plug is available. See "Calibration Plug" on page 15.

**Calibration Plug**

For high precision, low end and/or full scale conductivity ranges, an EP485A or EP485N calibration plug is offered in lieu of the calibration cable described in the previous paragraph. The EP485A is offered with sanitary or industrial sensors, while the EP485N is offered with industrial sensors only. The plug is specific to an 871FT Sensor Model, and the desired conductivity value. It connects to the calibration port of the sensor, and calibration is in accordance with Instruction MI 611-220 or Instruction MI 611-202. Specify Calibration Plug Model EP485A or EP485N, sanitary or industrial, line size, conductivity range, and RTD value. Contact Global Customer Support with your requirements prior to ordering. A typical calibration plug is shown below.

**Cable Assemblies and Extension Cables**

The Extension Cable Assembly, Part Number BS807PA, is a Teflon jacketed multiconductor (8 conductors **plus ground**) cable that provides intrasystem connections up to 100 ft (30 m). Numbered leads terminated in spade terminals at **both ends** allow the extension cable to be connected to the terminals in the junction box, and at the opposite end permit connection to 870ITEC Transmitters, or 875EC Analyzers.

The Extension Cable Assembly, Part Number BS807PB, is a Teflon jacketed multiconductor (8 conductors **plus ground**) cable that provides intrasystem connections up to 100 ft (30 m). Numbered leads terminated in spade terminals at **one end** allow the extension cable to be connected to the terminals in the junction box, while stripped and tinned leads at the opposite end permit connection to 873EC and 873AEC Analyzers.

The Extension Cable Assembly, Part Number BS807PC, is a PVC jacketed multiconductor (8 conductors, **no ground**) cable that provides intrasystem connections up to 100 ft (30 m). Numbered leads terminated in spade terminals at **both ends** allow the extension cable to be connected to the terminals in the junction box, and at the opposite end permit connection to 870ITEC Transmitters, or 875EC Analyzers.

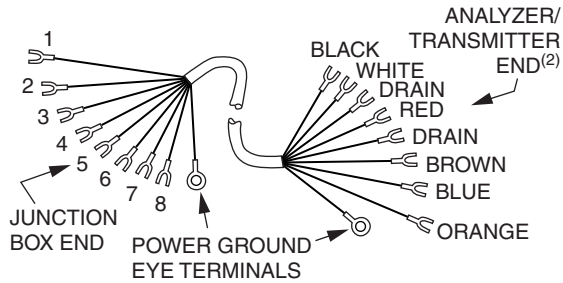
The Extension Cable Assembly, PN BS807PD, is a PVC jacketed multiconductor (8 conductors, **no ground**) cable that provides intrasystem connections up to 100 ft (30 m). Numbered leads terminated in spade terminals at **one end** allow the extension cable to be connected to the terminals in the junction box, while stripped and tinned leads at the opposite end permit connection to 873EC and 873AEC Analyzers.

The extension cable, Part Number P0170RB, is a Teflon jacketed multiconductor (8 conductors **plus ground**) cable that provides intrasystem connections. It is available in lengths up to 1000 ft (300 m)<sup>(9)</sup>. **No wire lead terminations** are provided. For use with either 870ITEC Transmitter, or 873EC, 873AEC, or 875EC Analyzers (must be selected for use with NEMA 1 873 Analyzers having a plastic enclosure).

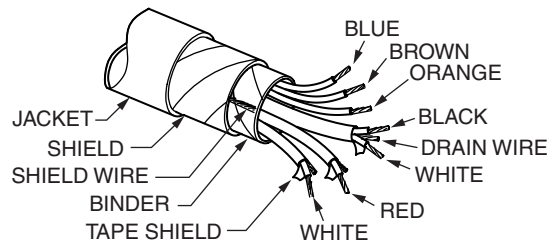
9. Although the extension cable is available in lengths up to 1000 ft, the maximum recommended separation between sensor and Analyzer or Transmitter is 100 ft (30 m)

The extension cable, Part Number P0170RG, is a PVC jacketed multiconductor (8 conductors, **no ground**) cable that provides intrasystem connections. Available in lengths up to 1000 ft (300

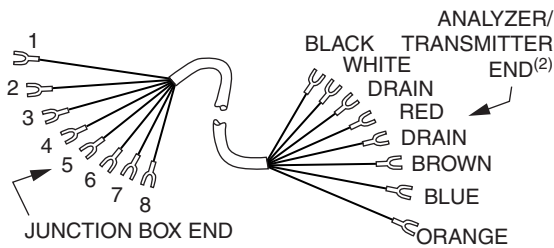
m). **No wire lead terminations** are provided. For use with either 870ITEC Transmitter, or 873EC, 873AEC, or 875EC Analyzers.



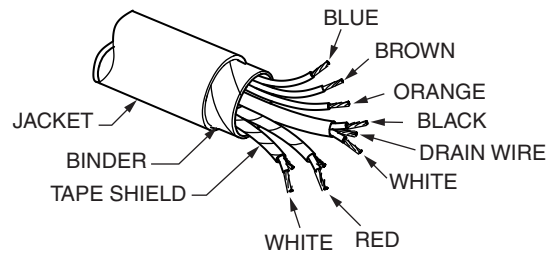
Cable Assembly (Part No. BS807PA shown)



Extension Cable (Part No. P0170RB shown)



Cable Assembly (Part No. BS807PC shown)



Extension Cable (Part No. P0170RG shown)



MODEL CODE - SANITARY FLOW-THROUGH CONDUCTIVITY SENSOR

Description	Model
Sanitary Flow-Through Conductivity Sensor; for use with 875EC, 873EC, and 873AEC Analyzers; and 876EC and 870ITEC Transmitters	871FT
<b>Sensor Type</b>	
Sanitary, High-Range Conductivity (3-A Compliant)	-1
Sanitary, Low-Range Conductivity (3-A Compliant)	-2
<b>Nominal Line Size</b>	
1/2 in (a)	C
3/4 in (a) (b)	D
1 in (a)	E
1 1/2 in (a)	F
2 in	G
3 in	H
4 in	J
<b>End Connection Material</b>	
None (One-Piece Insulator)	1
<b>Insulator (Wetted Bore Piece) Material</b>	
Virgin Polyetheretherketone (VPEEK); FDA/3-A Compliant Material	A
Polychlorotrifluoroethylene (PCTFE) (c)	C
<b>End Connection Form</b>	
Tri-Clamp (d) (e)	1
<b>RTD</b>	
None	C
1000 Ohm RTD (for use with 870ITEC Transmitter or 875EC Analyzer)	R
100 Ohm RTD	T
<b>Options</b>	
<b>Cables</b>	
Cable Length per Sales Order; 100 ft (30 m) recommended maximum	-3
Cable with Lugless Terminations;	-4
Used with 876EC and 873EC or 873AEC Analyzers because they require lugless terminations.	
Shielded Teflon Cable; may be used with all Analyzers/Transmitters;	-9
873EC/873AEC NEMA 1 Analyzers (plastic enclosures) require Teflon cable	
<b>Calibration Cable; for in-line calibration</b>	
Calibration Plug Model EP485A recommended. Contact Global Customer Support.	-C
<b>Electrical Certification Option</b>	
Class I, Division 2, Groups A, B, C, and D T4 Ta=20°C to +60°C; Class I, Zone 2, IIC T4 Ta = -20°C to +60°C	-FN
No Agency Certification	-ZZ
EXAMPLE: 871FT-1G1A1R-3C	

- 1/2-inch and 3/4-inch line sizes use 3/4-inch Tri-Clamp type end connections. 1- and 1 1/2-inch line sizes use 1 1/2 inch Tri-Clamp type end connections.
- Available only with Insulator Material Code A (VPEEK).
- For 4-inch line sizes, contact Global Customer Support.
- See "Pressure-Temperature Ratings" section for pressure derating with increasing temperature.
- Sanitary sensors use gaskets which are supplied by user.

MODEL CODE - INDUSTRIAL FLOW-THROUGH CONDUCTIVITY SENSOR

Description	Model
Industrial Flow-Through Conductivity Sensor, for use with 875EC, 873EC, and 873AEC Analyzers; and 876EC and 870ITEC Transmitters	871FT
<b>Sensor Type</b>	
Industrial, High-Range Conductivity	-3
Industrial, Low-Range Conductivity	-4
<b>Nominal Line Size</b>	
1/2 in (a) (b)	C
1 in (a)	E
1 1/2 in	F
2 in	G
3 in (c)	H
4 in (c)	J
<b>End Connection Material</b>	
Nickel Alloy (b) (d) (e)	2
316 Stainless Steel (316 ss)	3
Carpenter 20-CB3 (C-20Cb3) (e) (f)	4
<b>Insulator (Wetted Bore Piece) Material</b>	
Polyvinylidenedifluoride (PVDF) (b)	B
Polychlorotrifluoroethylene (PCTFE) (g)	C
Glass-Filled PEEK (GFPEEK)	D
<b>End Connection Form (h)</b>	
Pipe Adapter, NPT (f)	2
Flange, ANSI Class 150	3
Flange, ANSI Class 300 (b) (i)	4
<b>RTD</b>	
None	C
1000 Ohm RTD (for use with 876EC and 870ITEC Transmitter or 875EC Analyzer only)	R
100 Ohm RTD	T
<b>Options</b>	
<b>Cables</b>	
Cable Length per Sales Order 100 ft (30 m) maximum	-3
Cable with Lugless Terminations; Used with 873EC or 873AEC Analyzers because they require lugless terminations.	-4
Shielded Teflon Cable; may be used with all Analyzers/Transmitters; 873EC/873AEC NEMA 1 Analyzers (plastic enclosures) require Teflon cable	-9
<b>O-Rings</b>	
Viton (g)	-V
Perfluoroelastomer (Chemraz)	-P
<b>Calibration Cable; for in-line calibration</b>	
Calibration Plug Models EP485A and EP485N recommended. Contact Global Customer Support.	-C
<b>Bolts</b>	
B7 Spacer Tubes and Hex Bolts (j) (k)	-B
Nickel Alloy (d) Spacer Tubes and Hex Bolts (j)	-H
EXAMPLE: 871FT-3F3B3R-3V	

- a. 1/2- and 1-inch line sizes use 1-inch flanges, as applicable.
- b. A specific combination of Nominal Line Size, End Connection Material, Insulator Material, and End Connection Form is offered as shown in Table 12 below. Contact Global Customer Support for further information.
- c. 3- and 4-inch line sizes not available with NPT pipe adapter mounting.

- d. Equivalent to Hastelloy® C-276.
- e. For 300 lb flange versions, contact Global Customer Support. Also see footnote (b).
- f. Industrial sleeve material is Alloy 20, ASTM A-351, Grade CN-7M.
- g. Specified for high concentration sulfuric acid or oleum applications. Select Carpenter 20 end connection material, and also select either the Viton or Chemraz O-ring options.
- h. See “Pressure-Temperature Ratings” section for pressure derating with increasing temperature.
- i. ANSI Class 300 Flanges are available with 316 ss material and having GFPEEK insulators only, except for the specific combination noted in footnote (b).
- j. Only available in Nominal Line Size 1/2 inch and 1 inch with End Connection Form 4.
- k. Consult Global Customer Support for material compatibility.

**Table 12. Nominal Line Size, End Connection Material, Insulator Material, and End Connection Form**

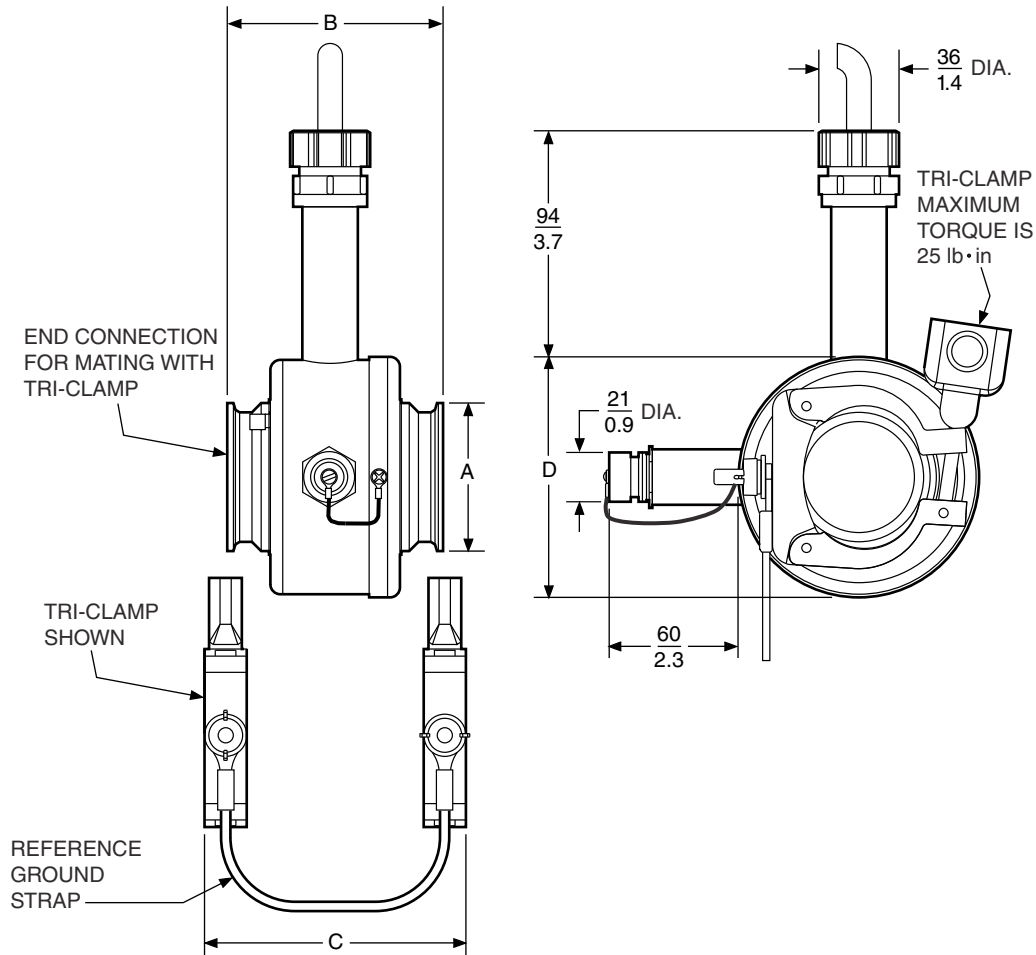
Nominal Line Size	End Connection Material	Insulator Material	End Connection Form
1/2 in, Code C	Nickel Alloy (a), Code 2	PVDF, Code B	ANSI Cl. 300, Code 4

- a. Equivalent to Hastelloy® C-276.

DIMENSIONS-NOMINAL

871FT FLOW-THROUGH 3-A COMPLIANT SANITARY CONDUCTIVITY SENSORS WITH SANITARY END CONNECTIONS

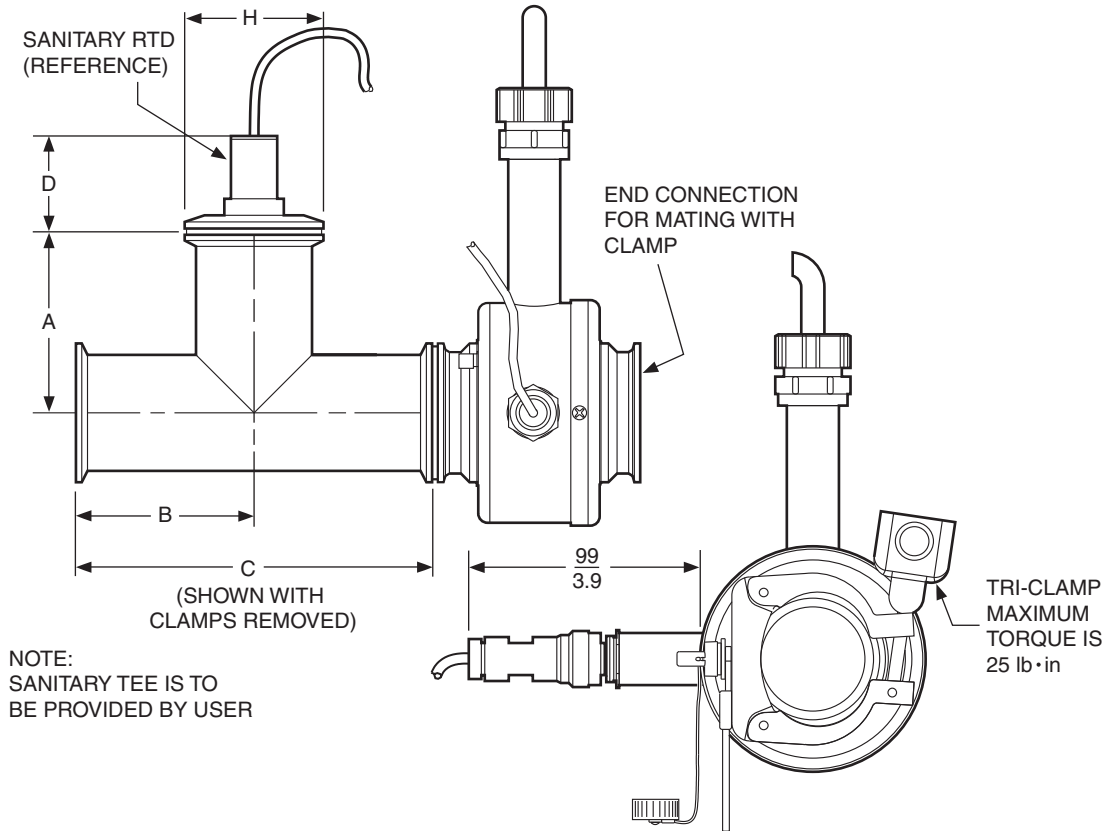
$\frac{mm}{in}$



Nominal Line Size	Clamp Size	Nominal Dimensions - Inches			
		A	B	C	D
1/2 in	3/4 in	1.0 in	3.0	3.8	3.2
3/4 in	3/4 in	1.0 in	3.0	3.8	3.2
1 in	1 1/2 in	2.0 in	3.6	4.4	4.1
1 1/2 in	1 1/2 in	2.0 in	3.6	4.4	4.1
2 in	2 in	2.5 in	5.0	5.8	4.1
3 in	3 in	3.6 in	5.0	5.8	6.4
4 in	4 in	4.8 in	5.0	5.8	6.4

871FT FLOW-THROUGH 3-A COMPLIANT SANITARY CONDUCTIVITY SENSORS  
WITH RTD SANITARY TEE

$\frac{\text{mm}}{\text{in}}$

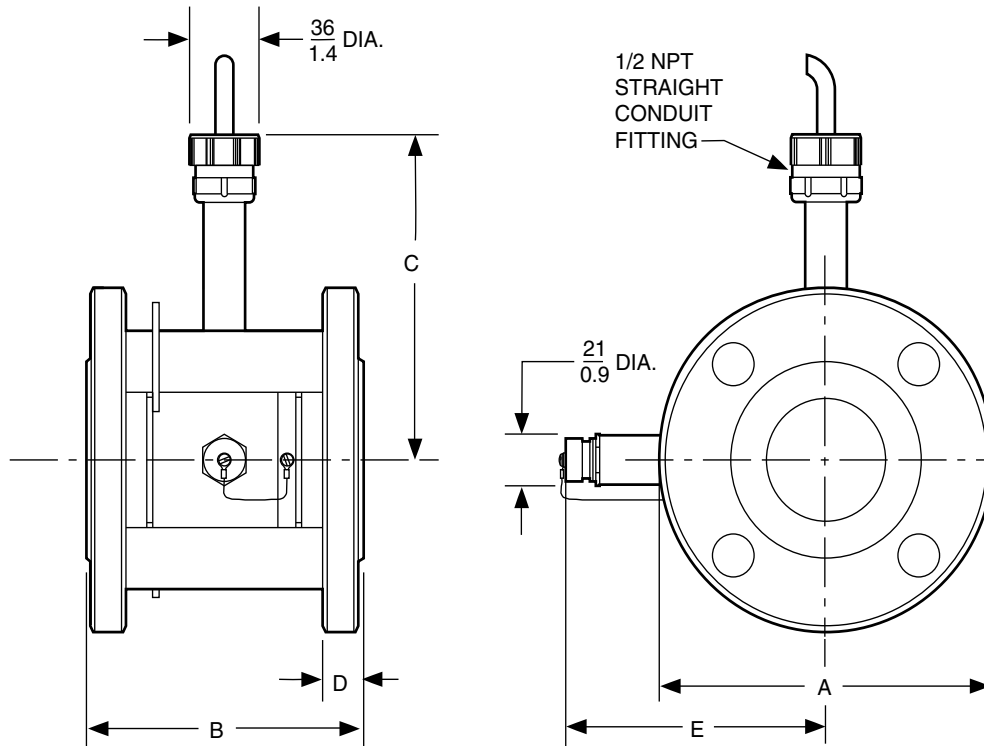


Nominal Line Size	Clamp Size	Nominal Dimensions - Inches				
		A	B	C	D	H (Dia)
1/2 in	3/4 in	2.6	2.6	5.2	1.7	0.98
3/4 in (a)	3/4 in	2.6	2.6	5.2	1.7	0.98
1 in (b)	1 1/2 in	2.6	2.6	5.2	1.7	0.98
1 1/2 in (c)	1 1/2 in	2.9	2.9	5.8	1.7	0.98
2 in	2 in	3.5	3.5	7.0	1.8	2.52
3 in (d)	3 in	3.1	3.1	6.2	1.8	2.52
4 in	4 in	4.5	4.5	9.0	1.8	4.68

- a. Uses reducing tee, 3/4 to 1/2 in.
- b. Uses reducing tee, 1 in to 1/2 in.
- c. Uses reducing tee, 1 1/2 in to 1/2 in.
- d. Uses reducing tee, 3 in to 2 in.

871FT FLOW-THROUGH INDUSTRIAL CONDUCTIVITY SENSORS  
WITH FLANGED END CONNECTIONS

$\frac{\text{mm}}{\text{in}}$



Nominal Line Size	Dimensions in Inches with ANSI Class 150 Flanges (a)					Bolt Holes
	A	B	C	D	E	
1/2 in	4.25	4.6	4.3	0.56	3.9	4
3/4 in	N/A	N/A	N/A	N/A	N/A	N/A
1 in	4.25	4.6	4.3	0.56	3.9	4
1 1/2 in	5.0	4.9	4.3	0.69	3.9	4
2 in	6.0	5.0	4.8	0.75	4.3	8
3 in	7.5	5.9	5.4	0.94	4.9	8
4 in	9.0	5.9	6.0	0.94	5.4	8

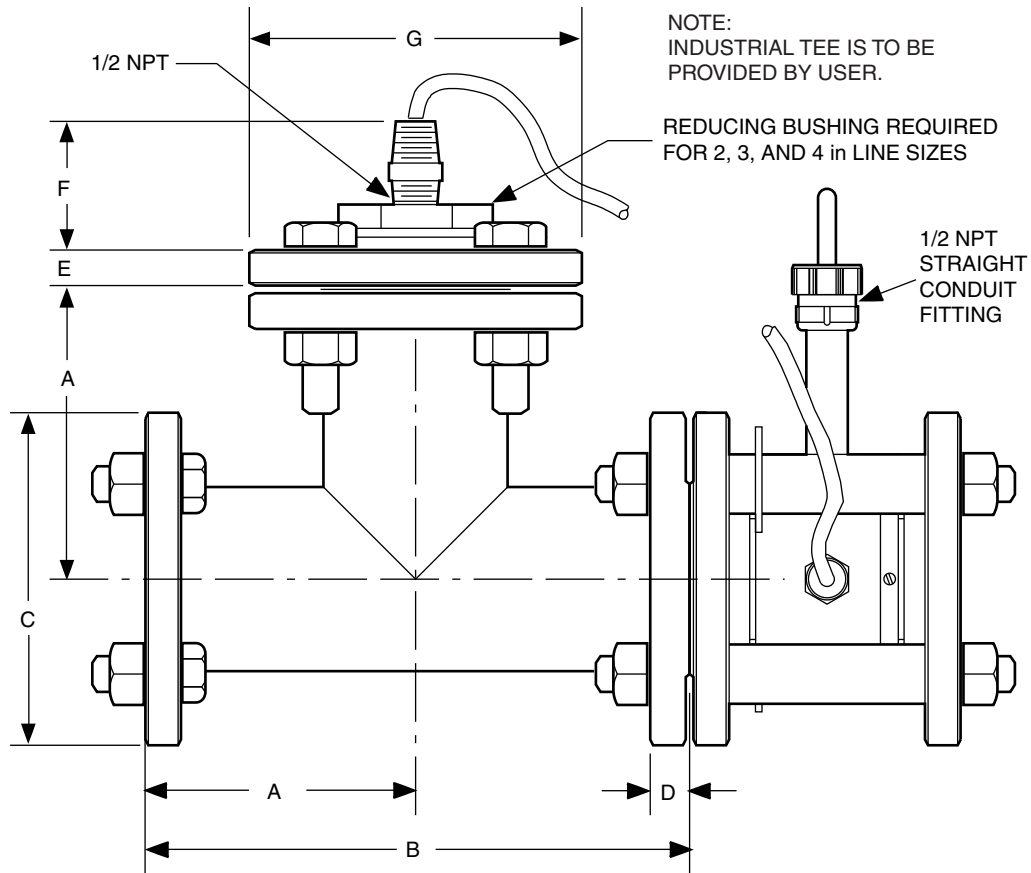
a. ANSI Class 150 flanges are available in 316 ss, nickel alloy, or Carpenter 20-Cb3.

Nominal Line Size	Dimensions in Inches with ANSI Class 300 Flanges					Bolt Holes
	A	B	C	D	E	
1/2 in (a)	4.9	4.9	4.3	0.69	3.9	4
3/4 in	N/A	N/A	N/A	N/A	N/A	N/A
1 in	4.9	4.9	4.3	0.69	3.9	4
1 1/2 in	6.13	5.1	4.3	0.81	3.9	4
2 in	6.50	5.3	4.8	0.88	4.3	8
3 in	8.25	6.2	5.4	1.12	4.9	8
4 in	10.0	7.5	6.0	1.25	5.4	8

a. ANSI Class 300 flanges are available in 316 ss material and PEEK insulator only. However, a specific configuration is offered with a nickel alloy flange and PVDF insulator for the nominal 1/2 inch line size only.

871FT FLOW-THROUGH INDUSTRIAL CONDUCTIVITY SENSORS  
 WITH BOTH ANSI CLASS 150 AND ANSI CLASS 300 FLANGED END CONNECTIONS  
 AND WITH RTD INDUSTRIAL TEE

**mm**  
**in**



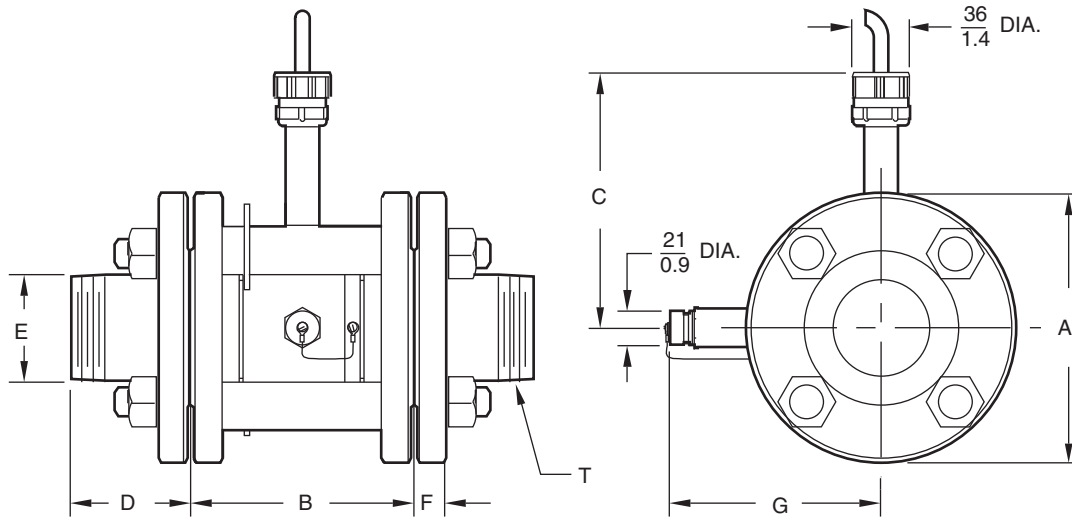
Nominal Line Size	Dimensions in Inches with ANSI Class 150 Flanges							Number of Bolt Holes
	A	B	C (Dia)	D	E	F	G (Dia)	
1/2 in	3.5	7.0	4.25	0.56	0.56	2.2	4.25	4
1 in	3.5	7.0	4.25	0.56	0.56	2.2	4.25	4
1 1/2 in	4.0	8.0	5.0	0.69	0.69	2.2	5.0	4
2 in	4.5	9.0	6.0	0.75	0.75	2.3	6.0	4
3 in	5.5	11.0	7.5	0.94	0.94	2.5	7.5	4
4 in	6.5	13.0	9.0	0.94	0.94	2.6	9.0	8

Nominal Line Size	Dimensions in Inches with ANSI Class 300 Flanges							Number of Bolt Holes
	A	B	C (Dia)	D	E	F	G (Dia)	
1/2 in (a)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1 in	4.0	8.0	4.9	0.72	0.72	1.5	4.9	4
1 1/2 in	4.5	9.0	6.1	0.81	0.81	1.5	6.1	4
2 in	5.0	5.0	6.5	0.88	0.88	2.3	6.5	8
3 in	6.0	12	8.3	1.1	1.1	2.5	8.3	8
4 in	7.0	14	10	1.3	1.3	2.6	10	8

a. ANSI Class 300 flanges are available in 316 ss material and PEEK insulator only. However, a specific configuration is offered with a nickel alloy flange and PVDF insulator for the nominal 1/2 inch size only.

871FT FLOW-THROUGH INDUSTRIAL CONDUCTIVITY SENSORS  
 WITH INDUSTRIAL-RATED NPT THREADED END CONNECTIONS  
USED WITH ANSI CLASS 150 FLANGES ONLY

**mm**  
**in**



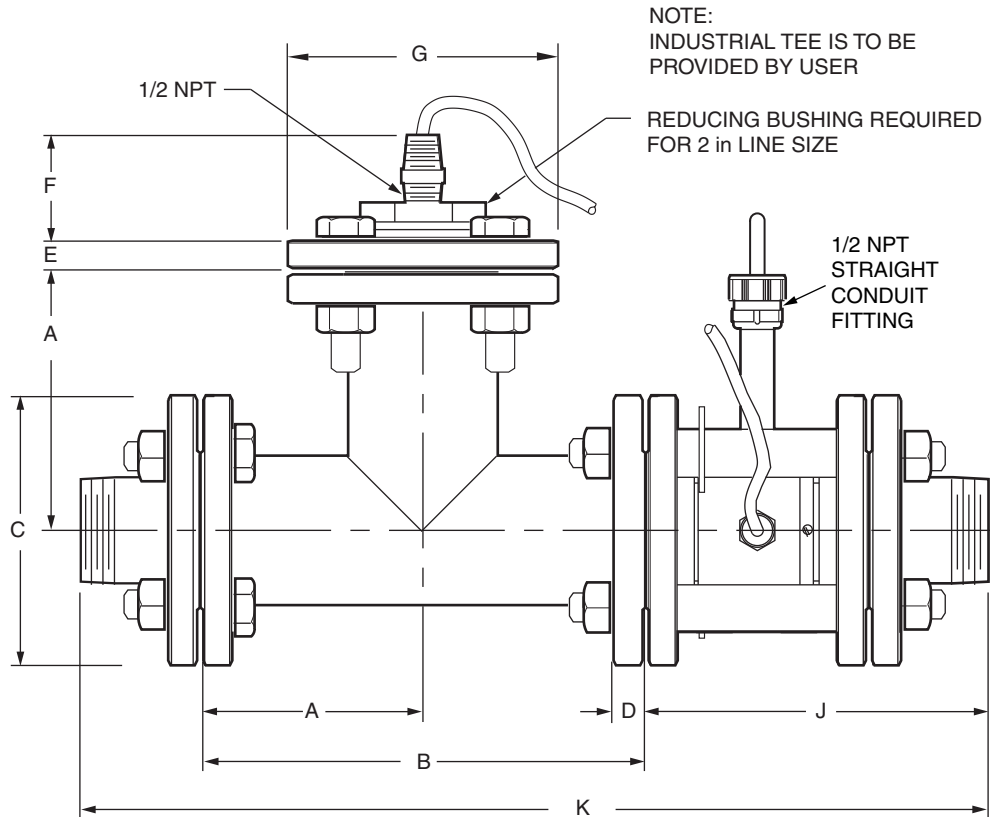
Nominal Line Size (a)	Nominal Dimensions - Inches (b)								Number of Bolt Holes (c)
	A (Dia)	B	C	D	E (Dia)	F	G	T (a)	
1/2 in	4.25	4.9	4.3	2.5	0.84	0.56	3.9	1/2 NPT	4
1 in	4.25	4.9	4.3	2.5	1.3	0.56	3.9	1 NPT	4
1 1/2 in	5.0	4.9	4.3	2.7	1.9	0.69	3.9	1 1/2 NPT	4
2 in	6.0	5.2	4.8	3.0	2.4	0.75	4.3	2 NPT	4

- a. Not applicable to 3/4 in, 3 in, or 4 in line sizes.
- b. ANSI Class 150 flanges only. NPT threaded end connections not applicable to ANSI Class 300 flanges.
- c. Number of Bolt Holes in ANSI Class 150 Flange.



871FT FLOW-THROUGH INDUSTRIAL CONDUCTIVITY SENSORS  
WITH INDUSTRIAL-RATED NPT THREADED END CONNECTIONS  
AND WITH RTD INDUSTRIAL TEE  
USED WITH ANSI CLASS 150 FLANGES ONLY

$\frac{\text{mm}}{\text{in}}$



Nominal Line Size (a)	Nominal Dimensions - Inches (b)									Number of Bolt Holes
	A	B	C (Dia)	D	E	F	G (Dia)	J(b)	K (c)	
1/2 in	3.5	7.0	4.25	0.56	0.56	2.2	4.25	7.4	17.0	4
1 in	3.5	7.0	4.25	0.56	0.56	2.2	4.25	7.4	17.0	4
1 1/2 in	4.0	8.0	5.0	0.67	0.69	2.2	5.0	7.7	18.5	4
2 in	4.5	9.0	6.0	0.75	0.75	2.3	6.0	8.3	20.4	4

- a. Not applicable to 3/4 in, 3 in, or 4 in Line Sizes.
- b. ANSI Class 150 flanges only. NPT threaded end connections not applicable to ANSI Class 300 flanges.
- c. Dimensions J and K vary with user-supplied gasket thickness.

**NOTES**



### REFERENCE DOCUMENTS

Document	Description
MI 611-220	Electrodeless Conductivity System Calibration Examples
PSS 6-1C1 E	873EC Electrochemical Analyzer
PSS 6-1C1 F	873AEC Electrochemical Analyzer
PSS 6-2N1 C	875EC Intelligent Electrochemical Analyzer
PSS 6-3N2 A	870ITEC Intelligent Electrochemical Transmitter
Bulletin EP485A	Calibration Plugs for use with 871FT Sanitary or Industrial Sensors
Bulletin EP485N	Calibration Plugs for use with 871FT Industrial Sensors Only

### ORDERING INSTRUCTIONS

1. Model Number (see Model Code)
2. Calibration Cable or Calibration Plug (Recommended)
3. Other Accessories
4. Tag Data

### ADDITIONAL PRODUCTS

These product lines offer a broad range of measurement and instrument products, including solutions for pressure, flow, analytical, temperature, positioning, and controlling. For a list of these offerings, visit our web site at:

[www.se.com](http://www.se.com)

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