

## 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. As symbolized by the “CE” Logo marking on the product, these sensors conform to the applicable European Union directives.

### NON-INVASIVE

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.

### Non-Invasive Flow-Through Design

- Where the process solution contains solids that cause fouling, the tubular design of the flow cell promotes self-cleaning and limits obstruction. Measurement inaccuracies and downtime associated with this problem are significantly reduced or eliminated altogether.
- Installation problems, 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 eliminates:
  - 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 spec product caused by incorrect caustic or acid strength

- For critical processes in the pharmaceutical and biotechnology industries that involve solutions with proteins and other physically sensitive species, the non-invasive flow-through measurement eliminates damage to these sensitive and typically expensive medium. For those industries requiring sanitary designs with smooth bore finishes, the 871FT Sanitary version is certified to 3A standards.

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

### **PRINCIPLE OF OPERATION**

The 871FT Flow-Through 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**

The unique non-invasive Sanitary 871FT Flow-Through Conductivity 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. The 871FT Sanitary Sensor may be selected with either a Virgin PEEK<sup>(2)</sup> or PCTFE<sup>(2)</sup> insulator (bore piece) providing a 16 micro inch or better interior bore finish in line sizes from 0.5 to 4.0 inches. Completely crevice-free flow-through construction facilitates all CIP (clean-in-place) operations. Industry standard Tri-Clamp or DIN 11851 milk pipe end connection mountings may be selected, and 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 (e.g., juices, beer, milk, etc.) and their associated CIP requirements.

The 871FT Flow-Through Sensor permits dramatic savings in product otherwise lost to drain and 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 re-certification. Finally, the simple Tri-Clamp or milk pipe end connections permit ease of installation.

### **INDUSTRIAL SENSORS**

The Industrial 871FT Flow-Through Conductivity 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 flange (ANSI 150/300, or DIN 2501) or NPT pipe mounting, in either 316 ss, Carp 20, or Hast C. Insulator materials of PEEK, PCTFE, or PVDF<sup>(2)</sup> in line sizes from 1.0 to 4.0 inches may be selected to satisfy a multitude of applications.

### **The Industrial Non-Invasive Advantage**

The 871FT Industrial Flow-Through Sensors provide a non-invasive conductivity measurement for innumerable aqueous and/or chemical concentration monitoring and control applications (e.g., boiler/condensate water, acid or caustic concentration control, waste stream monitoring, leak detection, interface detection, etc.). The Industrial 871FT Flow-Through Sensors may often be calibrated in-line, thus significantly reducing scheduled maintenance time, and eliminating the need for exposure of personnel to potentially hazardous chemicals. Simple design ANSI 150 or DIN 2501 flange mounting facilitates both installation and removal 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, dangerous, and costly. Obtaining permits, suiting up, testing for gas, pulling the probe, capping the line, calibrating the cell, and cleaning up can take 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 eliminated, calibration is accomplished in-situ, and the associated costs and safety issues diminish.

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

(2) PEEK = PolyEtherEtherKetone (Virgin or Glass-Filled); PCTFE = PolyChloroTriFluoroEthylene; and PVDF = PolyVinylideneDiFluoride.

### Rugged Design, Robust, Environmentally Isolated Sensor

871FT Flow-Through Sensors are housed in a tough epoxy-painted aluminum housing and are designed to provide NEMA 4, CSA Enclosure 4, and IEC IP65 protection.

The most common failure mode of conventional insertion sensors in process is 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 which contains the completely encapsulated core is available in many more chemically compatible materials than those available in conventional sensors. These two elements combine to create a virtually fail-proof sensor. Downtime and production losses associated with sensor failure are eliminated.

### WETTED MATERIALS

The 871FT Sanitary Sensor provides only the Insulator (bore piece) as a wetted part. This may be either of Virgin PEEK or PCTFE (gaskets are user supplied).

The 871FT Industrial Sensor provides a choice of application suitable metals, Insulator (bore piece), and O-ring materials (see “Standard Specifications” section).

### 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 depicts these ranges vs. bore size.

### CABLE

The 871FT provides a 20 foot integral PVC, or optional shielded Teflon, RFI/EMI protected cable. The teflon cable eliminates the need for placing the cable in conduit in many typical installations. Extension cable(s), as well as the appropriate junction boxes, are available (see “Accessories” section). The maximum recommended cable length, as with any toroidal conductivity sensor, is 100 feet.

### 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 870ITEC Transmitter), or 100 Ohm RTD [compatible with either the 870ITEC, 873EC, or 873AEC Analyzer(s)]. These temperature sensing elements provide the fastest temperature response possible by inserting into the process stream through a user supplied, industry standard tee. Where an accurate, rapid temperature response is not required, or where indication only is necessary, an optional temperature measurement method is available (contact Foxboro).

### EASE OF INSTALLATION

The Non-Invasive 871FT Flow-Through 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 a face-to-face dimension which does not exceed 7 inches in any bore size. The matrix in Table 1 depicts the exact measurements for each model/bore size. Normal precautions should be taken relative to pipeline support (see “Flowcell Weights” section) and alignment of the flow-through. Naturally, Cantilever or bending loads on the sensor should be eliminated.

Table 1. 871FT Full Scale Range Settings (Minimum and Maximum)

Sensor Type and Nominal Line Size 871FT—	871FT—1 Sanitary High Range, 871FT—2 Sanitary Low Range 871FT—3 Industrial High Range, 871FT—4 Industrial Low Range											
	50 us/cm	100 us/cm	200 us/cm	500 us/cm	1000 us/cm	50 mS/cm	100 mS/cm	200 mS/cm	500 mS/cm	1000 mS/cm	2000 mS/cm	
2C, 1E				YES								YES
2E			YES				YES					
2F, 4E	YES							YES				
2G, 2H, 4F, 4G	YES							YES				
2J, 4H, 4J	YES							YES				
1C, 3E, 3F, 3G					YES							YES
1F, 1G, 1H			YES							YES		
1J	YES							YES				
3H				YES							YES	
3J			YES								YES	

**LOCATION IN PROCESS LINE**

The 871FT Flow-Through Sensors can be installed in any non-magnetic metal piping, and are neither flow-direction, nor flow-rate sensitive. They can be mounted in any convenient orientation (horizontal, vertical, or sloping) which assures full and continuous capacity of the bore, and includes normal precautions (separation by 3 to 5 pipe diameters) for upstream/downstream disturbances (e.g., valves, elbows, etc.). Avoidance of entrained air or the formation of voids will assure a stable, accurate measurement (see MI 611-202).

**COMPATIBLE INSTRUMENTATION**

These Sensors are ideal for use with the 870ITEC Transmitter or the 873EC or 873AEC Analyzers. Certain 871FT configurations require cell type codes which are new to the 873EC Analyzer firmware. Therefore, 873EC Analyzers manufactured prior to 1 Jan. 1996 may require a firmware upgrade (completed at Foxboro) and a change to a capacitor. Contact Foxboro for details. The 871FT Flow-Through Sensors were not designed to be, nor are they easily compatible to the older instrumentation (e.g., 870EC Transmitter or 872-20 Monitor, etc.).

**STANDARD SPECIFICATIONS**

**Sanitary – Wetted Bore Piece**

- Virgin PEEK
- O-RINGS
  - Not applicable
- MAXIMUM PRESSURE
  - 225 psi
- TEMPERATURE LIMITS
  - 20 to 250°F (–10 to +121°C)
- PCTFE
- O-RINGS
  - Not applicable
- MAXIMUM PRESSURE
  - 60 psi
- TEMPERATURE LIMITS
  - 20 to 140°F (–10 to +60°C) linearly derated to 10 psi @ 250°F (121°C)

**Flowcell Dimensions**

The table below lists the flowcell end-to-end dimensions. (Refer also to the “Dimensions-Nominal” section.) Note that the dimensions noted for the Industrial cells should be increased to accommodate the two required flange gaskets

Face-to-Face Dimensions		
Mounting	Sanitary (in)	Industrial Flange (ANSI CLASS 150) (in)
1/2	2.65	N/A
1	3.60	N/A
1 1/2	3.60	4.93
2	3.60	5.18
3	5.00	5.89
4	5.00	6.86

**Industrial – Wetted Bore Piece**

- Glass-Filled PEEK (choice of metals<sup>(1)</sup>)
- O-RINGS
  - EPR<sup>(2)</sup>
- MAXIMUM PRESSURE
  - 275 psi
- TEMPERATURE LIMITS
  - 20 to 140°F (–10 to +60°C) linearly derated to 190 psi @ 411°F (210°C)
- PVDF (choice of metals<sup>(1)</sup>)
- O-RINGS
  - EPR<sup>(2)</sup>
- MAXIMUM PRESSURE
  - 100 psi
- TEMPERATURE LIMITS
  - 20 to 140°F (–10 to +60°C) linearly derated to 10 psi @ 250°F (121°C)
- PCTFE (choice of metals<sup>(1)</sup>)
- O-RINGS
  - EPR<sup>(2)</sup>
- MAXIMUM PRESSURE
  - 100 psi
- TEMPERATURE LIMITS
  - 20 to 140°F (–10 to +60°C) linearly derated to 10 psi @ 250°F (121°C)

**Approximate Mass**

The table below lists approximate gross weights for various sizes of flowcells.

Size (in)	Approximate Weight (kg/lb)		
	Sanitary	Flanged	Threaded NPT
1/2	TBD	N/A	N/A
1	3.4/7.5	N/A	8.4/18.5
1 1/2	3.2/7	5.4/12	7.9/17.5
2	3/6.5	TBD	TBD
3	5.9/13	TBD	N/A
4	5.4/12	TBD	N/A

(1) 316 ss, Carp 20-CB3, or Hastelloy C-276.

(2) Optionally either Viton or Chemraz.

## MODEL CODE

<b>Description</b>	<b>Model</b>
Flow-Through Conductivity Sensor; for use with 870ITEC Series Transmitter, 873EC Series Analyzers, or 873AEC Series Analyzers	871FT
<b>Sensor Type</b>	
Sanitary, High Range Conductivity	-1
Sanitary, Low Range Conductivity	-2
Industrial, High Range Conductivity	-3
Industrial, Low Range Conductivity	-4
<b>Nominal Line Size</b>	
<b>English(j)</b> <b>Metric(k)</b>	
1/2 in(a,c)      DN 10	C
1 in(c,e,f)      DN 20(a)	E
1.5 in(e)      DN 40	F
2 in(e)      DN 50	G
<b>End Connection Material</b>	
None (One-piece insulator – Sanitary)(a)	1
Hastelloy C-276(b)	2
316 ss(b)	3
Carpenter 20 - CB3(b,g)	4
<b>Insulation Material</b>	
Virgin PEEK (Sanitary)(a)	A
PVDF(b)	B
PCTFE (Sanitary or Industrial)(h)	C
Glass-Filled PEEK(b)	D
<b>End Connection Form</b>	
Tri-Clamp(a)	1
Pipe, NPT(b,e)	2
Flange, ANSI Class 150(b,d)	3
<b>RTD</b>	
None	C
1000 Ohm RTD (for use with 870ITEC Transmitter only)	R
100 Ohm RTD	T
<b>Cable Options</b>	
Cable Length per Sales Order (100 ft maximum)	-3
Cable with Lugless Terminations (for use with 873EC or 873AEC Analyzers)	-4
Shielded Teflon Cable (must be used with NEMA 1 [plastic] 873EC or 873AEC Analyzers)	-9
<b>O-Ring Options(b)</b>	
Viton(h,l)	-V
Perfluoroelastomer (Chemraz)(l)	-P
<b>Calibration Cable Option</b>	
Calibration Cable(m)	-C

(a) Sanitary only.

(b) Industrial only.

(c) Sanitary – 1/2 inch line size uses 3/4 inch Tri-clover mounting flange and clamp; 1 and 1 1/2 inch line sizes use 1 1/2 inch Tri-clover mounting flange and clamp.

(d) Note that ANSI Temperature/psi rating of 275 psi at 100°F (38°C) is linearly derated to 190 psi @ 411°F (210°C).

(e) 1, 1 1/2, and 2 inch industrial may use Flange/NPT pipe adapter (available from Foxboro).

(f) 1 inch industrial available as NPT industrial version only.

(g) 2 through 4 inch industrial sleeves are Alloy 20, ASTM A-351, Grade CN-7M.

(h) Must be specified for high concentration sulfuric acid or oleum applications. Choose Carpenter 20 end connection material and PCTFE, and optional O-rings.

(j) Available only with end connection form 1, 2, or 3.

(k) Available only with end connection form 5 or 6. (Not available at Sales Release.)

(l) Standard O-ring material is EPR.

(m) Recommended – required for in line calibration.

**ELECTRICAL SAFETY SPECIFICATIONS**

<b>Testing Laboratory, Types of Protection, and Area Classification</b>	<b>Condition of Certification</b>	<b>Electrical Safety Design Code</b>
<b>CENELEC</b> intrinsically safe EEx ia IIC Zone 0.	Connect to certified 870ITEC Transmitter. Temperature Class T4-T6.	CS-E/EAA
<b>CSA</b> intrinsically safe for Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G.	Connect to approved 870ITEC Transmitter per TI 005-105. Temperature Class T6.	CS-E/CAA
<b>CSA</b> Class I, Division 2, Groups A, B, C, and D; Class II, Division 2, Groups F and G, Class III, Division 2.	Connect to certified 870ITEC Transmitter, or 873EC or 873AEC Analyzer per TI 005-105. Temperature Class T6.	CS-E/CNN
<b>FM</b> non-incendive for Class I, Division 2, Groups A, B, C, and D; Class II, Division 2, Groups F and G; Class III, Division 2.	Connect to certified 870ITEC Transmitter, or 873EC or 873AEC Analyzer per TI 005-101. Temperature Class T6.	CS-E/FNN
<b>FM</b> intrinsically safe for Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G.	Connect to approved 870ITEC per TI 005-101. Temperature Class T6.	CS-E/FAA
<b>SAA</b> intrinsically safe Ex ia IIC Zone 0.	Connect to certified 870ITEC Transmitter. Temperature Class T4-T6.	CS-E/AAA

**NOTE**

These sensors have been designed to meet the electrical safety descriptions noted in the table above. For detailed information or status of testing laboratory approvals and certifications, contact Foxboro.

**ACCESSORIES**

<b>Part Number</b>	<b>Description</b>	<b>Comments</b>
BS807BD	Calibration Cable	
BS807PA	Extension Cable, Teflon, lugs/lugs termination	Use with 870ITEC
BS807PB	Extension Cable, Teflon, lugs/lugless termination	Use with 873EC or 873AEC
BS807PC	Extension Cable, PVC, lugs/lugs termination	Use with 870ITEC
BS807PD	Extension Cable, PVC, lugs/lugless termination	Use with 873EC or 873AEC
P0170RB	Cable, Teflon, not terminated, nor dressed	Use with 870ITEC, 873EC, or 873AEC
P0170RG	Cable, PVC, not terminated, nor dressed	Use with 870ITEC, 873EC, or 873AEC
BS807DY	Junction Box, 9 conductor	Use with Teflon, 9 conductor cable
BS807NS	Junction Box, 8 conductor	Use with PVC, 8 conductor cable
Tees	For Temperature Compensation Sensors	Contact Foxboro
Clamps	For Temperature Compensation Sensors	Contact Foxboro
Spool Piece	316 ss Adaptor for Non-Invasive Sanitary Temperature Compensation	Contact Foxboro
Sanitary or Industrial	Temperature Compensation Sensor Elements	See Selection on Page 7

**TEMPERATURE COMPENSATION SENSOR ELEMENTS**

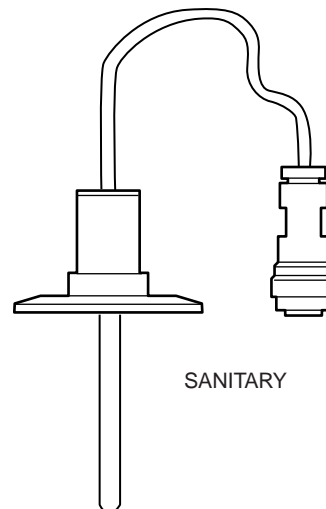
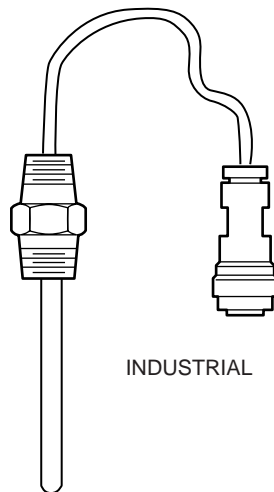
**Industrial RTDs**

Size		Value	Material	Part No.
mm	in			
25	1	100 ohm	Hastelloy C	BS807WP
			316 ss	BS807WR
			C-20CB3	BS807WT
		1000 ohm	Hastelloy C	BS807WQ
			316 ss	BS807WS
			C-20CB3	BS807WU
40, 50	1 1/2, 2	100 ohm	Hastelloy C	BS807VH
			316 ss	BS807VX
			C-20CB3	BS807WF
		1000 ohm	Hastelloy C	BS807VJ
			316 ss	BS807VY
			C-20CB3	BS807WG
80, 100	3, 4	100 ohm	Hastelloy C	BS807VM
			316 ss	BS807WB
			C-20CB3	BS807WK
		1000 ohm	Hastelloy C	BS807VN
			316 ss	BS807WC
			C-20CB3	BS807WL

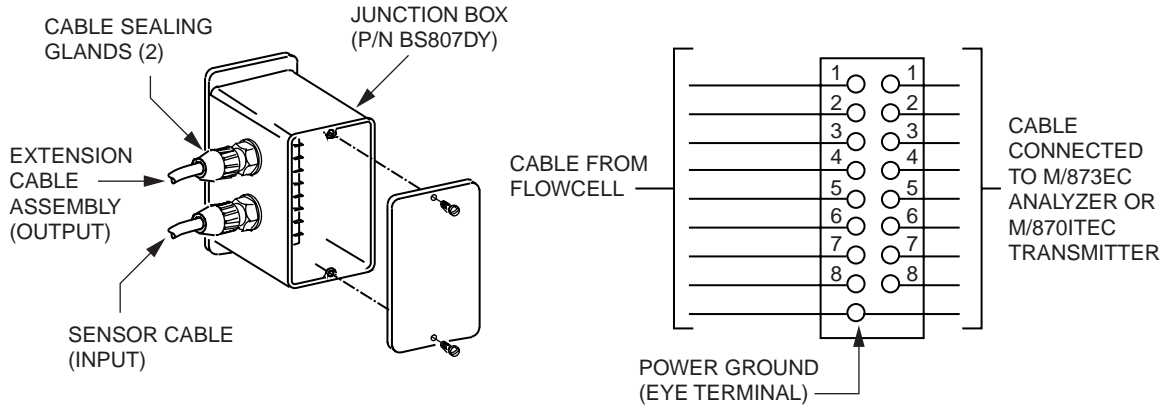
**Sanitary RTDs**

Size		Value	Material	Part No.
mm	in			
15 thru 40	1/2 thru 1 1/2	100 ohm	316 ss	BS807VR
		1000 ohm		BS807VS
50, 80	2, 3	100 ohm	316 ss	BS807VT
		1000 ohm		BS807VU
100	4	100 ohm	316 ss	BS807VV
		1000 ohm		BS807VW

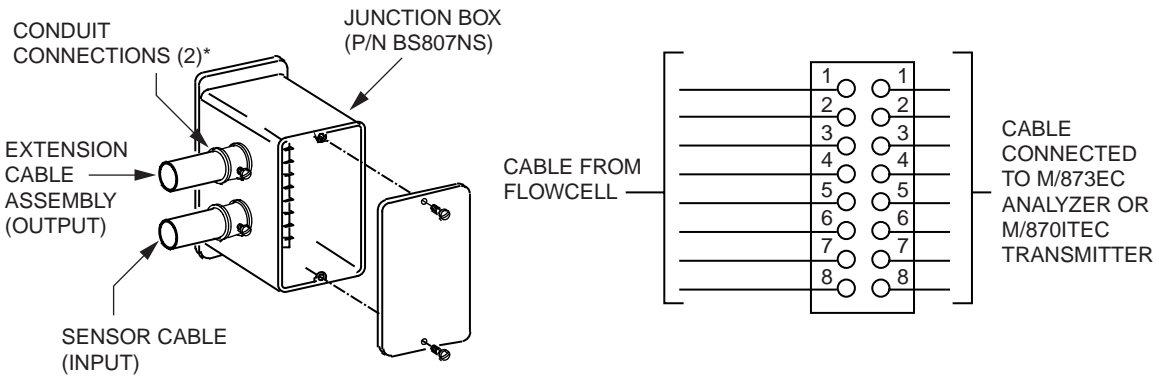
Corresponding Tee's are Industry Standard, and customer supplied.



### JUNCTION BOXES



### JUNCTION BOX WIRING WITH 9-CONDUCTOR TEFLON-JACKETED CABLE



\*CUSTOMER SUPPLIED.

### JUNCTION BOX WIRING WITH 8-CONDUCTOR PVC-JACKETED CABLE



### CALIBRATION CABLE FOXBORO P/N BS807BD

Calibration Cable (Foxboro P/N BS807BD) is required for any in-line calibration of the 871FT Flow-Through Sensors.



## EXTENSION CABLE ASSEMBLIES, AND EXTENSION CABLES

The extension cable assembly, Foxboro P/N BS807PB, is a Teflon jacketed multiconductor (8 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 Analyzers.

The extension cable assembly, Foxboro P/N BS807PA, is a Teflon jacketed multiconductor (8 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.

The extension cable assembly, Foxboro PN BS807PD, is a PVC jacketed multiconductor (8, 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 Analyzers.

The extension cable assembly, Foxboro P/N BS807PC, is a PVC jacketed multiconductor (8, no ground) cable that provides intrasystem connections up to 100 ft (30 m).

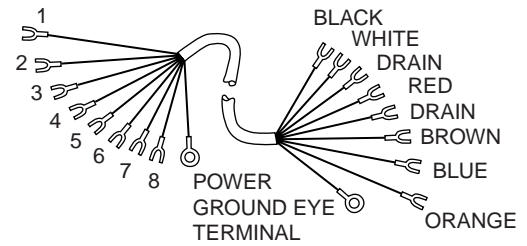
Numbered leads terminated in spade terminals at both ends allow the extension cable to be connected to the terminals in the junction box, and at the opposite end permit connection to 870ITEC Transmitters.

The extension cable assembly, Foxboro P/N P0170RB, is a Teflon jacketed multiconductor (8 plus ground) cable that provides intrasystem connections. It is available in lengths up to 1000 ft (300 m)<sup>(1)</sup>.

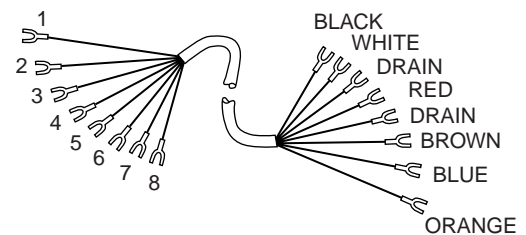
No termination is provided. For use with either 870ITEC Transmitter or 873EC or 873AEC Analyzers (must be selected for use with NEMA 1 plastic 873 Analyzers).

The extension cable assembly, Foxboro P/N P0170RG, is a PVC jacketed multiconductor (8, no ground) cable that provides intrasystem connections. Available in lengths up to 1000 ft (300 m).\*

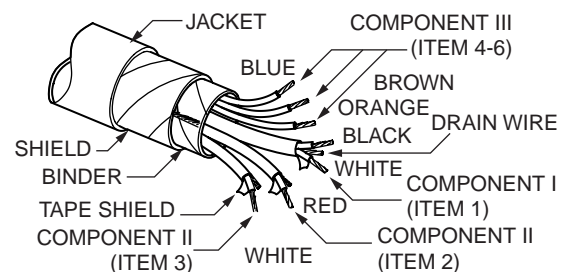
No termination is provided. For use with either 870ITEC Transmitter or 873EC or 873AEC Analyzers.



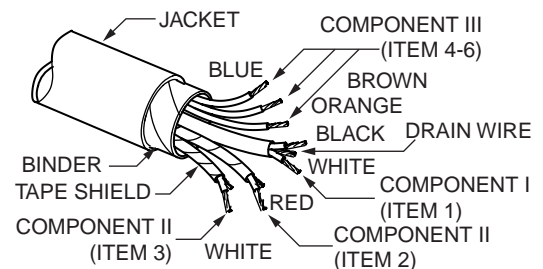
Extension Cable Assembly  
(Foxboro Part BS807PA)



Extension Cable Assembly  
(Foxboro Part BS807PC)



Extension Cable  
(Foxboro Part P0170RB)



Extension Cable  
(Foxboro Part P0170RG)

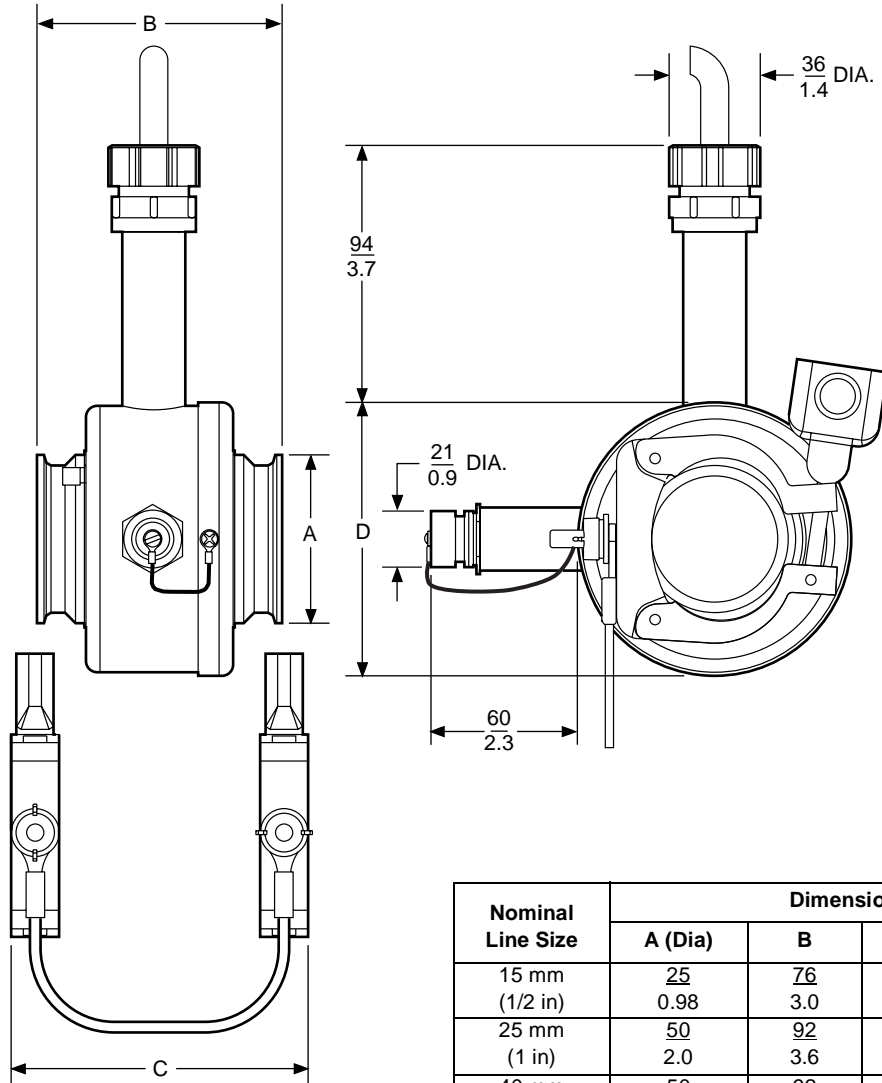
(1) Although the extension cable is available in lengths up to 1000 ft, the maximum recommended separation between sensor and Analyzer or Transmitter is 100 ft (30 m).

**DIMENSIONS—NOMINAL**

mm  
in

**871FT Flow-Through Conductivity Sensors  
Sanitary**

**871FT Toroidal Flow-Through Conductivity Sensors  
with Sanitary End Connections**

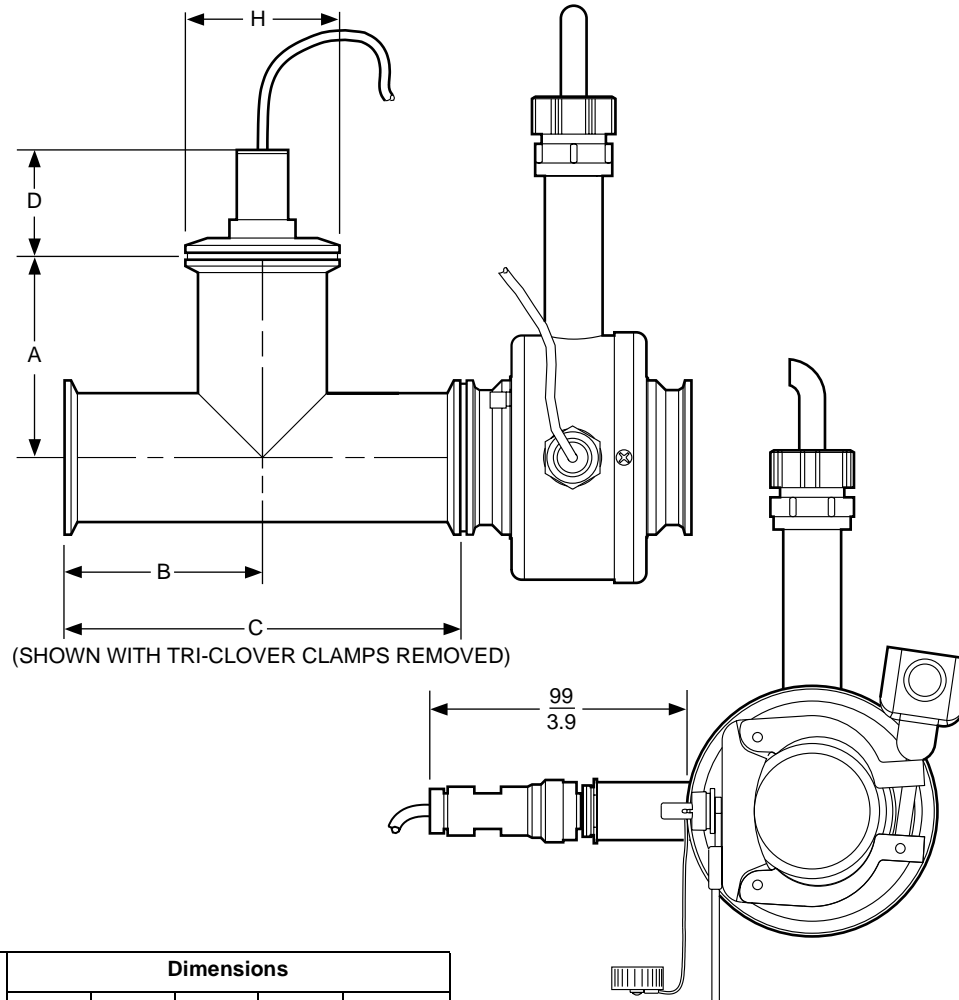


Nominal Line Size	Dimensions			
	A (Dia)	B	C	D
15 mm (1/2 in)	<u>25</u> 0.98	<u>76</u> 3.0	<u>95</u> 3.8	<u>82</u> 3.2
25 mm (1 in)	<u>50</u> 2.0	<u>92</u> 3.6	<u>111</u> 4.4	<u>104</u> 4.1
40 mm (1 1/2 in)	<u>50</u> 2.0	<u>92</u> 3.6	<u>111</u> 4.4	<u>104</u> 4.1
50 mm (2 in)	<u>64</u> 2.5	<u>92</u> 3.6	<u>111</u> 4.4	<u>104</u> 4.1
80 mm (3 in)	<u>91</u> 3.6	<u>127</u> 5.0	<u>146</u> 5.8	<u>163</u> 6.4
100 mm (4 in)	<u>119</u> 4.7	<u>127</u> 5.0	<u>146</u> 5.8	<u>163</u> 6.4

DIMENSIONS-NOMINAL (Cont.)

mm  
in

871FT Flow-Through Conductivity Sensors – with RTD  
Sanitary Tee



Nominal Line Size	Dimensions				
	A	B	C	D	H (Dia)
15 mm (1/2 in)	67 2.6	67 2.6	133 5.2	42 1.7	25 0.98
25 mm* (1 in)	67 2.6	67 2.6	133 5.2	42 1.7	25 0.98
40 mm* (1 1/2 in)	73 2.9	73 2.9	146 5.8	42 1.7	25 0.98
50 mm (2 in)	90 3.5	90 3.5	178 7.0	45 1.8	64 2.5
80 mm* (3 in)	79 3.1	79 3.1	157 6.2	45 1.8	64 2.5
100 mm (4 in)	114 4.5	114 4.5	229 9.0	46 1.8	119 4.7

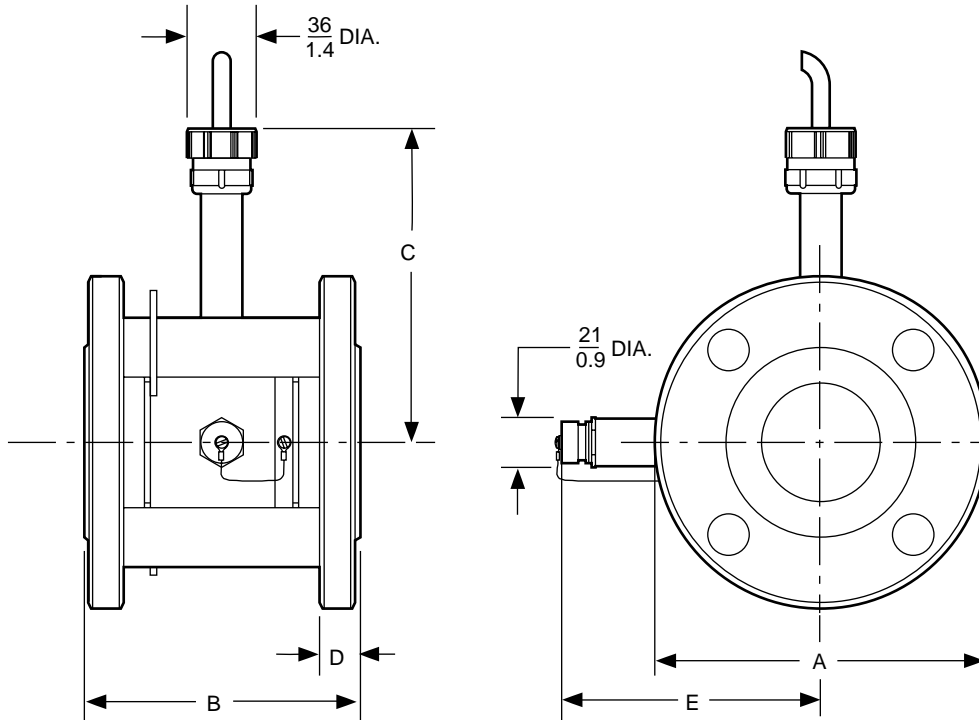
\*Uses reducing tee.

DIMENSIONS-NOMINAL (Cont.)

mm  
in

**871FT Flow-Through Conductivity Sensors  
Industrial**

**871FT Toroidal Flow-Through Conductivity Sensors  
with ANSI Class 150 Flanged End Connections**



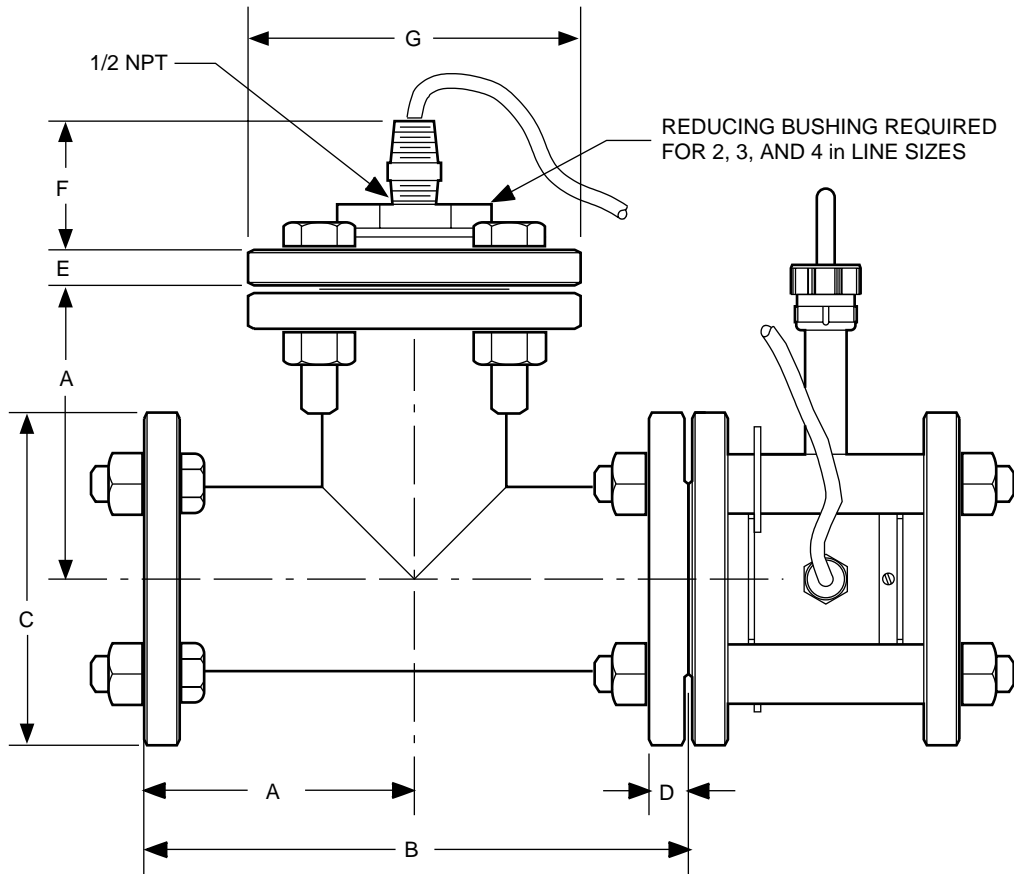
Nominal Line Size	Dimensions					Number of Bolt Holes
	A (Dia)	B	C	D	E	
40 mm (1 1/2 in)	<u>127</u> 5.0	<u>124</u> 4.9	<u>109</u> 4.3	<u>18</u> 0.69	<u>98</u> 3.9	4
50 mm (2 in)	<u>152</u> 6.0	<u>132</u> 5.2	<u>122</u> 4.8	<u>19</u> 0.75	<u>109</u> 4.3	4
80 mm (3 in)	<u>190</u> 7.5	<u>150</u> 5.9	<u>137</u> 5.4	<u>24</u> 0.94	<u>123</u> 4.9	4
100 mm (4 in)	<u>229</u> 9.0	<u>175</u> 6.9	<u>152</u> 6.0	<u>24</u> 0.94	<u>138</u> 5.4	8

DIMENSIONS-NOMINAL (Cont.)

mm  
in

**871FT Flow-Through Conductivity Sensors – with RTD  
Industrial Tee**

**871FT Toroidal Flow-Through Conductivity Sensors  
with ANSI Class 150 Flanged End Connections and RTD**

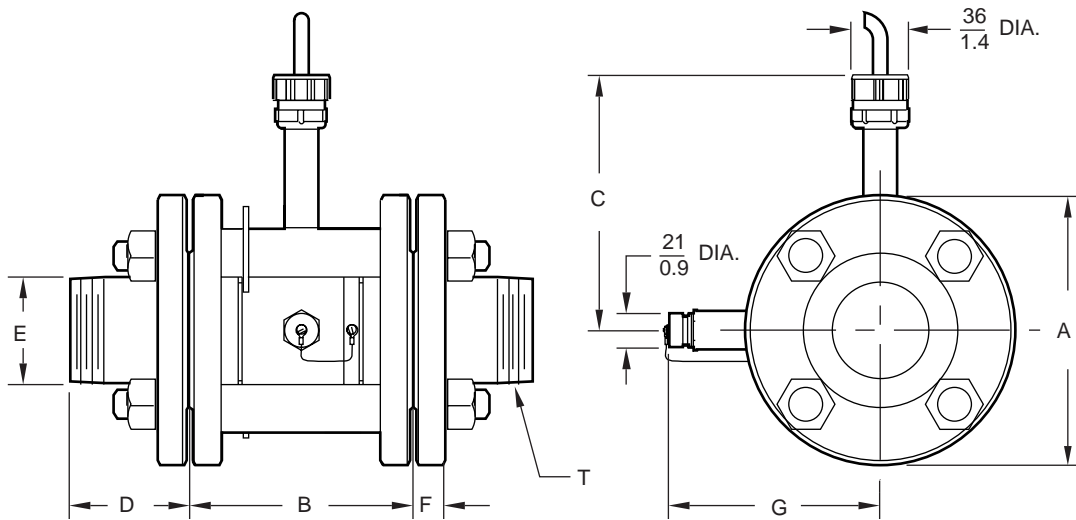


Nominal Line Size	Dimensions							Number of Bolt Holes
	A	B	C (Dia)	D	E	F	G (Dia)	
40 mm (1 1/2 in)	<u>102</u> 4.0	<u>203</u> 8.0	<u>127</u> 5.0	<u>14</u> 0.56	<u>17</u> 0.69	<u>56</u> 2.2	<u>127</u> 5.0	4
50 mm (2 in)	<u>114</u> 4.5	<u>229</u> 9.0	<u>152</u> 6.0	<u>16</u> 0.62	<u>19</u> 0.75	<u>58</u> 2.3	<u>152</u> 6.0	4
80 mm (3 in)	<u>140</u> 5.5	<u>279</u> 11.0	<u>190</u> 7.5	<u>19</u> 0.75	<u>24</u> 0.94	<u>64</u> 2.5	<u>190</u> 7.5	4
100 mm (4 in)	<u>165</u> 6.5	<u>330</u> 13.0	<u>229</u> 9.0	<u>24</u> 0.94	<u>24</u> 0.94	<u>66</u> 2.6	<u>229</u> 9.0	8

DIMENSIONS-NOMINAL (Cont.)

mm  
in

**871FT Flow-Through Conductivity Sensors**  
**871FT Toroidal Flow-Through Conductivity Sensors**  
**with Industrial-Rated NPT Threaded End Connections**



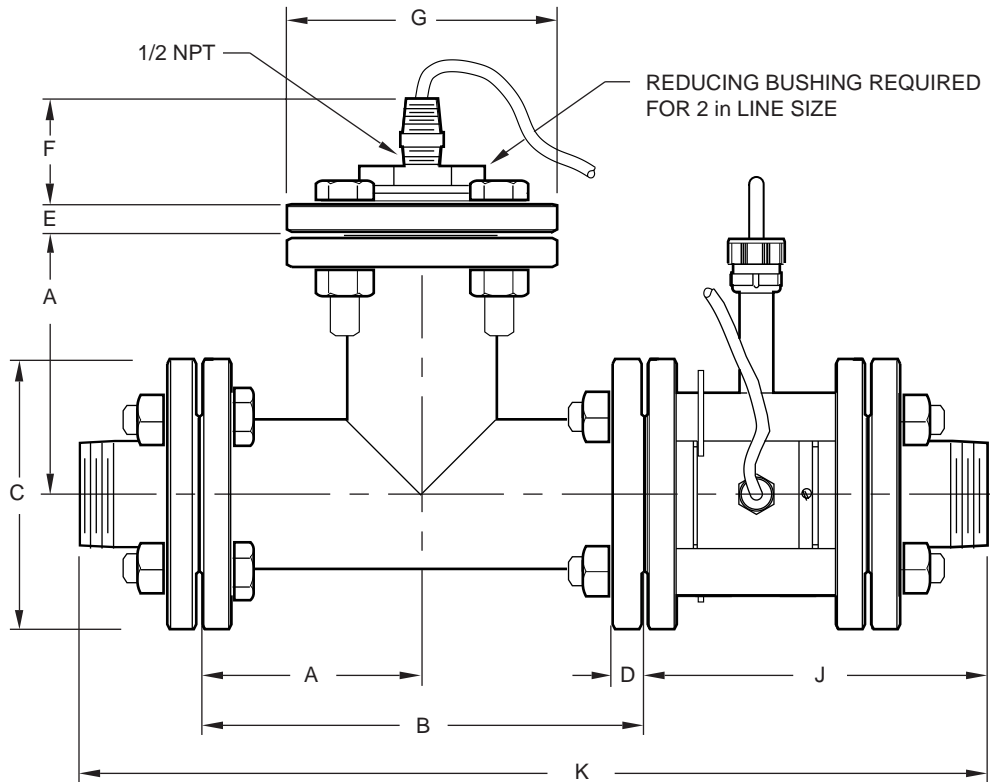
Nominal Line Size	Dimensions								Number of Bolt Holes
	A (Dia)	B	C	D	E (Dia)	F	G	T	
25 mm (1 in)	<u>127</u> 5.0	<u>124</u> 4.9	<u>109</u> 4.3	<u>64</u> 2.5	<u>33</u> 1.3	<u>18</u> 0.69	<u>98</u> 3.9	1 NPT	4
40 mm (1 1/2 in)	<u>127</u> 5.0	<u>124</u> 4.9	<u>109</u> 4.3	<u>71</u> 2.8	<u>48</u> 1.9	<u>18</u> 0.69	<u>98</u> 3.9	1 1/2 NPT	4
50 mm (2 in)	<u>152</u> 6.0	<u>132</u> 5.2	<u>122</u> 4.8	<u>79</u> 3.1	<u>61</u> 2.4	<u>19</u> 0.75	<u>109</u> 4.3	2 NPT	4

**DIMENSIONS—NOMINAL (Cont.)**

mm  
in

**871FT Flow-Through Conductivity Sensors – with RTD  
Industrial – NPT**

**871FT Toroidal Flow-Through Conductivity Sensors  
with Industrial-Rated NPT Threaded End Connections and RTD**



Nominal Line Size	Dimensions									Number of Bolt Holes
	A	B	C (Dia)	D	E	F	G (Dia)	J*	K*	
40 mm (1 1/2 in)	102 4.0	203 8.0	127 5.0	14 0.56	17 0.69	56 2.2	127 5.0	196 7.7	470 18.5	4
50 mm (2 in)	114 4.5	229 9.0	152 6.0	16 0.62	19 0.75	58 2.3	152 6.0	211 8.3	518 20.4	4

\*Dimensions J and K vary with gasket thickness.

**REFERENCE DOCUMENTS**

<b>Document</b>	<b>Description</b>
DP 611-011	Dimensional Print – 871EC Electrodeless Conductivity Sensors
DP 611-150	Dimensional Print – 871FT Flow-Through Conductivity Sensors – Industrial/Flange
DP 611-151	Dimensional Print – 871FT Flow-Through Conductivity Sensors – Industrial/NPT
DP 611-152	Dimensional Print – 871FT Flow-Through Conductivity Sensors – Sanitary
MI 611-150	Master Instruction – 871EC Electrodeless Conductivity Sensors and Accessories
MI 611-167	Master Instruction – 873EC Series Electrochemical Analyzers
MI 611-193	Master Instruction – 873AEC Series Electrochemical Analyzers
MI 611-202	Master Instruction – 871FT Flow-Through Conductivity Sensors
MI 611-212	Master Instruction – 870ITEC Intelligent Electrochemical Transmitters
PL 611-017	Parts List – 871FT Flow-Through Conductivity Sensors

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