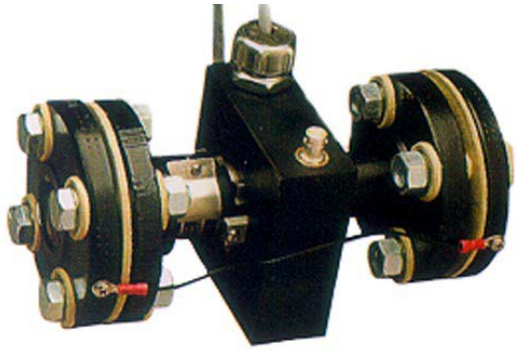
Flow Through Toroidal Sensors

- Flow through design is ideal for use with viscous or fibrous process liquids
- Sensor fits into 1-inch and 2-inch process lines using 150 or 300 lb flanges
- Teflon® pipe liner resists corrosion
- Temperature sensor included



Applications

The Rosemount Analytical 222 flow-through sensor is ideal for use in viscous or fibrous liquids. No part of the sensor protrudes into the sample flow, so there is no obstruction on which solids can accumulate.

Features

The operation of a flow-through toroidal sensor is slightly different from the typical toroidal sensor. In a traditional sensor, the plastic-encased drive and receive toroids are immersed in the process liquid. An alternating voltage applied to the drive toroid induces a voltage in the liquid surrounding the toroids. The voltage causes an ionic current to flow, which is directly proportional to the conductance of the liquid. The ionic current, in turn, induces a current in the receive toroid, which the analyzer measures. The induced current is proportional to the conductance.

In the 222 sensor the toroids are not immersed in the liquid. Instead, they surround a Teflon-lined pipe through which the liquid flows. Because liquid does not surround the toroids, the ionic current loop, which couples the drive and receive toroids in an immersion sensor, is absent. In the 222 sensor the current loop is partially electronic. The electronic portion consists of two contact rings (the unlined outer flanges) on either side of the toroids connected by a wire passing outside the toroids. A voltage applied to the drive toroid induces an ionic current in the liquid. Because the liquid contacts the metal flanges, the ionic current causes an electronic current to flow from the flanges through the wire, thus completing the circuit. The current loop induces a proportional current in the receive toroid. The analyzer measures this current, which is directly proportional to the conductance of the liquid.

The 222 sensor includes a Pt 100 RTD to allow temperature-compensated conductivity measurements. The RTD is installed in a user-supplied thermowell.

Flow through toroidal conductivity sensors work well in highly conductive liquids, up to about 2 S/cm (2,000,000 µS/cm). The minimum conductivity is about 500 µS/cm. Consult the product data sheet for the analyzer for more details about recommended ranges.

The measurement is insensitive to flow rate and direction. The sensor must be installed so that it is completely filled with liquid.

Choose either a 1-inch or a 2-inch diameter sensor with either a 150 or 300 lb mounting flange.

Specifications

Cell constants (nominal):

Diameter	Cell constant
1 inch	6/cm
2 inch	4/cm

Wetted materials: Teflon®-lined carbon steel pipe, with carbon steel after flanges; 316SS outer flanges are also available (option -21)

Process connections:

1-inch 150 lb or 300 lb raised face threaded ANSI B16.5 flange

2-inch 150 lb or 300 lb raised face threaded ANSI B16.5 flange

Temperature and pressure:

Flange	Temperature Range	Pressure
150 lb	41 °F (5 °C) - 360 °F (182 °C)	125 psig (963 kPa abs)
300 lb	41°F (5 °C) - 360 °F (182 °C)	250 psig (1825 kPa abs)

Pressure (for CRN registration only):

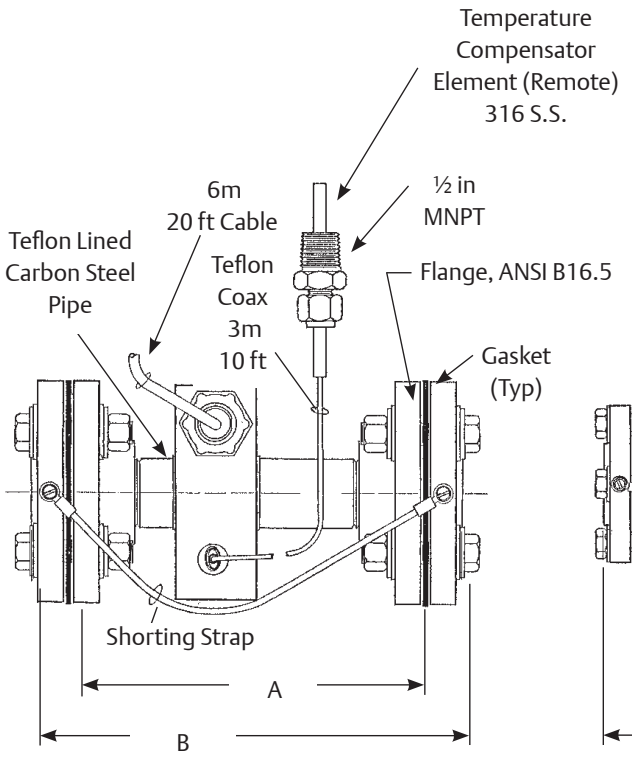
Option	Flange	Diameter	Pressure (max)
01	150 lb	1 inch	125 psig (963 kPa abs)
02	150 lb	2 inch	125 psig (963 kPa abs)
05	300 lb	1 inch	200 psig (1480 kPa)
06	300 lb	2 inch	250 psig (1825 kPa abs)
01–21	150 lb	1 inch	125 psig (963 kPa abs)

Cable length: 20 ft (6.1 m)

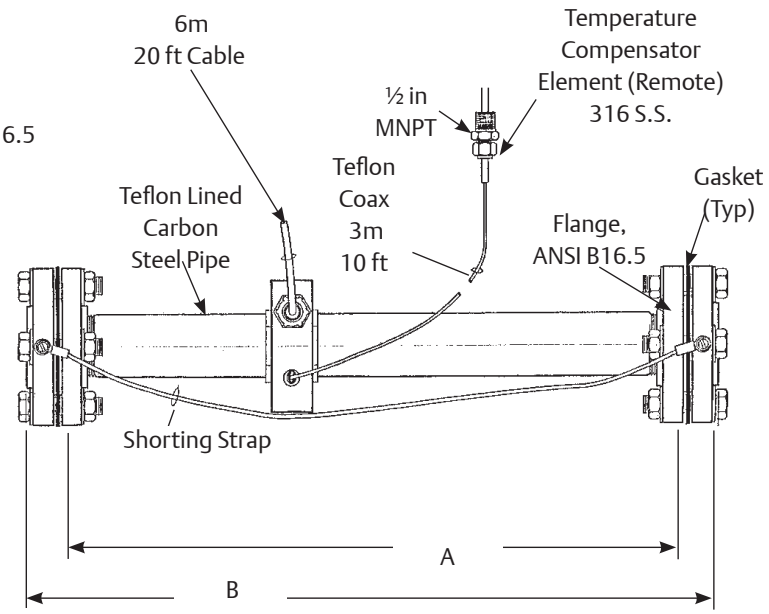
Maximum cable length: 100 ft (30 m)

Weight/shipping weight: Weights and shipping weights are rounded up to the nearest 1 lb or 0.5 kg.

Diameter	Flange	Weight	Shipping Weight
1 inch	150 lb	11 lb (5.0 kg)	14 lb (6.5 kg)
1 inch	300 lb	17 lb (8.0 kg)	20 lb (9.0 kg)
2 inch	150 lb	33 lb (15.0 kg)	37 lb (17.0 kg)
2 inch	300 lb	35 lb (16.0 kg)	40 lb (18.0 kg)



1-inch diameter sensor



2-inch diameter sensor

Model	Pipe diam	Flange (1)	A Dimension (2)	B Dimension (3)
222-01	1 inch	150 lb	7.0 in. (178 mm)	8.4 in. (213 mm)
222-02	2 inch	150 lb	24.0 in. (610 mm)	26.0 in. (660 mm)
222-05	1 inch	300 lb	7.0 in. (178 mm)	9.1 in. (232 mm)
222-06	2 inch	300 lb	24.0 in. (610 mm)	26.6 in. (676 mm)
222-21	1 inch	150 lb	7.0 in. (178 mm)	8.4 in. (213 mm)

(1) Outside flanges are ANSI B16.5 raised face, threaded pipe flanges.
(2) Dimension is +0.125 in (3mm).
(3) Approximate dimension.

222 Dimensional Drawing

222 Flow-Through Toroidal Conductivity

The 222 Flow-Through Conductivity Sensor includes Teflon-lined pipe, external toroid assembly, two unlined carbon steel outer flanges, temperature compensation element (Pt 100 RTD), and 20 ft (6 m) of integral cable. Stainless steel outer flanges (150 lb, 316 SS) are available with the 1-inch sensor as an option. The sensor can be used with the 1056, 56, 5081-T, and 1066-T instruments.

222 Flow-Through Toroidal Conductivity Sensor	
Code	Sizes (Required Selection) (Note 1)
01	1 inch, 150 lb
02	2 inch, 150 lb (not available with code -21)
05	1 inch, 300 lb (not available with code -21)
06	2 inch, 300 lb (not available with code -21)
01–21	1 inch, 150 lb, 316 SS outer flanges
Code	Cable (Required Selection) (Note 2)
54	Standard integral cable (Note 2)
222	**-01 -54 EXAMPLE**

Notes:

1. Grounding rings are required for proper operation if the outer flanges of the 222 sensor are substituted by the customer with non-conductive flanges. Order SQ 7430 and consult the factory for pricing.
2. Cables can be extended using the remote junction box PN 23550-00. See Extension Cable.

Accessories	
Part Number	Description
2001492	Stainless steel tag, specify marking
23550-00	Remote junction box for use with 1056, 56, 5081-T and 1066-T
Extension Cable	
Part Number	Description
23294-00	Interconnecting cable for use with 222 sensors

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