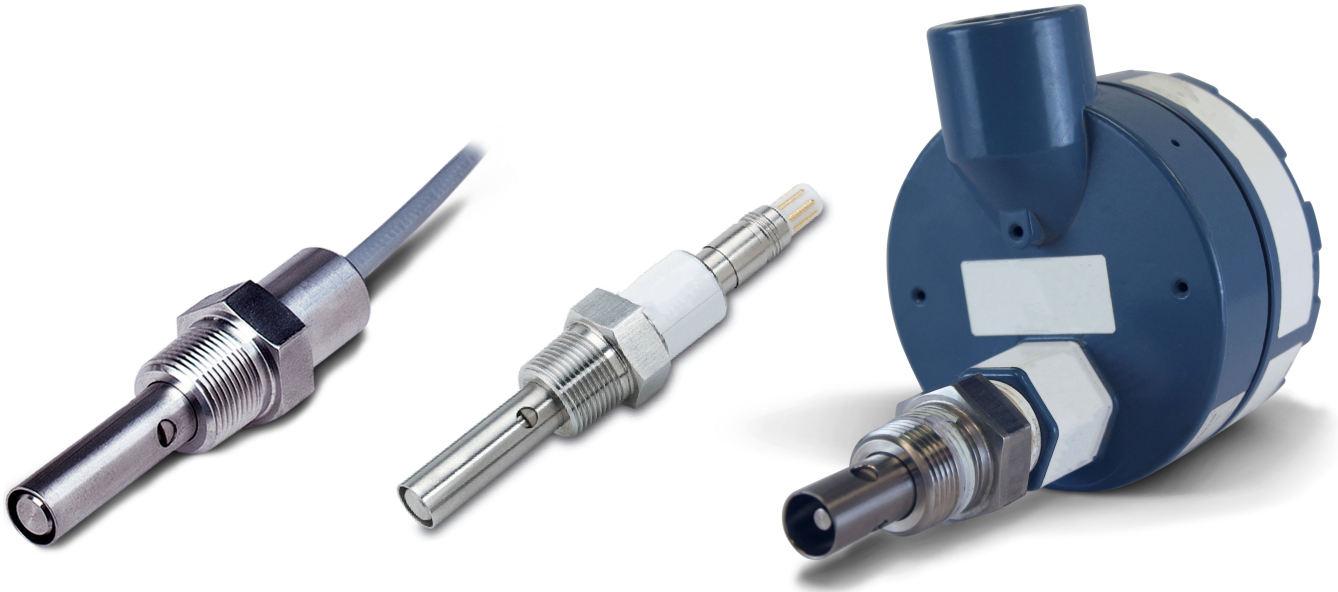


# Rosemount™ 400 and 400VP

## Contacting Conductivity Sensors



### Reliable conductivity measurements for your process

With Rosemount 400 and 400VP contacting conductivity sensors, you can accurately measure electrolytic conductivity in a broad range of applications from high purity water to clean cooling water. These sensors are ideal for use in clean, non-corrosive liquid having conductivity less than 20,000  $\mu\text{S}/\text{cm}$ .

# Overview

Minimize start-up and installation time.

- A factory-measured cell constant ensures out-of-the-box accuracy and no initial calibration requirements.
- Available in cell constants of:
  - 0.01/cm
  - 0.1/cm
  - 1.0/cm



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Meet your process mounting needs.

- The sensors are designed for direct screw-in insertion into process piping using a front facing 3/4 in. male national pipe thread (MNPT) fitting.
- Can alternatively be used with a pipe tee or flow cell in a sidestream installation.
- Offered with Variopol (VP6) quick disconnect fittings.

**A robust two-electrode design.**

- The sensors have concentric titanium electrodes separated by a polyether ether ketone (PEEK) insulator.
- A Viton® O-ring seals the internal parts of the sensor from the process liquid.
- Available with a high temperature option up to 392 °F (200 °C) with integral junction box.

## Ordering information



The Rosemount 400/400VP contacting conductivity sensors are intended to measure electrolytic conductivity in clean water applications. You can configure these sensors with a 0.01/cm, 0.1/cm, or 1.0/cm to accommodate varying levels of conductivity. The sensors are available with either an integral cable connection or Variopol (VP6) connector. Variopol cables sold separately (see [Accessories](#)).

[CONFIGURE >](#)

[VIEW PRODUCT >](#)

## Rosemount 400 Contacting Conductivity Sensor ordering information

**Note**

The Endurance™ Rosemount 400 screw-in conductivity sensors consist of titanium electrodes and a 3/4-in. (19.1 mm) stainless steel process connector. Maximum temperature range for the standard sensor is 221 °F (105 °C) with an option for use in applications up to 392 °F (200 °C).

**Model**

Code	Description
400	Conductivity sensor - Endurance™ screw-in

## Cell constant

Code	Description
11	0.01/cm
12	0.1/cm
13	1.0/cm

## Temperature compensation

Code	Description
_	Pt-1000 (standard) for Rosemount 1056, 1066-C, 56, and 5081-C
54	Pt-100 for Rosemount 1054 and series 2081

## Electrode extension insertion length

Code	Description
_	No selection
36	Extended insertion length <sup>(1)</sup>

(1) 5.5 in. (139.7 mm) from the bottom of threads to tip of sensor

## Cable length

Code	Description
_	No selection
50	Integral 50-ft. (15 m) cable
60	Integral junction box for high temperature and special general purpose application
02	Integral 15-ft. (4.6 m) cable
20	Integral 20-ft. (6 m) cable
03	Integral 33-ft. (10 m) cable
06	Integral 100-ft. (30 m) cable

## Calibration and conformance certificates - optional level

Code	Description
CC	Certificate of Calibration (no test data given)
LC	Loop Calibration Certificate (sensor and transmitter calibrated together with test data)
EC	Electronic Calibration Certificate (sensor calibrated against factory instrument with test data)

## Rosemount 400VP Contacting Conductivity Sensor ordering information

### Note

An integral six pin Variopol (VP6) connector is standard and must be installed with a mating VP connector cable. The standard Rosemount 400VP sensor is compatible with Rosemount 5081-X, 1056, 1057, and 56. To make the sensor compatible with other transmitters, use code -54.

## Model

Code	Description
400VP	Conductivity sensor - Endurance™ screw-in Variopool connector

## Cell constant

Code	Description
11	0.01/cm
12	0.1/cm
13	1.0/cm

## Temperature compensation

Code	Description
_	Pt-1000 (standard) for Rosemount 1055, 1056, 1066-C, 54C, 54eC, 4081-C, 5081-C, 6081-C, and Xmt-C
54	Pt-100 for Rosemount 1054 and series 2081

## Electrode extension insertion length

Code	Description
_	No selection
36	Extended insertion length <sup>(1)</sup>

(1) 5.5 in. (139.7 mm) from the bottom of threads to tip of sensor

## Calibration and conformance certificates - optional level

Code	Description
CC	Certificate of Calibration (no test data given)
LC	Loop Calibration Certificate (sensor and transmitter calibrated together with test data)
EC	Electronic Calibration Certificate (sensor calibrated against factory instrument with test data)

## Accessories

Part number	Description
23747-06	Junction box for a remote cable connection
9200275	Connecting cable, unterminated, specify length
23747-00	Connecting cable, terminated, specify length
24091-02	Low flow cell for Rosemount 400/400VP sensors
05010781899	Conductivity standard SS-6, 200 µS/cm, 32 oz. (0.95 L)
05010797875	Conductivity standard, SS-6A, 200 µS/cm, 1 gal. (3.78 L)
05010782468	Conductivity standard, SS-5, 1000 µS/cm, 32 oz. (0.95 L)
05010783002	Conductivity standard SS-5A, 1000 µS/cm, 1 gal. (3.78 L)

Part number	Description
05000705464	Conductivity standard, SS-1, 1409 $\mu\text{S}/\text{cm}$ , 32 oz. (0.95 L)
05000709672	Conductivity standard, SS-1A 1409 $\mu\text{S}/\text{cm}$ , 1 gal. (3.78 L)
05010782147	Conductivity standard SS-7, 5000 $\mu\text{S}/\text{cm}$ , 32 oz. (0.95 L)
05010782026	Conductivity standard SS-7A, 5000 $\mu\text{S}/\text{cm}$ , 1 gal. (3.78 L)
23747-06	2.5-ft. (0.8 m) interconnecting VP6 cable
23747-04	6.4-ft. (1.2 m) interconnecting VP6 cable
23747-02	10-ft. (3.0 m) interconnecting VP6 cable
23747-07	15-ft. (4.6 m) interconnecting VP6 cable
23747-08	20-ft. (6.1 m) interconnecting VP6 cable
23747-09	25-ft. (7.6 m) interconnecting VP6 cable
23747-10	30-ft. (9.1 m) interconnecting VP6 cable
23747-03	50-ft. (15.2 m) interconnecting VP6 cable
23747-11	100-ft. (30.5 m) interconnecting VP6 cable

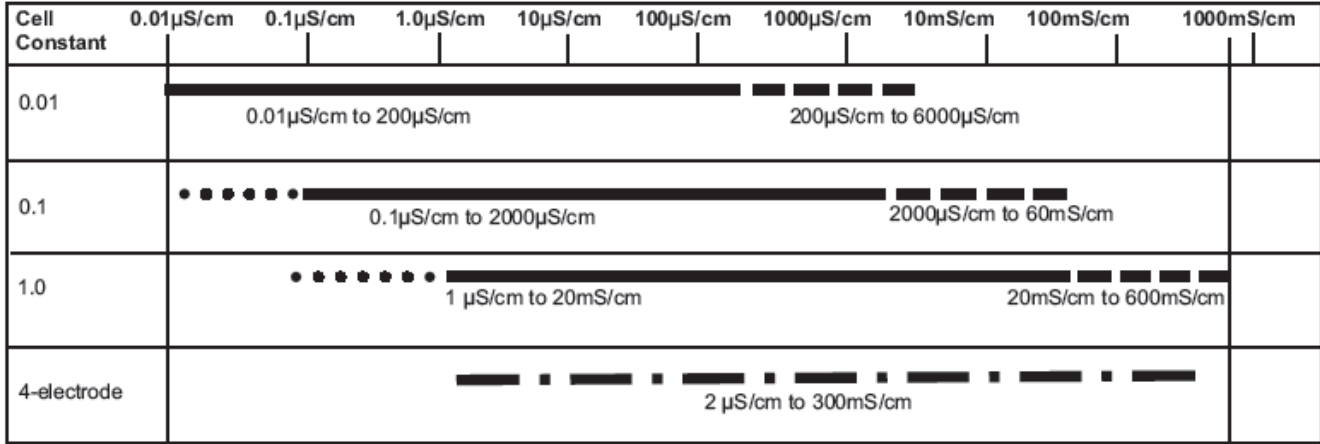
## Specifications

Wetted materials	
Electrodes	Titanium
Insulator	Glass filled polyether ether ketone (PEEK)
BodyHex block	316 stainless steel
O-ring	Viton®
Surface finish	<ul style="list-style-type: none"> <li>- Inner electrode = 16 Ra</li> <li>- Outer electrode = 32 Ra (Options 13/17 = 16 Ra)</li> <li>- Insulator = 32 Ra</li> <li>- Wetted hex nut = No surface roughness</li> </ul>
Temperature range	
Standard	32 to 221 °F (0 to 105 °C)
With optional integral junction box	32 to 392 °F (0 to 200 °C)
Maximum pressure	
250 psig (1825 kPa [abs])	
Vacuum	
At 1.6-in. Hg (5.2 kPa), air leakage is less than 0.005 SCFM (0.00014 m <sup>3</sup> /min.)	
Cell constants	
0.01, 0.1, and 1.0/cm	
Process connection	
¾-in. Male National Pipe Thread (MNPT)	
Cable length	
10-foot standard; for longer cable lengths, choose option -60 (integral junction box) and order interconnecting cable separately; interconnecting VP6 cables sold separately (see <a href="#">Accessories</a> ).	

Figure 1: Recommended Range - Contacting Conductivity

### Performance Specifications

#### Recommended Range – Contacting Conductivity



**Cell Constant Linearity**

- ±0.6% of reading in recommended range
- +2 to -10% of reading outside high recommended range
- ±5% of reading outside low recommended range
- ±4% of reading in recommended range

Table 1: Weights and Shipping Weights

Rounded up to the nearest 1 lb. or 0.5 kg.

Sensor	Weight	Shipping weight
Rosemount 400 with 10-ft. integral cable	1 lb. (0.5 kg)	2 lb. (1.0 kg)
Rosemount 400 with 50-ft. integral cable	4 lb. (2.0 kg)	5 lb. (2.5 kg)
Rosemount 400VP with Variopol cable connection	1 lb. (0.5 kg)	2 lb. (1.0 kg)
Rosemount 400 with integral junction box	3 lb. (1.5 kg)	4 lb. (2.0 kg)

Figure 2: Flow Cell



**Flow Cell (24092-02) Specifications**

<b>Wetted materials</b>	<b>Body and nut</b>	Polycarbonate and polyester
	<b>¼ in. (6.4 mm) fittings</b>	316 stainless steel
	<b>O-ring</b>	Silicone
<b>Process connection</b>	Compression fittings for ¼ in. (6.4 mm) OD tubing	
<b>Temperature range</b>	32 to 158 °F (0 to 70 °C)	
<b>Maximum pressure</b>	90 psig (722 kPa [abs])	

**Retraction Assembly Specifications**

<b>Assembly includes</b>	Ball valve	
	Retraction body	
	Pipe nipple	
<b>Wetted materials</b>	<b>Ball valve</b>	316 stainless steel with PTFE seals and seat steel
	<b>Nipple</b>	316 stainless steel
	<b>Packing rings</b>	Graphite
	<b>Packing bushing</b>	303 stainless steel
	<b>Retraction body</b>	316 stainless steel
<b>Process connection</b>	Ball valve: 1¼-inch female national pipe thread (FNPT) Nipple: 1¼-inch male national pipe thread (MNPT)	
<b>Temperature</b>	32 to 212 °F (0 to 100 °C)	
<b>Pressure</b>	200 psig (1481 kPa [abs]) maximum	
<b>Maximum retraction pressure</b>	64 psig (542 kPa [abs]) maximum	
<b>Vacuum</b>	AT 1.6 inHg (5.2 kPa), air leakage is less than 0.005 SCFM (0.00014 m <sup>3</sup> /min).	

## Engineering specifications

**Cell constants 0.01, 0.1, and 1.0/cm**

The sensor shall:

- be suitable for the determination of electrolytic conductivity in clean, non-corrosive samples.
- have a ¾-inch male national pipe thread (MNPT) fitting for direct insertion into pipes or tees. A clear plastic flow cell shall also be available for side-stream samples.
- be available with either integral cable or a Variopol quick disconnect fitting.
- be suitable for vacuum service as low as 1.6 inHg
- be Rosemount 400 (integral cable) or 400VP (Variopol fitting) or approved equal.
- incorporate titanium electrodes and a polyether ether ketone (PEEK) insulator.
- have an integral platinum resistance temperature device (RTD) for temperature measurement.

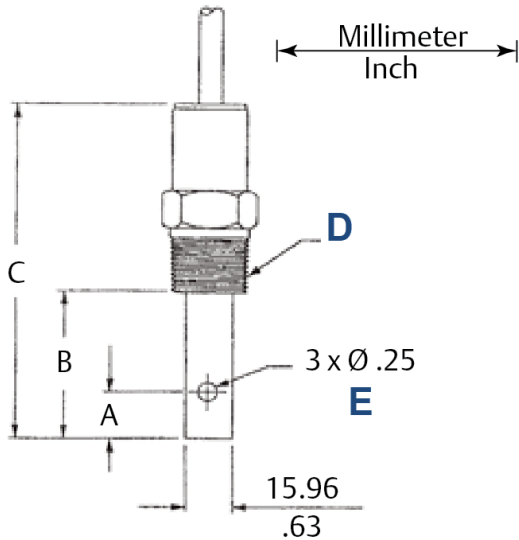
In addition,:



- The maximum temperature for the sensor shall be 105 °C at 250 psig. A high temperature option that can be used at 200 °C shall also be available.

## Dimensional drawings

Figure 3: Rosemount 400 with Integral Cable Connection Dimensional Drawing

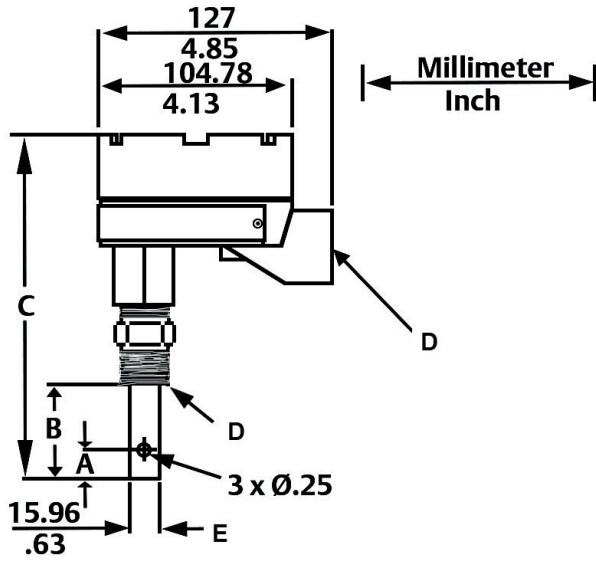


- A. Dimension (see [Table 2](#))
- B. Dimension (see [Table 2](#))
- C. Dimension (see [Table 2](#))
- D. 3/4-in. -14 national pipe thread (NPT)
- E. Equally spaced

Table 2: Rosemount 400 with Integral Cable Dimensions

Sensor configuration	A		B		C	
	in.	mm	in.	mm	in.	mm
0.01/cm	1.59	40.39	1.98	50.34	4.52	114.8
0.1/cm	0.687	17.45	1.11	28.15	3.65	92.71
1.0/cm	0.667	16.94	1.13	28.70	3.65	92.71
0.01/cm (with extended insertion length)	1.59	40.39	5.49	139.4	8.00	203.2
0.1/cm (with extended insertion length)	0.687	17.45	5.49	139.4	8.00	203.2
1.0/cm (with extended insertion length)	0.667	16.94	5.49	139.4	8.00	203.2

Figure 4: Rosemount 400 with Integral Junction Box Dimensional Drawing

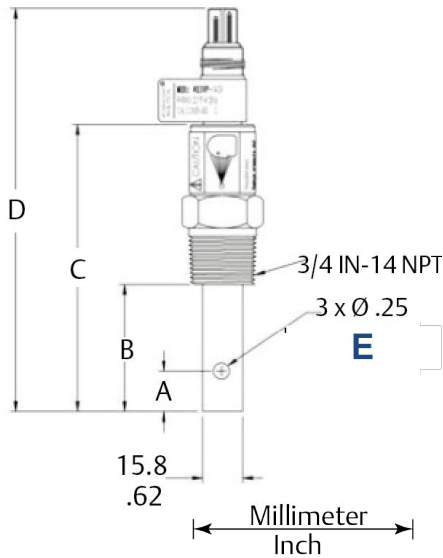


- A. Dimension (see [Table 3](#))
- B. Dimension (see [Table 3](#))
- C. Dimension (see [Table 3](#))
- D. 3/4-in.-14 NPT
- E. Equally spaced

Table 3: Rosemount 400 with Integral Junction Box Dimensions

Sensor configuration	A		B		C	
	in.	mm	in.	mm	in.	mm
0.01/cm	1.59	40.39	1.98	50.34	7.41	188.2
0.1/cm	0.687	17.45	1.11	28.15	6.49	164.9
1.0/cm	0.667	16.94	1.13	28.70	6.51	165.4
0.01/cm (with extended insertion length)	1.59	40.39	5.49	139.4	10.90	276.9
0.1/cm (with extended insertion length)	0.687	17.45	5.49	139.4	10.90	276.9
1.0/cm (with extended insertion length)	0.667	16.94	5.49	139.4	10.90	276.9

Figure 5: Rosemount 400VP with Variopol Cable Connection Dimensional Drawing

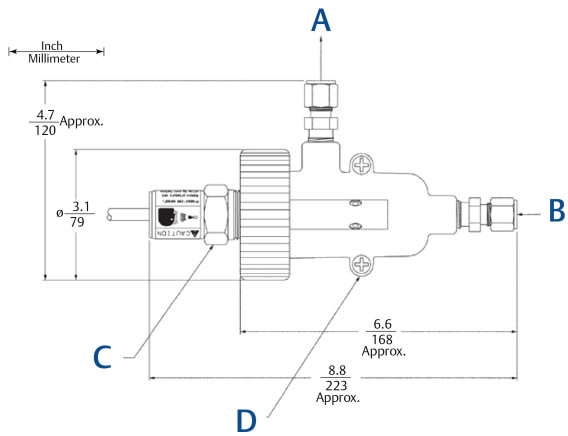


- A. Dimension (see [Table 4](#))
- B. Dimension (see [Table 4](#))
- C. Dimension (see [Table 4](#))
- D. Dimension (see [Table 4](#))
- E. Equally spaced

Table 4: Rosemount 400VP with Variopol Cable Connection Dimensions

Sensor configuration	A		B		C		D	
	in.	mm	in.	mm	in.	mm	in.	mm
0.01/cm	1.59	40.39	1.98	50.34	4.43	112.5	6.3	160.0
0.1/cm	0.67	17.0	1.10	27.9	3.47	90.4	5.43	137.9
1.0/cm	0.67	17.0	1.10	27.9	3.58	90.9	5.45	138.4
0.01/cm (with extended insertion length)	1.59	40.4	5.48	139.2	7.91	200.9	9.78	248.4
0.1/cm (with extended insertion length)	0.67	17.0	5.48	139.2	7.91	200.9	9.78	248.4
1.0/cm (with extended insertion length)	0.67	17.0	5.48	139.2	7.91	200.9	9.78	248.4

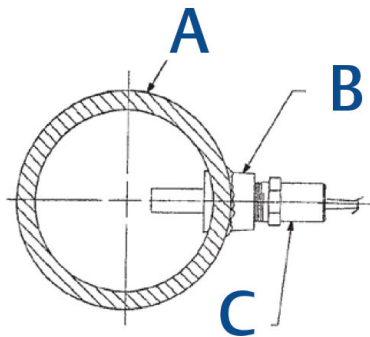
Figure 6: Flow Cell (PN24091-02)



- A. Outlet
- B. Inlet
- C. Rosemount 400
- D. Low flow cell (PN 24091-02)

Rosemount 400 with Integral Cable Connection

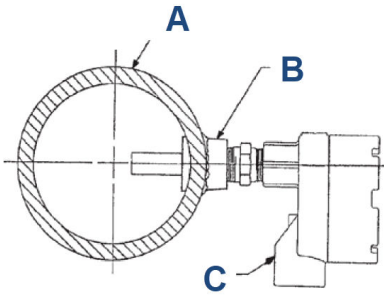
Figure 7: Large Pipe or Tank Installation



You can screw the Endurance™ sensor into a weldolet in either a pipe or large tank.

- A. Process piping
- B. Weldolet
- C. Sensor

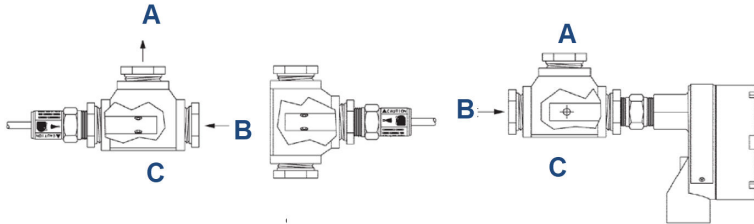
**Figure 8: The Junction Box Advantage**



Select the optional junction box for installations where a long length of cable must be run through conduit.

- A. Process piping
- B. Weldolet
- C. Sensor

**Figure 9: Standard Tee Installation**

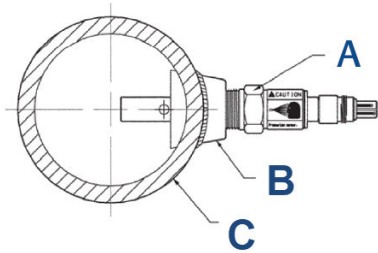


For systems with small diameter piping, install the sensor in a pipe tee. You can also use a pipe tee for sidestream samples. For best performance, orient the sensor with the end facing the liquid flow.

- A. Outlet
- B. Inlet
- C. 1-in. pipe tee with 3/4-in. bushing shown

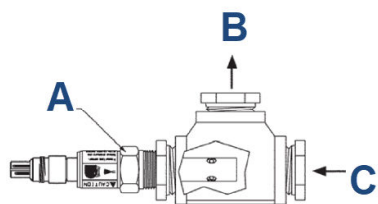
**Rosemount 400 with Variopol cable connection**

**Figure 10: Large Pipe or Tank Installation**



You can screw the Endurance sensor into a weldolet in either a large pipe or tank.

- A. Sensor
- B. Weldolet
- C. Process piping

**Figure 11: Standard Tee Installation**

For systems with small diameter piping, install the sensor in a pipe tee. You can also use a pipe tee for sidestream samples. For best performance, orient the sensor with the end facing the liquid flow.

- A. *Sensor*
- B. *Outlet*
- C. *Inlet*



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