

Rosemount[™] 402 and 402VP

Contacting Conductivity Sensors



Reliable conductivity measurements for your process

With Rosemount 402 and 402VP 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



Meet your process mounting needs.

- The sensors are designed to be retracted through a 1¼-inch ball valve assembly (sold separately).
- Sensors may be removed from process piping without having to shut down or drain the line.
- 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.
- Maximum operating pressure up to 212 °F (100 °C).
- Maximum pressure rating up to 200 psig.

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Ordering information

The Rosemount 402 contacting conductivity sensor is 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 (402) or Variopol (VP6) connector (402VP). Variopol cables sold separately (see [Accessories](#)).



Rosemount 402 ordering information

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Sensor type

Option	Description
402	Conductivity sensor - Endurance retractable

Cell constant

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

Note

The Endurance™ Rosemount 402-11, -12, and -13 retractable conductivity sensors feature titanium electrodes, a 316 stainless steel sensor tube, and 10 ft. (3 m) of integral cable or an optional 4 in. (101.6 mm) for use with a junction box (option -61).

Temperature compensation

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

Note

The maximum temperature rating for the Rosemount 402 is 212 °F (100 °C), and the maximum pressure is 200 psig (1480 kPa [abs]). Pt 1000 resistance temperature device is standard.

Retraction assembly

Code	Description
_	No selection
31	Retraction, 1¼ in. full port, 316 stainless steel valve kit

Integral junction box

Code	Description
_	No selection
60	Junction box

Cable length

Code	Description
_	No selection
61	Sensor cable prepped for junction box
02	Integral 15 ft. (4.6 m) cable
20	Integral 20 ft. (6 m) cable
03	Integral 33 ft. (10 m) cable
50	Integral 50 ft. (15 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 402VP ordering information

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Sensor type

Product Code	Description
402VP	Conductivity sensor - retractable Variopol connector

Note

The base Rosemount 402VP sensor is compatible with the Rosemount 1056, 1057, 56, 5081-C, and 1066 instruments.

Cell constant

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

Note

The Endurance Rosemount 402VP -11, -12, and -13 retractable conductivity sensors feature titanium electrodes, a 316 stainless steel sensor tube, and an integral Variopol (VP6.0) connector, which uses a mating VP cable.

Temperature compensation

Code	Description
–	No selection
31	Retraction, 1¼-inch full port, 316 stainless steel valve kit

Note

Pt 1000 resistance temperature device is the standard thermocompensation used. Optional thermocompensations are also available for compatibility with other instruments.

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)

Specifications

Wetted materials	Electrodes	Titanium
	Insulator	Glass filled polyether ether ketone (PEEK)
	Body	316 stainless steel
	O-ring	Viton®
	Washer	Neoprene
	Surface finish	Inner electrode: 16 Ra Outer electrode: 32 Ra (Options 13/17: 16 Ra) Insulator: 32 Ra Wetted hex nut: No surface roughness
Temperature range	Standard	32 °F to 212 °F (0 °C to 100 °C)
Maximum pressure	200 psig	
Vacuum	At 1.6 in. Hg (5.2 kPa), air leakage is less than 0.005 SCFM (0.00014 m ³ /min.)	
Cell constants	0.01/cm	
	0.1/cm	
	1.0/cm	
Process connection	Sensor is inserted through 1¼-inch National Pipe Thread (NPT) full port ball valve.	
Cable length	10-foot standard	
	For longer cable lengths, choose option 60 (see Integral junction box) and order interconnecting cable separately	
	interconnecting VP6 cables sold separately (see Accessories).	

Figure 1: Recommended Range - Contacting Conductivity

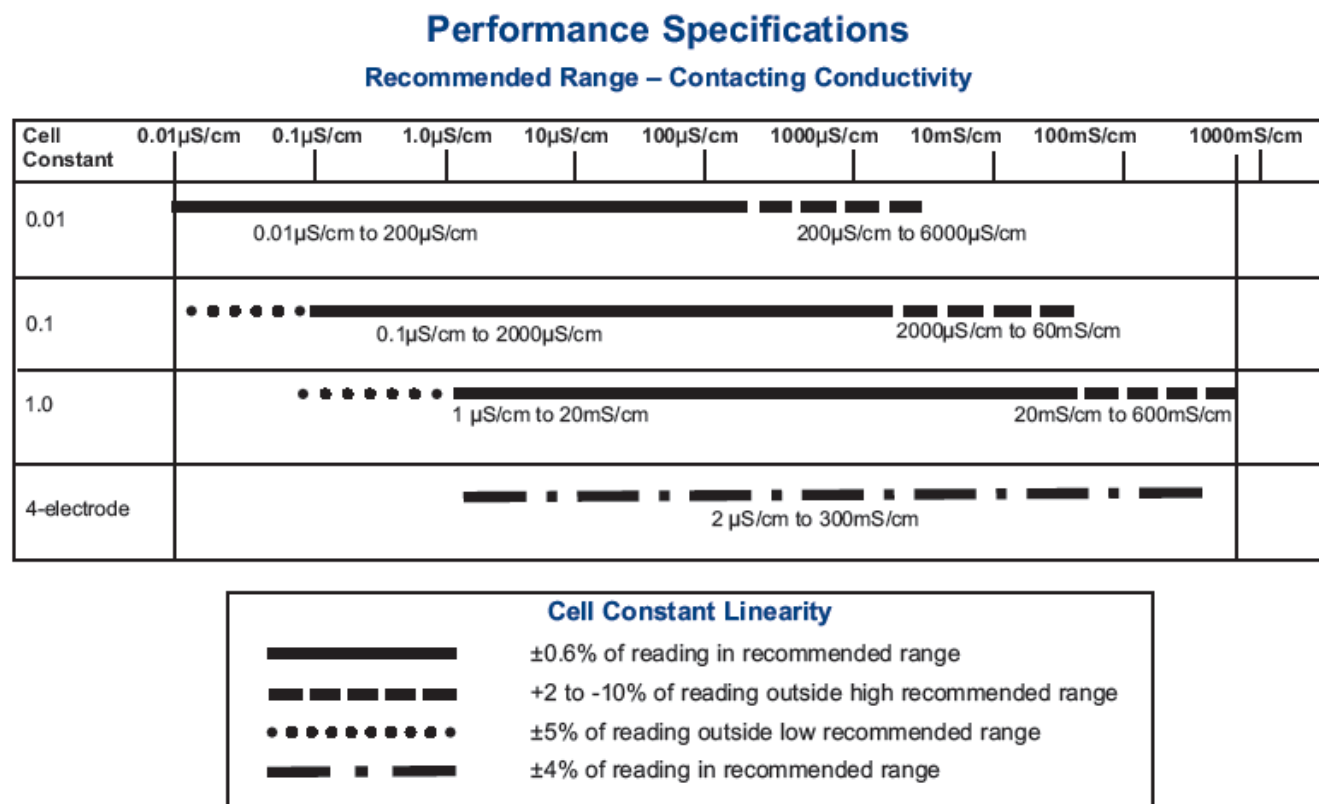


Table 1: Rosemount 402/402VP Weights and Shipping Weights

Model	With 10 ft. (3.1 m) cable		With junction box	
	Weight	Shipping weight	Weight	Shipping weight
Rosemount 402	3 lb. (1.5 kg)	4 lb. (2.0 kg)	4 lb. (2.0 kg)	5 lb. (2.5 kg)
Rosemount 402VP	3 lb. (1.5 kg)	4 lb. (2.0 kg)	N/A	N/A

Flow Cell (24092-02) Specifications

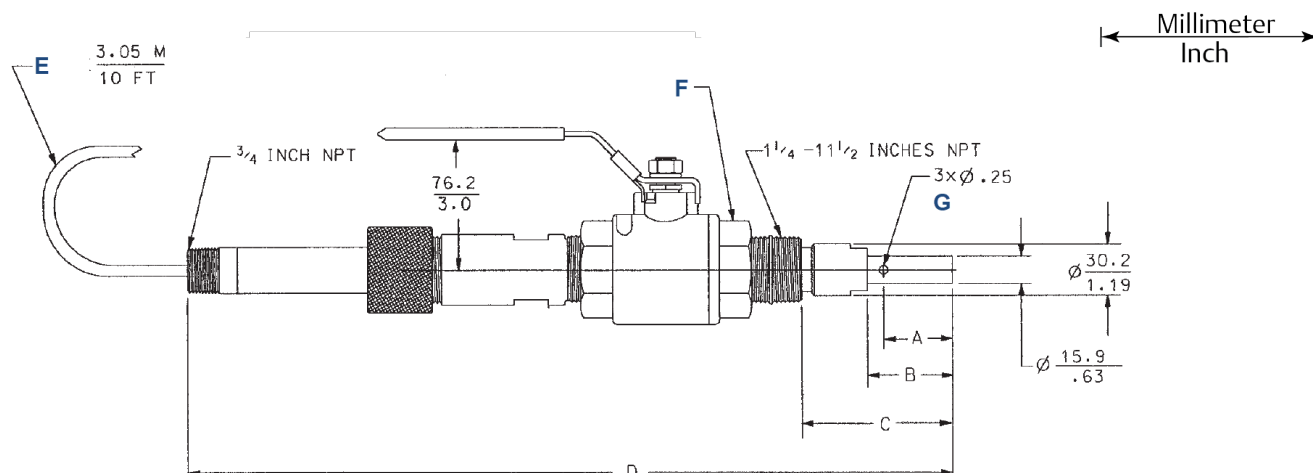
Wetted materials	Body and nut	Polycarbonate and polyester
	¼ in. (6.4 mm) fittings	316 stainless steel
	O-ring	Silicone
Process connection	Compression fittings for ¼ in. (6.4 mm) OD tubing	
Temperature range	32 °F to 158 °F (0 °C to 70 °C)	
Maximum pressure	90 psig (722 kPa [abs])	

Retraction Assembly Specifications

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

Dimensional drawings

Figure 2: Rosemount 402 Dimensional Drawing



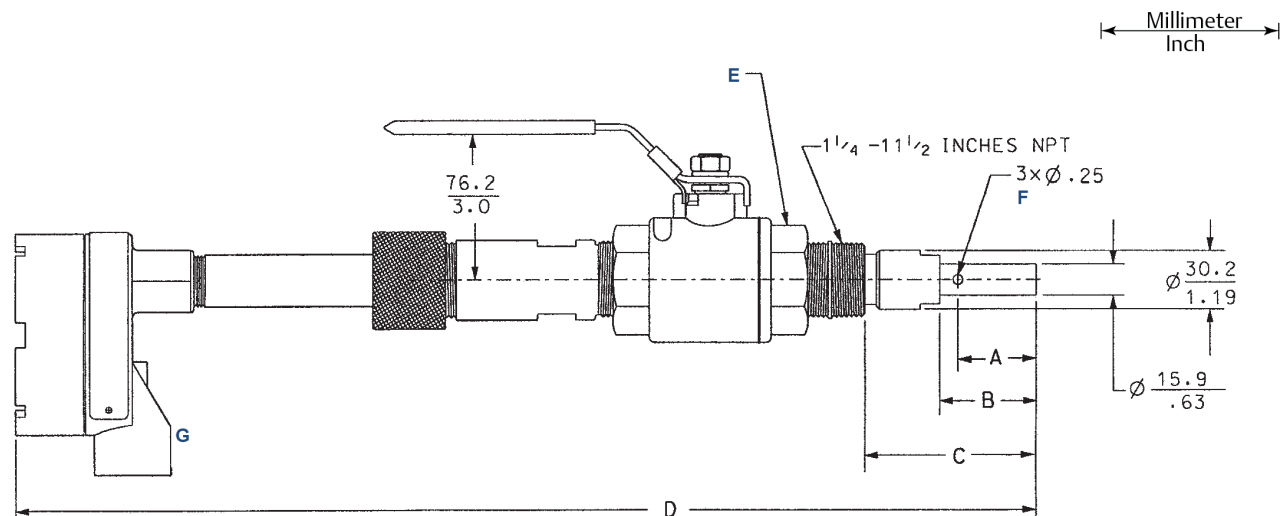
Rosemount 402-11 and 402-13 require kit 23765-00. All retractable sensors shown with retraction assembly kit PN 23765-00/01 (purchased separately).

- A. Dimension (see [Table 2](#))
- B. Dimension (see [Table 2](#))
- C. Dimension (see [Table 2](#))
- D. Dimension (see [Table 2](#))
- E. Cable
- F. Ball valve
- G. Equally spaced

Table 2: Rosemount 402 Dimensions

	Rosemount 402-11	Rosemount 402-12	Rosemount 402-13
Retraction assembly kit	23765-00	23765-00	23765-00
A: in. (mm)	1.59 (40.4)	.667 (16.9)	.667 (16.9)
B: in. (mm)	1.99 (50.5)	1.11 (28.2)	1.11 (28.2)
C	Customer-defined based on insertion depth	Customer-defined based on insertion depth	Customer-defined based on insertion depth
D: in. (mm)	17.25 (438.2)	16.37 (415.8)	16.37 (415.8)

Figure 3: Rosemount 402 with Integral Junction Box (Option -60) Dimensional Drawing



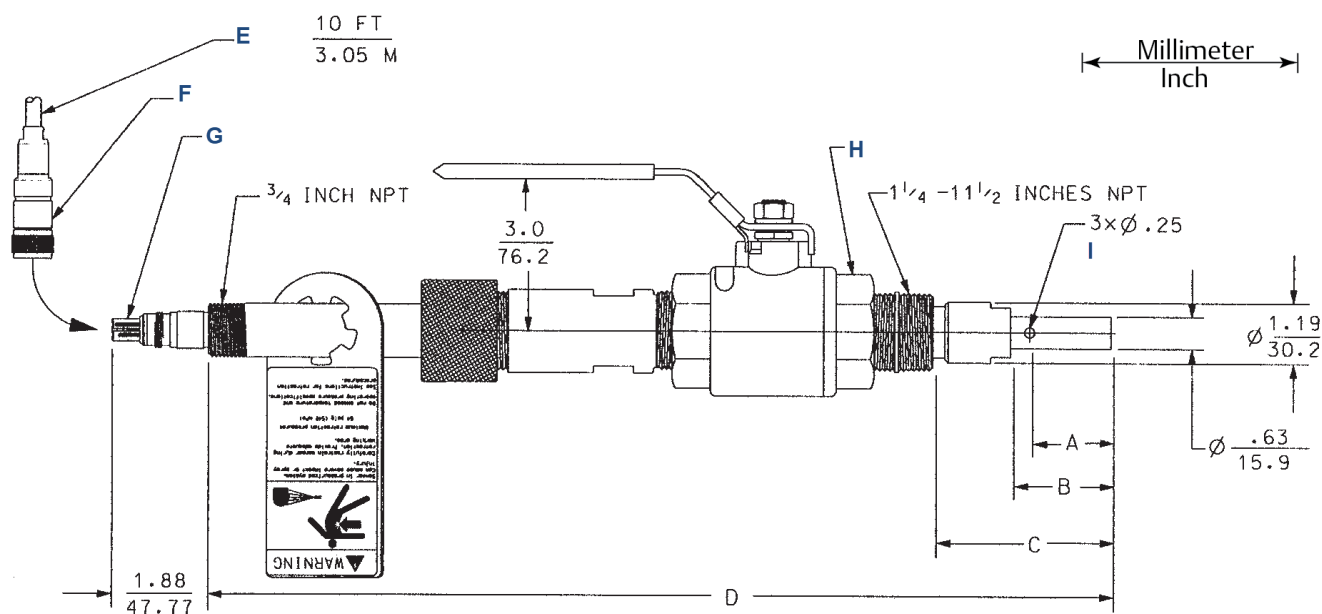
Rosemount 402-11 and 402-12 require kit PN 23765-00. All retractable sensors shown with retraction assembly kit PN 23765-00/02 (purchased separately).

- A. Dimension (see [Table 3](#))
- B. Dimension (see [Table 3](#))
- C. Dimension (see [Table 3](#))
- D. Dimension (see [Table 3](#))
- E. Ball valve
- F. Equally spaced
- G. Junction box

Table 3: Rosemount 402 with Integral Junction Box Dimensions

	Rosemount 402-11	Rosemount 402-12	Rosemount 402-13
Retraction assembly kit	23765-00	23765-00	23765-00
A: in. (mm)	1.59 (40.4)	.667 (16.9)	.667 (16.9)
B: in. (mm)	1.99 (50.5)	1.11 (28.2)	1.11 (28.2)
C	Customer-defined based on insertion depth	Customer-defined based on insertion depth	Customer-defined based on insertion depth
D: in. (mm)	20.25 (514.3)	19.37 (492.0)	19.37 (492.0)

Figure 4: Rosemount 402VP Dimensional Drawing



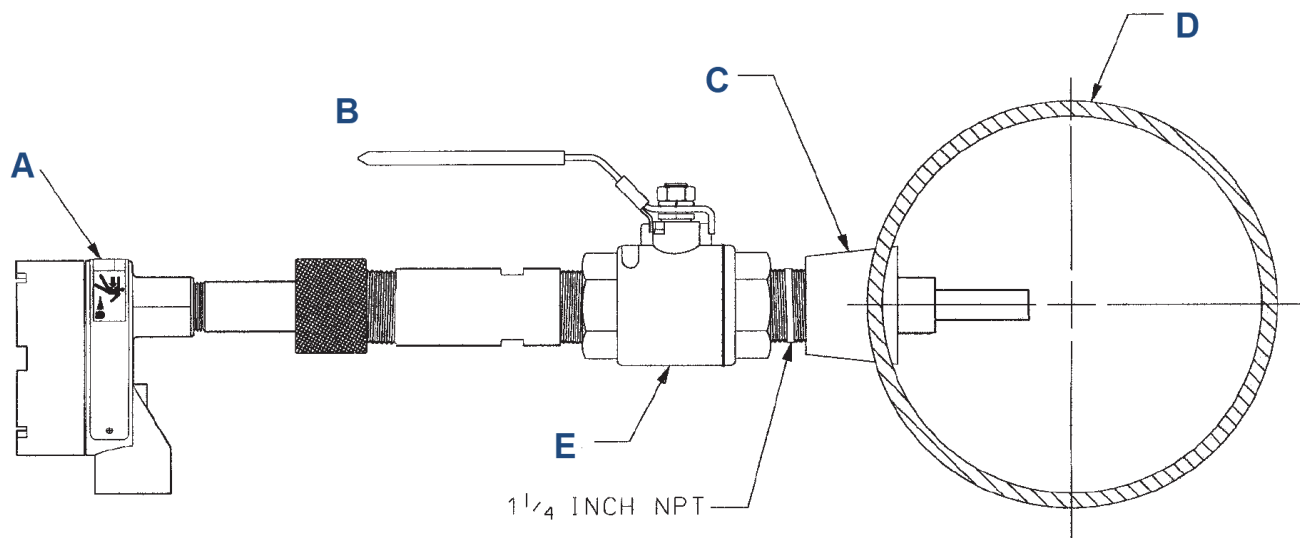
All retractable sensors shown with retraction assembly kit PN 23765-00/01. Rosemount 402-11 and 402-13 require kit PN 23765-00.

- A. Dimension (see Dimensions table)
- B. Dimension (see Dimensions table)
- C. Dimension (see Dimensions table)
- D. Dimension (see Dimensions table)
- E. Cable
- F. Variopol 6.0 socket
- G. Variopol 6.0 plug
- H. Ball valve
- I. Equally spaced

Table 4: Rosemount 402VP Dimensions

Description	Rosemount 402-11	Rosemount 402-12	Rosemount 402-13
Retraction assembly kit	23765-00	23765-00	23765-00
A: in. (mm)	1.59 (40.4)	.667 (16.9)	.667 (16.9)
B: in. (mm)	1.99 (50.5)	1.11 (28.2)	1.11 (28.2)
C	Customer-defined based on insertion depth	Customer-defined based on insertion depth	Customer-defined based on insertion depth
D: in. (mm)	17.25 (438.2)	16.37 (415.8)	16.37 (415.8)

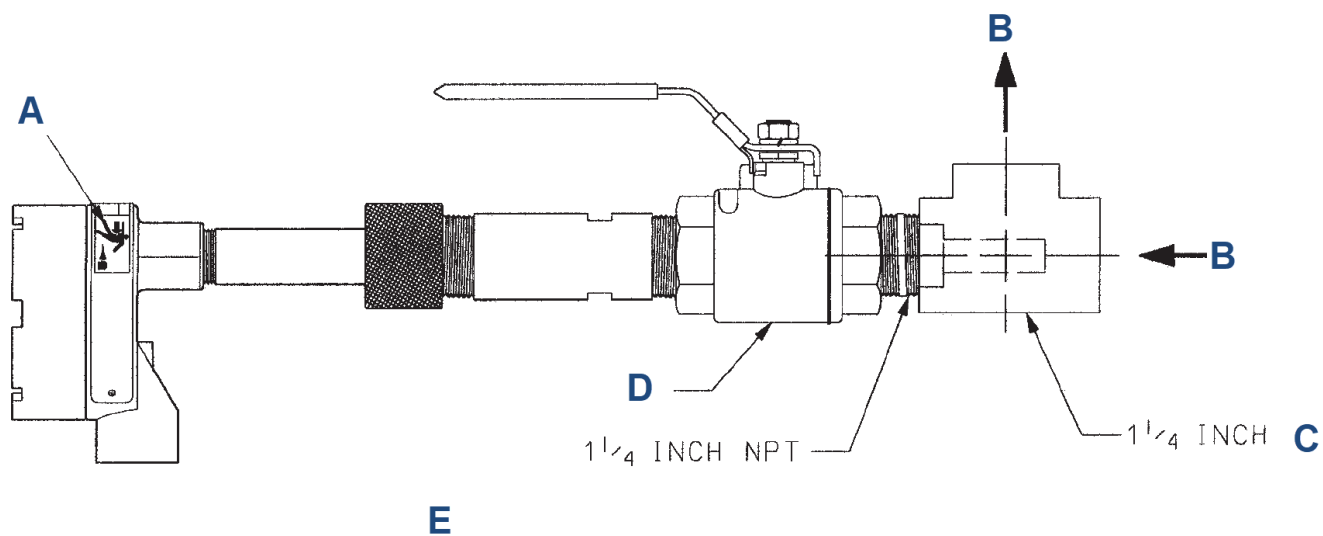
Figure 5: Rosemount 402 Retractable Sensor Installed in a Large Pipe or Tank



You can attach the Endurance™ retractable sensor through a weldolet in either a large pipe or tank.

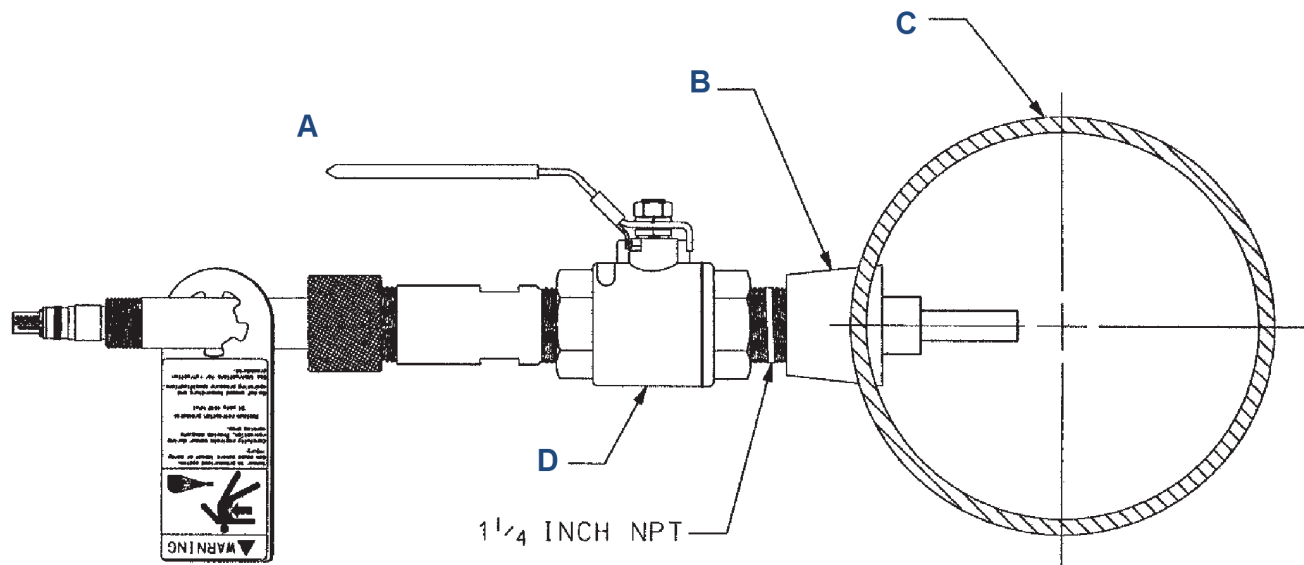
- A. Warning label
- B. Retractable sensor assembly
- C. Weldolet
- D. Process piping
- E. Ball valve

Figure 6: Rosemount 402 Retractable Sensor Installed in a Standard Tee



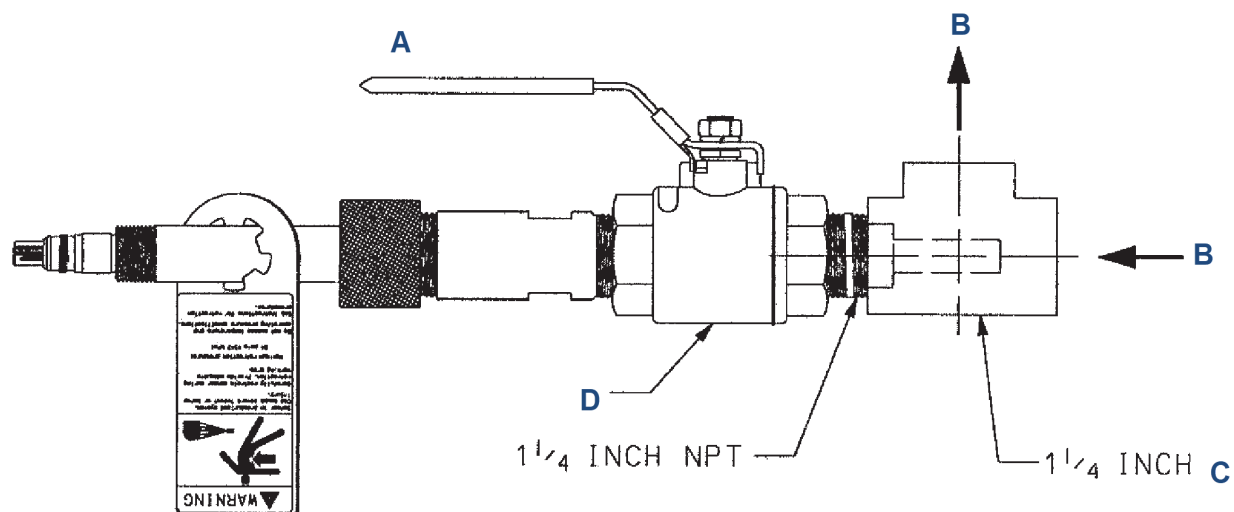
For best performance, orient the sensor with the end facing the liquid flow.

- A. Warning label
- B. Flow
- C. Tee
- D. Ball valve
- E. Retractable sensor assembly

Figure 7: Rosemount 402VP Retractable Sensor Installed in a Large Pipe or Tank

You can attach the Endurance retractable sensor through a weldolet in either a large pipe or tank.

- A. Retractable sensor assembly
- B. Weldolet
- C. Process piping
- D. Ball valve

Figure 8: Rosemount 402VP Retractable Sensor Installed in a Standard Tee

For best performance, orient the sensor with the end facing the liquid flow.

- A. Retractable sensor assembly
- B. Flow
- C. Tee
- D. Ball valve

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
23765-00	Retraction assembly kit (includes nipple, ball valve, and retraction body)
23796-00	Retraction body
9340078	1¼-in. national pipe thread (NPT) full port ball valve
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)
05000705464	Conductivity standard, SS-1, 1409 µS/cm, 32 oz. (0.95 L)
05000709672	Conductivity standard, SS-1A 1409 µS/cm, 1 gal. (3.78 L)
05010782147	Conductivity standard SS-7, 5000 µS/cm, 32 oz. (0.95 L)
05010782026	Conductivity standard SS-7A, 5000 µS/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

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, noncorrosive samples where the ability to remove the sensor from the process piping or tank without shutting down or draining lines or equipment is desired.
- be supplied with a retraction assembly and full port ball valve. The ball valve shall be connected to the piping or tank using a 1¼-inch close nipple.
- be available with integral cable, integral junction box, or a Variopol quick disconnect fitting.
- be suitable for vacuum service as low as 1.6 inHg
- be Rosemount 402 (integral cable) or 402VP (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 sensor insertion tube shall be 316 stainless steel.
- The ball valve shall be 316 stainless steel with PTFE seals and seats.
- The retraction body shall be 316 stainless steel and shall use three graphite packing rings to seal the sensor tube.
- The maximum temperature for the sensor shall be 212 °F (100 °C) at 200 psig (1481 kPa [abs]).
- The maximum retraction pressure shall be 64 psig (542 kPa [abs]).

For more information: [Emerson.com/global](https://emerson.com/global)

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