

# Rosemount™ 402 and 402VP

## Contacting Conductivity Sensors



### Reliable conductivity measurements for your process

With Rosemount 402 and 402VP contacting conductivity sensors, you will be able to accurately measure electrolytic conductivity in a broad range of applications from high purity water to clean cooling water. The Rosemount 402 and 402VP contacting conductivity 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, 0.1, and 1.0/cm.

## Meet Your Process Mounting Needs

- The sensors are designed to be retracted through a 1¼ in. ball valve assembly (sold separately).
- Sensors may be removed from process piping without having to shutdown or drain the line.
- Offered with Variopool (VP6) quick disconnect fitting.

## A Robust Two-electrode Design

- The sensors have concentric titanium electrodes separated by a PEEK insulator.
- An EPDM O-ring seals the internal parts of the sensor from the process liquid.
- Maximum operating temperature up to 100 °C.
- Maximum pressure rating up to 200 psig.

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## Contents

Overview .....	2	Dimensional Drawings .....	7
Ordering Information .....	3	Accessories .....	10
Specifications .....	5	Engineering Specifications .....	11

## Ordering Information



The Rosemount 402 Contacting Conductivity sensor is intended to measure electrolytic conductivity in clean water applications. These sensors can be configured with either 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 Variopool (VP6) connector (402VP). Variopool cables sold separately (see accessories).

### Additional Information

Specifications: see “Specifications” on page 5

Dimensional drawings: see “Dimensional Drawings” on page 7

Accessories: see “Accessories” on page 10

Engineering Specifications: see “Engineering Specifications” on page 11

**Table 1. Rosemount 402 Contacting Conductivity Sensor ordering information**

Model	Sensor type
402	Contacting Conductivity Sensor
<b>Cell constant</b>	
11	0.01/cm
12	0.1/cm
13	1.0/cm
<b>Temperature compensation</b>	
_	Pt-1000 <sup>(1)</sup>
54	Pt-100
55	10K Ohm TC
<b>Option 1</b>	
_	No selection
31	Retraction assembly kit <sup>(2)</sup>
<b>Option 2</b>	
_	No selection
60	Integral junction box <sup>(3)</sup>
<b>Option 3</b>	
_	No selection
61	Sensor cable terminated for use with sensor junction box <sup>(3)</sup>
<b>Typical Model Number: 402-11-_-60-61</b>	

1. Recommended for use with Rosemount transmitters 1056, 56, 1057, 1066, and 5081.
2. Assembly contains nipple, ball valve, and retraction body.
3. Interconnecting cable between the junction box and transmitter must be purchased as a separate item.

**Table 2. Rosemount 402VP Contacting Conductivity Sensor with Variopol cable connection ordering information**

Model	Sensor type
402VP	Contacting Conductivity Sensor
<b>Cell constant</b>	
11	0.01/cm
12	0.1/cm
13	1.0/cm
<b>Temperature compensation</b>	
_	Pt-1000 <sup>(1)</sup>
54	Pt-100
55	10K Ohm TC
<b>Options</b>	
_	No selection
31	Retraction assembly kit <sup>(2)</sup>
<b>Typical Model Number: 402VP-11-_-31</b>	

1. Recommended for use with Rosemount transmitters 1056, 56, 1057, 1066 and 5081,
2. Assembly contains nipple, ball valve, and retraction body.

## Specifications

**Table 3. Rosemount 402/402VP Contacting Conductivity Sensor specifications**

<b>Wetted materials</b>	
Electrodes	Titanium
Insulator	Glass Filled PEEK
Sensor tube	316 Stainless Steel
O-ring	EPDM
Washer	Neoprene
<b>Temperature range</b>	
Standard	32 to 212 °F (0 to 100 °C)
<b>Maximum pressure</b>	
200 psig (1481 kPa abs)	
<b>Maximum retraction pressure</b>	
64 psig (542 kPa abs)	
<b>Vacuum</b>	
At 1.6 in. Hg (5.2 kPa) air leakage is less than 0.005 SCFM (0.00014 m <sup>3</sup> /min)	
<b>Cell constants</b>	
0.01, 0.1, and 1.0/cm	
<b>Process connection</b>	
Sensor is inserted through 1¼ in. NPT full port ball valve	
<b>Cable</b>	
10 ft (3.1 m) standard; for longer cable lengths, choose option -60 (integral junction box) and order interconnecting cable separately; 402VP Interconnecting VP6 cables sold separately (See <a href="#">Accessories</a> ).	

**Table 4. Rosemount 402/402VP weights and shipping weights\***

<b>Model</b>	<b>With 10 ft. (3.1 m) cable</b>		<b>With junction box</b>	
	<b>Weight</b>	<b>Shipping Weight</b>	<b>Weight</b>	<b>Shipping Weight</b>
Rosemount 402 Contacting Conductivity Sensor	3 lb. (1.5 kg)	4 lb. (2.0 kg)	4 lb. (2.0 kg)	5 lb. (2.5 kg)
Rosemount 402VP Contacting Conductivity Sensor	3 lb. (1.5 kg)	4 lb. (2.0 kg)		

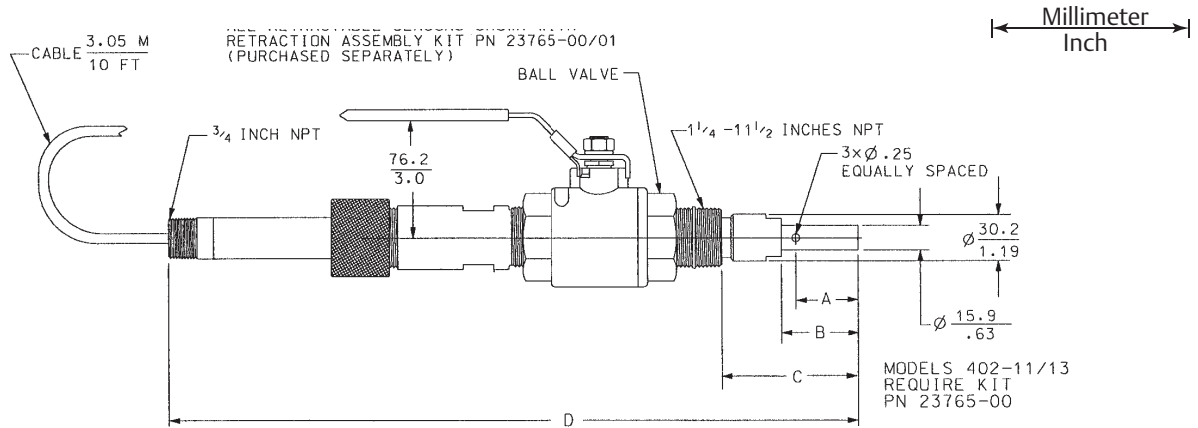
\* Rounded up to the nearest 1 lb or 0.5 kg.

## Retraction Assembly Specifications

<b>Assembly includes</b>	
Ball valve, retraction body, and pipe nipple.	
<b>Wetted materials</b>	
Ball valve	316 Stainless Steel with Teflon seals and seat steel
Nipple	316 Stainless Steel
Packing rings	Graphite
Packing bushing	303 Stainless Steel
Retraction body	316 Stainless Steel
<b>Process connection</b>	
Ball valve 1 ¼ in. FNPT; Nipple 1 ¼ in. 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 in. Hg (5.2 kPa) air leakage is less than 0.005 SCFM (0.00014 m <sup>3</sup> /min)	

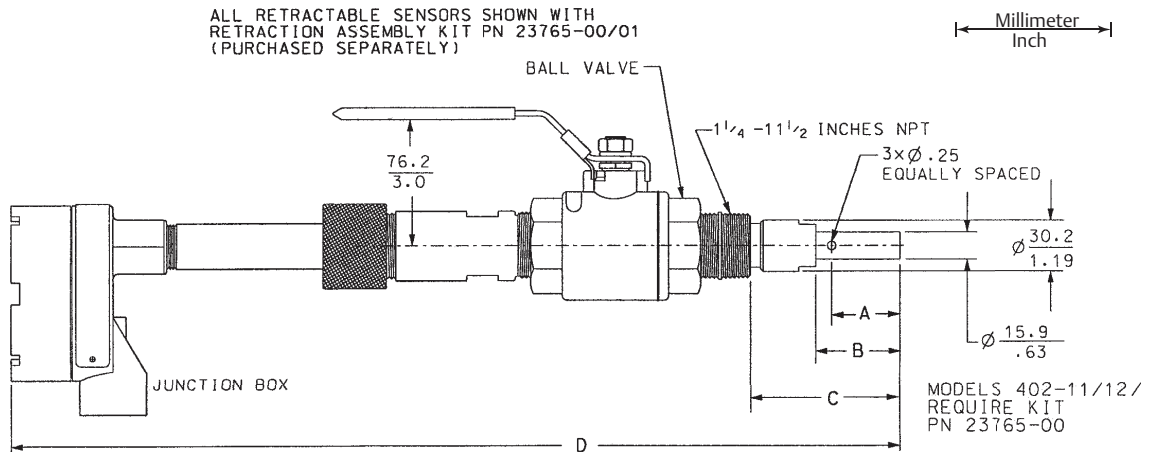
# Dimensional Drawings

Figure 1. Rosemount 402 dimensional drawing



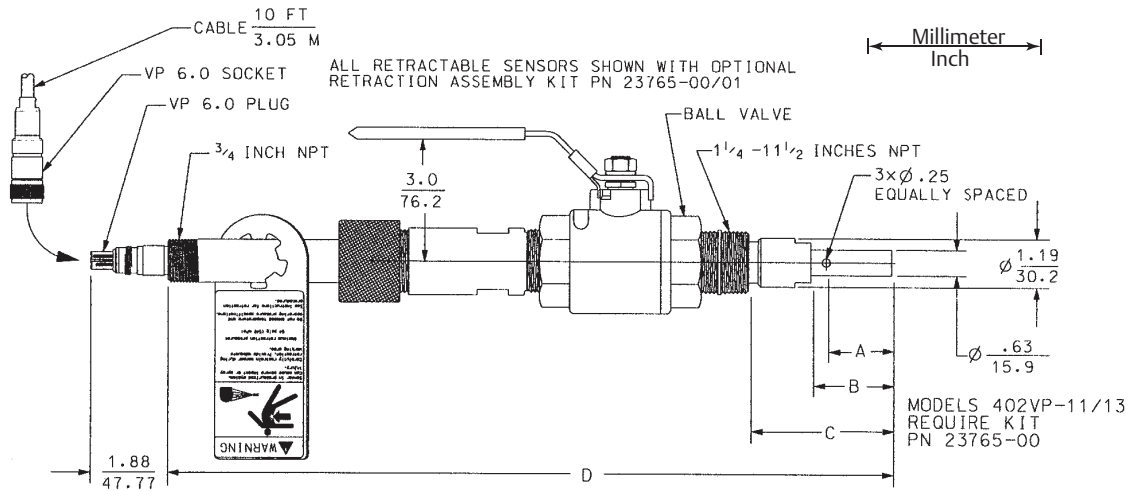
MODEL	RETRACTION ASSY KIT	A		B		C (MIN - MAX)		D	
		INCHES	mm	INCHES	mm	INCHES	mm	INCHES	mm
402-11	23765-00	1.59	40.4	1.98	50.3	3.21-5.34	82-136	18.13	460.5
402-12	23765-00	.687	17.4	1.11	28.2	2.34-4.47	59-114	17.33	440.2
402-13	23765-00	.667	16.9	1.13	28.7	2.36-4.49	60-114	17.33	440.2

Figure 2. Rosemount 402 with integral junction box (option-60) dimensional drawing



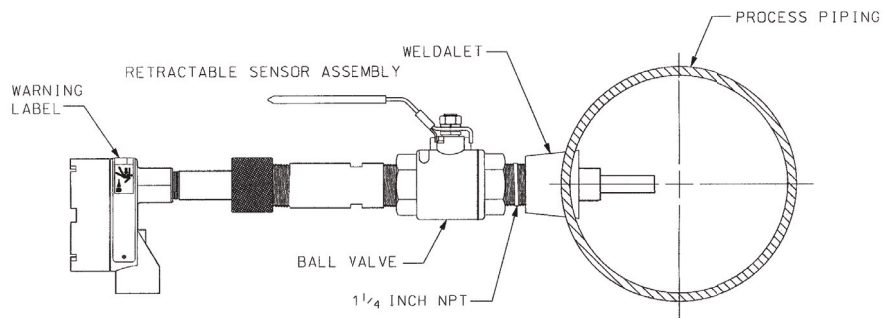
MODEL	RETRACTION ASSY KIT	A		B		C (MIN - MAX)		D	
		INCHES	mm	INCHES	mm	INCHES	mm	INCHES	mm
402-11	23765-00	1.59	40.4	1.98	50.3	3.21-5.34	82-136	21.1	537
402-12	23765-00	.687	17.4	1.11	28.2	2.34-4.47	59-114	20.3	515
402-13	23765-00	.667	16.9	1.13	28.7	2.36-4.49	60-114	20.3	515

Figure 3. Rosemount 402VP dimensional drawing



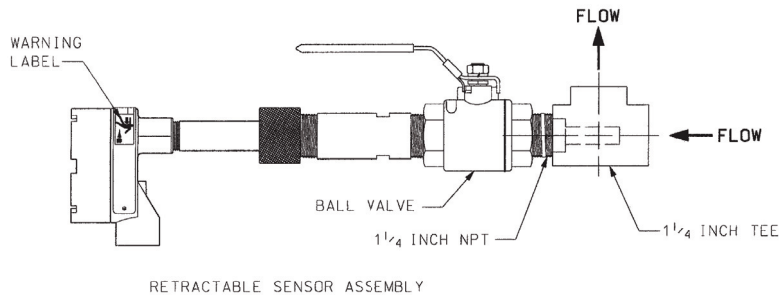
MODEL	RETRACTION ASSY KIT	A		B		C (MIN - MAX)		D	
		INCHES	mm	INCHES	mm	INCHES	mm	INCHES	mm
402-11	23765-00	1.59	40.4	1.98	50.3	3.21-5.34	82-136	18.13	460.5
402-12	23765-00	.687	17.4	1.11	28.2	2.34-4.47	59-114	17.33	440.2
402-13	23765-00	.667	16.9	1.13	28.7	2.36-4.49	60-114	17.33	440.2

Figure 4. Rosemount 402 with integral junction box installation details



**Rosemount 402 Retractable Sensor Installed In a Large Pipe or Tank**

The Endurance Retractable Sensor can be attached through a weldolet in either a large pipe or tank.

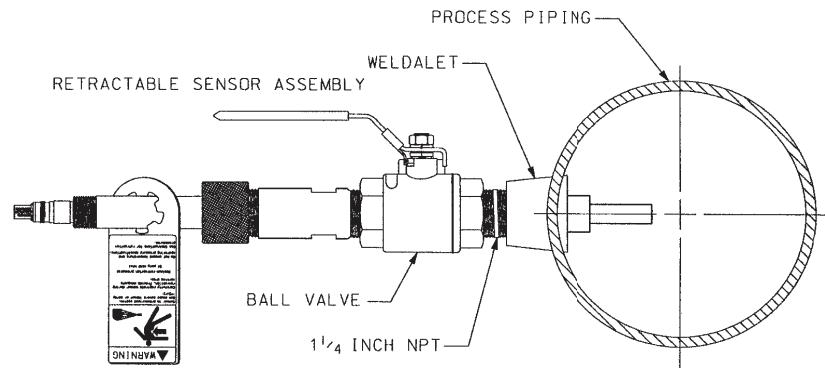


**Rosemount 402 Retractable Sensor Installed In a Standard Tee**

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

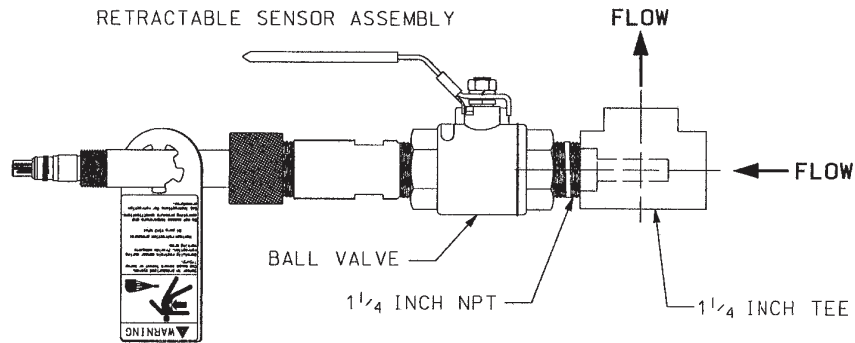


Figure 5. Rosemount 402VP installation details



**402VP Retractable Sensor Installed in a Large Pipe or Tank**

The ENDURANCE Retractable Sensor can be attached through a weldolet in either a large pipe or tank.



**402VP Retractable Sensor Installed in a Standard Tee**

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

## Accessories

**Table 5. Rosemount 402/402VP Contacting Conductivity Sensor accessories information**

Part number	Description
23550-00	Remote junction box without preamplifier
23747-00	Interconnect cable, prepped (must specify length)
9200275	Extension cable, unprepped (must specify length)
23765-00	Retraction assembly kit (includes nipple, ball valve, and retraction body)
23796-00	Retraction Body
9340078	1¼ in. 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, 100k0 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.
- The sensor shall 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 in. close nipple.
- The sensor shall incorporate titanium electrodes and a PEEK insulator.
- The sensor shall have an integral platinum RTD for temperature measurement.
- The sensor insertion tube shall be 316 stainless steel.
- The ball valve shall be 316 stainless steel with Teflon 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).
- The sensor shall be suitable for vacuum service as low as 1.6 in Hg (5.2 kPa).
- The sensor shall be available with integral cable, integral junction box, or a Variopol quick disconnect fitting.
- The sensor shall be Rosemount 402 (integral cable) or 402VP (Variopol fitting) or approved equal.

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