Rosemount™ 3900/3900VP

General Purpose pH/ORP Sensors

High performance for your process pH/ORP needs

The Rosemount 3900 and 3900VP pH/ORP combination sensors are used for reliable pH or oxidation/reduction potential measurements of aqueous solutions in pipelines, open tanks, or ponds. Its robust sensor design allows the Rosemount 3900 and 3900VP sensors to be used in a wide range of applications.

ROSEMOUNT™

EMERSON.

Overview

A robust sensor design

- Extended sensor life and protection against poisoning ions using a double junction reference.

- Enhanced performance and increased life with cracking resistant glass.

- Maximum chemical resistance provided by a rugged polyphenylene sulfide body.

- Operates in sub-zero temperatures down to 14 °F (-10 °C).

- Built-ins solution ground for advanced diagnostics.

Versatile installation options

- The sensor body features a one-piece construction with both front facing and rear facing process threads.

- ¾-in. and 1-in. MNPT process connections to meet a variety of application installation requirements.

- Variopol (VP8) cable connection option, for quick cable-to-sensor release, eliminates cable twisting.

SMART preamplifier

- Automatic recognition of pH sensors by Rosemount transmitters: 1066, 1057, 1056, and 56.

- pH calibration data is stored, which allows sensors to be calibrated in advance for "plug and play" installations in the field.

Ordering information

The Rosemount 3900 and 3900VP General Purpose pH/ORP sensors feature a chemically resistant Ryton® plastic body, along with a built-in solution ground for advanced diagnostics and a Pt-100 resistance temperature device (RTD) for temperature compensation. These sensors are available with either an integral cable connection (Rosemount 3900) or Variopol (VP8) connector (Rosemount 3900VP). Variopol cables are sold separately (see Accessories).

Contents

Table 1: Rosemount 3900 Ordering Information

Option	Description
3900	General Purpose pH/ORP Sensor
Preamplifier option	
01	SMART preamplifier, 32-ft. (10 m) cable (standard preamplifier if used with ORP)
02	No preamplifier, 15-ft. (5 m) cable
04	SMART preamplifier, 50-ft. (15 m) cable (standard preamplifier if used with ORP)
05	SMART preamplifier, 66-ft. (20 m) cable (standard preamplifier if used with ORP)
06	SMART preamplifier, 100-ft. (30 m) cable (standard preamplifier if used with ORP)
07	No preamplifier, 4-ft. (1 m) cable
08	No preamplifier, 10-ft. (3 m) cable
Measuring code	
10	General purpose low resistivity (GPLR) pH glass (0-14 pH)
12	Platinum ORP
Calibration certificates - optional level	
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)
Q1	Certificate of Conformance

Note

The Rosemount 3900 pH/ORP sensor is housed in a Ryton plastic body with built-in solution ground for advanced diagnostics. Pt-100 is offered for a temperature compensator. The sensor is available with an integral cable. You can mount the sensor using a process connector, both ordered separately. You can also order junction box kits with preamplifiers separately if the transmitter does not have an integral preamplifier with 15 ft. (5 m) of the sensor.

Table 2: Rosemount 3900VP Ordering Information

Option	Description
3900VP	General Purpose pH/ORP Sensor with Variopol connector
Preamplifier option	
01	SMART preamplifier (standard preamplifier if used with ORP)
02	No preamplifier
Measuring code	
10	General purposel low resistivity (GPLR) pH glass (0-14 pH)
12	Platinum ORP
Calibration certificates - optional level	
CC	Certificate of Calibration (no test data given)
LC	Loop Calibration Certificate (sensor and transmitter calibrated together, with test data)

Table 2: Rosemount 3900VP Ordering Information *(continued)*

Option	Description
EC	Electronic Calibration Certificate (sensor calibrated against factory instrument, with test data)
Q1	Certificate of Conformance

Specifications

Table 3: Percent Linearity over pH Range

pH range	Linearity
0-7	97%
1-7	98%
4-7	98%
7-10	99%
7-12	97%
7-13	96%
7-14	95%

Table 4: Rosemount 3900/3900VP pH/ORP Sensor Specifications

Measurement range	
pH	0 to 14
ORP	-1500 to +1500 mV
Operating temperature	
14 to 212 °F (-10 to 100 °C), automatic temperature compensation from 14 to 212 °F (-10 to 100 °C)	
Maximum pressure	
100 psig (790 kPa [abs]) at 212 °F (100 °C) CRN rating: 60 psig up to 212 °F (100 °C)	
Materials of construction	
Sensor body	Ryton®: polyphenylene sulfide (PPS)
O-ring	EPDM
pH electrode	Glass
ORP electrode	Glass, platinum
Solution ground	Stainless steel
Reference junction	PFTE (Teflon®)
Conductivity	
Responds to changes in pH at a minimum conductivity of 0.1 μS/cm when used with the low flow panel. The sample flow rate must be controlled to 2 gallons per hour (7.61 liters per hour).	

Table 4: Rosemount 3900/3900VP pH/ORP Sensor Specifications *(continued)*

Process connection	
Front facing	¾-in. and 1-in. MNPT
Rear facing	1-in. MNPT
Temperature compensation	
Pt-100	
Cable	
3900	Various cable lengths (see Ordering information) with integral preamplifier; 15-ft. (4.6 m) and less without preamplifier
3900VP	Use 24281-XX, 2.5-ft. (0.8 m) to 100 ft. (30.5 m). See Accessories.
Weight/shipping weight	
1 lb./2 lb. (0.45 kg/0.9 kg)	

Dimensional and installation drawings

Figure 1: Proper Sensor Installation Orientation
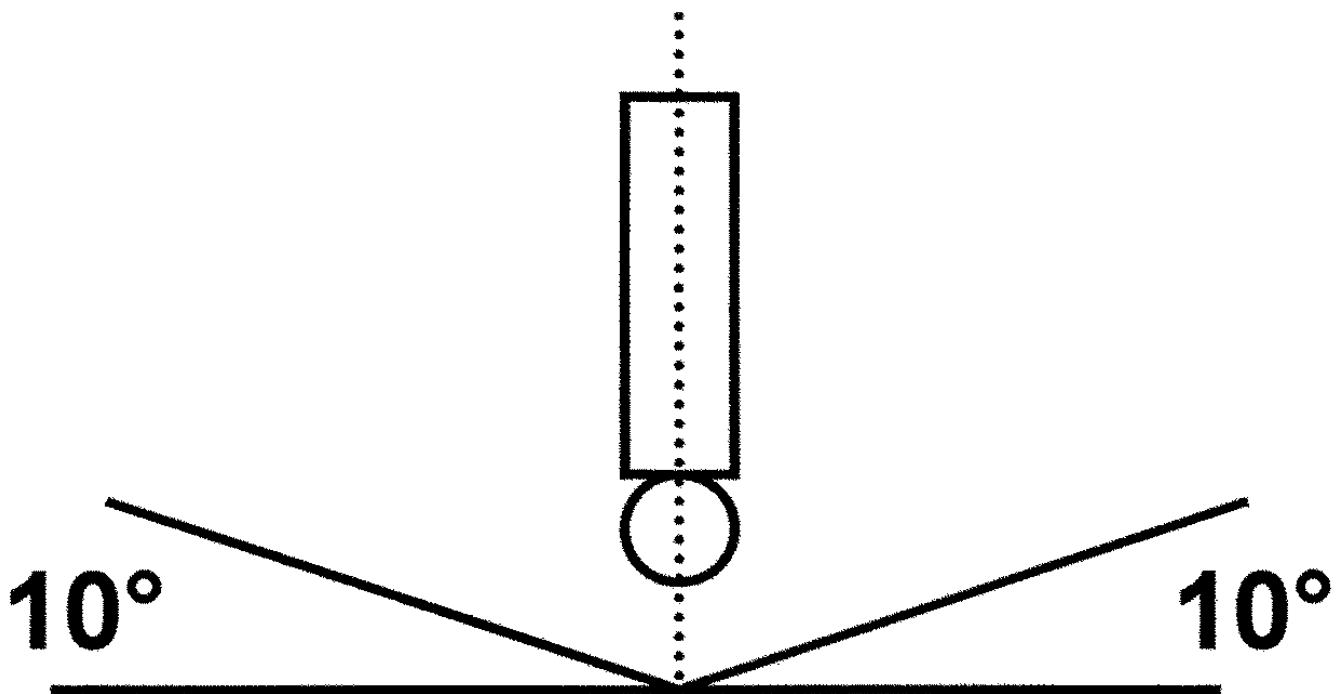
Install sensor within 80 degrees of vertical.

Figure 2: Rosemount 3900 with Integral Cable Connection
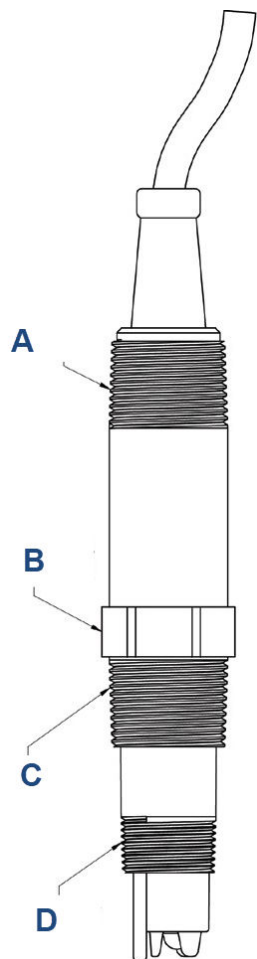
A.   1-in. MNPT
B.   Wrench flats, 1.30 in. across
C.   1-in. MNPT
D.   ¾-in. MNPT

Figure 3: Rosemount 3900VP with Variopol Cable Connection
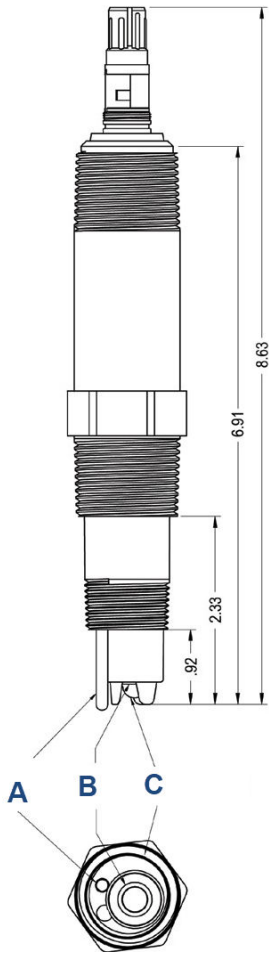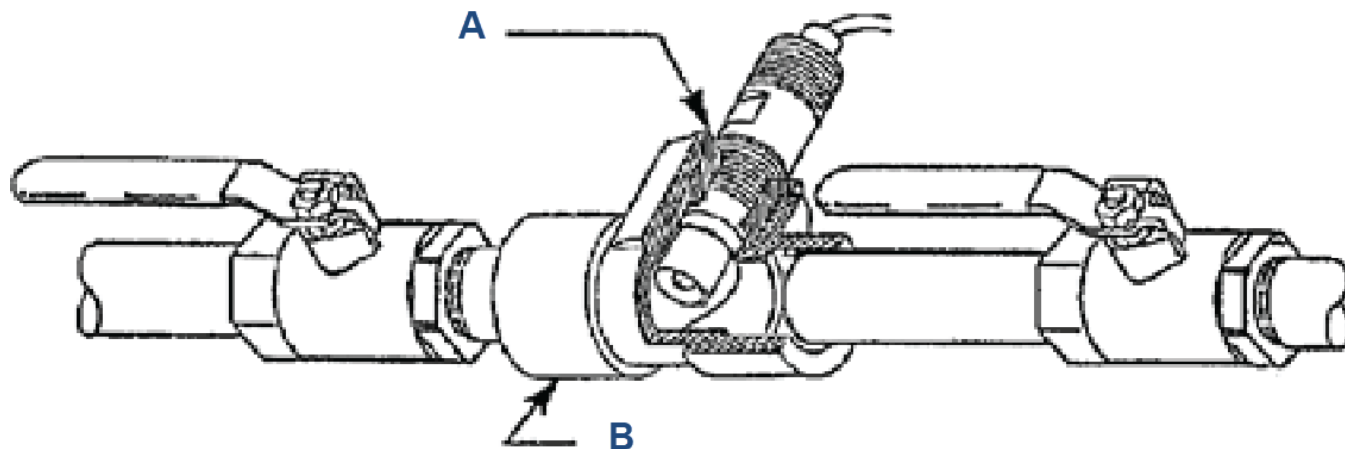
A. Temperature compensation solution ground
B. Reference junction
C. pH electrode

Table 5: Horizontal Pipe Tee (PN 2002011) Pressure/Temperature Ratings

psig (kpa [abs])	°F (°C)
150 (1136)	150 (65)
128 (984)	160 (71)
102 (805)	170 (77)
80 (653)	180 (82)
57 (494)	200 (93)
48 (432)	210 (99)

Figure 4: Typical Flow-through Insertion Installation using PN 2002011 Pipe Tee

A. 1½-in. x 1-in. reducing bushing
B. 1½-in. pipe tee PN 2002011

Table 6: Low Flow Cell Specifications PN 24091-00/24091-02

| Wetted materials	
Body and nut	Polyester/polycarbonate
Fittings	316 stainless steel
Seals	Silicone
Flow cell ratings	
Temperature	32 to 158 °F (0 to 70 °C)
Maximum pressure	90 psig (721 kPa [abs])
Flow rate	2 to 5 gallons per hour (7,6 to 18,9 liters per hour)
Sensor threaded connection	
24091-00	1-in. NPT adapter
24091-02	¾-in. NPT adapter

Figure 5: Low Flow Cell (PN 24091-00)

4.05 / 102.89

2.90 / 73.79

A
B

4.58 / 116.33

5.73 / 145.44

C

D

2.09 / 53.09
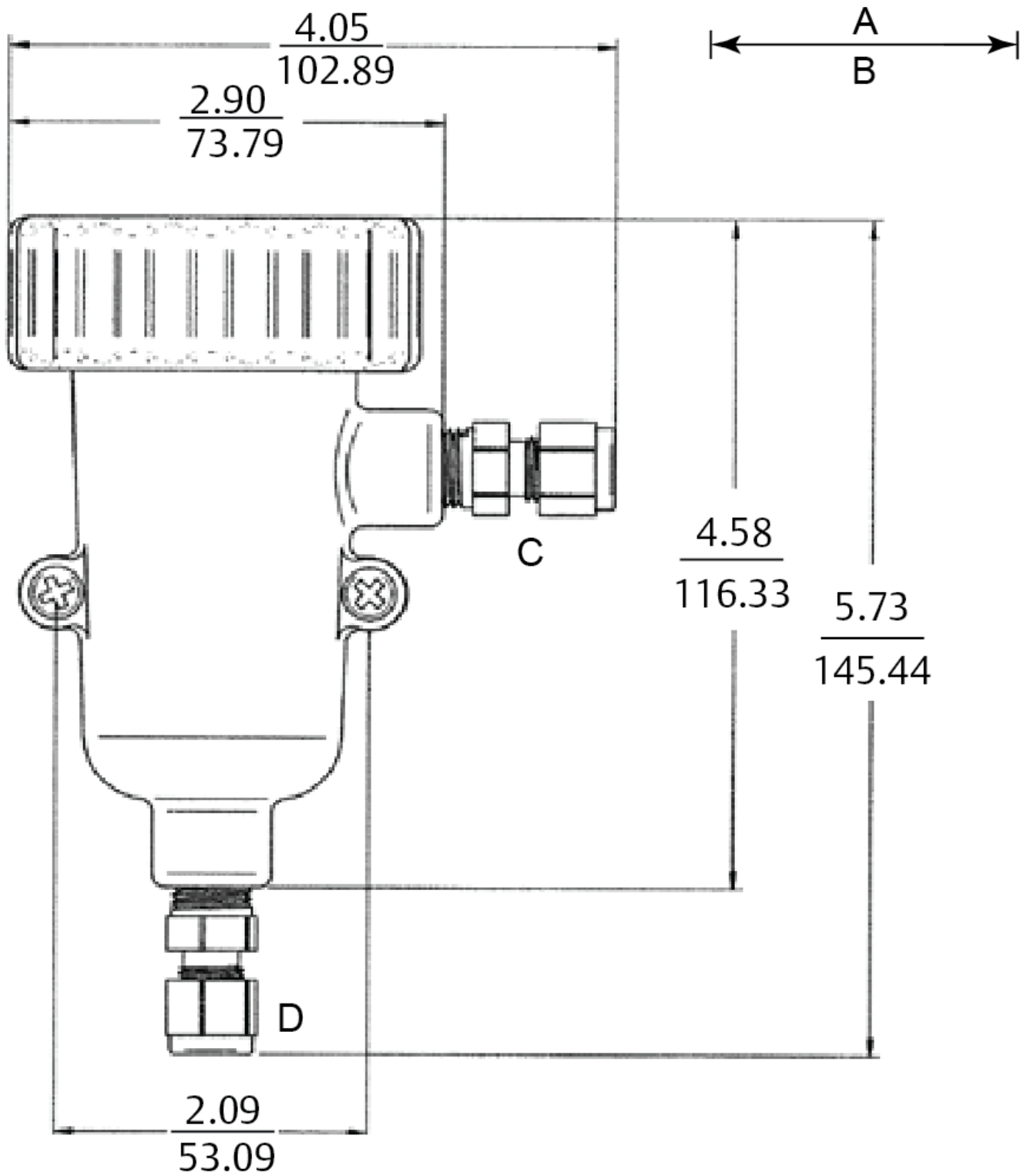
A. Inches
B. Millimeters
C. Outlet
D. Inlet

Figure 6: Flow-through Tee (2-in.) (PN 914240-XX)


179
7.1

A

162
6.4
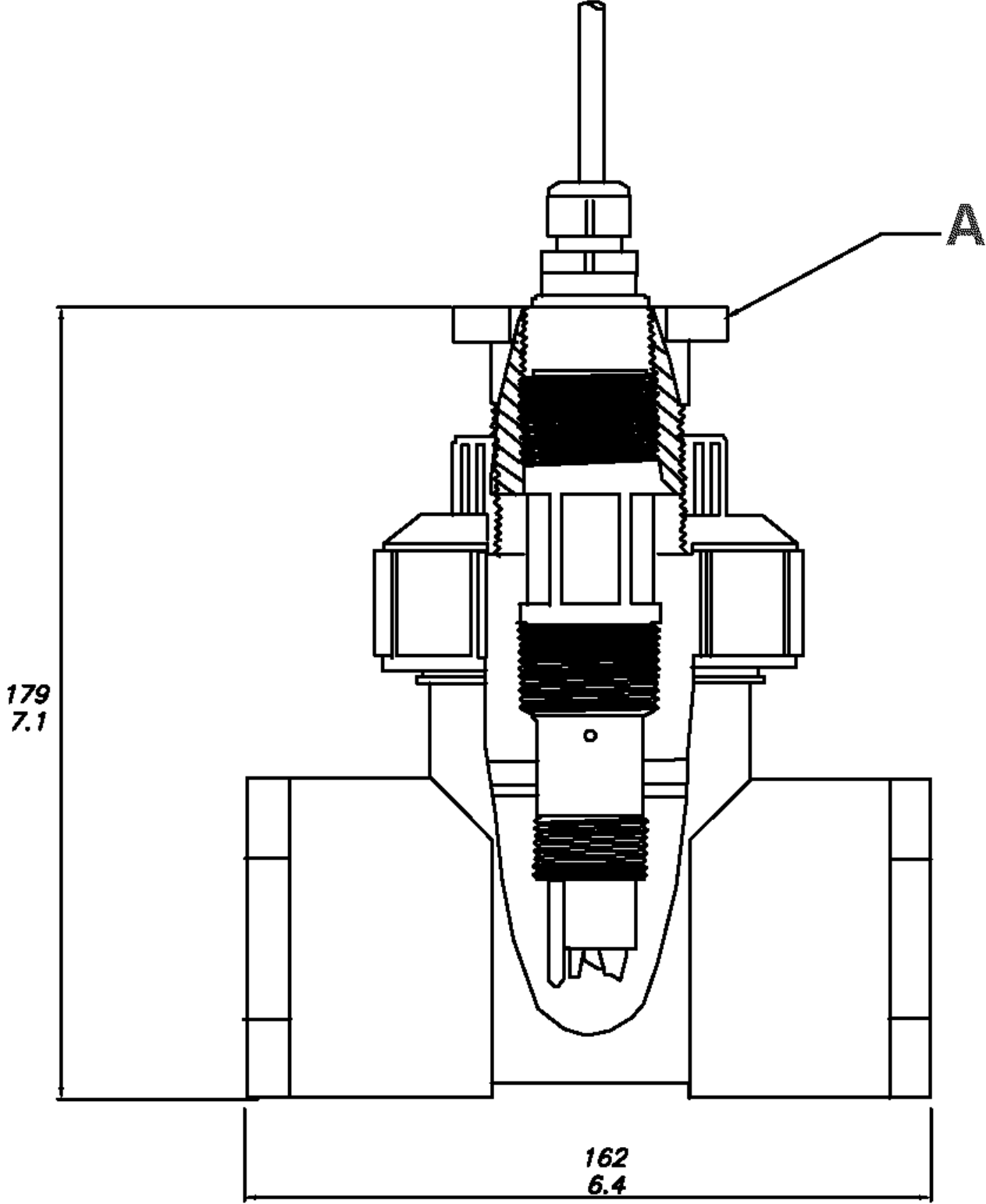
A. Adapter

The following flow-through tees are available for the Rosemount 3900/3900VP.

- 915240-03
- 915240-04
- 915240-05

For a new installation, use the appropriate tee above and add the S10283-LQD adapter.

When replacing an existing Rosemount 399 with a Rosemount 3900 sensor, add the S10283-LQD adapter to convert the tee to accept the Rosemount 3900 sensor.

Figure 7: Jet Spray Cleaner
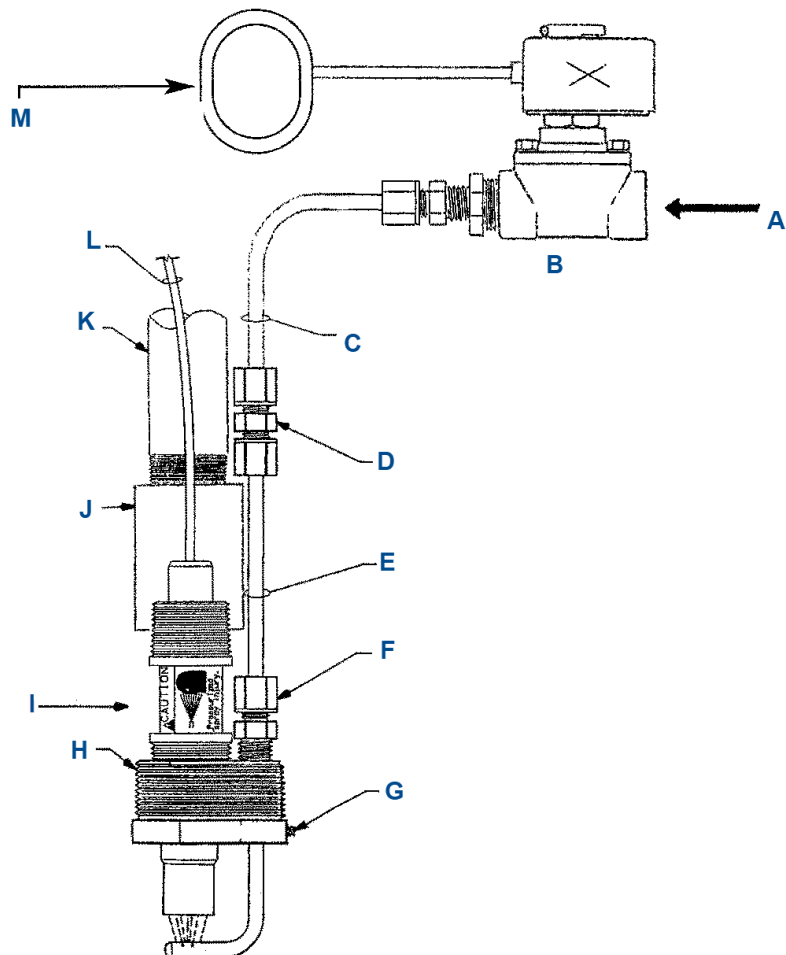
A. Cleaning solution by others.
B. Solenoid valve or manual valve (supplied by others).
C. Corrosion resistant tubing (supplied by others).
D. Polypropylene ¼-in. compression fitting.
E. ¼-in. 316 stainless steel.
F. ¼-in. polypropylene.
G. Stainless set screw for adjustable spray nozzle height.
H. 2-in. NPT threads.
I. Sensor.
J. 1-in. PVC coupling for submersible applications (supplied by others).
K. 1-in. PVC or stainless conduit (supplied by others).
L. Cable.
M. Timer supplied by others or use timer feature in Rosemount instrument.

Figure 8: Rosemount 3900 Sensor with Jet Spray Cleaner

The jet spray cleaner eliminates routine, manual sensor maintenance by cleaning the sensor with water or compressed air. You can control flow through the cleaner with a solenoid valve.
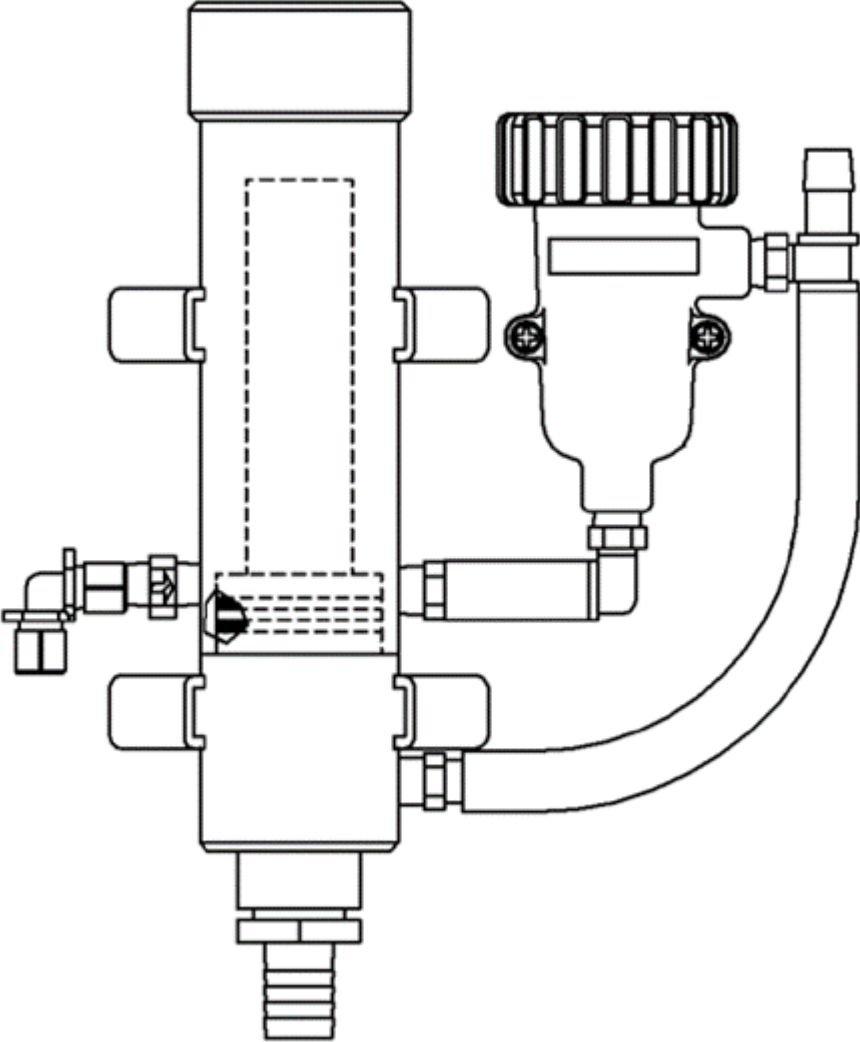
Note
You can use the jet spray cleaner with the handrail mounting assembly (PN 11275-01, not shown), or you can mount it through the conduit as shown in Figure 8.

Figure 9: Low Flow Panel PN SQP10077-LQD

Table 7: Low Flow Panel Specifications

Inlet flow	3 to 80 gallons per hour (11,4 to 304 liters per hour)
Inlet pressure	3 to 65 psig (122 to 549 kPa [abs])[1]
Temperature	32 to 122 °F (0 to 50 °C)

(1) *The minimum inlet pressure is required to open a check valve, which prevents the flow cell from draining if sample flow is lost. Removing the check valve lowers the inlet pressure requirement to a few feet of water head.*

Accessories

Table 8: Accessories

Part number	Description
11275-01	Handrail mounting assembly
12707-00	Jet spray cleaner
2002011	CPVC flow-through tee, 1½-in. NPT process connection
23242-02	Mounting adapter, 1½-in. insertion, 1 x ¾-in.
23555-00	Junction box, Rosemount 54/5081/1055/Xmt compatible preamplifier
24091-00	Cell, low flow, ¼-in. inlet and outlet
33894-00	Adapter, 1-in. NPT low flow cell
24281-00	15-ft. (4.6 m) VP8 cable
24281-01	25-ft. (7.6 m) VP8 cable
24281-02	2.5-ft. (0.8 m) VP8 cable
24281-03	50-ft. (15.2 m) VP8 cable
24281-04	100-ft. (30.5 m) VP8 cable
24281-05	4-ft. (1.2 m) VP8 cable
24281-06	10-ft. (3 m) VP8 cable
24281-07	20-ft. (6.1 m) VP8 cable
24281-08	30-ft. (9.1 m) VP8 cable
9200273	Extension cable, 11-conduit, shielded, unprepped, per foot
9210012	Buffer solution, pH 4.01, 16 oz. (473 ml)
9210013	Buffer solution, pH 6.86, 16 oz. (473 ml)
9210014	Buffer solution, pH 9.18, 16 oz. (473 ml)
SQP10077-LQD	Low flow panel

GLOBAL HEADQUARTERS
Emerson Automation Solutions
6021 Innovation Blvd
Shakopee, MN 55379, USA
+1 800 999 9307 or +1 952 906 8888
F +1 952 949 7001
liquid.csc@emerson.com

NORTH AMERICA
Emerson Automation Solutions
8200 Market Blvd
Chanhassen, MN 55317
Toll Free +1 800 999 9307
F +1 952 949 7001
liquid.csc@emerson.com

EUROPE
Emerson Automation Solutions
Neuhofstrasse 19a P.O. Box 1046
CH-6340 Baar
Switzerland
T + 41 (0) 41 768 6111
F + 41 (0) 41 768 6300
liquid.csc@emerson.com

MIDDLE EAST AND AFRICA
Emerson Automation Solutions
Emerson FZE
Jebel Ali Free Zone
Dubai, United Arab Emirates, P.O. Box 17033
T +971 4 811 8100
F +971 4 886 5465
liquid.csc@emerson.com

ASIA-PACIFIC
Emerson Automation Solutions
1 Pandan Crescent
Singapore 128461
Singapore
T +65 777 8211
F +65 777 0947
liquid.csc@emerson.com

Linkedin.com/company/Emerson-Automation-Solutions

Twitter.com/Rosemount_News

Facebook.com/Rosemount

Youtube.com/user/RosemountMeasurement

ROSEMOUNT™

EMERSON™