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™

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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-in 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.

Contents

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 RTD for temperature compensation. These sensors are available with either an integral cable connection (3900) or Variopol (VP8) connector (3900VP). Variopol cables are sold separately (see Accessories).

Table 1. Rosemount 3900 pH/ORP Sensor ordering information

Model	Sensor Type
3900	pH/ORP sensor
Preamplifier Option	
01	Preamplifier [1]
02	No preamplifier [2]
Measuring Electrode	
10	General Purpose Low Resistivity (GPLR) pH glass
12	Platinum ORP
Typical Model Number: 3900-01-10	

1.   Preamplifier is SMART with -10 option and a standard preamplifier if with -12 option. Comes with 32 ft. (10 m) of integral cable.
2.   Comes standard with 15 ft. (4.7 m) of integral cable.

Table 2. Rosemount 3900VP pH/ORP Sensor with Variopol cable connection ordering information

Model	Sensor Type
3900VP	pH/ORP sensor
Preamplifier Option	
01	Preamplifier [1]
02	No preamplifier
Measuring Electrode	
10	General Purpose Low Resistivity (GPLR) pH glass
12	Platinum ORP
Typical Model Number: 3900VP-01-10	

1.   Preamplifier is SMART with -10 option and a standard preamplifier if with -12 option.

Specifications

Table 3. Percent linearity over pH range

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

Table 4. Rosemount 3900/3900VP pH/ORP Sensor specification

Measurement Range	
pH	0 to 14
ORP	-1500 to +1500 mV
Operating Temperature	
-10 to 100 °C (14 to 212 °F), Automatic temperature compensation from -10 to 100 °C (14 to 212 °F)	
Maximum Pressure	
100 psig (790 kPa [abs]) at 100 °C (212 °F) CRN Rating: 60 psig up to 100 °C (212 °F)	
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	PTFE (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 GPH (7.6 L/hr)	
Process Connection	
Front Facing	¾ in. and 1 in. MNPT
Rear Facing	1 in. MNPT
Temperature Compensation	
Pt-100	
Cable	
3900	32 ft (10m) cable with integral preamplifier; 15 ft (4.7m) cable without preamplifier
3900VP	Use 24281-XX, 2.5 ft (.8m) to 100 ft (31m) (see Accessories)
Weight/Shipping Weight	
0.45 kg/0.9 kg (1 lb/2 lb)	

Product Certifications

IECEx

3900/3900VP without preamp (pH and ORP) – Ex ia IIC T4 Ga (-20 °C ≤ Ta ≤ +60 °C)

3900/3900VP with SMART preamp (pH only) – Ex ia IIC T4 Ga (-20 °C ≤ Ta ≤ +60 °C)

Per standards IEC60079-0: 2011, IEC 60079-11: 2011

ATEX

3900/3900VP without preamp (pH and ORP) – ⓔ II 1 G Ex ia IIC T4 Ga (-20 °C ≤ Ta ≤ +60 °C)

3900/3900VP with SMART preamp (pH only) – ⓔ II 1 G Ex ia IIC T4 Ga (-20 °C ≤ Ta ≤ +60 °C)

Per standards EN 60079-0: 2012+A11:2013, EN 60079-11:2012

FM

3900/3900VP with SMART preamp (pH only), with standard preamp (ORP only), and without preamp (pH and ORP):

Intrinsically Safe for use in Class I, II, and III, Division 1, Groups A, B, C, D, E, F, and G; Temperature Class T6 Ta = -20 °C to +60 °C

Intrinsically Safe for use in Class I, Zone 0, AEx ia IIC T6 Ta = -20 °C to +60 °C

Nonincendive for use in Class I, Division 2, Groups A, B, C, and D; Temperature Class T6 Ta = -20 °C to +60 °C

Suitable for use in Class II and III, Division 2, Groups E, F, and G; Temperature Class T6 Ta = -20 °C to +60 °C Hazardous (Classified)

Locations

IS/I,II,III/1/ABCDEFG/T6 Ta = 60 °C - 1400332; Entity; I/0/AEx ia IIC/T6 Ta = 60 °C - 1400332; Entity; NI/I/2/ABCD/T6 Ta = 60 °C; S/II,III/2/EFG/T6 Ta = 60 °C

Per standards 3600:1998, 3610:2010, 3611:2044, 3810:2005

CSA

3900/3900VP with SMART preamp (pH only) – Intrinsically Safe:

Class I, Division 1, Groups ABCD; Class II, Division 1, Groups EFG; Class III; Class I, Division 2, Groups ABCD; Ambient temperature rating -20 °C to +60 °C; Ex ia IIC; T6

3900/3900VP without preamp (pH and ORP) – Intrinsically Safe and Non-Incendive:

Class I, Division 1, Groups ABCD; Class II, Division 1, Groups EFG; Class III; Class I, Division 2, Groups ABCD; Ex ia IIC; T6; Ambient temperature rating -20 °C to +60 °C: (Simple Apparatus)

Per standards C22.2 No. 142 – M1987, C22.2 No 157 – M1992, CAN/CSA E60079-0:07, CAN/CSA E60079-11:02, UL 50, UL 508, UL 913, UL 60079-0: 2005, UL 60079-11: 2002

Dimensional and Installation Drawings
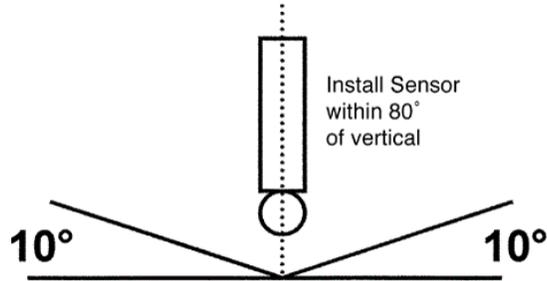
Figure 1. Proper sensor installation orientation

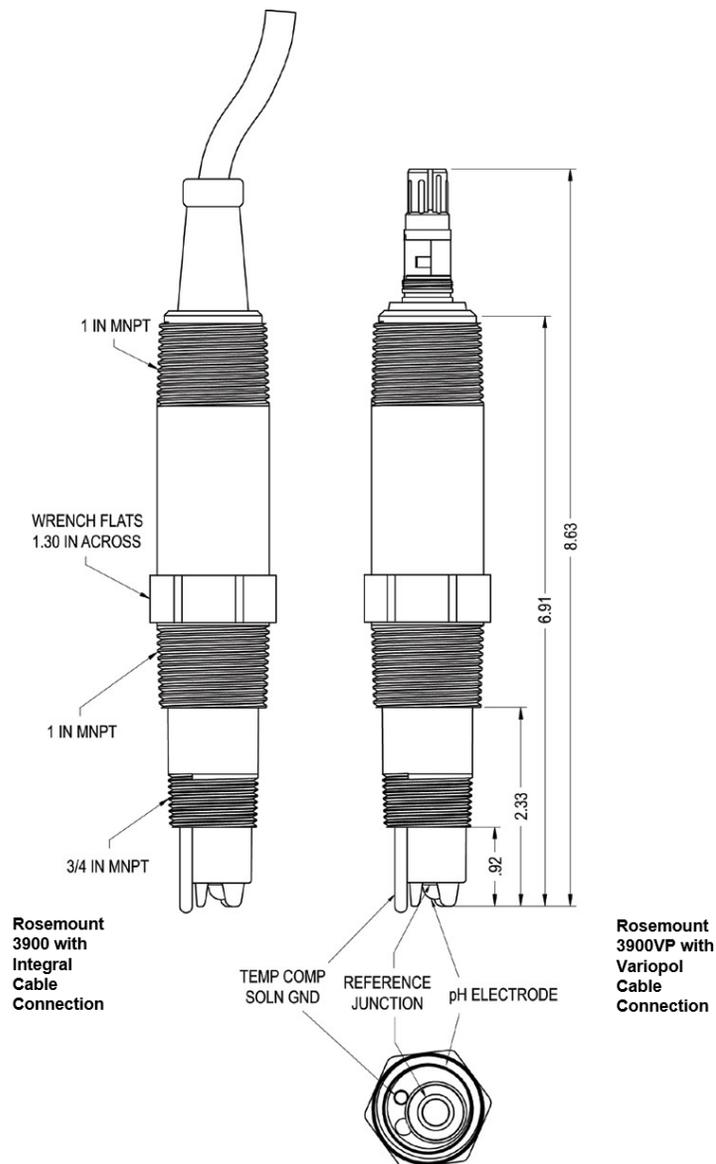**Figure 2. Dimensional Drawing for the Rosemount 3900/3900VP Sensor**

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 3. Typical flow through insertion installation using PN 2002011 pipe tee

Sensor must be installed at least 10° above the horizon
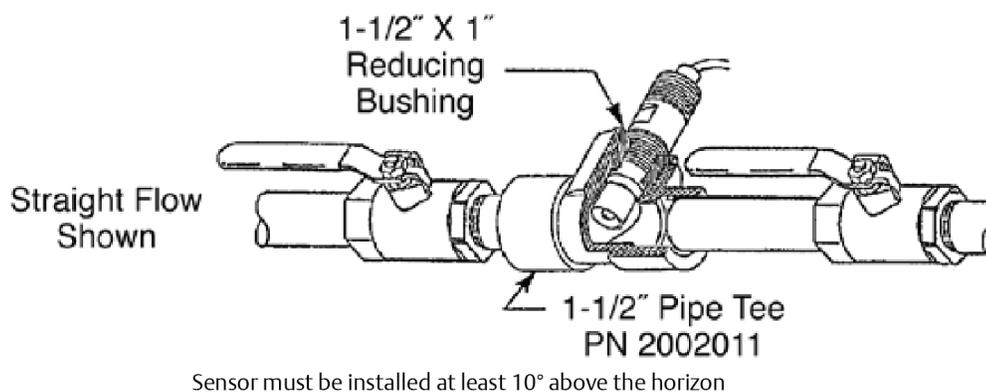
Table 6. Low flow cell specifications PN 24091-00/24091-02

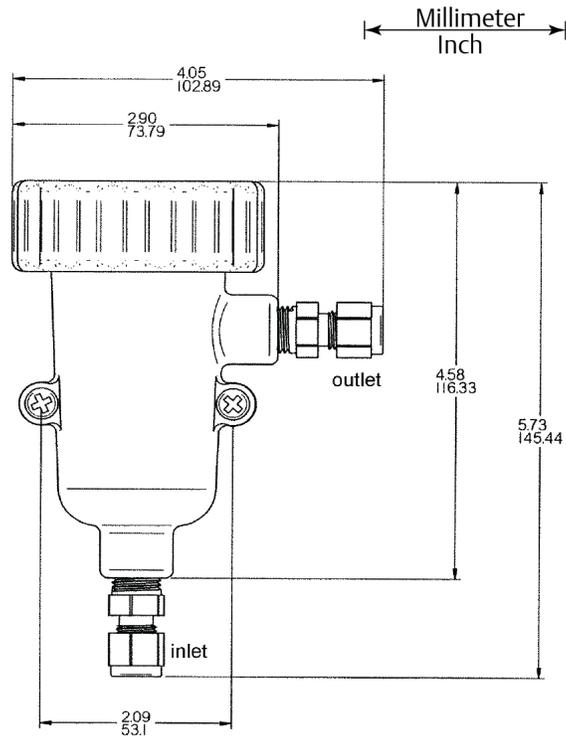| Wetted Materials	
Body and nut	Polyester/Polycarbonate
Fittings	316 SST
Seals	Silicone
Flow Cell Ratings	
Temperature	32 to 158 °F (0 to 70 °C)
Maximum pressure	90 psig (721 kPa [abs])
Flow Rate	2 to 5 GPH (7.6 to 18.9 LPH)
Sensor Threaded Connection	
24091-00	1 in. NPT adapter
24091-02	¾ in. NPT adapter

Figure 4. Low flow cell PN 24091-00/24091-02

**Figure 5. Flow-through tee (2 in.) (PN 915240-XX)**
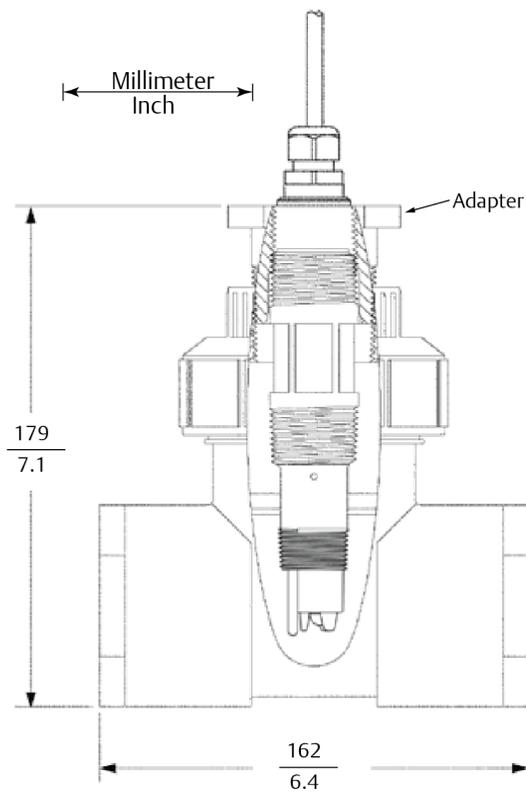
The following flow-through tees are available for the Rosemount 3900/3900VP:

- 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 6. Jet spray cleaner PN 12707-00
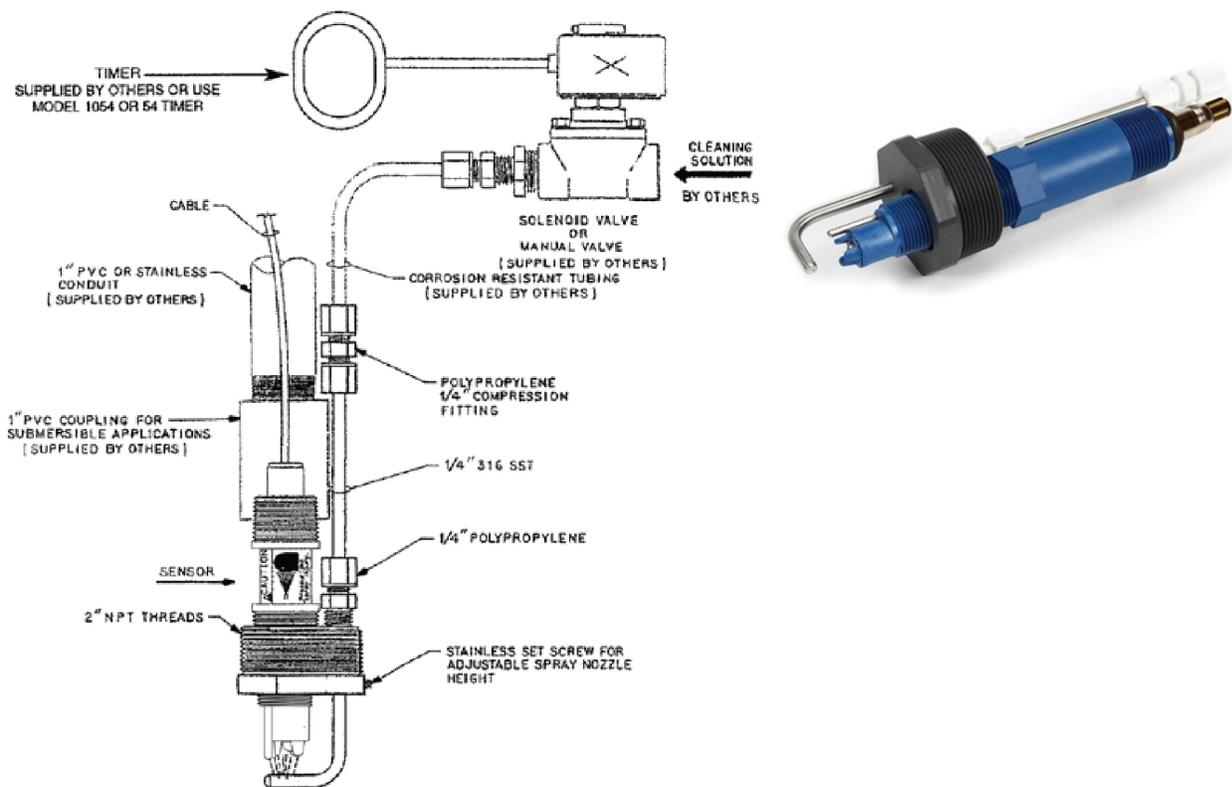
The jet spray cleaner eliminates routine, manual sensor maintenance by cleaning the sensor with water or compressed air. Flow through the cleaner can be controlled by a solenoid valve.

Note: The jet spray cleaner can be used with handrail mounting assembly (PN 11275-01, not shown) or can be mounted through conduit as shown above.
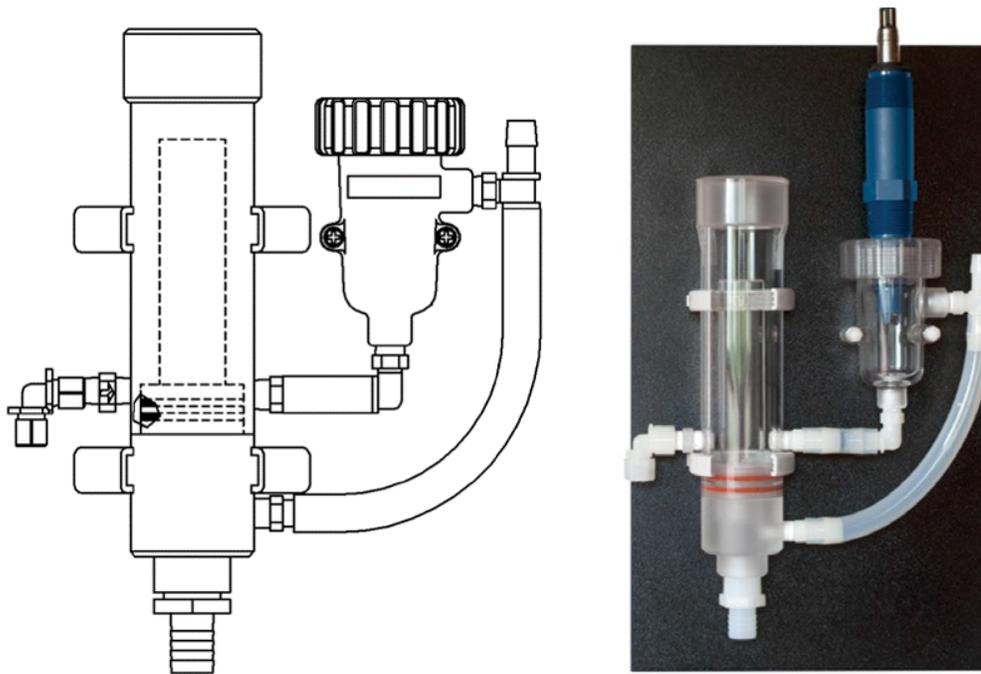
Figure 7. Low flow panel PN SQP10077-LQD

Table 7. Low flow panel specifications

Inlet flow	3-80 gph (11.4-304 L/hr)
Inlet pressure	3 – 65 psig (122 – 549 kPa abs)*
Temperature	32 - 122 °F (0 - 50 °C)

(*)   *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. Rosemount 3900/3900VP pH/ORP Sensor accessories information

Part number	Description
24281-00	15 ft. cable with mating VP8 connector
24281-01	25 ft. cable with mating VP8 connector
24281-02	2.5 ft. cable with mating VP8 connector
24281-03	50 ft. cable with mating VP8 connector
24281-04	100 ft. cable with mating VP8 connector
24281-05	4 ft. cable with mating VP8 connector
24281-06	10 ft. cable with mating VP8 connector
24281-07	20 ft. cable with mating VP8 connector
24281-08	30 ft. cable with mating VP8 connector
12707-00	Jet spray cleaner
23242-02	Insertion mounting adapter, 1.5 in. MNPT process connection, 1 in. x ¾ in. FPT sensor adapter/union thread size
24091-00	Low flow cell, 1 in. NPT adapter
24091-02	Low flow cell, ¾ in. NPT adapter
23555-00	Weatherproof junction box, with preamplifier
2002011	CPVC In-line Tee, 1.5 in. size, 1.0 in. threaded process connection
11275-01	Handrail mounting assembly
9200273	11-Conductor extension cable, shielded and unprepped (for use with remote junction box)
915240-03	PVC flow through Tee, ¾ in. NPT process connection
915240-04	PVC flow through Tee, 1 in. NPT process connection
915240-05	PVC flow through Tee, 1-½ in. NPT process connection
9210012	Buffer solution, 4.01 pH, 16 oz
9210013	Buffer solution, 6.86 pH, 16 oz
9210014	Buffer solution, 9.18 pH, 16 oz
SQP10077-LQD	Low flow panel

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