

# 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™**



# 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.

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## 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
<b>Preamplifier Option</b>	
01	Preamplifier <sup>(1)</sup>
02	No preamplifier <sup>(2)</sup>
<b>Measuring Electrode</b>	
10	General Purpose Low Resistivity (GPLR) pH glass
12	Platinum ORP
<b>Typical Model Number: 3900-01-10</b>	

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
<b>Preamplifier Option</b>	
01	Preamplifier <sup>(1)</sup>
02	No preamplifier
<b>Measuring Electrode</b>	
10	General Purpose Low Resistivity (GPLR) pH glass
12	Platinum ORP
<b>Typical Model Number: 3900VP-01-10</b>	

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 <a href="#">Accessories</a> )
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

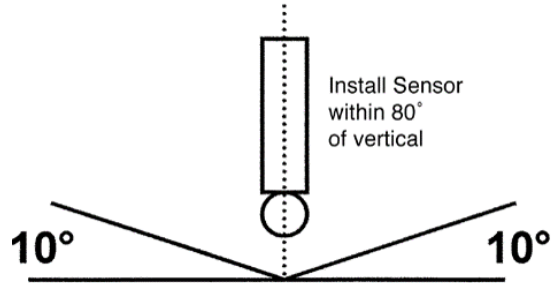
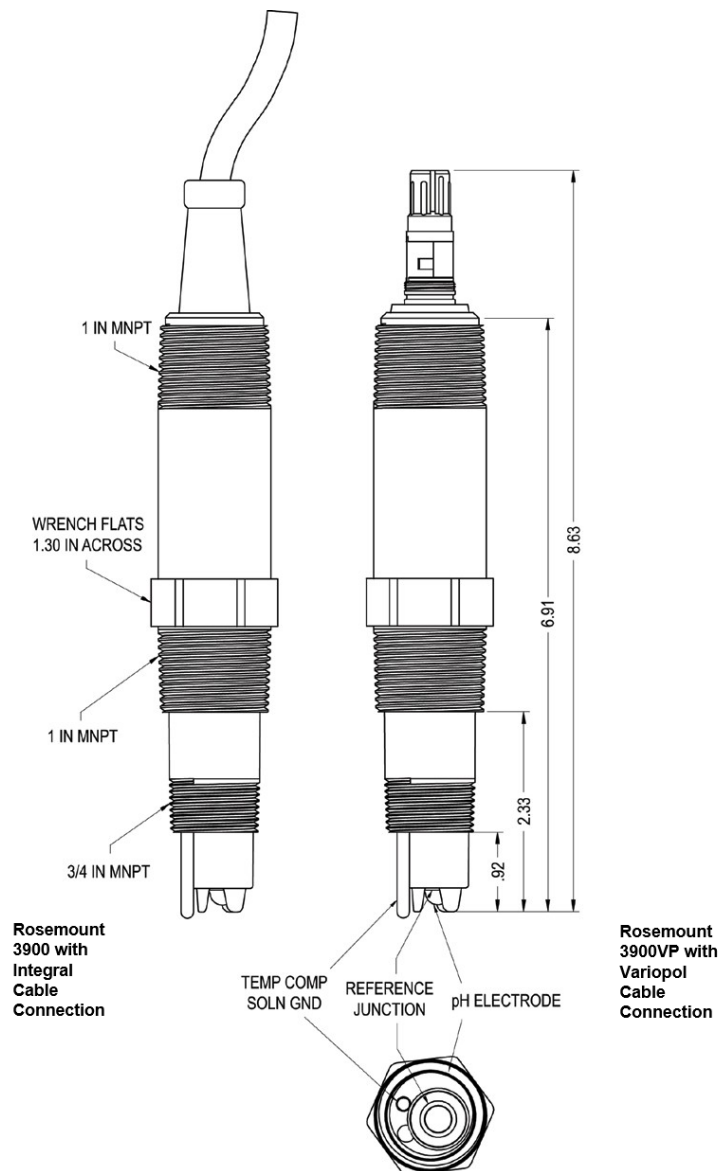


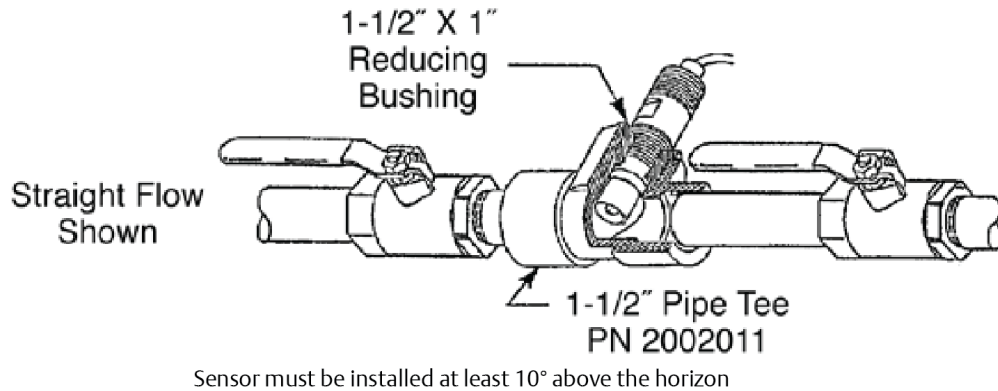
Figure 2. Dimensional Drawing for the Rosemount 3900/3900VP Sensor



**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**



**Table 6. Low flow cell specifications PN 24091-00/24091-02**

<b>Wetted Materials</b>	
Body and nut	Polyester/Polycarbonate
Fittings	316 SST
Seals	Silicone
<b>Flow Cell Ratings</b>	
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)
<b>Sensor Threaded Connection</b>	
24091-00	1 in. NPT adapter
24091-02	¾ in. NPT adapter

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

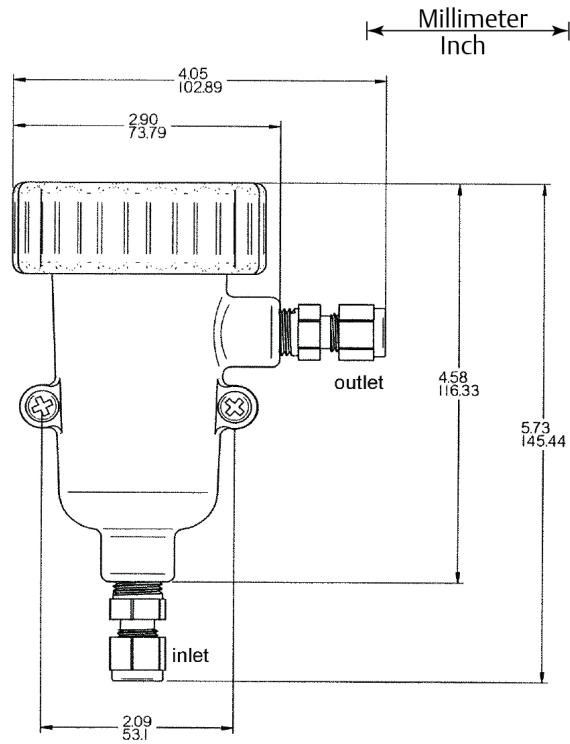
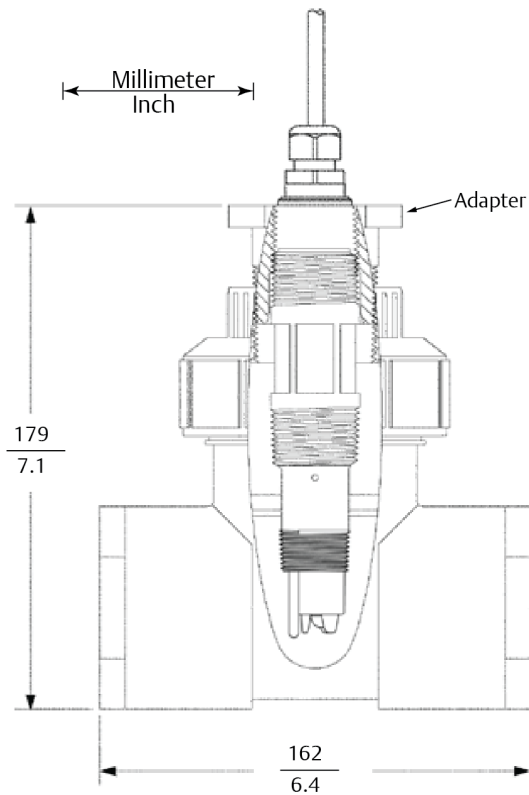


Figure 5. Flow-through tee (2 in.) (PN 915240-XX)





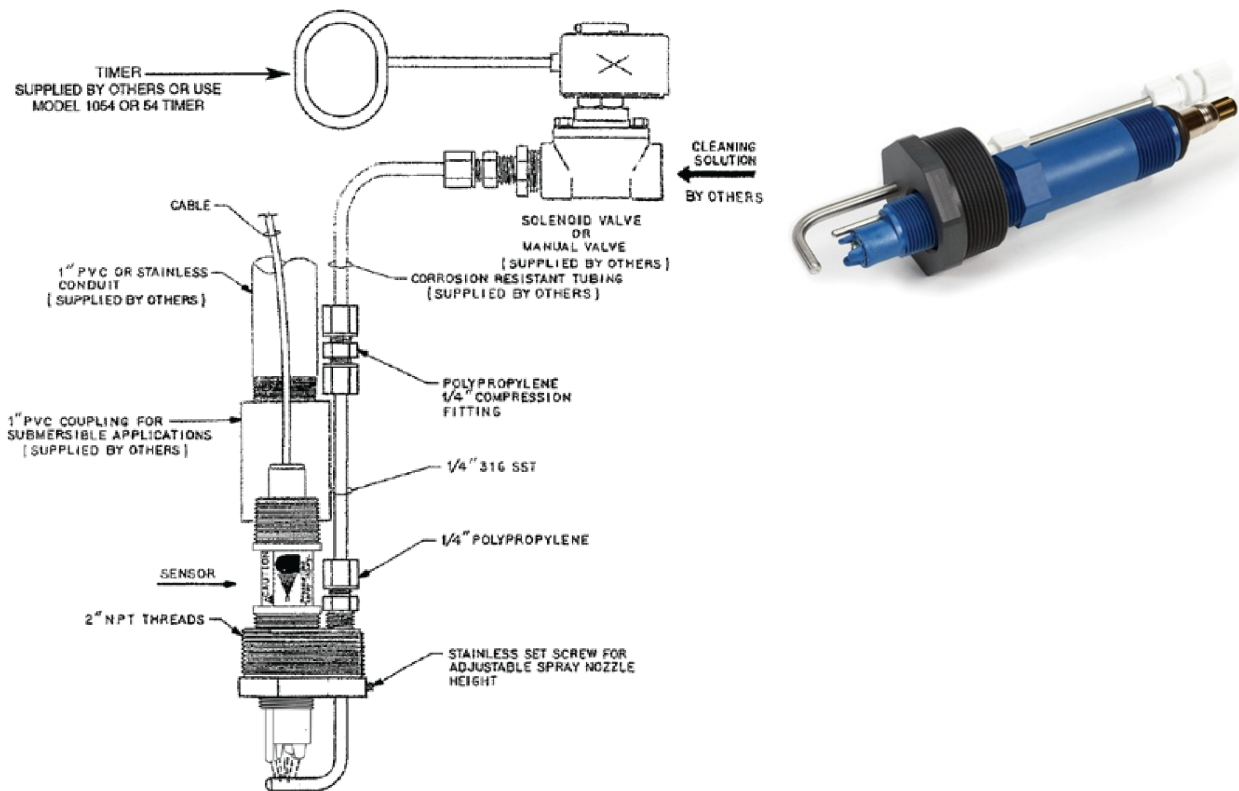
The following flow-through tees are available for the Rosemount 3900/3900VP:

- 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

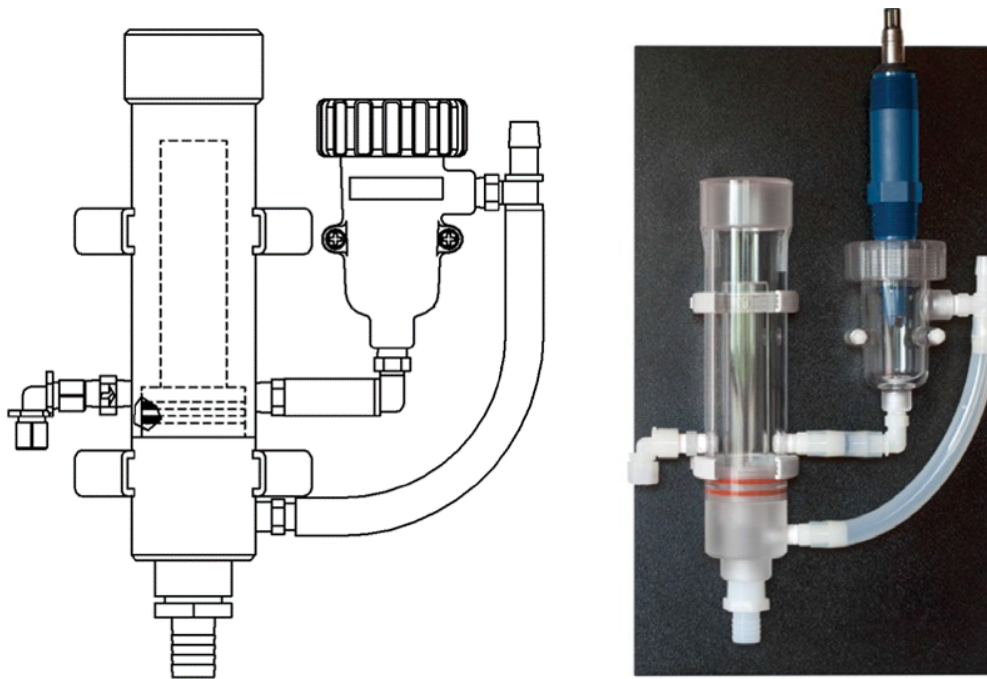


Table 7. Low flow panel specifications

<b>Inlet flow</b>	3-80 gph (11.4-304 L/hr)
<b>Inlet pressure</b>	3 – 65 psig (122 – 549 kPa abs)*
<b>Temperature</b>	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