

Rosemount™ 350A

High Performance pH/ORP Sensors



High performance sensors for tough pH/ORP applications

The Rosemount 350A pH/ORP sensors are versatile sensors suited to meet a number of demanding application requirements. These high-performance sensors are ideal for use in high-temperature and high-pressure processes and offer a wide range of options to meet your pH/ORP measurement needs.

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Specifications

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Overview

350A M12



Digital sensor output for fast and reliable readings

- Digital plug-and-play connection allows for easy and quick installation.
- Features advanced diagnostics with predictive sensor health indicators with built-in troubleshooting tips.
- Improved reliability and reduced errors from:
 - Ground loops
 - Vibration
 - Electromagnetic interference (EMI)

Extended application flexibility

- Selectable reference electrolytes allow sensors to be used in a large number of applications. Electrolyte options include:
 - High temperature: Most suitable for use in highly acidic, basic, or oxidative solutions with high temperatures.
 - Biofilm resistant: Inhibits the growth of bacteria and algae.
 - Metal resistant: Most suitable for use in applications where chloride in the reference electrode would react in the process.
 - Oil resistant: Aimed for use in applications where light oils and greases can corrode a sensor.
 - Poisoning resistant: Most suitable for use in processes containing sulfides, mercaptans, and cyanides.
 - Scaling resistant: Targets applications where precipitation of calcium magnesium salts, like gypsum or water hardness, coat over the electrode.

Minimal maintenance allows for lower cost of ownership

- Features a long-lasting rebuildable reference junction and electrolyte, which extends sensor life and allows sensors to be easily rebuilt where other sensors typically would have to be replaced.

M12 connector



Ordering information

Rosemount 350A

Rosemount 350A pH/ORP features a PPS body material best suited for high performance applications with titanium sensors in various retractable lengths.

The digital Rosemount 350A is available with an M12 connector.

Model

Code	Description
350A	High Temperature & High Pressure pH/ORP Sensor

Measuring electrode

Code	Description
P3	pH High temperature glass
R1	ORP platinum electrode

Mounting style

Code	Description
T1	Retractable: 7 in. (178 mm) length, Titanium
T3	Retractable: 21 in. (533 mm) length, Titanium
T4	Retractable: 36 in. (914 mm) length, Titanium

Body material

Code	Description
A	PPS

O-ring material

Code	Description
A	EPDM
B	FKM
C	FFKM

Electrolyte solution

Code	Description
C	High temperature
D	Biofilm resistant
E	Metal resistant
F	Oil resistant
G	Poisoning resistant
H	Scaling resistant

Sensor output connection

Sensor output	Sensor Connection	
D00	Digital	M12 Connector (cable sold separately)

Optional selections

Product certifications

Code	Description
N5	US Division 2, Non-Incendive
N6	Canada Division 2, Non-Incendive

Calibration certificates

Code	Description
Q4	Calibration certificate

Material traceability certificates

Code	Description
Q8	Supplier material traceability certificates

Accessories

Table 1: Mounting assemblies

Part number	Description
11275-01	Handrail mounting assembly
12707-00	Jet spray cleaner
200211	CPVC flow through tee, 1 ½ in.-NPT process connection
24091-00	Cell, low flow, ¼ in., inlet and outlet
915240-03	Tee, flow through, 2 in. PVC, ¾ in.-NPT
915240-04	Tee, flow through, 2 in. PVC, 1 in.-NPT
915240-05	Tee, flow through, 2 in. PVC, 1 ½ in.-NPT
23765-00	Ball valve assembly kit, 1 ¼ in. male NPT
23240-00	Ball valve assembly kit, 1 ½ in. female NPT, requires process connector
23166-00	1 in. male NPT connector, 316 SST
23166-01	1 in. male NPT connector, Titanium
9510066	1 in. male NPT connector, Nylon

Table 2: Remote junction box

Part number	Description
2002565	Mounting bracket kit
23555-00	Junction box, Rosemount 54/5081/1055/Xmt/56/1056/1057/1066 compatible amplifier

Table 3: Other accessories

Part number	Description
24231-00	High temperature reference kit
24231-01	Bio-film resistant reference kit
24231-02	Poisoning resistance reference kit
24231-03	Oil resistant reference kit
24231-04	Scaling resistance reference kit
24231-05	Metal resistance reference kit
24238-00	High temperature porous PTFE liquid junction
24238-01	Bio-film porous PTFE liquid junction
24238-02	Poisoning resistant porous PTFE liquid junction
24238-03	Oil resistant porous PTFE liquid junction
24238-04	Scaling porous PTFE liquid junction
24238-05	Metal resistant porous PTFE liquid junction
24239-00	High temperature junction and FKM O-ring kit
24240-00	High temperature junction and FFKM O-ring kit
24250-00	FKM O-ring kit
24251-00	FFKM O-ring kit
24270-00	EPDM O-ring kit
34116-00	Junction cap, Ryton
34017-00	Cap, high temperature guard pH/ORP molded PPS
9210012	Buffer solution, pH 4.01, 16 oz. (473.2 mL)
9210013	Buffer solution, pH 6.86, 16 oz. (473.2 mL)
9210014	Buffer solution, pH 9.18, 16 oz. (473.2 mL)
9210392	Reference fill gel high temperature, silica, 1 oz. (30mL)
9210422	Metal resistant refill kit, 30 cc syringe (4 to 5 refills per syringe)
9210423	Oil resistant refill kit, 30 cc syringe (4 to 5 refills per syringe)
9210424	Scale resistant refill kit, 30 cc syringe (4 to 5 refills per syringe)
9210425	Poison resistant refill kit, 30 cc syringe (4 to 5 refills per syringe)
9210426	Bio-film refill kit, 30 cc syringe (4 to 5 refills per syringe)

Part number	Description
R508-8OZ	Oxidation Reduction Potention (ORP) standard, 460 ± 10 mV, 8 oz. (236.6 mL)

Specifications

Table 4: Rosemount 350A sensor specifications

Specifications	Rosemount 350A Digital
Measurements and ranges	pH: 0 to +14 ORP: -1500 mV to +1500 mV
Wetted materials	• Titanium • Ryton • PTFE • Glass • O-Ring (EPDM/FKM/FFKM) • Platinum (ORP only)
Process connection	Must use 1 in. compression process connector (PN 23166-00 or 23166-01). Can be inserted through a ball valve.
Temperature range	High temperature gel: +41 °F to +311 °F (+5 °C to +155 °C) All other gels: +41 °F to +248 °F (+5 °C to 120 °C)
Pressure ranges	0 to 400 psig
Maximum pressure at retraction or insertion	21 in. (533.4 mm) length = 64 psig (542 kPa) 36 in. (914.4 mm) length = 35 psig (343 kPa)
Weight/shipping weight	1 lb (0.5 kg) / 2 lb (0.9 kg)

Dimensional drawings

Figure 1: Rosemount 350A pH/ORP 7-inch sensor

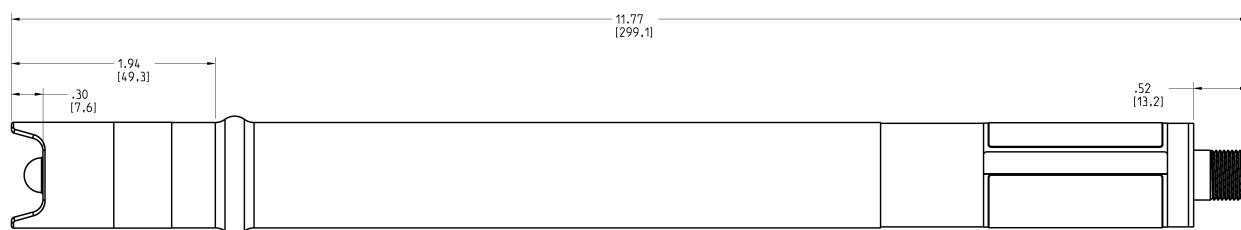


Figure 2: Rosemount 350A pH/ORP 21-inch sensor

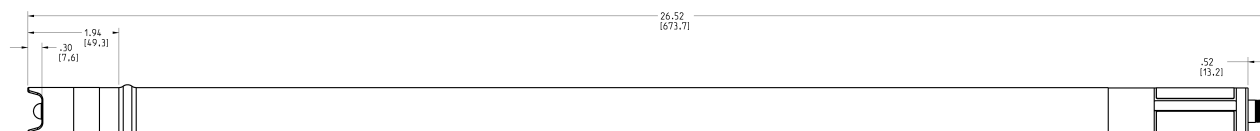
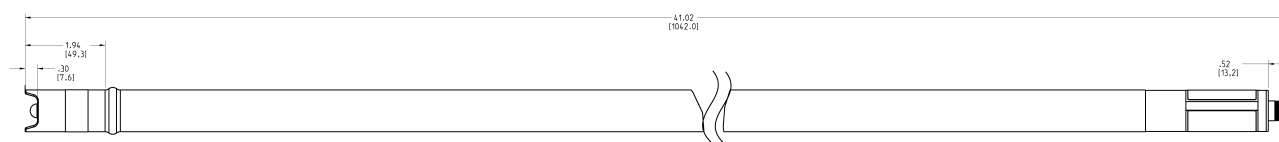


Figure 3: Rosemount 350A pH/ORP 36-inch sensor



Note

Dimensions are in inches with millimeters in parenthesis.

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

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ROSEMOUNT[™]



Rosemount[™] 396A

Anti-Coating pH/ORP Sensor



Anti-coating sensors for tough pH/ORP applications

Rosemount 396A pH/ORP sensors are robustly designed to meet a number of difficult application requirements. Sensors feature a variety of options suited to meet dirty, abrasive, coating, and high solid applications.

Overview

396A M12



Digital sensor output for fast and reliable readings

- Digital plug-and-play connection allows for easy and quick installation.
- Features advanced diagnostics with predictive sensor health indicators with built-in troubleshooting.
- Improved reliability and reduced errors due to ground loops, vibration, and electromagnetic interference (EMI).

396A Integral



Robust sensor design to maximize sensor life

- Anti-coating reference technology minimizes sensor maintenance and ensures a steady pH/ORP signal even when sensor is coated.
- Maximize sensor life with poisoning-resistant helical reference pathway design.

M12 Connector



Versatile mounting options to meet installation requirements

- Features 3/4-inch and 1-inch NPT front-facing and 1-inch NPT rear-facing process threads.
- Offered with a variety of sensor connection options to meet your installation needs.

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Ordering information

Rosemount 396A

396A pH/ORP sensors feature a reinforced polypropylene body with forward-facing ¾-inch and 1-inch NPT and rear-facing 1-inch NPT threads suitable for insertion, submersion, and flow-through installations. The digital 396A is available with either an M12 connector or an integral cable with M12 connector.

Model

Code	Description
396A	Anti-Coating pH/ORP Sensor

Measuring electrode

Code	Description
P1	pH general purpose glass
R1	Oxidation reduction potential (ORP) platinum electrode

Mounting style

Code	Description
N1	NPT: ¾-inch, 1-inch

Body material

Code	Description
B	Polypropylene

O-ring material

Code	Description
A	Ethylene propylene diene monomer (EPDM)

Electrolyte solution

Code	Description
B	Plugging resistant

Sensor output connection

Sensor output	Sensor Connection	
D00	Digital	M12 connector (Cable sold separately. See Rosemount 102C Product Data Sheet .)
D04	Digital	4 ft. (1.2 m) integral cable with male M12 connector
D10	Digital	10 ft. (3.0 m) integral cable with male M12 connector
D15	Digital	15 ft. (4.6 m) integral cable with male M12 connector

Sensor output	Sensor Connection	
D25	Digital	25 ft. (7.6 m) integral cable with male M12 connector

Optional selections

Product certifications

Code	Description
N5	US Division 2, Non-Incendive
N6	Canada Division 2, Non-Incendive

Calibration certificates

Code	Description
Q4	Calibration certificate

Material traceability certificates

Code	Description
Q8	Supplier material traceability certificates

Tags

Code	Description
Y2	Wire-On Stainless Steel Tag (customer specified marking)

Accessories

Refer to [Liquid Sensor Accessories Product Data Sheet](#) for additional information about the accessories.

To order the 102C cables, reference the [Rosemount 102C Cable Product Data Sheet](#).

Table 1: Mounting Assemblies

Part number	Description
11275-01	Handrail mounting assembly
20002011	CPVC flow through tee: 1½ in. (38 mm) NPT process connection
24091-00	Cell, low flow, ¼ in. (6 mm) inlet and outlet
915240-03	Tee, flow-through, 2 in. (51 mm) PVC, 0.75 in. (19 mm) NPT
915240-04	Tee, flow-through, 2 in. (51 mm) PVC, 1 in. (25 mm) NPT
915240-05	Tee, flow-through, 2 in. (51 mm) PVC, 1.5 in. (38 mm) NPT

Table 2: Other Accessories

Part number	Description
12707-00	Jet spray cleaner
23242-02	Mounting adapter, 1.5 in. (38 mm) insertion, 1 in. (25 mm) x 0.75 in. (19 mm)

Table 2: Other Accessories (continued)

Part number	Description
9210012	Buffer solution, pH 4.01, 16 oz.
9210013	Buffer solution, pH 6.86, 16 oz.
9210014	Buffer solution, pH 9.18, 16 oz.
9320057	Union, PVC
R508-80Z	Oxidation reduction potential (ORP) standard, 475 mV, 8 oz.
33946-00	Shroud, Rosemount 396/396P
BG0228	Union for flow-through tee

Specifications

Table 3: Rosemount 396A Sensor Specifications

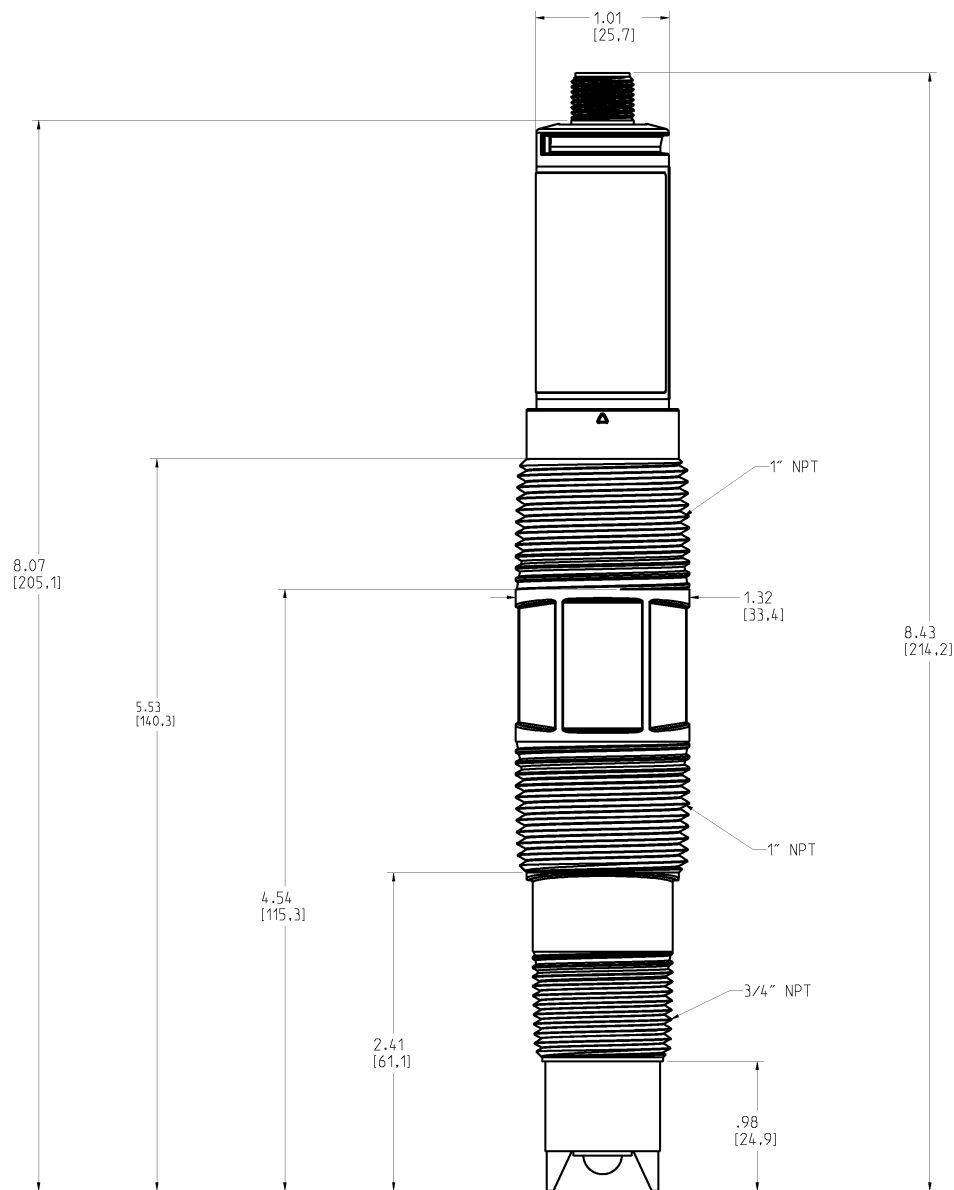
Specifications	396A Digital
Measurements and ranges	pH: 0 to 14 Oxidation reduction potential (ORP): -1500 mV to 1500 mV
Available glass types	General purpose GPHT hemi bulb ORP glass
Wetted materials	Titanium, polypropylene, glass, O-ring (EPDM), Platinum (ORP only)
Process connection	¾-inch NPT and 1-inch NPT forward-facing threads. 1-inch NPT rear-facing threads.
Temperature range	+32 to +212 °F (0 to +100 °C)
Pressure ranges	0 to 150 psig (0 to 10.3 bars)
Water ingress rating	IP67, IP68
Minimum conductivity	100 µS/cm
Product weight	With M12: 1 lb. With integral: 3 lbs.
Shipping weight	With M12: 2 lbs. With integral: 4 lbs.

Table 4: Percent Linearity over Various pH Ranges

pH value	Linearity
0 to 7	98 percent
4 to 7	99 percent
7 to 10	97 percent
7 to 14	95 percent

Dimensional drawings

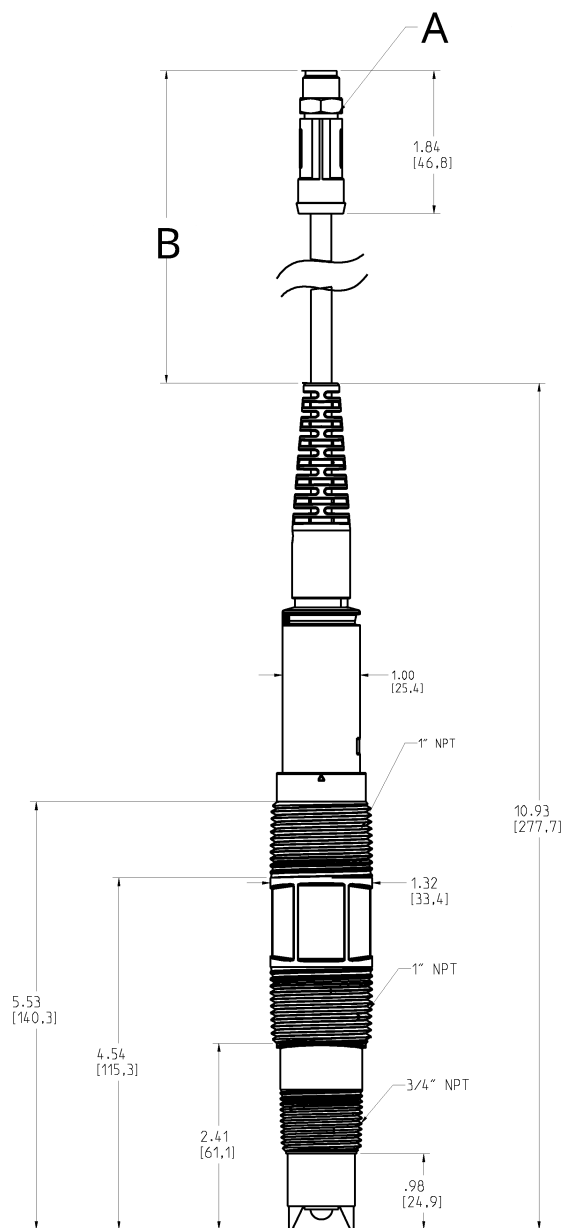
Figure 1: Dimensional Drawing – 396A M12



Note

Dimensions are in inches [millimeters].

Figure 2: Dimensional Drawing – 396A Integral



Note

Dimensions are in inches [millimeters].

Note

Cable length shown as a visual example and not drawn to scale. The shortest integral cable length offered on the 396A is four feet.

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

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ROSEMOUNT™



Rosemount™ 3300HT/3300HTVP, 3400HT/ 3400HTVP, and 3500P/3500VP

PERpH-X™ High Performance pH/ORP Sensors



A sensor design that is flexible to meet your demanding pH/ORP needs

Rosemount PERpH-X sensors are versatile sensors suited to meet a number of difficult application requirements. These high performance sensors are ideal for use in high temperature and high pressure processes and feature a wide array of options to solve your pH/ORP measurement needs.

Overview

Extended application flexibility



- Selectable reference electrolytes allow sensors to be used in a large number of applications.
- Electrolyte options include:
 - High temperature: Most suitable for use in highly acidic, basic, or oxidative solutions, and high temperature applications.
 - Bio-film resistant: Inhibits the growth of bacteria and algae.
 - Poisoning resistant: Most suitable for use in processes containing sulfides, mercaptans, and cyanides.
 - Oil resistant: Aimed for use in applications where light oils and greases can foul a sensor.
 - Scaling resistant: Targets applications where the precipitation of calcium magnesium salts, like gypsum or water hardness, coat over the electrode.
 - Metal resistant: Most suitable for use in applications where chloride in the reference electrode would react with the process.

Minimal maintenance and lower total cost of ownership



- A long lasting rebuildable reference junction and electrolyte extends sensor life and allows sensors to be easily rebuilt where normally other sensors would have to be replaced.
- SMART preamplifier allows 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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Versatile mounting options to meet your installation requirements

- Ryton body sensors feature 1-in. MNPT front and rear facing process threads.
- Titanium body sensors offered in 21-in. (533,4 mm) and 36-in. (914,4 mm) lengths suitable for use with retraction assemblies.
- Variopol (VP8) cable connection option, for quick cable-to-sensor release, eliminates cable twisting.

Ordering information

Rosemount PERpH-X™ High Performance pH/ORP sensors feature various sensor body options.

Figure 1: Rosemount 3500P pH/ORP Sensor



Sensors are available in a chemically resistant Ryton plastic body (Rosemount 3500P/3500VP) or titanium tube housing (Rosemount 3300HT/3300HTVP/3400HT/3400HTVP). Emerson constructs Rosemount 3500P/3500VP sensors with front and rear facing 1-in. male national pipe threads (MNPT) for insertion or submersion type installations.

Rosemount 3300HT/3300HTVP/3400HT/3400HTVP sensors must be used with a process connector allowing for various insertion depths. These titanium body sensors also have extended sensor length options allowing installation through a ball valve assembly.

Sensors feature a PTFE reference junction and a Pt-100 Resistance Temperature Device (RTD) for temperature compensation. Rosemount PERpH-X pH/ORP sensors are available with either an integral cable connection or Variopol (VP8) connector. Variopol cables sold separately (see [Accessories](#)).

Rosemount 3300HT ordering information

Note

The Rosemount 3300HT pH/ORP sensor is housed in a titanium tube with a replaceable reference junction and refillable reference electrolyte. The sensor includes a Pt-100 temperature compensator. The sensor is available with a standard 15-ft. (4.6 m) cable. You can mount the sensor using a process connector, ordered separately. You can also order junction box kits with preamplifiers separately if the transmitter does not have an integral preamplifier within 15-ft. (4.6 m) of the sensor.

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Model

Code	Description
3300HT	pH/ORP sensor: PERpH-X High Performance

Measuring electrode

Code	Description
10	GPHT hemi pH glass, 0-14 pH
12	Oxidation Reduction Potential (ORP)

O-ring material

Code	Description
30	EDPM

Code	Description
31	FKM
32	FFKM

Cable

Code	Description
02	Without preamplifier, 15-ft. (4.6 m) cable
07	Without preamplifier, 4-ft. (1.2 m) cable
08	Without preamplifier, 10-ft. (3 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 3300HTVP ordering information

Note

The Rosemount 3300HTVP Sensor is available with an integral Variopol (VP 8.0) connector. A mating Variopol connector cable is required for use with these sensors. SMART preamplifier (-70) is the standard preamplifier option.

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Model

Code	Description
3300HTVP	pH/ORP sensor: PERpH-X High Performance with Variopol connector

Measuring electrode

Code	Description
10	GPHT hemi pH glass, 0-14 pH
12	Oxidation Reduction Potential (ORP)

O-ring material

Code	Description
30	EDPM
31	FKM
32	FFKM

Preamplifier options

Code	Description
—	No selection
70	SMART preamplifier ⁽¹⁾

(1) For use with -10 only.

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 3400HT ordering information

Note

The Rosemount 3400HT High Temperature pH/ORP Retractable Sensor is housed in a titanium tube for use with a ball valve (order separately). You can mount the sensor with a ball valve or a process connector, both ordered separately.

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Model

Code	Description
3400HT	pH/ORP sensor: PERpH-X High Performance Retractable

Measuring electrode

Code	Description
10	GPHT hemi pH glass, 0-14 pH
12	Oxidation Reduction Potential (ORP)

Sensor length

Code	Description
21	21 in (533 mm) titanium tube
25	36 in (914 mm) titanium tube

O-ring material

Code	Description
30	EDPM
31	FKM

Code	Description
32	FFKM

Options

Code	Description
61	9.5-in. (241.3 mm) cable without BNC (for preamplifier options)
62	15-ft. (4.6 m) cable without BNC
07	Without preamplifier, 4-ft. (1.2 m) cable
08	Without preamplifier, 10-ft. (3 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 3400HTVP ordering information

Note

The standard Rosemount 3400HTVP is offered with an integral Variopol connector.

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Model

Code	Description
3400HTVP	pH/ORP sensor: PERpH-X Retractable/Variopol Connector

Measuring electrode

Code	Description
10	GPHT hemi pH glass, 0-14 pH
12	Oxidation Reduction Potential (ORP)

Sensor length

Code	Description
21	21 in (533 mm) titanium tube
25	36 in (914 mm) titanium tube

O-ring material

Code	Description
30	EDPM
31	FKM
32	FFKM

Preamplifier options

Code	Description
—	No selection
70	SMART preamplifier ⁽¹⁾

(1) For use with -10 only.

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 3500P ordering information

Note

The Rosemount 3500P sensor is a versatile sensor platform for measuring pH or ORP. The rugged Ryton body and rebuildable reference electrode with front and rear facing 1-in. male national pipe threads allows use in either insertion or submersion applications.

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Model

Code	Description
3500P	pH/ORP sensor: PERpH-X Insertion/Submersion

Electrolyte selection

Code	Description
BF	Bio-film resistant
HT	High temperature
MR	Metal resistant
OR	Oil resistant
PR	Poisoning resistant
SR	Scaling resistant

Preamplifier/cable

Code	Description
01	SMART integral preamplifier, 25 ft. (7.6 m) for Rosemount 1056, 1057, 1066, 56, 5081, 6081, and Xmt. ⁽¹⁾
02	Without integral preamplifier, 15-ft. (4.6 m) cable
03	SMART preamplifier, 33-ft. (10 m) cable ⁽¹⁾
04	SMART preamplifier, 50-ft. (15.2 m) cable ⁽¹⁾
05	SMART preamplifier, 66-ft. (20 m) cable ⁽¹⁾
06	SMART preamplifier, 100-ft. (30.5 m) cable ⁽¹⁾
07	Without preamplifier, 4-ft. (1.2 m) cable
08	Without preamplifier, 10-ft. (3 m) cable

(1) Standard preamp if used with ORP.

Measuring electrode

Code	Description
10	GPHT hemi pH glass, 0-14 pH
12	Oxidation Reduction Potential (ORP)

Reference type

Code	Description
21	Double junction reference

O-ring material

Code	Description
30	EDPM
31	FKM
32	FFKM

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 3500VP ordering information

Note

The Rosemount 3500VP uses a mating Variopol cable (purchased separately). The sensor is offered with six different gel electrolytes to match the application.

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Model

Code	Description
3500VP	pH/ORP sensor: PERpH-X Insertion/Submersion Sensor with Variopol connection

Electrolyte selection

Code	Description
BF	Bio-film resistant
HT	High temperature
MR	Metal resistant
OR	Oil resistant
PR	Poisoning resistant
SR	Scaling resistant

Preamplifier/cable

Code	Description
01	SMART integral preamplifier, 25 ft. (7.6 m) for Rosemount 1056, 1057, 1066, 56, 5081, 6081, and Xmt. (Standard preamp if used with Oxidation Reduction Potential [ORP]).
02	Without integral preamplifier, 15-ft. (4.6 m) cable

Measuring electrode

Code	Description
10	GPHT hemi pH glass, 0-14 pH
12	Oxidation Reduction Potential (ORP)

Reference type

Code	Description
21	Double junction reference

O-ring material

Code	Description
30	EDPM
31	FKM

Code	Description
32	FFKM

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)

Accessories

Table 1: Connector Cable (Required for all First Time Installations)

Part number	Description
24281-00	15 ft (4.57 m) VP8 cable
24281-01	25 ft (7.62 m) VP8 cable
24281-02	2.5 ft (0.762 m) VP8 cable
24281-03	50 ft (15.24 m) VP8 cable
24281-04	100 ft (30.48 m) VP8 cable
24281-05	4 ft (1.22 m) VP8 cable
24281-06	10 ft (3.05 m) VP8 cable
24281-07	20 ft (6.10 m) VP8 cable
24281-08	30 ft (9.14 m) VP8 cable

Table 2: Extension Cables (Requires a Remote Junction Box)

Part number	Description
23646-01	Extension cable, 11-conduit, shielded, prepped, per foot
9200273	Extension cable, 11-conduit, shielded, unprepped, per foot

Table 3: Mounting Assemblies

Part number	Description
11275-01	Handrail mounting assembly
12707-00	Jet spray cleaner
2002011	CPVC flow through tee, 1½-in. National Pipe Thread (NPT) process connection
24091-00	Cell, low flow, ¼-in. inlet and outlet
915240-03	Tee, flow-through, 2-in. PVC, ¾-in. NPT
915240-04	Tee, flow-through, 2-in. PVC, 1-in. NPT
915240-05	Tee, flow-through, 2-in. PVC, 1½-in. NPT

Table 4: Remote Junction Boxes

Part number	Description
2002565	Mounting bracket kit
23555-00	Junction box, Rosemount 54/5081/1055/Xmt/56/1056/1057/1066 compatible preamplifier

Table 5: Other Accessories

Part number	Description
24231-00	High temperature reference kit
24231-01	Bio-film resistant reference kit
24231-02	Poisoning resistance reference kit
24231-03	Oil resistant reference kit
24231-04	Scaling resistant reference kit
24231-05	Metal resistant reference kit
24238-00	High temperature porous PTFE liquid junction
24238-01	Bio-film porous PTFE liquid junction
24238-02	Poisoning resistant porous PTFE liquid junction
24238-03	Oil resistant porous PTFE liquid junction
24238-04	Scaling porous PTFE liquid junction
24238-05	Metal resistant porous PTFE liquid junction
24239-00	High temperature junction and FKM O-ring kit
24240-00	High temperature junction and FFKM O-ring kit
24250-00	FKM O-ring kit
24251-00	FFKM O-ring kit
24270-00	EPDM O-ring kit
34116-00	Junction cap, Ryton
34017-00	Cap, high temperature guard pH/ORP molded PPS
9210012	Buffer solution, pH 4.01, 16 oz. (473.2 ml)
9210013	Buffer solution, pH 6.86, 16 oz. (473.2 ml)
9210014	Buffer solution, pH 9.18, 16 oz. (473.2 ml)
9210392	Reference fill gel high temperature, silica, 1 oz. (30 ml)
9210422	Metal resistant refill kit, 30 cc syringe (4-5 refills per syringe)
9210423	Oil resistant refill kit, 30 cc syringe (4-5 refills per syringe)
9210424	Scale resistant refill kit, 30 cc syringe (4-5 refills per syringe)
9210425	Poison resistant refill kit, 30 cc syringe (4-5 refills per syringe)
9210426	Bio-film refill kit, 30 cc syringe (4-5 refills per syringe)
R508-8OZ	Oxidation Reduction Potential (ORP) standard, 460 ± 10 mV, 8 oz. (236.6 ml)

Specifications

Table 6: Percent Linearity over pH Range

pH range	HT series
0 to 2 pH	94%
2 to 12 pH	99%
12 to 13 pH	97%
13 to 14 pH	92%

Table 7: Rosemount 3300HT/3300HTVP pH/ORP Sensor Specifications

Measurement range	
pH	0 to 14
Oxidation reduction potential (ORP)	-1500 to +1500 mV
Operating temperature	
Without preamplifier	41 to 311 °F (5 to 155 °C)
With preamplifier	Up to 212 °F (100 °C)
Storage temperature	
14 to 138 °F (-10 to 70 °C)	
Maximum process pressure	
400 psig (2859 kPa)	
CRN rating	200 psig at room temperature
Wetted materials	
Platinum (ORP only), titanium, Ryton, PTFE, glass, and user-specified O-ring material (EPDM, FKM, or FFKM)	
Reference electrode	
Double junction with replaceable process side electrolyte and PTFE junction	
Temperature sensor	
Pt-100 Resistance Temperature Device (RTD)	
Process connections	
Must use 1-in. compression process connector (PN 23166-00 or 23166-01)	
Cable length	
4 to 15 ft. (1.2 to 4.6 m) integral cable (Rosemount 3300HT) or VP8 cable for Rosemount 3300HTVP (sold separately)	
Weight/shipping weight	
1 lb./2 lb. (0.5 kg/0.9 kg)	

Table 8: Rosemount 3400HT/3400HTVP pH/ORP Sensor Specifications

Measurement range	
pH	0 to 14
ORP	-1500 to +1500 mV

Table 8: Rosemount 3400HT/3400HTVP pH/ORP Sensor Specifications (continued)

Operating temperature	
Without preamplifier	41 to 311 °F (5 to 155 °C)
With preamplifier	Up to 212 °F (100 °C)
Storage temperature	
14 to 138 °F (-10 to 70 °C)	
Maximum process pressure	
400 psig (2859 kPa)	
CRN rating	200 psig at room temperature
Maximum pressure at retraction or insertion	
21-in. (533.4 mm) length	64 psig (542 kPa)
36-in. (914.4 mm) length	35 psig (343 kPa)
Wetted materials	
Platinum (ORP only), titanium, Ryton, PTFE, glass, and user-specified O-ring material (EPDM, FKM, or FFKM)	
Reference electrode	
Double junction with replaceable process side electrolyte and PTFE junction	
Temperature sensor	
Pt-100 RTD	
Process connections	
Must use 1-in. compression process connector (PN 23166-00 or 23166-01). Can be inserted through a ball valve.	
Cable length	
4 to 15 ft. (1.2 to 4.6 m) integral cable or options 9.5-in. (241.3 mm) for use with sensor head junction box (Rosemount 3400HT)	
VP8 cable for Rosemount 3400HTVP (sold separately)	
Weight/shipping weight	
1 lb./2 lb. (0.5 kg/0.9 kg)	

Table 9: Rosemount 3500P/3500VP pH/ORP Sensor Specifications

Measurement range	
pH	0 to 14
Oxidation reduction potential (ORP)	-1500 to +1500 mV
Temperature range	
41 to 248 °F (5 to 120 °C)	
Storage temperature	
14 to 122 °F (-10 to 50 °C)	
Maximum process pressure	
100 psig (790 kPa)	
CRN rating	40 psig at room temperature
Wetted materials	
Platinum (ORP only), titanium, Ryton, PTFE, glass, and user-specified O-ring material (EPDM, FKM, or FFKM)	
Reference electrode	
Double junction with replaceable process side electrolyte and PTFE junction	
Temperature sensor	
Pt-100 Resistance Temperature Device (RTD)	
Process connections	
1-in. Male National Pipe Thread (MNPT) front and rear-facing threads	
Cable length	
Rosemount 3500P	4 to 100 ft. (1.2 to 30.5 m) integral cable. Maximum of 15 ft. (4.6 m) for sensors without a preamplifier.
Rosemount 3500VP	VP8 cable (sold separately)

Dimensional and installation drawings

Figure 2: Proper Sensor Installation Orientation

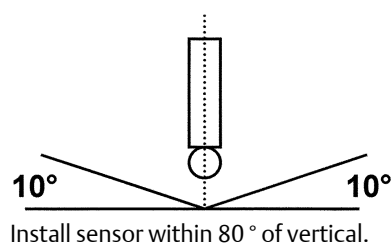
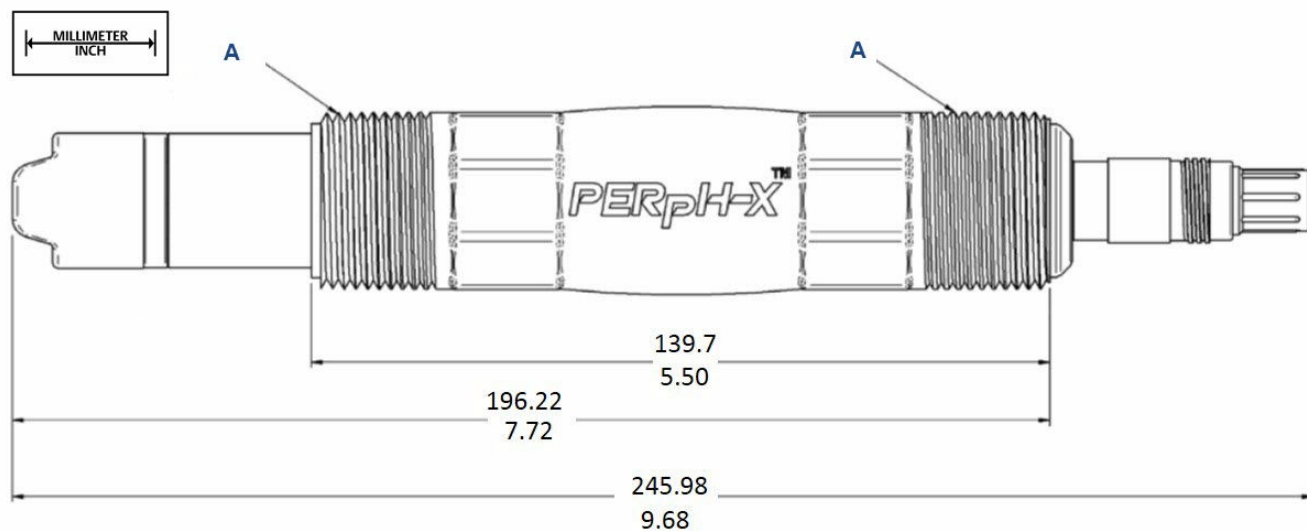
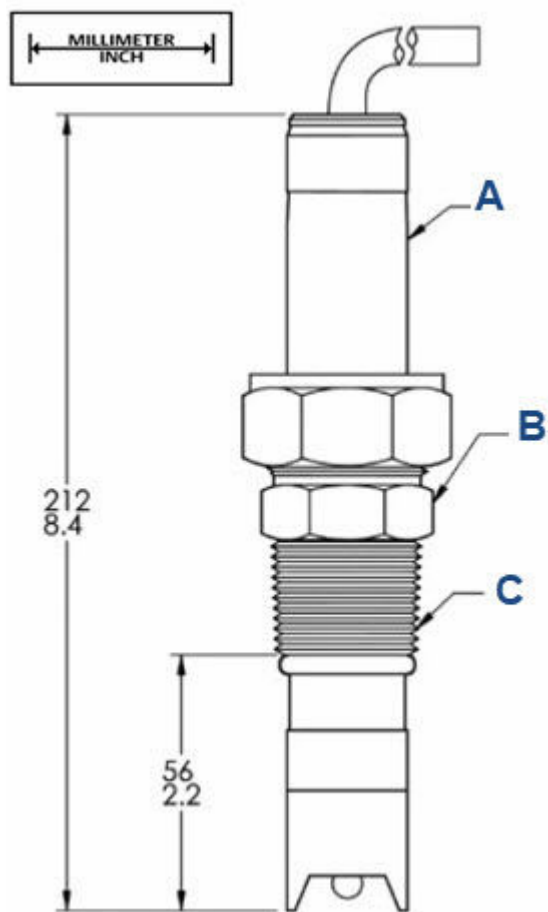
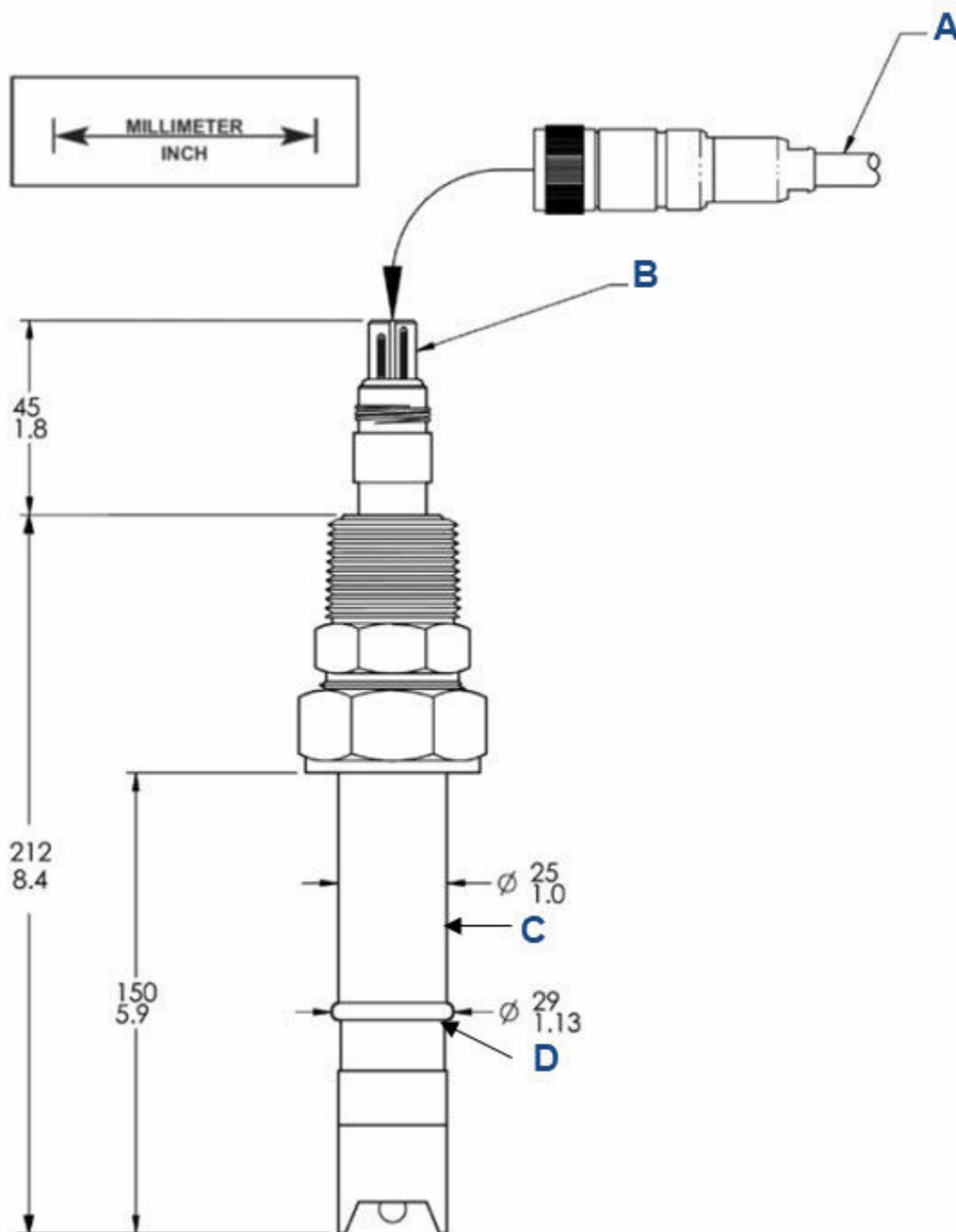


Figure 3: Rosemount 3500VP Sensor Dimensional Drawing

A. 1-in. (25.4 mm) male national pipe thread (MNPT)

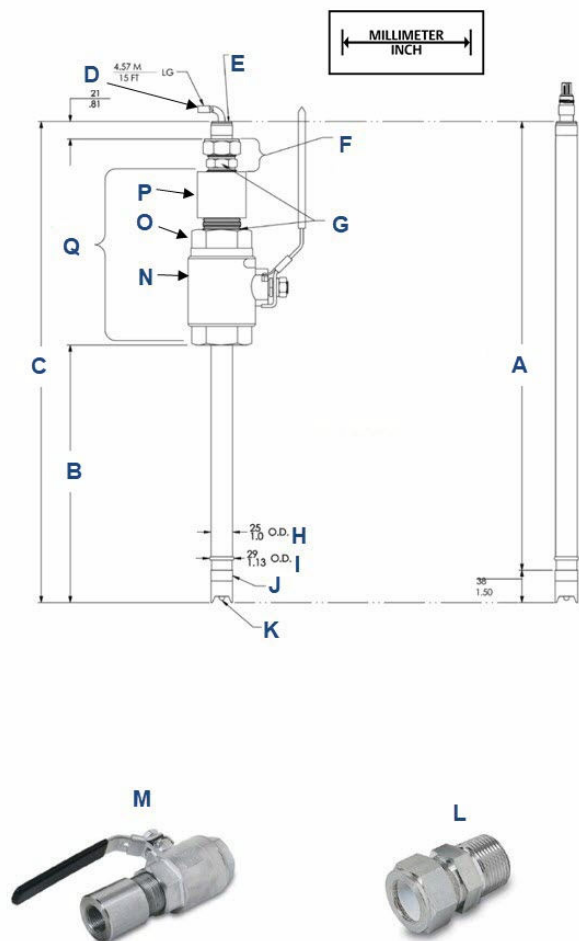
Figure 4: Rosemount 3300HT Sensor Dimensional Drawing: Standard Hemi Bulb Sensor

- A. Sensor body
- B. 1-in. (25.4 mm) Swagelok® fitting process connector assembly PN 23166-00/01
- C. 1-in. (25.4 mm) National Pipe Thread (NPT)

Figure 5: Rosemount 3300HTVP: Standard Hemi Bulb Sensor

- A. Cable with Variopol receptacle (female) connector
- B. Variopol plug (male) connector
- C. Sensor body
- D. Retraction stop collar

Figure 6: Rosemount 3400HT Sensor Dimensional Drawing (with and without 1½-in. Ball Valve Assembly)



- A. Dimension (see [Table 10](#))
- B. Dimension (see [Table 10](#))
- C. Dimension (see [Table 10](#))
- D. Cable
- E. Cable bushing polypropylene
- F. 1-in. x 1-in. (25.4 x 25.4 mm) Swagelok fitting kit (PN 23166-00 or 23166-01) required to connect sensor directly to process or to ball valve
- G. Residual pressure may become trapped at this location. Please see the following Caution message for more information.

⚠ CAUTION

Residual pressure and process may remain trapped between ball valve and male connector.

64 psig (option 21)

35 psig (option 25)

- H. O.D. titanium housing
- I. O.D. retraction stop collar
- J. Electrode housing Ryton®
- K. pH electrode
- L. A process connector (PN 23166-00 or -01 must be used to connect the sensor to a ball valve kit 23240-00. (Process connectors sold separately).
- M. Ball valve kit (PN 23240-00) used with extended length retractable sensor

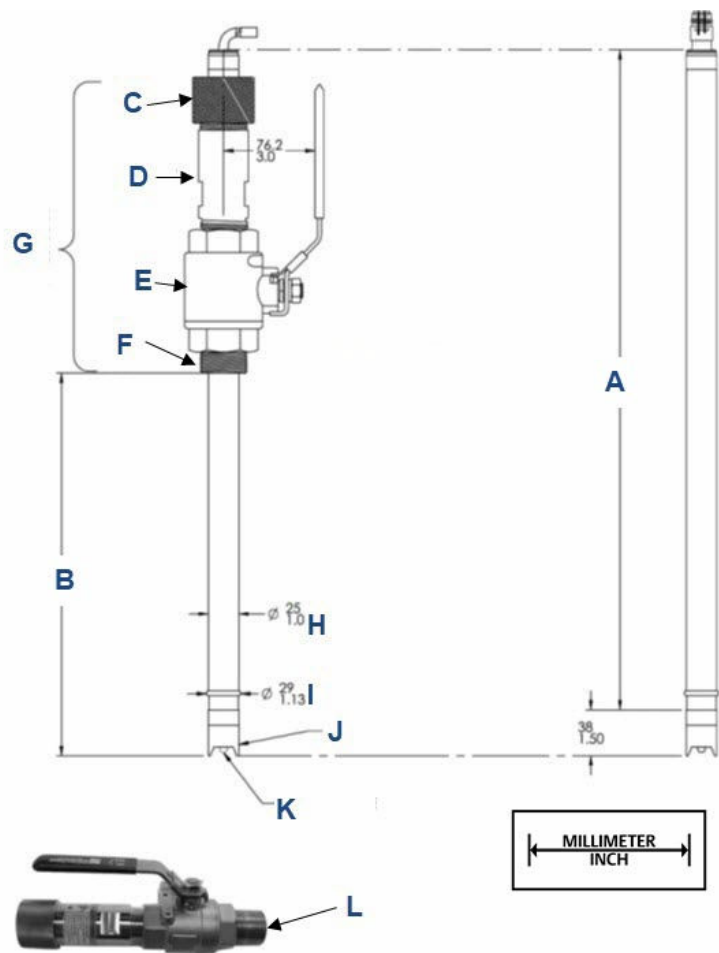
- N. 1½-in. (38.1 mm) Female Pipe Thread (FPT) ball valve PN 9340065
 O. 1½-in. (38.1 mm) Male Pipe Thread (MPT) close nipple
 P. 1½-in. (38.1 mm) FPT reducing coupling
 Q. Ball valve kit PN 23240-00 (optional)

Table 10: Rosemount 3400HT Dimensions

Option	A (in./mm) ⁽¹⁾	B (in./mm)	C (in./mm)
21	21.6/549	14.0/355	23.1/587
25	36.1/917	28.5/724	37.6/955

(1) Add five inches of length to Dimension A if mounting a sensor head junction box onto the sensor.

Figure 7: Rosemount 3400HTVP Dimensional Drawing (with and without 1¼-in. Ball Valve Assembly)

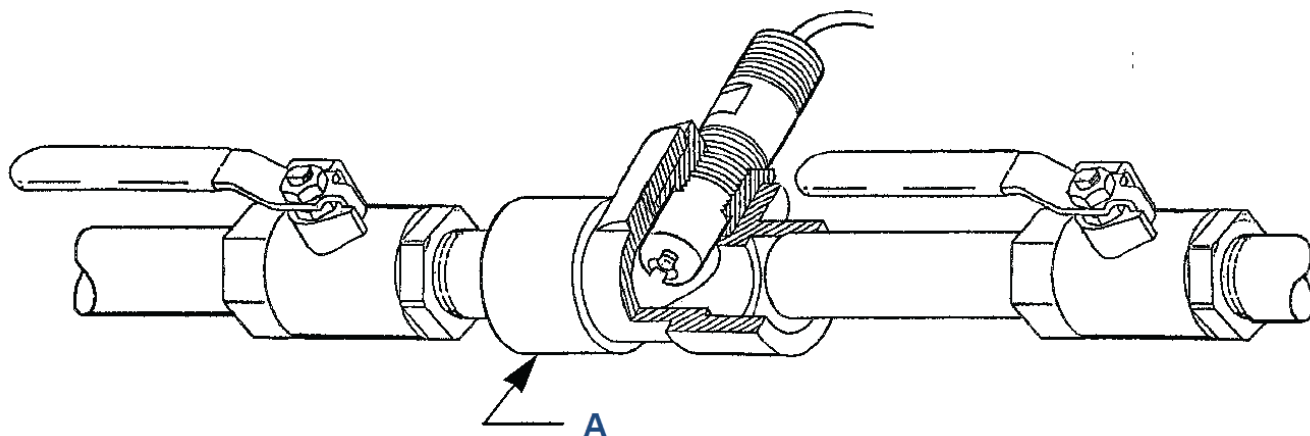


- A. Dimension (see Table 10)
- B. Dimension (see Table 10)
- C. Knurl retainer
- D. Packing adapter
- E. Ball valve
- F. 1¼-in. (31.8 mm) MPT close nipple
- G. Ball valve kit PN 23765-00
- H. Housing titanium
- I. Retraction stop collar
- J. Electrode housing
- K. pH electrode
- L. Ball valve kit PN 23765-00 contains a 1¼-in. (31.8 mm) full port ball valve, 1¼-in. (31.8 mm) close nipple, and a retraction kit PN 23796-00 with carbon graphite packing for easy sensor insertion and removal.

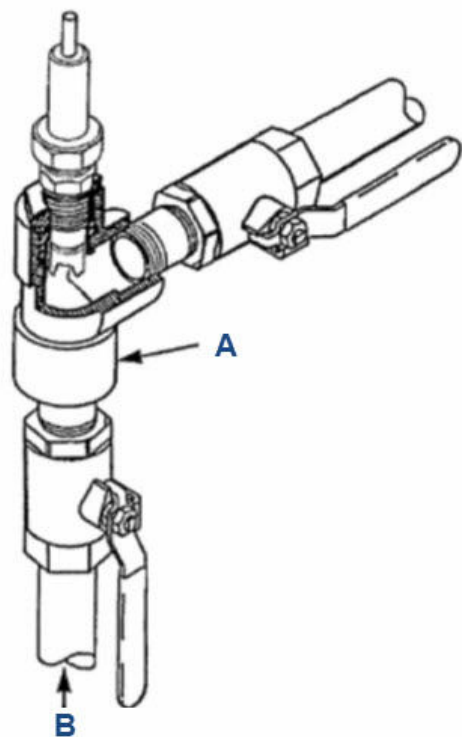
Table 11: Rosemount 3400HTVP Dimensions

Option	A (in./mm) ⁽¹⁾	B (in./mm)
21	21.6/549	12.2/310
25	36.1/917	26.7/678

(1) Add five inches of length to Dimension A if mounting a sensor head junction box onto the sensor.

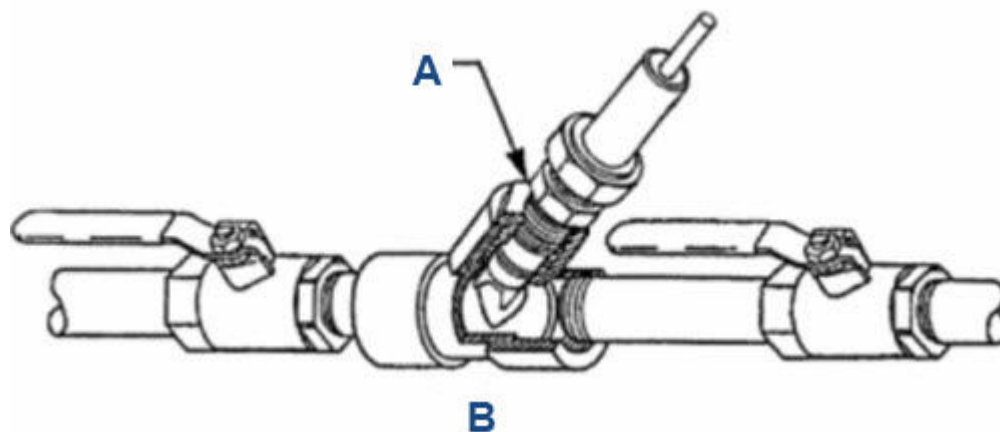
Figure 8: Rosemount 3300HT/3300HTVP Straight Flow Installation

A. 1½-in. (38.1 mm) pipe tee with 1-in. (25.4 mm) threaded connections PN 2002011

Figure 9: Rosemount 3300HT/3300HTVP Angle Flow Installation

A. 1½-in. (38.1 mm) pipe tee with 1-in. (25.4 mm) threaded connections PN 2002011

B. Flow

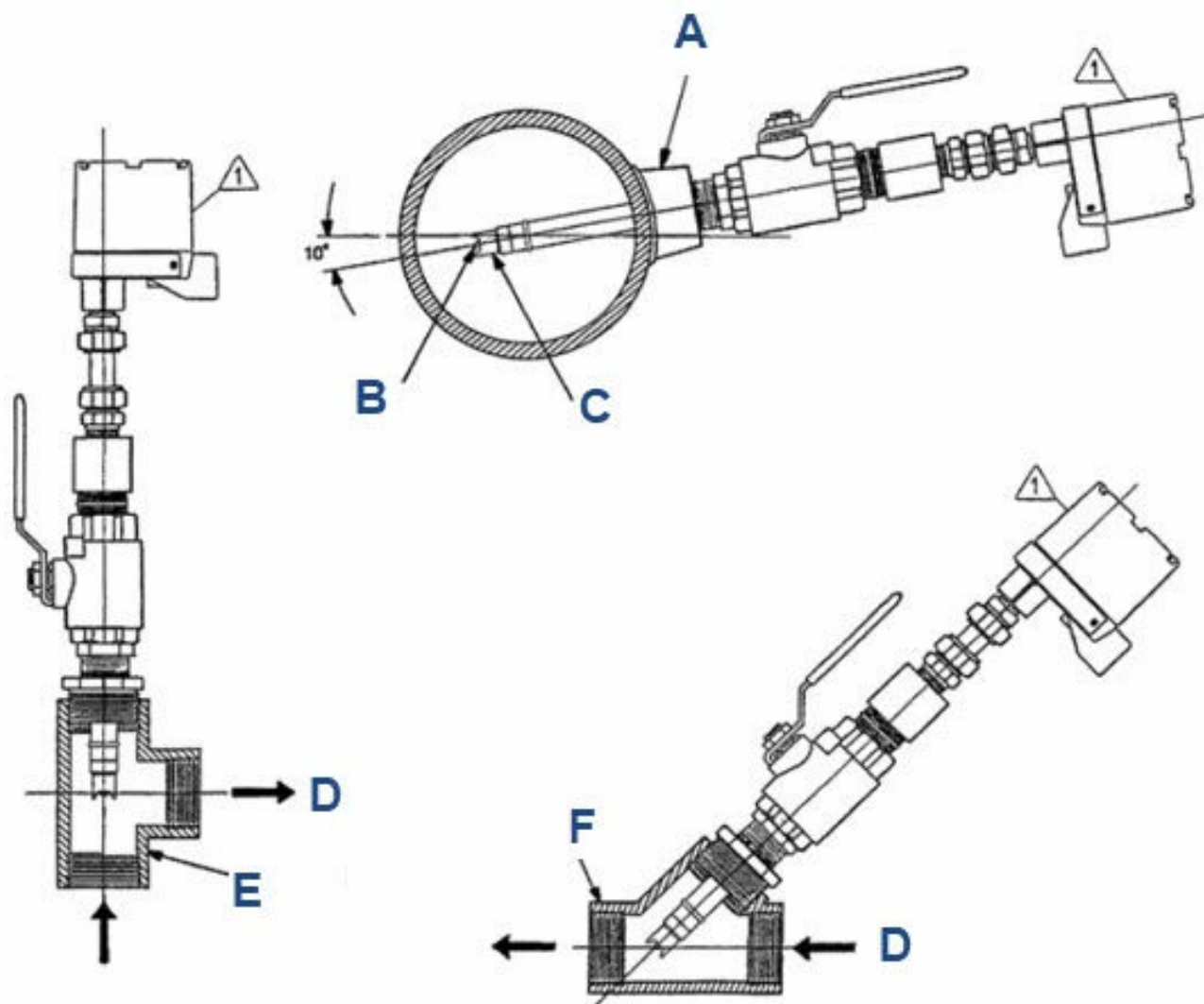
Figure 10: Rosemount 3300HT/3300HTVP Pipe "Y" Installation

A. 1½-in. x 1-in. (38.1 x 25.4 mm) reducing bushing

B. 1½-in. (38.1 mm) pipe "Y"

Note

Valves and fittings must be obtained from other suppliers. Mount the sensor at least 10 degrees from horizontal.

Figure 11: Typical Retraction Mounting for the Rosemount 3400HT Sensor (Shown with Sensor Head Junction Box)

- A. Weldolet (1½-in. [38.1 mm] FPT)
- B. Electrode
- C. Electrode housing tip
- D. Flow
- E. Pipe tee
- F. Pipe "Y"

Note

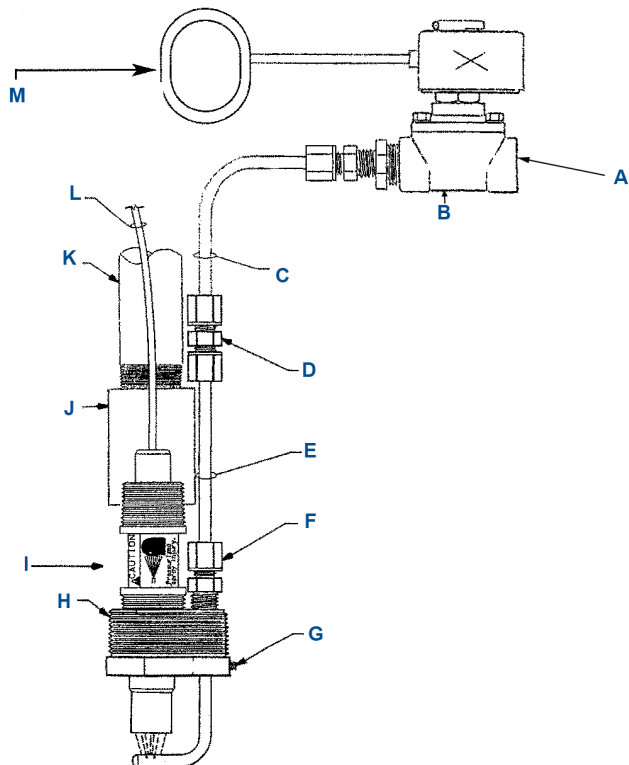
The sensor must be mounted at an angle between 10 degrees and 90 degrees above the horizontal. The customer provides the pipe tees and weldalets.

Figure 12: Rosemount 3500P/3500VP Sensor with Jet Spray Cleaner (PN 12707-00) for Submersion Installations



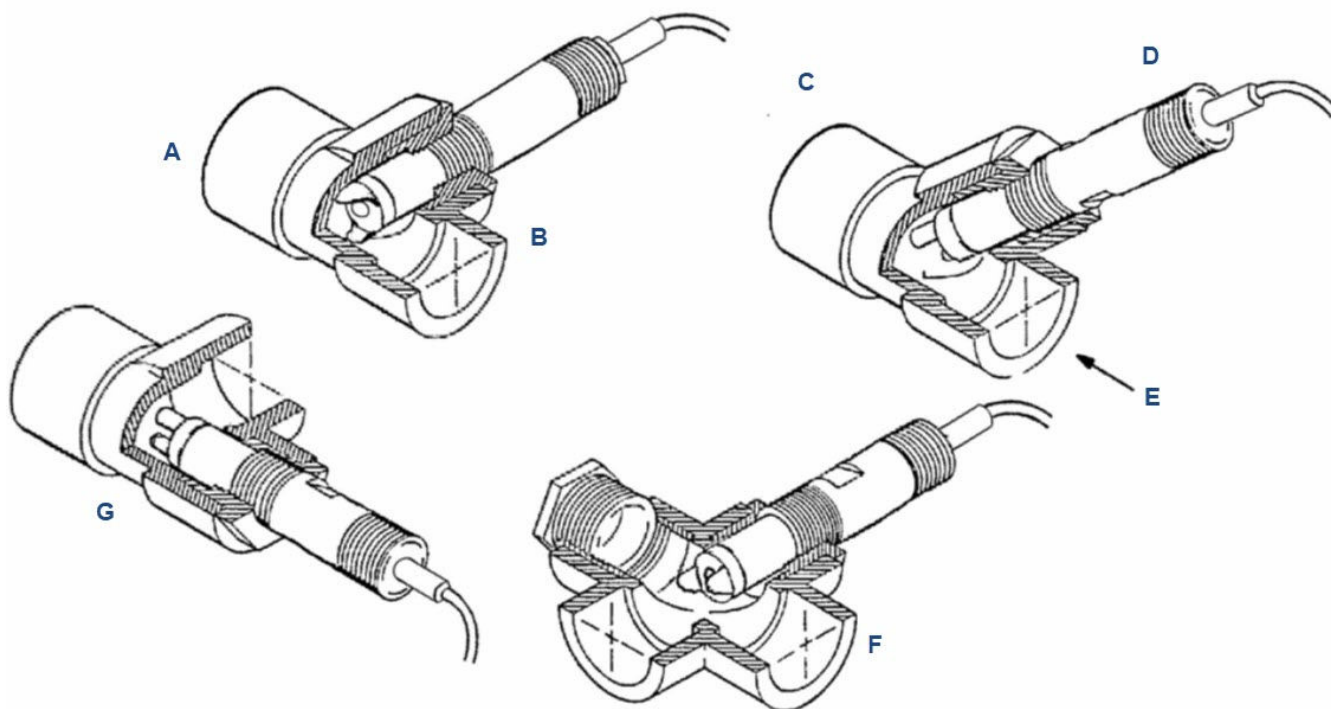
Note

This accessory is especially useful for keeping the sensor clean in dirty ponds or tanks. It can be mounted using a handrail mounting assembly or similar submersion assembly.

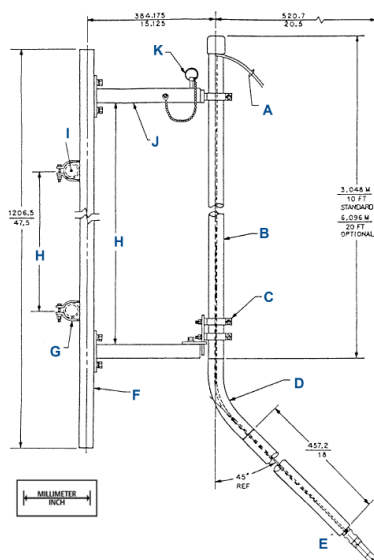
Figure 13: Jet spray cleaner

- A. Cleaning solution (supplied by customer)
- B. Solenoid valve or manual valve (supplied by customer)
- C. Corrosion resistant tubing (supplied by customer)
- D. Polypropylene ¼-in. (6.4 mm) compression fitting
- E. ¼-in. (6.4 mm) 316 stainless steel
- F. ¼-in. (6.4 mm) polypropylene
- G. Stainless set screw for adjustable spray nozzle height
- H. 2-in. (50.8 mm) NPT threads
- I. Sensor
- J. 1-in. (25.4 mm) PVC coupling for submersible applications (supplied by customer)
- K. 1-in. (25.4 mm) PVC or stainless conduit (supplied by customer)
- L. Cable
- M. Timer supplied by customer or use timer feature in Rosemount instrument

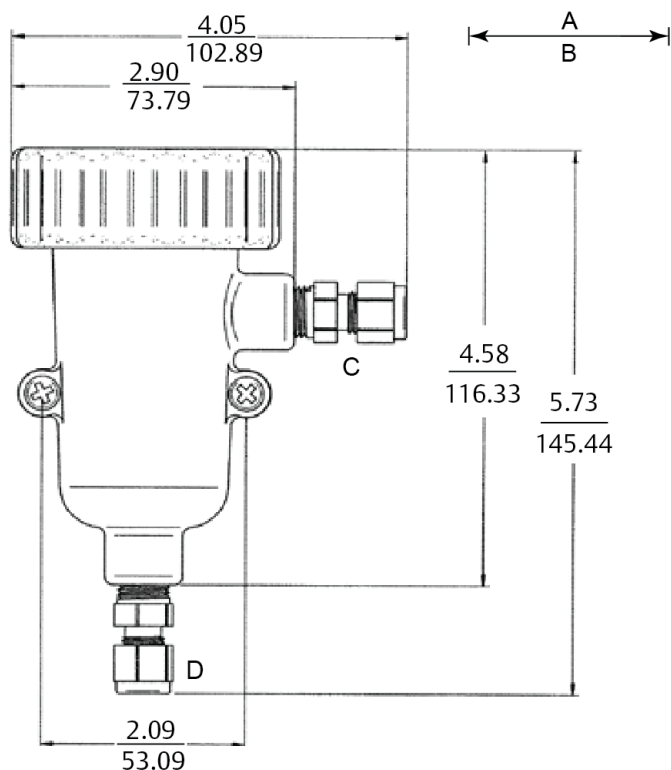
Figure 14: Rosemount 3500P Sensor Flow-through Installations



- A. 1½-in. schedule 80 CPVC tee with 1-in. Female National Pipe Thread (FNPT) connections (code 16) straight flow shown
- B. Always mount sensor at least 10 degrees above horizontal
- C. 1½-in. pipe "Y"
- D. 1½-in. x 1-in. reducing bushing
- E. Flow
- F. 1½-in. schedule 80 CPVC with view or cleaning port
- G. Angle flow shown

Figure 15: Submersion Installation: Handrail Mounting Accessory (PN 11275-01)

- A. Sensor cable
- B. 1½-in. (38.1 mm) PVC pipe schedule 80
- C. 1½-in. (38.1 mm) pipe clamp, three places
- D. 45-degree sweep ell extension pipe
- E. Regularly check to make sure connections are water tight
- F. Unistrut 1⅝-in. x 1⅝-in. (41.3 x 41.3 mm) aluminum
- G. 1½-in. (38.1 mm) pipe clamp, two places
- H. Can be any convenient dimension
- I. Customer handrail, two places
- J. Mounting channel aluminum, two places
- K. Locking pin with bead chain

Low flow cell specifications**Figure 16: Low Flow Cell (PN 24091-00)**

A. Inches

B. Millimeters

C. Outlet

D. Inlet

Inlet and outlet connections are stainless steel and take ¼-in. (6.4 mm) OD tubing. Flow cell is polycarbonate with ¼-in. (6.4 mm) FNPT fittings.

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)

Flow rate: 2 to 5 gallons per hour (7.6 to 18.9 liters per hour)

Sensor threaded connection

24091-00: 1-in. (25.4 mm) NPT adapter

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

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ROSEMOUNT™



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. Their robust designs allow the Rosemount 3900 and 3900VP sensors to be used in a wide range of applications.

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 (-10.0 °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.
- 3/4-in. and 1-in. male national pipe thread (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](#)).

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Rosemount 3900 ordering information

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[VIEW PRODUCT >](#)

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.

Model

Code	Description
3900	General Purpose pH/ORP Sensor

Preamplifier options

Code	Description
01	SMART preamplifier, 32 ft. (10 m) cable ⁽¹⁾
02	No preamplifier, 15 ft. (5 m) cable
04	SMART preamplifier, 50 ft. (15 m) cable ⁽¹⁾
05	SMART preamplifier, 66 ft. (20 m) cable ⁽¹⁾
06	SMART preamplifier, 100 ft. (30 m) cable ⁽¹⁾
07	No preamplifier, 4 ft. (1 m) cable
08	No preamplifier, 10 ft. (3 m) cable

(1) Standard preamplifier if used with Oxidation Reduction Potential (ORP).

Measuring code

Code	Description
10	General Purpose Low Resistivity (GPLR) pH glass (0-14 pH)
12	Platinum Oxidation Reduction Potential (ORP)

Calibration 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 3900VP ordering information

[CONFIGURE >](#)[VIEW PRODUCT >](#)

Model

Code	Description
3900VP	General Purpose pH/ORP Sensor with Variopol connector

Preamplifier options

Code	Description
01	SMART preamplifier ⁽¹⁾
02	No preamplifier

(1) Standard preamplifier if used with Oxidation Reduction Potential (ORP).

Measuring code

Code	Description
10	General Purpose Low Resistivity (GPLR) pH glass (0-14 pH)
12	Platinum Oxidation Reduction Potential (ORP)

Calibration 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)

Accessories

Part number	Description
11275-01	Handrail mounting assembly
12707-00	Jet spray cleaner
2002011	Tee, Flow-Through, 1-1/2" CPVC, 1" FNPT 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. (4.57 m) VP8 cable
24281-01	25 ft. (7.62 m) VP8 cable
24281-02	2.5 ft. (0.762 m) VP8 cable
24281-03	50 ft. (15.24 m) VP8 cable
24281-04	100 ft. (30.48 m) VP8 cable
24281-05	4 ft. (1.22 m) VP8 cable
24281-06	10 ft. (3.05 m) VP8 cable
24281-07	20 ft (6.10 m)VP8 cable
24281-08	30 ft. (9.14 m) VP8 cable
9200273	Extension cable, 11-conduit, shielded, unprepped, per foot
9210012	Buffer solution, pH 4.01, 16 oz (453.6 g)
9210013	Buffer solution, pH 6.86, 16 oz (453.6 g)
9210014	Buffer solution, pH 9.18, 16 oz (453.6 g)
00390-7101-0001	Low flow panel
R508-8OZ	Oxidation Reduction Potential (ORP) calibration standard 460 ± 10 mV

Specifications

Table 1: 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 2: Rosemount 3900/3900VP pH/ORP Sensor Specifications

Measurement range	
pH	0 to 14
Oxidation reduction potential (ORP)	-1500 to +1500 mV
Operating temperature	
14 °F (-10 °C) to 212 °F (100 °C), automatic temperature compensation from 14 °F (-10 °C) to 212 °F (100 °C)	
Maximum pressure	
100 psig (6.89 barg) at 212 °F (100 °C) CRN rating: 60 psig (4.14 barg) 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	PTFE
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 gal per hour.	
Process connection	
Front facing	¾-in. and 1-in. Male National Pipe Thread (MNPT)
Rear facing	1-in. MNPT
Temperature compensation	
Pt-100	
Cable	
3900	Various cable lengths (See Preamplifier options) with integral preamplifier; 15 ft. (4.57 m) and less without preamplifier
3900VP	Use 24281-XX, 2.5 ft. (0.762 m) to 100 ft. (30.48 m). See Accessories .

Table 2: Rosemount 3900/3900VP pH/ORP Sensor Specifications (continued)

Weight/shipping weight
1 lb./2 lb.

Rosemount pH/ORP sensor(s) product certifications

Rev 0.5

European directive information

A copy of the EU Declaration of Conformity can be found at the end of the Quick Start Guide. The most recent revision of the EU Declaration of Conformity can be found at Emerson.com/global.

Ordinary location certification

As standard, the transmitter has been examined and tested to determine that the design meets the basic electrical, mechanical, and fire protection requirements by a Nationally Recognized Test Laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

Installing equipment in North America

The US National Electrical Code® (NEC) and the Canadian Electrical Code (CEC) permit the use of Division marked equipment in Zones and Zone marked equipment in Divisions. The markings must be suitable for the area classification, gas, and temperature class. This information is clearly defined in the respective codes.

USA

USA Intrinsic Safety

Certificate	FM17US0198X
Standards	FM Class 3600:1998, FM Class 3610:2010, FM Class 3611: 2004, FM Class 3810: 2005
Markings	IS/I,II,III/1/ABCDEFG/T6 Ta = -20 °C to 60 °C I/O/AEx ia IIC/T6 Ta = -20 °C to 60 °C NI/I/2/ABCD/T6 Ta = -20 °C to 60 °C S/II,III/2/EFG/T6 Ta = -20 °C to 60 °C

Specific Conditions for Safe Use (X):

1. Sensors with Model 1700702 preamplifier:
 - a. Model 385+-a-b-c. Triple junction pH/ORP sensor
 - b. Model 389-a-b-c-d-e. pH/ORP sensor
 - c. Model 389VP-a-b-c-d. pH/ORP sensor
 - d. Model 396VP-a-b-c-d. Submersion/insertion pH/ORP sensor
 - e. Model 396P-a-b-c-d-e. Submersion/insertion pH/ORP sensor

- f. Model 396PVP-a-b-c-d-e. Submersion/insertion pH/ORP sensor
- g. Model 396RVP-a-b-c-d-e. Retraction/submersion/insertion pH/ORP sensor
- h. Model 398RVP-a-b-c-d-e-f. pH/ORP sensor
- i. Model 3200HP-00. High purity water pH sensor
- j. Model 3300HTVP-a-b-c-d. High performance pH and ORP sensor
- k. Model 3400HTVP-a-b-c-d-e. High performance pH and ORP sensor
- l. 3500P-a-b-c-d-e-f. High performance pH and ORP sensor
- m. 3500VP-a-b-c-d-e-f. High performance pH and ORP sensor
- n. Model 3900-a-b-c. General purpose pH/ORP sensor
- o. Model 3900VP-a-b. General purpose pH/ORP sensor

The polymeric surface of all the apparatus listed above may store electrostatic charge and become a source of ignition. Clean surface should only be done with a damp cloth.

2. Sensors without Model 1700702 preamplifier (simple apparatus):
- a. Model 385-a-b-c-d-e. Retractable pH/ORP sensor
 - b. Model 385+-a-b-c Triple junction pH/ORP sensor
 - c. Model 389-a-b-c-d-e. pH/ORP sensor
 - d. Model 389VP-a-b-c. pH/ORP sensor
 - e. Model 396-a-b-c. Submersion/insertion pH sensor
 - f. Model 396VP-a-b. Submersion/insertion pH sensor
 - g. Model 396P-a-b-c-d-e. Submersion/insertion pH/ORP sensor
 - h. Model 396PVP-a-b-c-d. Submersion/insertion pH/ORP sensor
 - i. Model 396R-a-b-c-d-e. Retraction/submersion/insertion pH/ORP sensor
 - j. Model 396RVP-a-b-c-d. Retraction/submersion/insertion pH/ORP sensor
 - k. Model 397-a-b-c-d-e. pH sensor
 - l. Model 398-a-b-c-d-e. pH/ORP sensor
 - m. Model 398VP-a-b-c. pH/ORP sensor
 - n. Model 398R-a-b-c-d-e-f. pH/ORP sensor
 - o. Model 398RVP-a-b-c-d-e-f. pH/ORP sensor
 - p. Model 3200HP-00. High purity water pH sensor
 - q. Model 3300HT-a-b-c-d. High performance pH and ORP sensor
 - r. Model 3300HTVP-a-b-c-d. High performance pH and ORP sensor
 - s. Model 3400HT-a-b-c-d-e-f. High performance pH and ORP sensor
 - t. Model 3400HTVP-a-b-c-d-e-f. High performance pH and ORP sensor
 - u. Model 3500P-a-b-c-d-e-f. High performance pH and ORP sensor
 - v. Model 3500VP-a-b-c-d-e-f. High performance pH and ORP sensor
 - w. Model 3800-a. Auto clavable and steam sterilizable pH sensors
 - x. Model 3800VP-a. Auto clavable and steam sterilizable pH sensors
 - y. Model 3900-a-b-c. General purpose pH/ORP sensor

z. Model 3900VP-a-b. General purpose pH/ORP sensor

The polymeric surface of all the apparatus listed above may store electrostatic charge and become a source of ignition. Clean surface should only be done with a damp cloth.

USA Intrinsic Safety

Certificate 70164066

Standards C22.2 No 0-10, C22.2 No 0.4-M2004, C22.2 No 94-M1991, C22.2 No 142 – M1987, C22.2 No 157-M1992, CAN/CSA E60079-0:07, CAN/CSA E60079-11:02, UL 50-11th Edition, UL 508-17th Edition, UL 913-7th Edition, UL 60079-0: 2005, UL 60079-11: 2002

Markings Preamplifier assembly:
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: Class I, Zone 0, AEx ia IIC; T6
Sensor apparatus with preamplifier:
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: Class I, Zone 0, AEx ia IIC; T6
Sensor apparatus:
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)

Canada

Canada Intrinsic Safety

Certificate 70164066

Standards C22.2 No 0-10, C22.2 No 0.4-M2004, C22.2 No 94-M1991, C22.2 No 142 – M1987, C22.2 No 157-M1992, CAN/CSA E60079-0:07, CAN/CSA E60079-11:02, UL 50-11th Edition, UL 508-17th Edition, UL 913-7th Edition, UL 60079-0: 2005, UL 60079-11: 2002

Markings Preamplifier assembly:
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: Class I, Zone 0, AEx ia IIC; T6
Sensor apparatus with preamplifier:
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: Class I, Zone 0, AEx ia IIC; T6
Sensor apparatus:
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)

Europe

ATEX/UKEX Intrinsic Safety

ATEX certificate Baseefa10ATEX0156X

UKEX certificate BAS21UKEX0396X

Standards EN IEC 60079-0: 2018
EN 60079-11: 2012

Markings

pH/ORP sensors with no preamplifier fitted

 II 1 G Ex ia IIC T4 Ga (–20 °C to +60 °C)

pH sensors with integral smart preamplifier fitted

 II 1 G Ex ia IIC T4 Ga (–20 °C to +60 °C)

ORP sensors with integral standard preamplifier fitted

 II 1 G Ex ia IIC T4 Ga (–20 °C to +80 °C)

Ex ia IIC T5 Ga (–20 °C to +40 °C)

pH sensors with integral standard preamplifier fitted

 II 1 G Ex ia IIC T4 Ga (–20 °C to +80 °C)

Ex ia IIC T5 Ga (–20 °C to +40 °C)

Special Conditions for Safe Use (X):

1. All pH/ORP sensor models with a plastic enclosure or exposed plastic parts may provide an electrostatic ignition hazard and must only be cleaned with a damp cloth to avoid the danger of ignition due to build-up of electrostatic charge.
2. All pH/ORP sensor models with a metallic enclosure may provide a risk of ignition by impact or friction. Care should be taken during installation to protect the sensor from the risk.
3. External connections to the sensor must be suitably terminated and provide a degree of protection of at least IP20.
4. All pH/ORP sensor models are intended to be in contact with the process fluid and may not meet the 500V r.m.s. test to earth. This must be taken into consideration at installation.

International

IECEx Intrinsic Safety

Certificate

IECEx BAS 10.0083X

Standards

IEC 60079-0: 2011, IEC 60079-11: 2011

Markings

pH/ORP sensors with no preamplifier fitted

Ex ia IIC T4 Ga (–20 °C to +60 °C)

pH sensors with integral smart preamplifier fitted

Ex ia IIC T4 Ga (–20 °C to +60 °C)

ORP sensors with integral standard preamplifier fitted

Ex ia IIC T4 Ga (–20 °C to +80 °C)

Ex ia IIC T5 Ga (–20 °C to +40 °C)

pH sensors with integral standard preamplifier fitted

Ex ia IIC T4 Ga (–20 °C to +80 °C)

Ex ia IIC T5 Ga (–20 °C to +40 °C)

Special Conditions for Safe Use (X):

1. All pH/ORP sensor models with a plastic enclosure or exposed plastic parts may provide an electrostatic ignition hazard and must only be cleaned with a damp cloth to avoid the danger of ignition due to build-up of electrostatic charge.
2. All pH/ORP sensor models with a metallic enclosure may provide a risk of ignition by impact or friction. Care should be taken during installation to protect the sensor from the risk.
3. External connections to the sensor must be suitably terminated and provide a degree of protection of at least IP20.

4. All pH/ORP sensor models are intended to be in contact with the process fluid and may not meet the 500V r.m.s. test to earth. This must be taken into consideration at installation.

China

China Intrinsic Safety

Certificate	GYB19.1035X
Standards	GB 3836.1-2010, GB 3836.4-2010, GB 3836.20-2010
Markings	Ex ia II C T4 Ga (-20 °C to +60 °C)

Special Conditions for Safe Use (X):

1. It is strictly forbidden to rub the plastic shell parts of the product to prevent the risk of static ignition.
2. When the product shell contains light metals, it should be prevented in a zone 0 environment.

EAC

EAC Intrinsic Safety

Certificate	TC RU C-US .MIO62. B.06011
Markings	pH/ORP sensors with no preamplifier fitted Ex ia IIC T4 Ga (-20 °C to +60 °C) pH sensors with integral smart preamplifier fitted Ex ia IIC T4 Ga (-20 °C to +60 °C) ORP sensors with integral standard preamplifier fitted Ex ia IIC T4 Ga (-20 °C to +80 °C) Ex ia IIC T5 Ga (-20 °C to +40 °C) pH sensors with integral standard preamplifier fitted Ex ia IIC T4 Ga (-20 °C to +80 °C) Ex ia IIC T5 Ga (-20 °C to +40 °C)

Special Condition for Safe Use (X):

See certificate for special conditions.

Declaration of Conformity

No: 1119 Rev. E



Declaration of Conformity



We,

Rosemount Inc.
6021 Innovation Blvd
Shakopee, MN 55379
USA

declare under our sole responsibility that the product,

Rosemount™ Sensor Model Series:

328A, 385, 385+, 389, 389VP, 396, 396P, 396PVP, 396VP, 396R, 396RVP, 397, 398, 398VP, 398R,
398RVP, 3200HP, 3300HT, 3300HTVP, 3400HT, 3400HTVP, 3500P, 3500VP, 3800, 3800VP, 3900,
3900VP

Authorized Representative in Europe:

Emerson S.R.L., company No. J12/88/2006, Emerson 4
street, Parcul Industrial
Tetarom II, Cluj-Napoca 400638, Romania

Regulatory Compliance Shared Services Department
Email: europaeproductcompliance@emerson.com Phone:
+40 374 132 035

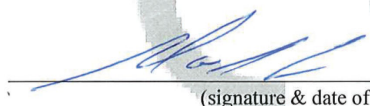
For product compliance destination sales
questions in Great Britain, contact Authorized
Representative:

Emerson Process Management Limited at
ukproductcompliance@emerson.com or +44 11
6282 23 64, Regulatory Compliance Department.

Emerson Process Management Limited, company
No 00671801, Meridian East, Leicester LE19 1UX,
United Kingdom

to which this declaration relates, is in conformity with:

- 1) the relevant statutory requirements of Great Britain, including the latest amendments
- 2) the provisions of the European Union Directives, including the latest amendments

 11/2/20
(signature & date of issue)

Mark Lee	Vice President, Quality	Shakopee, MN, USA
(name)	(function)	(place of issue)

ATEX Notified Body for EU Type Examination Certificate:
CSA Group Netherlands B.V. [Notified Body Number: 2813]
Utrechtseweg 310
6812 AR ARNHEM
Netherlands

ATEX Notified Body for Quality Assurance:
SGS Fimko Oy [Notified Body Number: 0598]
Takomotie 8
00380 Helsinki
Finland

UK Conformity Assessment Body for UK Type Examination Certificate:

CSA Group Testing UK Ltd [Approved Body Number: 0518]
Unit 6 Hawarden Industrial Park, Hawarden, CH5 3US
United Kingdom

UK Approved Body for Quality Assurance:
SGS Baseefa Ltd. [Approved Body Number: 1180]
Rockhead Business Park, Staden Lane
Buxton, Derbyshire. SK17 9RZ
United Kingdom

No: 1119 Rev. E



Declaration of Conformity



ATEX Directive (2014/34/EU)

Baseefa10ATEX0156X – Intrinsically Safe

Equipment Group II,
Category 1 G Ex ia IIC T4 Ga (-20°C ≤ Ta ≤ +60°C)
Models with no Pre-amplifier Fitted or with Integral Smart
Pre-amplifier fitted: 328A, 385, 385+, 389, 389VP, 396,
396P, 396VP, 396PVP, 396R, 396RVP, 397, 398, 398VP,
398R, 398RVP, 3200HP, 3300HT, 3300HTVP, 3400HT,
3400HTVP, 3500P, 3500VP, 3800, 3800VP, 3900, 3900VP

Equipment Group II, Category 1 G Ex ia IIC T4 Ga (-20°C ≤ Ta ≤ +80°C) or T5 (-20°C ≤ Ta ≤ +40°C)
for these model strings: 385+-XX-12, 389-XX-12, 389-XX-XX-54, 396P-XX-12, 396P-XX-XX-54, 3500P-XX-12, 3500VP-XX-12 (Excludes No Preamplifier Options: Preamplifier/Cable Options -02/-07/-08)

Harmonized Standards:

EN IEC 60079-0:2018
EN 60079-11:2012

Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016 (S.I. 2016/1107)

BAS21UKEX0396X – Intrinsically Safe

Equipment Group II,
Category 1 G Ex ia IIC T4 Ga (-20°C ≤ Ta ≤ +60°C)
Models with no Pre-amplifier Fitted or with Integral Smart
Pre-amplifier fitted: 328A, 385, 385+, 389, 389VP, 396,
396P, 396VP, 396PVP, 396R, 396RVP, 397, 398, 398VP,
398R, 398RVP, 3200HP, 3300HT, 3300HTVP, 3400HT,
3400HTVP, 3500P, 3500VP, 3800, 3800VP, 3900, 3900VP

Equipment Group II, Category 1 G Ex ia IIC T4 Ga (-20°C ≤ Ta ≤ +80°C) or T5 (-20°C ≤ Ta ≤ +40°C)
for these model strings: 385+-XX-12, 389-XX-12, 389-XX-XX-54, 396P-XX-12, 396P-XX-XX-54, 3500P-XX-12, 3500VP-XX-12 (Excludes No Preamplifier Options: Preamplifier/Cable Options -02/-07/-08)

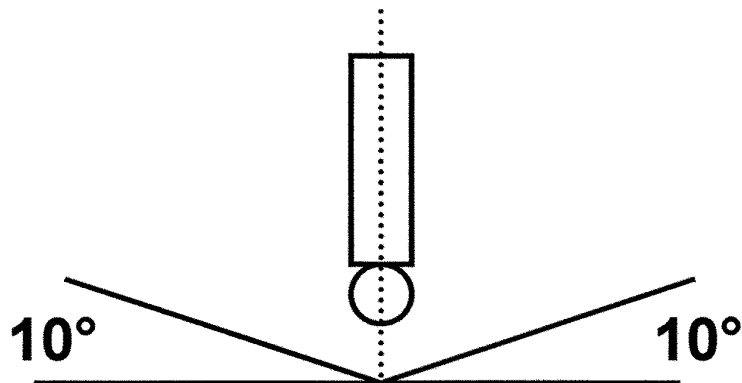
Designated Standards:

EN IEC 60079-0:2018
EN 60079-11:2012



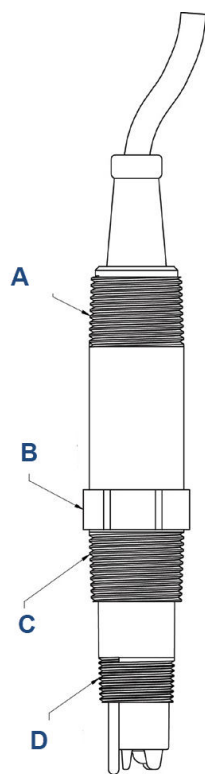
Dimensional and installation drawings

Figure 1: Proper Sensor Installation Orientation

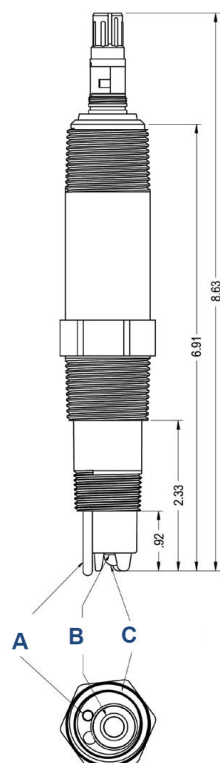


Install sensor within 80 degrees of vertical.

Figure 2: Rosemount 3900 with Integral Cable Connection



- A. 1-in. Male National Pipe Thread (MNPT)
- B. Wrench flats, 1.30 in. across
- C. 1-in. MNPT
- D. 3/4-in. MNPT

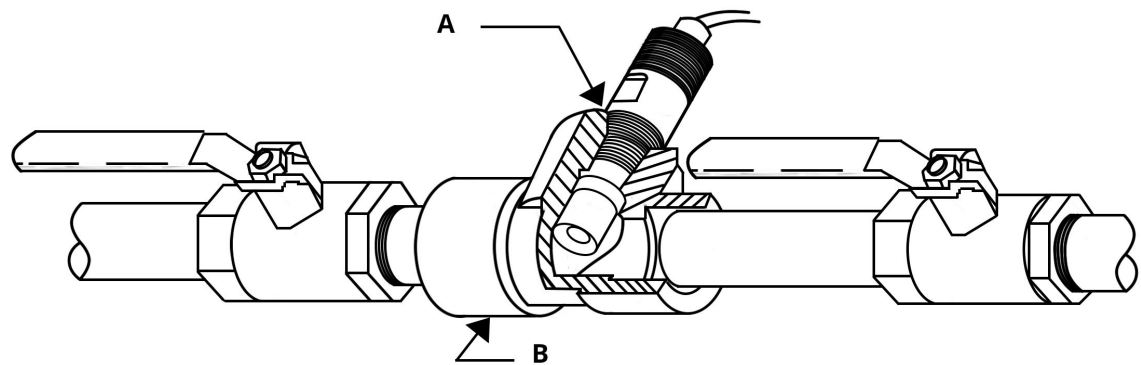
Figure 3: Rosemount 3900VP with Variopol Cable Connection

- A. *Temperature compensation solution ground*
- B. *Reference junction*
- C. *pH electrode*

Table 3: Horizontal Pipe Tee (PN 2002011) Pressure/Temperature Ratings

Pressure	Temperature
150 psig (10.34 barg)	150 ° F
128 psig (8.83 barg)	160 ° F
102 psig (7.03 barg)	170 ° F
80 psig (5.52 barg)	180 ° F
57 psig (3.93 barg)	200 ° F
48 psig (3.31 barg)	210 ° F

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 4: 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 ° F to 158 ° F
Maximum pressure	90 psig (6.21 barg)
Flow rate	2 gal to 5 gal per hour
Sensor threaded connection	
24091-00	1-in. National Pipe Thread (NPT) adapter
24091-02	¾-in. NPT adapter

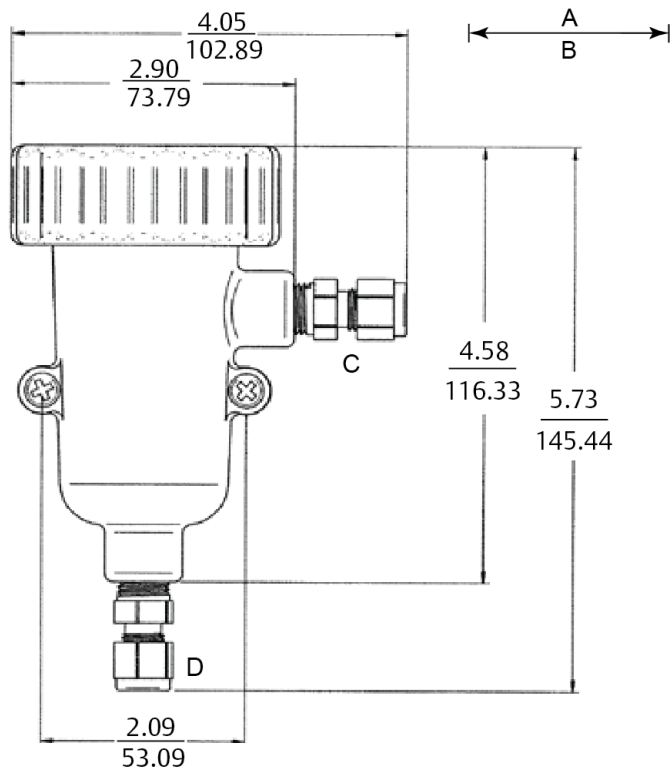
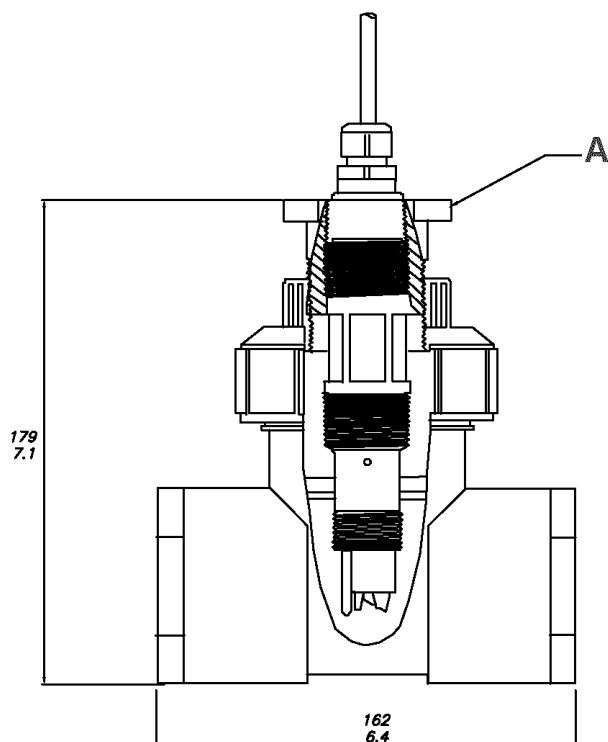
Figure 5: Low Flow Cell (PN 24091-00)

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

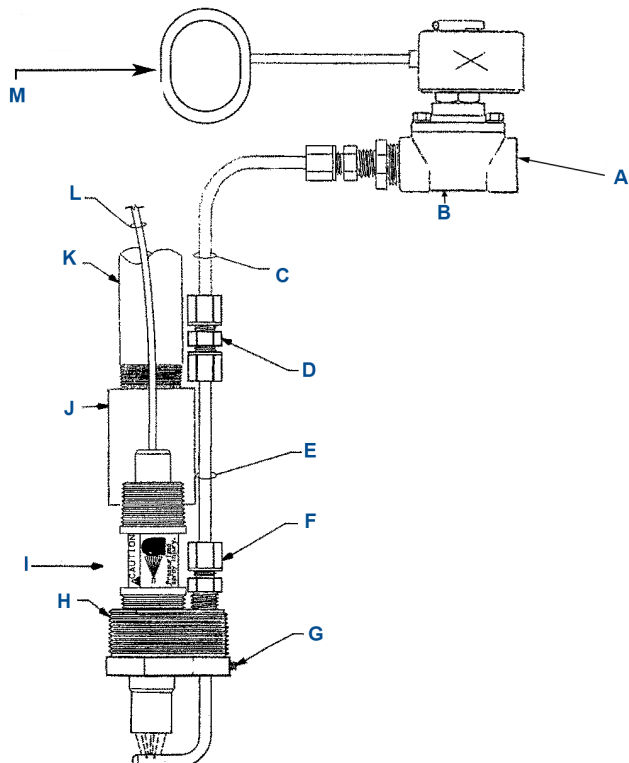
A. Adapter

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 (supplied by customer)
- B. Solenoid valve or manual valve (supplied by customer)
- C. Corrosion resistant tubing (supplied by customer)
- D. Polypropylene ¼-in. (6.4 mm) compression fitting
- E. ¼-in. (6.4 mm) 316 stainless steel
- F. ¼-in. (6.4 mm) polypropylene
- G. Stainless set screw for adjustable spray nozzle height
- H. 2-in. (50.8 mm) NPT threads
- I. Sensor
- J. 1-in. (25.4 mm) PVC coupling for submersible applications (supplied by customer)
- K. 1-in. (25.4 mm) PVC or stainless conduit (supplied by customer)
- L. Cable
- M. Timer supplied by customer 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 00390-7101-0001

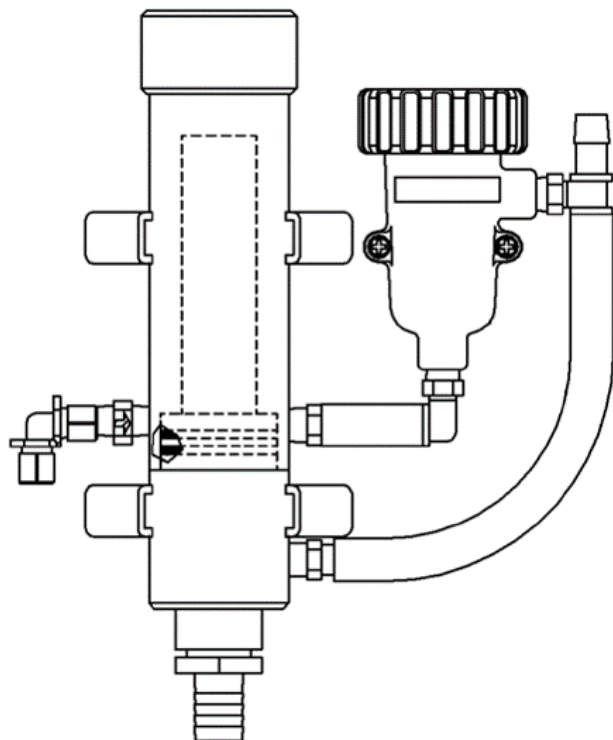


Table 5: Low Flow Panel Specifications

Inlet flow	3 gal to 80 gal per hour
Inlet pressure	3 psig (0.21 barg) to 65 psig (4.48 barg) ⁽¹⁾
Temperature	32 °F (0 °C) to 122 °F (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.*

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

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