Quick Start Guide
00825-0100-3900, Rev AB
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Rosemount™ 3900/3900VP

General Purpose pH/ORP Sensors

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ROSEMOUNT™

EMERSON™

Essential instructions

Read this page before proceeding!

Emerson designs, manufactures, and tests its products to meet many national and international standards. Because these instruments are sophisticated technical products, you must properly install, use, and maintain them to ensure they continue to operate within their normal specifications. You must adhere to the following instructions and integrate them into your safety program when installing, using, and maintaining Emerson's Rosemount products.

⚠ WARNING

Failure to follow the proper instructions may cause any one of the following situations to occur: loss of life, personal injury, property damage, damage to this instrument, and warranty invalidation. Unauthorized parts and procedures can affect the product's performance, place the safe operation of your process at risk, and may result in fire, electrical hazards, or improper operation.

- Read all instructions prior to installing, operating, and servicing the product.
- Follow all warnings, cautions, and instructions marked on and supplied with the product.
- If this Quick Start Guide is not the correct one, call 1-800-854-8257 or 949-757-8500 to request the correct Quick Start Guide. Save this Quick Start Guide for future reference.
- Inform and educate your personnel in the proper installation, operation, and maintenance of the product.
- Use only qualified personnel to install, operate, program, and maintain the product.
- Install equipment as specified in the installation instructions of the appropriate Quick Start Guide and per applicable local and national codes. Connect all products to the proper electrical and pressure sources.
- When replacement parts are required, ensure that qualified people use replacement parts specified by Emerson.
- Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified people, to prevent electrical shock and personal injury.

Note
The information contained in this document is subject to change without notice.

⚠ WARNING

Hazardous area installation

- Installations near flammable liquids or in hazardous areas must be carefully evaluated by on site safety personnel.
- To secure and maintain intrinsically safe installation, an appropriate transmitter/safety barrier/ sensor combination must be used. The installation system must be in accordance with the governing approval agency (FM, CSA, or BASEEFA/CENELEC) hazardous area classification requirements. Consult your transmitter Reference Manual for details.
- Proper installation, operation, and servicing of this sensor in a hazardous area are entirely the operator's responsibility.

⚠ WARNING

Pressure and temperature

- Before removing the sensor, be absolutely certain that the process pressure is reduced to 0 psig and the process temperature is lowered to a safe level.
- Do not insert or retract retractable sensors when process pressures are in excess of 64 psig (5.4 barg) for option 21 or 35 psig (3.4 barg) for option 25.

⚠ WARNING

Corrosive substance

The solution used during calibration is an acid; handle it with care.
Follow the directions of the acid manufacturer.
Wear the proper protective equipment.
Do not let the solution come into contact with skin or clothing.
If contact with skin is made, immediately rinse with clean water.

⚠ WARNING

Physical access

Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

⚠ CAUTION

Special conditions for safe use

All pH/ORP sensors have a plastic enclosure which must be cleaned with a damp cloth to avoid the danger due to a buildup of electrostatic discharge.

⚠ CAUTION

Sensor/process application compatibility

The wetted sensor materials may not be compatible with process composition and operating conditions.

Application compatibility is entirely the operator's responsibility.

Contents

1 Installation

1.1 Storage

1. Emerson recommends storing electrodes in their original shipping containers until needed.
2. Do not store at temperatures below 14 °F (-10 °C).
3. Store electrodes with a protective cap containing KCl solution (PN 9210342).
4. For overnight storage, immerse the sensor in tap water or 4 pH buffer solution.
5. pH glass electrodes slowly deteriorate in storage. There is no specific expiration date. Follow the calibration procedures in Calibration and maintainenance to determine that the sensor calibrates properly.

1.2 Prepare electrode

Procedure

1. Remove electrode from shipping container.
2. Remove the protective boot covering the electrode bulb.
3. Rinse away salt film with clean water; then shake the electrode so that the internal solution fills the bulb, thus removing any air trapped there.

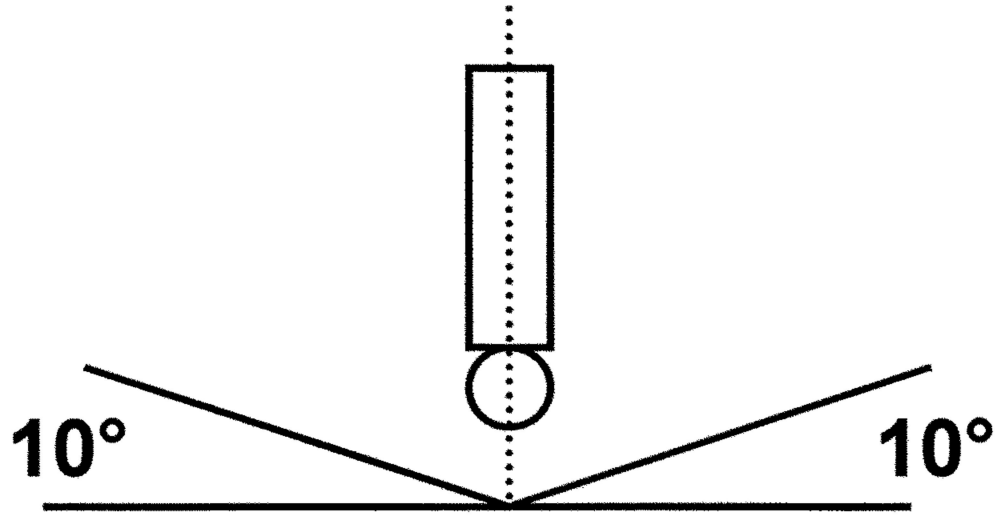
1.3 Install sensor

Procedure

1. Wrap the sensor threads with six or seven turns of PTFE tape to prevent leakage.

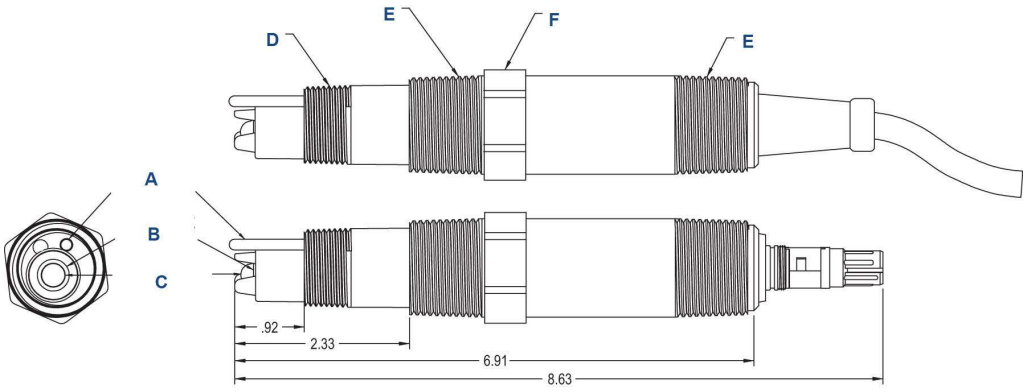
   Do not over tighten the sensor into its receptacle.
2. Hand tighten the sensor and then tighten one or two turns with a wrench.

Figure 1-1: Sensor Orientation



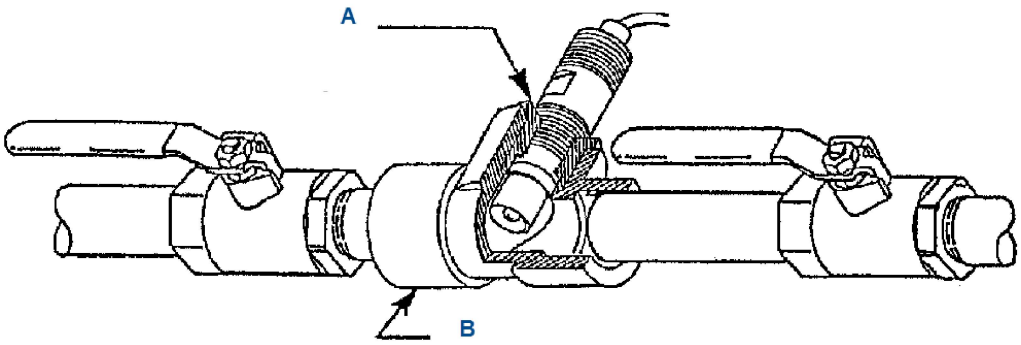
Install sensor within 80 ° of vertical.

Figure 1-2: Rosemount 3900/3900VP Sensor Dimensions



A. Temperature compensation solution ground
B. Reference junction
C. pH electrode
D. ¾-in. male national pipe thread (MNPT)
E. 1-in. MNPT
F. Wrench flats 1.30 in. (33 mm) across

Figure 1-3: Mount



Straight flow shown.

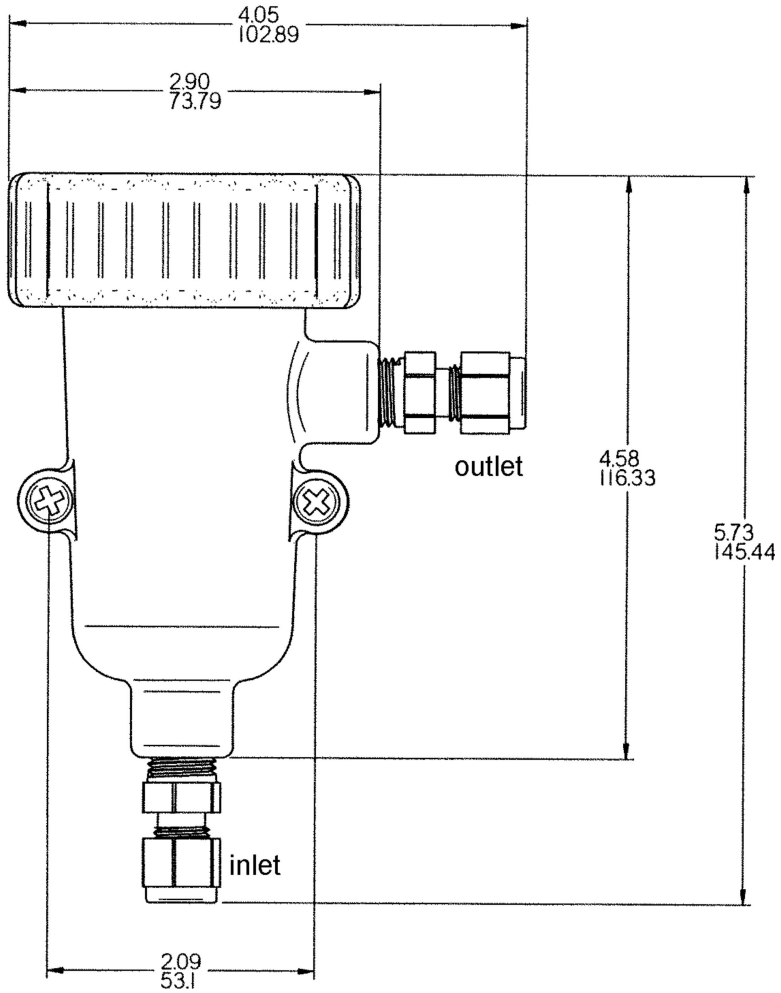
A. 1½-in. x 1-in. reducing bushing
B. 1½-in. pipe tee PN 2002011

Note
Install sensor at least ten degrees above the horizon.

Table 1-1: Horizontal Pipe Tee (PN 2002011) Pressure/Temperature Ratings

psig (barg)	°F (°C)
150 (11.4)	150 (65)
128 (9.8)	160 (71)
102 (8)	170 (77)
80 (6.5)	180 (82)
57 (4.9)	200 (93)
48 (4.3)	210 (99)

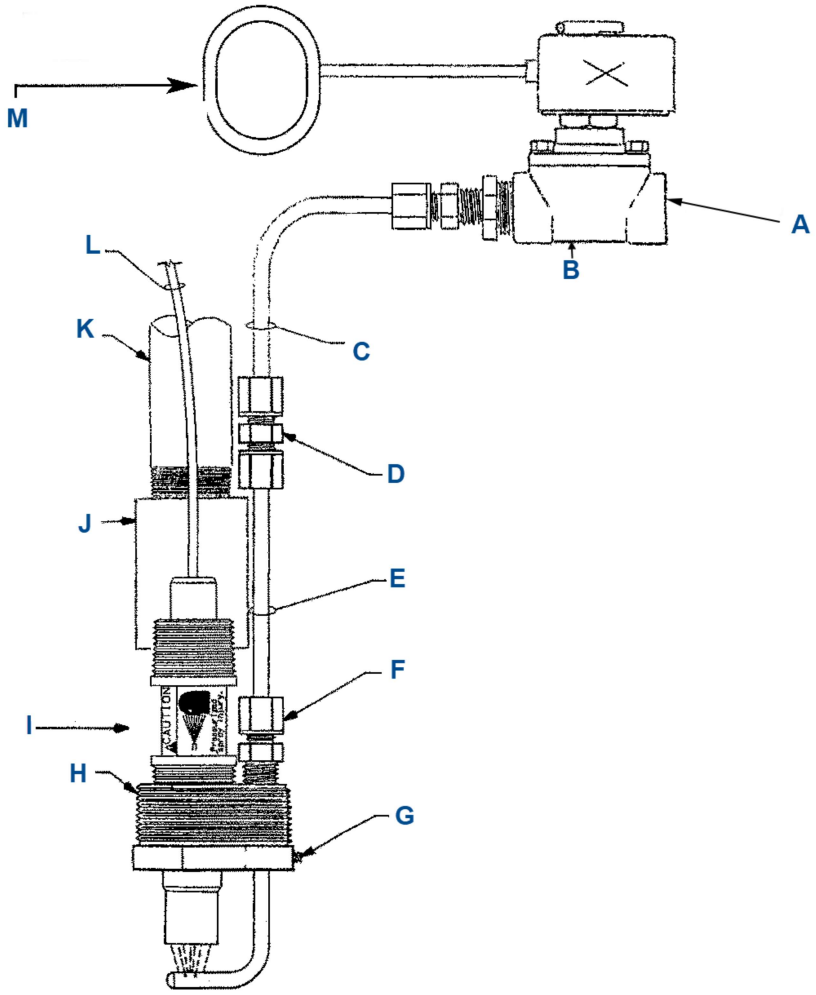
Figure 1-4: Low Flow Cell PN 24091-00/24091-02



Inlet and outlet connections are stainless steel and take ¼-in. OD tubing. Flow cell is polycarbonate with ¼-in. female national pipe thread (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) Max. pressure: 90 pisg (6.2 barg) 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 1-5: 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. (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 others)
K. 1-in. (25.4 mm) PVC or stainless conduit (supplied by others)
L. Cable
M. Timer supplied by others or use timer feature in Rosemount instrument.

The jet spray cleaner eliminates routine, manual sensor maintenance by cleaning the sensor with water or compressed air. Use a solenoid valve to control flow through the cleaner.

Note
You can also use the jet spray cleaner with the handrail mounting assembly (PN 11275-01, not shown) or mount it through the conduit as shown in Figure 1-6.

Figure 1-6: Jet Spray Cleaner with pH Sensor

Figure 1-7: Low Flow Panel: 00390-7101-0001

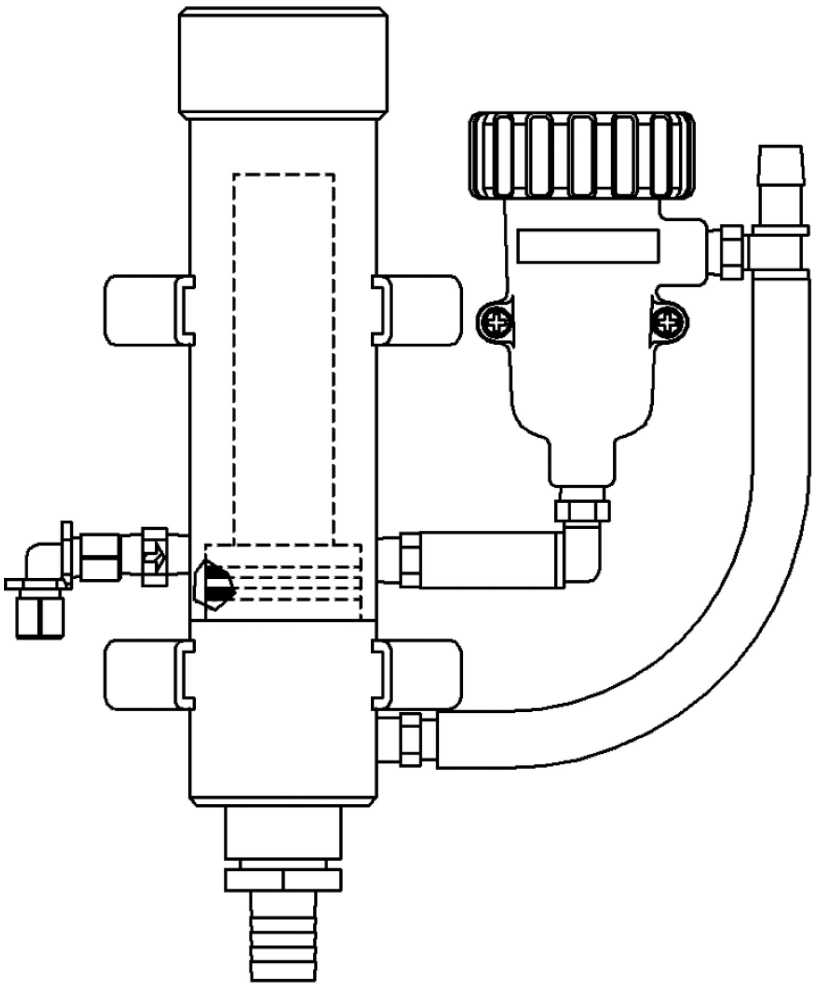


Table 1-2: Low Flow Panel Specifications

Inlet flow	3-80 gph (11.4 - 304 L/hr)
Inlet pressure	30 - 65 psig (2 - 5.5 barg)(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.

1.4 Wiring

For additional wiring information on this product, including sensor combinations not shown here, please refer to Liquid Transmitter Wiring Diagrams.

Figure 1-8: Rosemount 3900/3900VP with Preamplifier to Rosemount 56/1056/1057/1066 Transmitter Wiring

Table 1-3: Rosemount 3900/3900VP with Preamplifier to Rosemount 56/1056/1057/1066 Transmitter Wiring

Wire function	Wire color	Connects to
Earth ground	Green	Ground
Resistance temperature device (RTD) return	White	RTD return/return
RTD sense	White/red	RTD sense/sense
RTD in	Red	RTD in
Solution ground	Blue	Ground/solution ground
+5 Vdc	Inner drain	+5 Vdc/+V sensor
-5 Vdc	White/gray	-5 Vdc/-V sensor
mV/pH shield	Clear	pH shield/shield/guard
mV/pH in	Orange	pH/pH in
Reference in	Gray	Reference/reference in

Figure 1-9: Rosemount 3900/3900VP with Preamplifier to Rosemount 56/1056/1057/1066 Transmitter, Junction Box without Preamplifier (PN 23550-00) Wiring

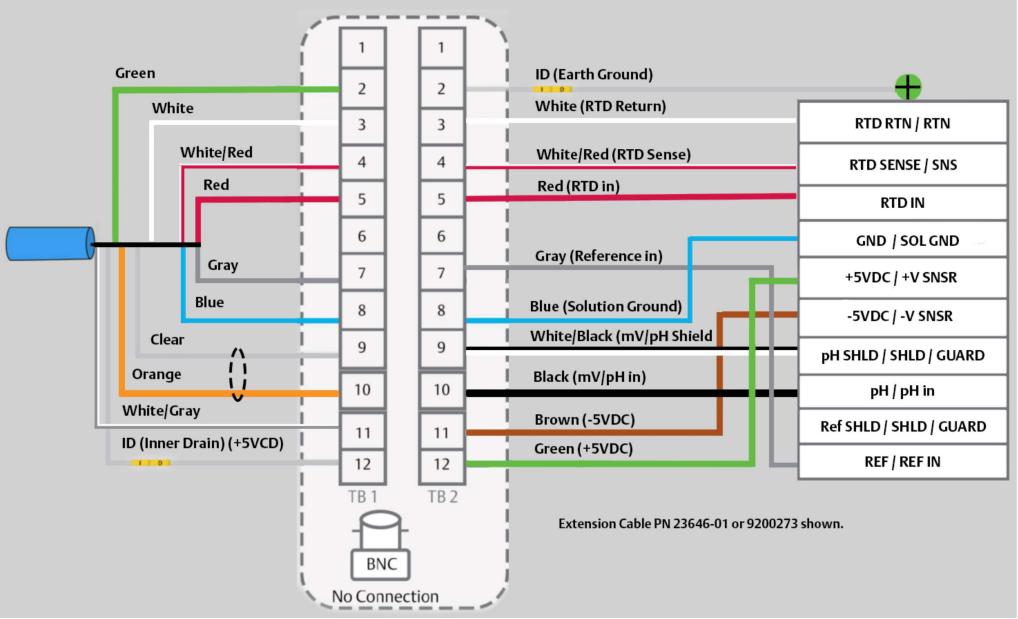


Table 1-4: Rosemount 3900/3900VP with Preamplifier to Rosemount 56/1056/1057/1066 Transmitter, Junction Box without Preamplifier (PN 23550-00) Wiring

Wire color (sensor to junction box)	Junction box terminal number	Wire color (junction box to transmitter)	Transmitter terminal
N/A	1	N/A	N/A
Green	2	Inner drain	Earth ground
White	3	White	RTD return
White/red	4	White/red	RTD sense
Red	5	Red	RTD in
N/A	6	N/A	N/A
Gray	7	Gray	Reference in
Blue	8	Blue	Solution ground
Clear	9	White/black	mV/pH shield
Orange	10	Black	mV/pH in
White/gray	11	Brown	-5 Vdc
Inner drain	12	Green	+5 Vdc

Figure 1-10: Rosemount 3900/3900VP without Preamplifier to Rosemount 56/1056/1057/1066 Transmitter Wiring

Table 1-5: Rosemount 3900/3900VP without Preamplifier to Rosemount 56/1056/1057/1066 Transmitter Wiring

Wire function	Wire color	Connects to
Inner drain	No connection	N/A
Earth ground	Green	Ground
RTD return	White	RTD return/return
RTD sense	White/red	RTD sense/sense
RTD in	Red	RTD in
Solution ground	Blue	Ground/solution ground
N/A	N/A	-5 Vdc/-V sensor
N/A	N/A	+5 Vdc/+V sensor
mV/pH shield	Clear	pH shield/shield/guard
mV/pH in	Orange	pH/pH in
Reference shield	White/gray	Reference shield/shield/guard
Reference	Gray	Reference/reference in

Figure 1-11: Rosemount 3900/3900VP without Preamplifier to Rosemount 56/1056/1057/1066 Transmitter, Junction Box with Preamplifier (PN 23555-00) Wiring

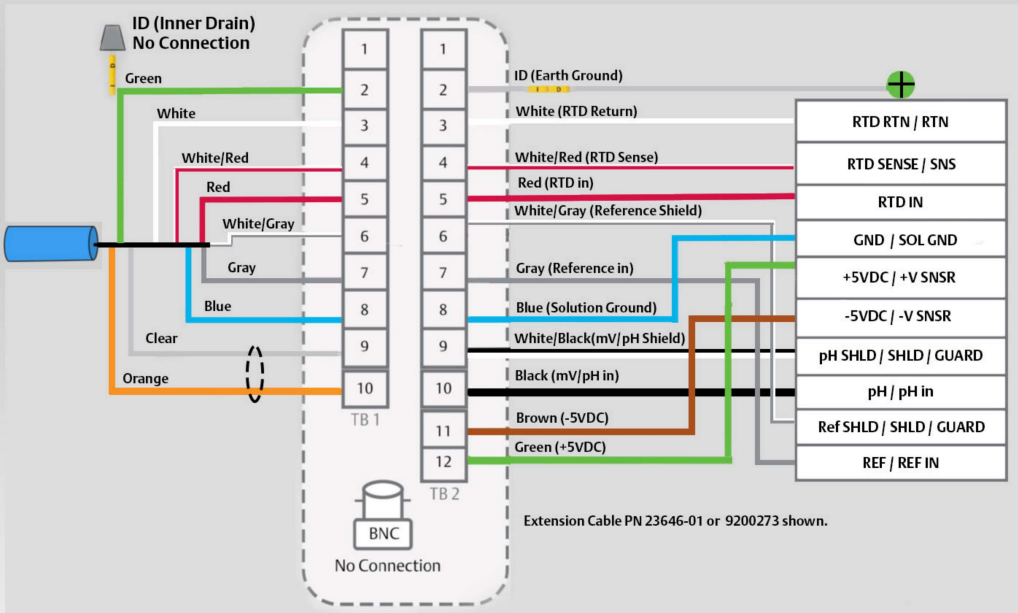


Table 1-6: Rosemount 3900/3900VP without Preamplifier to Rosemount 56/1056/1057/1066 Transmitter, Junction Box without Preamplifier (PN 23555-00) Wiring

Wire color (sensor to junction box	Junction box terminal number	Wire color (junction box to transmitter)	Wire function
Inner drain	N/A	N/A	No connection
N/A	1	N/A	N/A
Green	2	Inner drain	Earth ground
White	3	White	RTD return
White/red	4	White/red	RTD sense
Red	5	Red	RTD in
White/gray	6	White/gray	Reference shield
Gray	7	Gray	Reference in
Blue	8	Blue	Solution ground
Clear	9	White/black	mV/pH shield
Orange	10	Black	mV/pH in
N/A	11	Brown	-5 Vdc
N/A	12	Green	+5 Vdc

Figure 1-12: Rosemount 3900/3900VP with Preamplifier to Rosemount 5081 Transmitter Wiring

Table 1-7: Rosemount 3900/3900VP with Preamplifier to Rosemount 5081 Transmitter Wiring

Wire color	Wire function	Terminal block number
N/A	N/A	1
Green	N/A	Ground
White	RTD return	3
White/red	RTD sense	4
Red	RTD in	5
N/A	N/A	6
Gray	Reference in	7
Blue	Solution ground	8
Clear	mV/pH shield	9
Orange	mV/pH in	10
White/gray	-5 Vdc	11
Inner drain	+5 Vdc	12

Figure 1-13: Rosemount 3900/3900VP with Preamplifier to Rosemount 5081 Transmitter, Junction Box without Preamplifier (PN 23550-00) Wiring

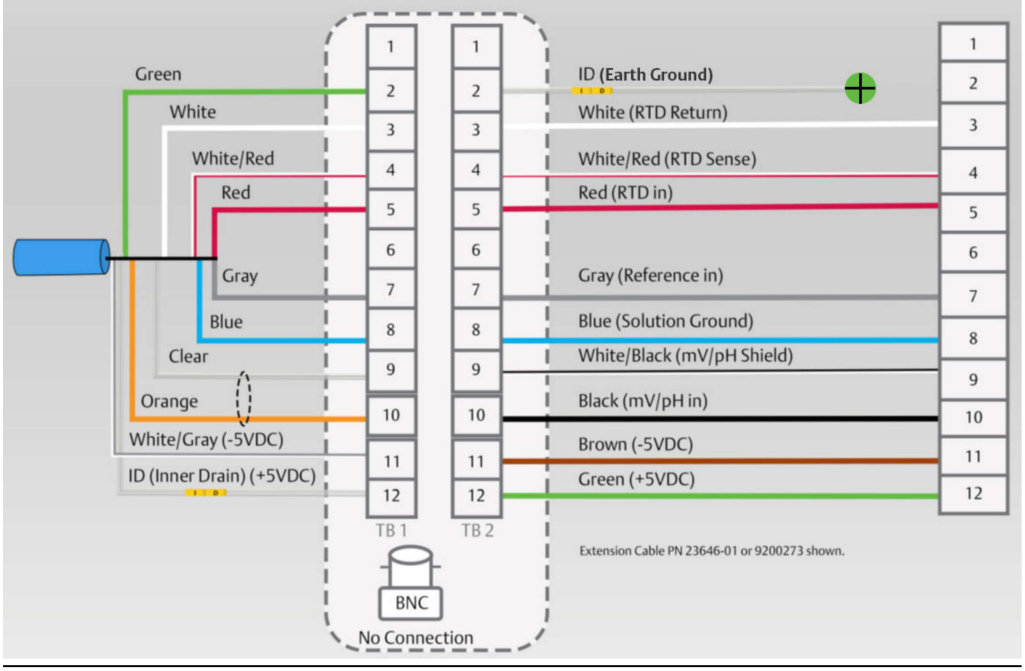


Table 1-8: Rosemount 3900/3900VP with Preamplifier to Rosemount 5081 Transmitter, Junction Box without Preamplifier (PN 23550-00) Wiring

Wire color (sensor to junction box)	Junction box terminal number	Wire color (junction box to terminal block)	Wire function
N/A	1	N/A	N/A
Green	2	Inner drain	Earth ground
White	3	White	RTD return
White/red	4	White/red	RTD sense
Red	5	Red	RTD in
N/A	6	N/A	N/A
Gray	7	Gray	Reference in
Blue	8	Blue	Solution ground
Clear	9	White/black	mV/pH shield
Orange	10	Black	mV/pH in
White/gray	11	Brown	-5 Vdc
Inner drain	12	Green	+5 Vdc

Figure 1-14: Rosemount 3900/3900VP without Preamplifier to Rosemount 5081 Transmitter Wiring

Table 1-9: Rosemount 3900/3900VP without Preamplifier to Rosemount 5081 Transmitter Wiring

Wire color	Wire function	Terminal block number
Inner drain	No connection	N/A
Green	N/A	Ground
White	RTD return	3
White/red	RTD sense	4
Red	RTD in	5
White/gray	Reference shield	6
Gray	Reference in	7
Blue	Solution ground	8
Clear	mV/pH shield	9
Orange	mV/pH in	10
N/A	N/A	11
N/A	N/A	12

Figure 1-15: Rosemount 3900/3900VP without Preamplifier to Rosemount 5081 Transmitter, Junction Box with Preamplifier (PN 23555-00) Wiring

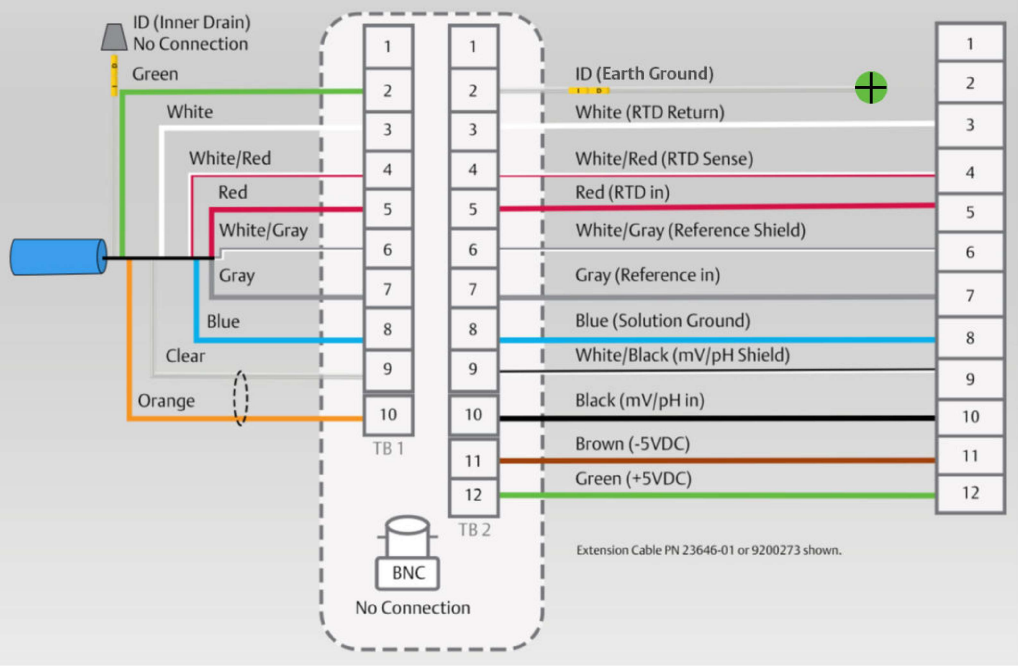


Table 1-10: Rosemount 3900/3900VP without Preamplifier to Rosemount 5081 Transmitter, Junction Box with Preamplifier (PN 23555-00) Wiring

Wire color (sensor to junction box)	Junction box terminal number	Wire color (junction box to terminal block)	Wire function
Inner drain (no connection)	1	N/A	N/A
Green	2	Inner drain	Earth ground
White	3	White	RTD return
White/red	4	White/red	RTD sense
Red	5	Red	RTD in
White/gray	6	White/gray	Reference shield
Gray	7	Gray	Reference in
Blue	8	Blue	Solution ground
Clear	9	White/black	mV/pH shield
Orange	10	Black	mV/pH in
N/A	11	Brown	-5 Vdc
N/A	12	Green	+5 Vdc

2 Calibration and maintainenance

2.1 Calibrate pH two point buffer

Prerequisites

Select two stable buffer solutions, preferably pH 4.0 and 7.0 (pH buffers other than pH 4.0 and pH 7.0 can be used as long as the pH values are at least two pH units apart).

NOTICE

A pH 7 buffer solution reads an mV value of approximately zero, and pH buffers read approximately ±59.1 mV for each unit above or below pH 7. Check the pH buffer manufacturer specifications for millivolt values at various temperatures since it may affect the actual value of the buffer solution mV/pH value.

Procedure

1. Immerse sensor in the first buffer solution. Allow sensor to equilibrate to the buffer temperature (to avoid errors due to temperature differences between the buffer solution and sensor temperature) and wait for reading to stabilize.
   The transmitter can now acknowledge the value of the buffer.
2. Once the transmitter has acknowledged the first buffer, rinse the buffer solution off the sensor with distilled or deionized water.
3. Repeat Step 1 and Step 2 using the second buffer solution.

The theoretical slope value, according to the Nernst equation for calculating pH, is approximately 59.1 mV/pH. Over time, the sensor will age, both in the process and in storage, which will result in reduced slope values. To ensure accurate readings, Emerson recommends that you replace the electrode when the slope value falls below 47 to 49 mV/pH.

2.2 Recommended pH standardization

For maximum accuracy, standardize the sensor on-line or with a process grab sample after performing a buffer calibration and conditioning the sensor to the process.

Standardization accounts for the sensor junction potential and other interferences. Standardization will not change the sensor's slope, but will simply adjust the transmitter's reading to match that of the known process pH.

2.3 Maintain pH electrodes

Electrodes should respond rapidly. Sluggishness, offsets, and erratic readings are indicators that the electrodes may need cleaning or replacement.

1. To remove oil deposits, clean the electrodes with a mild non-abrasive detergent.
2. To remove scale deposits, soak electrodes for one to five minutes in a five percent hydrochloric acid solution.

⚠ WARNING

Corrosive substance

Hydrochloric acid is toxic and highly corrosive.

Avoid skin contact.
Wear protective gloves.
Use only in a well-ventilated area.
Do not inhale fumes.
In case of an accident, consult a doctor immediately.

3. Temperature effect on life expectancy: If glass electrode life expectancy is 100 percent at 77 °F (25 °C), then it will be approximately 25 percent at 176 °F (80 °C), and approximately 10 percent at 212 °F (100 °C).

2.4 Calibrate oxidation reduction potential (ORP)

Prerequisites

After making an electrical connection between the sensor and the transmitter, obtain a standard solution of saturated quinhydrone PN R508-8OZ (460 ± 10 mV). You can also make the solution by simply adding a few crystals of quinhydrone to either pH 4 or pH 7 buffer. Quinhydrone is only slightly soluble; therefore only a few crystals are required.

Procedure

1. Immerse the sensor in the standard solution. Allow one to two minutes for the ORP sensor to stabilize.

2. Standardize the transmitter to the solution value shown in Table 2-1.

   The resulting potentials, measured with a clean platinum electrode and saturated KCl/AgCl reference electrode, should be within ±20 mV of the value shown in Table 2-1. Note solution temperature to ensure accurate interpretation of results. The ORP value of saturated quinhydrone solution is not stable over long periods of time. Therefore, make these standards fresh each time they are used.

Table 2-1: ORP of Saturated Quinhydrone Solution (Millivolts)

	pH 4 solution			**pH 7 solution**		
Temperature: °F (°C)	68 (20)	77 (25)	86 (30)	68 (20)	77 (25)	86 (30)
mV potential	168	264	260	94	87	80

3. Remove the sensor from the buffer, rinse, and install in the process.

2.5 Maintain oxidation reduction potential (ORP) sensors

Electrodes should respond rapidly. Sluggishness, offsets, and erratic readings are indicators that the electrodes may need to be cleaned or replaced.

1. To remove oil deposits, clean the electrode with a mild non-abrasive detergent.
2. To remove scale deposits, soak electrodes for one to five minutes in a 5 percent hydrochloric acid solution.
3. Polish ORP (metallic) electrodes with moistened baking soda.

3 Rosemount pH/ORP sensor(s) product certifications

Rev 0.5

3.1 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/Rosemount.

3.2 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).

3.3 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.

3.4 USA

3.4.1 FM 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/0/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. Autoclaveable and steam sterilizable pH sensors
x. Model 3800VP-a. Autoclaveable 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.

3.4.2 CSA 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 Ed, UL 508-17th Ed, UL 913-7th Ed, 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)

3.5 Canada

3.5.1 CSA 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 Ed, UL 508-17th Ed, UL 913-7th Ed, 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)

3.6 Europe

3.6.1 ATEX Intrinsic Safety

Certificate Baseefa10ATEX0156

Standards EN 60079-0: 2012+A11: 2013, 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)

Specific 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.

3.7 International

3.7.1 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)

Specific 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.

3.8 China

3.8.1 Nepsi 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)

Specific 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.

3.9 Technical Regulations Customs Union (EAC)

3.9.1 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)

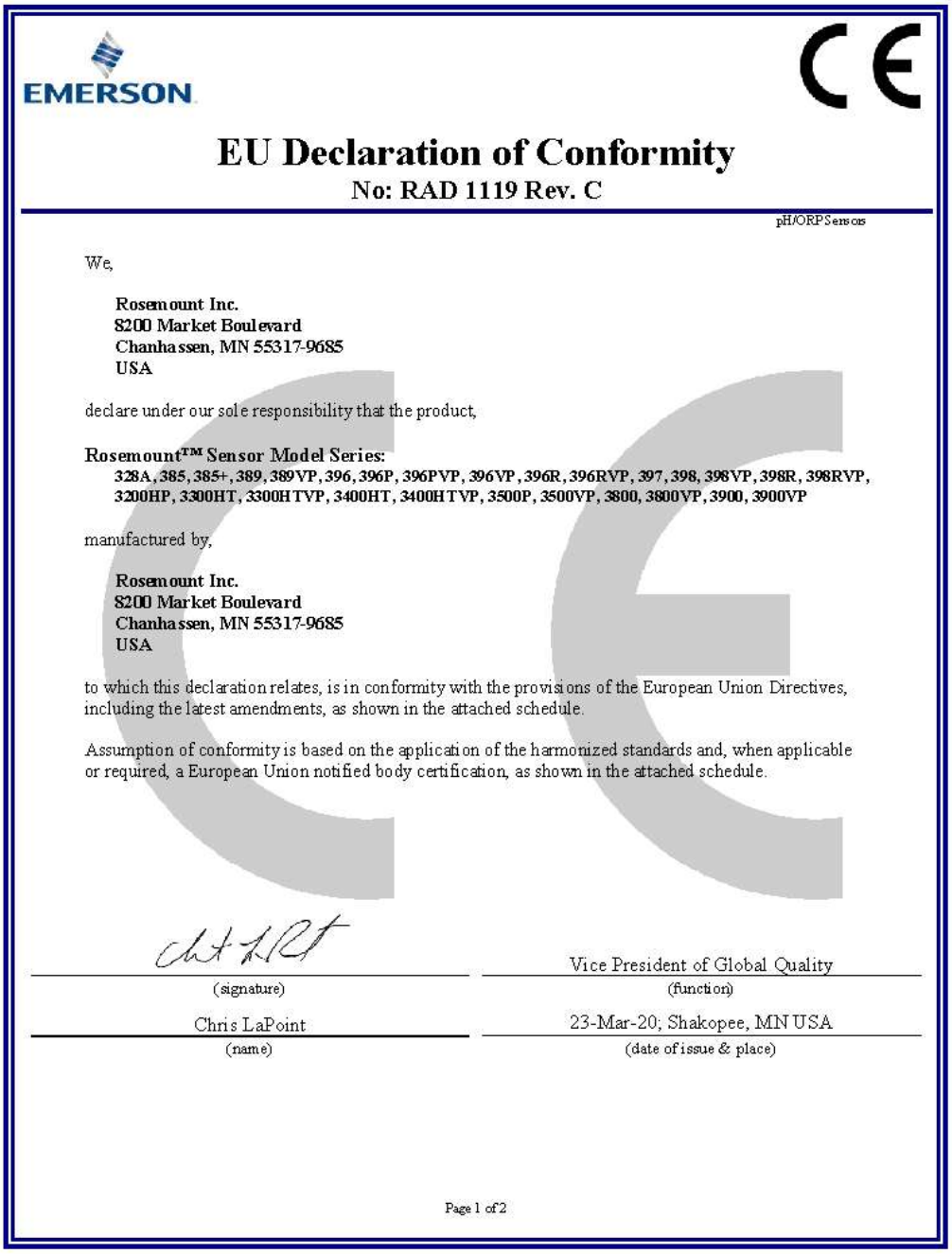
pH sensors with integral standard preamplifier fitted
Ex ia IIC T4 Ga (–20 °C to +80 °C)

Ex ia IIC T5 Ga (–20 °C to +40 °C)

Specific Condition for Safe Use (X):

See certificate for special conditions.

4 Declaration of Conformity



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EU Declaration of Conformity

No: RAD 1119 Rev. C

pH/ORP Sensors

We,

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317-9685
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

manufactured by,

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317-9685
USA

to which this declaration relates, is in conformity with the provisions of the European Union Directives, including the latest amendments, as shown in the attached schedule.

Assumption of conformity is based on the application of the harmonized standards and, when applicable or required, a European Union notified body certification, as shown in the attached schedule.

(signature)	Vice President of Global Quality (function)
Chris LaPoint (name)	23-Mar-20; Shakopee, MN USA (date of issue & place)

Page 1 of 2

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CE

EU Declaration of Conformity

No: RAD 1119 Rev. C

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)

Special conditions for safe use:
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 a buildup 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 this risk.
3) External connections to the sensor must be suitably terminated and provide a degree of protection of at least IP20. 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.

Harmonized Standards:
EN 60079-0:2012+A11:2013
EN 60079-11:2012

ATEX Notified Body for EC Type Examination Certificate & Quality Assurance

SGS FIMKO OY [Notified Body Number: 0598]
P.O. Box 30 (Särkiniementie 3)
00211 HELSINKI
Finland

Page 2 of 2

5 China RoHS table

表格 1: 含有 China RoHS 管控物质超过最大浓度限值的部件型号列
Table 1: List of Model Parts with China RoHS Concentration above MCVs

部件名称 Part Name	有害物质 / Hazardous Substances					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr +6)	多溴联苯 Polybrominated biphenyls (PBB)	多溴联苯醚 Polybrominated diphenyl ethers (PBDE)
电子组件 Electronics Assembly	X	O	O	O	O	O
传感器组件 Sensor Assembly	X	O	O	O	O	O

本表格系依据 SJ/T11364 的规定而制作。
This table is proposed in accordance with the provision of SJ/T11364
O: 意为该部件的所有均质材料中该有害物质的含量均低于 GB/T 26572 所规定的限量要求。
O: Indicate that said hazardous substance in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.
X: 意为在该部件所使用的所有均质材料里，至少有一类均质材料中该有害物质的含量高于 GB/T 26572 所规定的限量要求。
X: Indicate that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

A Intrinsically safe sensor installation drawing - FM