Rosemount™ 396P/396PVP

pH/ORP Sensors

EMERSON

Essential Instructions
Read this page before proceeding

Emerson designs, manufactures and tests its products to meet many national and international standards. Because these sensors are sophisticated technical products, you MUST properly install, use, and maintain them to ensure they continue to operate within their normal specifications. The following instructions MUST be adhered to and integrated into your safety program when installing, using, and maintaining Rosemount products. 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 sensor; and warranty invalidation.

- Read all instructions prior to installing, operating, and servicing the product.
- If you do not understand any of the instructions, contact your Emerson representative for clarification.
- Follow all warnings, cautions, and instructions marked on and supplied with the product.
- Inform and educate your personnel in the proper installation, operation, and maintenance of the product.
- Install your equipment as specified in the Installation Instructions of the appropriate Reference Manual and per applicable local and national codes. Connect all products to the proper electrical and pressure sources.
- To ensure proper performance, use qualified personnel to install, operate, update, program, and maintain the product.
- When replacement parts are required, ensure that qualified people use replacement parts specified by Emerson. Unauthorized parts and procedures can affect the product's performance, place the safe operation of your process at risk, and VOID YOUR WARRANTY. Third-party substitutions may result in fire, electrical hazards, or improper operation.
- Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent electrical shock and personal injury.

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

⚠ DANGER

Hazardous Area Installation

Installations near flammable liquids or in hazardous area locations must be carefully evaluated by qualified on site safety personnel.

To secure and maintain an intrinsically safe installation, the certified safety barrier, transmitter, and sensor combination must be used. The installation system must comply with the governing approval agency (FM, CSA or BASEEFA/CENELEC) hazardous area classification requirements. Consult your transmitter Reference Manual for more details.

Proper installation, operation and servicing of this sensor in a Hazardous Area Installation is entirely the responsibility of the user.

⚠ CAUTION

Sensor/Process Application Compatibility

The wetted sensor materials may not be compatible with process composition and operating conditions. Application compatibility is entirely the responsibility of the user.

⚠ CAUTION

Special Conditions for Safe Use

1. All pH/ORP sensors have a plastic enclosure which must only be cleaned with a damp cloth to avoid the danger due to a build up of an electrostatic charge.

2. All pH/ORP sensor models are intended to be in contact with the process fluid and may not meet the 500V r.m.s. a.c. test to earth.

This must be taken into consideration at installation.

Contents

Section 1: Description and Specifications

1.1 Specifications - General

Measurements and Ranges: pH*: 0-14 / ORP: -1500 to 1500 mv

Available pH ACCUGLASS Types: GPLR hemi or flat glass

Wetted Materials: Titanium, Polypropylene, EPDM, glass; platinum (ORP only)

Process Connection: 1 in. MNPT front and rear facing threads

Temperature Range: 0-100°C (32-212°F)

Pressure Range-Hemi bulb: 100-1135 kPa [abs] (0-150 psig)

Pressure Range-Flat bulb: 100-790 kPa [abs] (0-100 psig)

Minimum Conductivity: 100 μS/cm

Integral Cable 396P: Code 01 - 25 ft; Code 02 - 15 ft coaxial / 396PVP: none - must use mating VP cable

Weight/Shipping Weight: 0.45 kg/0.9 kg (1 lb/2 lb)

*Percent Linearity

pH Range	396 / 396VP		396P / 396PVP		396R / 396RVP	
	GPHT Hemi	GPHT Flat	GPHT Hemi	GPLR Flat	GPHT Hemi	GPHT Flat
0-2 pH	94%	95%	94%	–	94%	93%
2-12 pH	99%	99%	97%	98%	97%	98%
12-13 pH	97%	96%	98%	95%	98%	95%
13-14 pH	92%	–	98%	–	98%	–

1.2   Product Certifications

See online certificates for more details

<u>IECEx</u>

See online certificates for more details.

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

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

Sensors with standard preamp (396P only) – Ex ia IIC T4 Ga (-20 °C ≤ Ta ≤ +80 °C) or
Ex ia IIC T5 Ga (-20 °C ≤ Ta ≤ +40 °C)

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

<u>ATEX</u>

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

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

Sensors with standard preamp (396P only) –   II 1 G Ex ia IIC T4 Ga (-20 °C ≤ Ta ≤ +80 °C) or
II 1 G Ex ia IIC T5 Ga (-20 °C ≤ Ta ≤ +40 °C)

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

<u>FM</u>

See online FM Certificate of Compliance for applicable sensor options.

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

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

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

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

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

Per standards 3600:1998, 3610:2010, 3611:2004, 3810:2005

<u>CSA</u>

See online CSA Certificate of Compliance for applicable sensor options.

Sensors with preamp – Intrinsically Safe:

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

Sensors without preamp – Intrinsically Safe and Non-Incendive:

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

Per standards C22.2 No. 0-10, C22.2 No. 0.4-M2004, C22.2 No. 94-M1991, C22.2 No. 142 –
M198, C22.2 No 157 – M1992, CAN/CSA E60079-0:0, CAN/CSA E60079-11:02, UL50 11th Ed,
UL508 17th Ed, UL913 7th Ed, UL 60079-0: 2005, UL 60079-11: 2002

1.3 Ordering Information

The Rosemount 396P Sensor is housed in a molded reinforced polypropylene body with 1 in. MNPT threads suitable for insertion, submersion or flow through installation. The sensor includes a general purpose pH electrode or a platinum ORP electrode, a reference junction and a solution ground. The Rosemount 396P comes standard with a recessed electrode; an optional slotted tip is also available. In addition, the Rosemount 396P features an optional integral hermetically sealed preamplifier and 15 ft or 25 ft cable lengths. Automatic temperature compensation, Pt 100 or 3K Balco, is standard with the Rosemount 396P.

Rosemount 396P with Integral Cable Connection

Rosemount 396PVP with Variopol Cable Connection

The Rosemount 396PVP Sensor has similar features to the Rosemount 396P. However, the Rosemount 396PVP is offered with the Variopol (VP) connector and uses a mating VP cable (purchased separately).

A Variopol cable is required for all new installations. See below for cable selection.

Variopol connector shown with mating variopol cable receptacle

Examples of all sensing tip offerings

Shrouded Tip is standard on all hemi bulb sensors

Optional Slotted Tip is available on all hemi bulb sensors, ordered as option -41

Flat Tip is available with flat glass bulb sensors

Table 1-1. Rosemount 396P Ordering Information

Model	Sensor Type
396P	pH/ORP Sensor
Preamplifier/Cable	
01	With Integral Preamplifier and 25 ft (7.6m) Cable
02	Without Integral Preampflier and 15 ft (4.6m) Cable
Measuring Electrode Type	
10	pH - GPLR Glass
12	ORP
13	pH - GPLR Flat Glass
Transmitter/TC Compatibility	
50	For 1181 (3K TC)
54	For 1054A/B, 2054 2081 (Pt-100)
55	For 54, 1055, 1056, 1057, 6081, 3081, 4081, 5081, XMT, 56 (Pt-100)
Optional Tip Offerings	
_	No Selection
41	Slotted Tip [1]
Typical Model Number: 396P-01-10-55	

1.   Not available with option 13.

Table 1-1. Rosemount 396PVP Ordering Information

Model	Sensor Type
396PVP	pH/ORP Sensor
Measuring Electrode Type	
10	pH - GPLR Glass
12	ORP
13	pH - GPLR Flat Glass
Transmitter/TC Compatibility	
50	For 1181 (3K TC)
54	For 1054A/B, 2054 2081 (Pt-100)
55	For 54, 1055, 1056, 1057, 6081, 3081, 4081, 5081, XMT, 56 (Pt-100)
Optional Tip Offerings	
_	No Selection
41	Slotted Tip [1]
Preamplifier Option	
_	No Preamplifier
70	SMART Preamplifier [2]
Typical Model Number: 396PVP-10-55-_-70	

1.   Not available with option 13.
2.   Only available with pH sensors and option 55.