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PRODUCT DATASHEET

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Product Data Sheet
May 2017
LIQ-PDS-PERpH-X

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

PERpH-X™ High Performance pH/ORP Sensors

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

Rosemount 3500 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.

ROSEMOUNT™

EMERSON™

Overview

Expanded 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 electrolyte would react with the process

Minimize 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.

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. and 36 in. lengths suitable for use with retraction assemblies.
- Variopol (VP8) cable connection option, for quick cable-to-sensor release, eliminates cable twisting.

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Ordering Information

Rosemount 3500P pH/ORP Sensor

Rosemount PERpH-X High Performance pH/ORP Sensors feature various sensor body options. Sensors are available in a chemically resistant Ryton plastic body (3500P/3500VP) or titanium tube housing (3300HT/3300HTVP/3400HT/3400HTVP). Rosemount 3500P/3500VP sensors are constructed with front and rear facing 1 in. MNPT threads 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 Teflon reference junction and a Pt-100 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).

Table 1. Rosemount 3300HT pH/ORP Sensor ordering information

Model	Sensor type
3300HT	pH/ORP sensor
Measuring electrode	
10	pH - GPHT glass
12	ORP
O-ring material	
30	EPDM
31	Viton
32	Kalrez
Typical model number: 3300HT-10-30	

Table 2. Rosemount 3300HTVP pH/ORP Sensor ordering information

Model	Sensor type
3300HTVP	pH/ORP sensor
Measuring electrode	
10	pH - GPHT glass
12	ORP
O-ring material	
30	EPDM
31	Viton
32	Kalrez
Preamplifier option	
_	No preamplifier
70	SMART preamplifier [(1)]
Typical model number: 3300HTVP-10-30-70	

1. Only available if selected with option 10.

Table 3. Rosemount 3400HT pH/ORP Sensor ordering information

Model	Sensor type
3400HT	pH/ORP sensor
Measuring electrode	
10	pH - GPHT glass
12	ORP
Sensor length	
21	21 in. Titanium tube
25	36 in. Titanium tube
O-ring material	
30	EPDM
31	Viton
32	Kalrez
Cable length	
61	9.5 in. cable without BNC (1)
62	15 ft. cable without BNC (2)
Typical model number: 3400HT-10-21-30-62	

1. For use with sensor head junction boxes.
2. For wiring directly to transmitter or junction box.

Table 4. Rosemount 3400HTVP pH/ORP Sensor ordering information

Model	Sensor type
3400HTVP	pH/ORP sensor
Measuring electrode	
10	pH - GPHT glass
12	ORP
Sensor length	
21	21 in. Titanium tube
25	36 in. Titanium tube
O-ring material	
30	EPDM
31	Viton
32	Kalrez
Preamplifier option	
_	No preamplifier
70	SMART Preamplifier (1)
Typical model number: 3400HTVP-10-21-30-70	

1. Only available if selected with option 10.

Table 5. Rosemount 3500P pH/ORP Sensor ordering information

Model	Sensor type
3500P	pH/ORP sensor
Electrolyte selection	
BF	Bio-film resistant
HT	High temperature
MR	Metal resistant
OR	Oil resistant
PR	Poisoning resistant
SR	Scaling resistant
Preamplifier/cable	
01	Preamplifier with 25 ft. cable (1)
02	No preamplifier with 15 ft. cable
Measuring electrode type	
10	pH – GPHT glass
12	ORP
Reference type	
21	Double junction reference
O-ring material	
30	EPDM
31	Viton
32	Kalrez
Typical model number: 3500P-HT-01-10-21-30	

1. Preamplifier is SMART if selected with option 10. Preamplifier is standard if selected with option 12.

Table 6. Rosemount 3500VP pH/ORP Sensor ordering information

Model	Sensor type
3500VP	pH/ORP sensor
Electrolyte selection	
BF	Bio-film resistant
HT	High temperature
MR	Metal resistant
OR	Oil resistant
PR	Poisoning resistant
SR	Scaling resistant
Preamplifier/cable	
01	Preamplifier (1)
02	No Preamplifier
Measuring electrode type	
10	pH–GPHT glass
12	ORP
Reference type	
21	Double junction reference
O-ring material	
30	EPDM
31	Viton
32	Kalrez
Typical model number: 3500VP-HT-01-10-21-30	

1. Preamplifier is SMART if selected with option 10. Preamplifier is standard if selected with option 12.

Specifications

Table 7. 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 8. Rosemount 3300HT/3300HTVP pH/ORP Sensor specifications

Measurement range	
pH	0 to 14
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 [abs])	
CRN rating	200 psig at room temperature
Wetted materials	
Titanium, ryton, teflon, glass, and user specified O-ring material (EPDM, Viton or Kalrez)	
Reference electrode	
Double junction with replaceable process side electrolyte and Teflon junction	
Temperature sensor	
Pt-100 RTD	
Process connections	
Must use 1 inch compression process connector (P/N 23166-00 or 23166-01)	
Cable length	
15 ft. 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 9. Rosemount 3400HT/3400HTVP pH/ORP Sensor specifications

Measurement range	
pH	0 to 14
ORP	-1500 to +1500 mV
Operating temperature	
Without preamplifier	41 to 311 °F (5 to 155 °C)
With preamplifier	up to 293 °F (145 °C)
Storage temperature	
14 to 138 °F (-10 to 70 °C)	
Maximum process pressure	
400 psig (2859 kPa [abs])	
CRN rating	200 psig at room temperature
Maximum pressure at retraction or insertion	
21 in. length	64 psig (542 kPa [abs])
36 in. length	35 psig (343 kPa [abs])
Wetted materials	
Titanium, ryton, teflon, glass, and user specified O-ring material (EPDM, Viton or Kalrez)	
Reference electrode	
Double junction with replaceable process side electrolyte and Teflon junction	
Temperature sensor	
Pt-100 RTD	
Process connections	
Must use 1 in. compression process connector (P/N 23166-00 or 23166-01). Can be inserted through a ball valve	
Cable length	
15 ft. integral cable or optional 9.5 in. integral cable 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 10. Rosemount 3500P/3500VP pH/ORP Sensor specifications

Measurement range	
pH	0 to 14
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 [abs])	
CRN rating	40 psig at room temperature
Wetted materials	
Titanium, ryton, teflon, glass, and user specified O-ring material (EPDM, Viton or Kalrez)	
Reference electrode	
Double junction with replaceable process side electrolyte and Teflon junction	
Temperature sensor	
Pt-100 RTD	
Process connections	
1 in. MNPT front and rear facing threads	
Cable length	
Rosemount 3500P option -01	25 ft. Integral cable
Rosemount 3500P option -02	15 ft. Integral cable
Rosemount 3500VP	VP8 cable (sold separately)
Weight/shipping weight	
1 lb/2 lb (0.5 kg/0.9 kg)	

Product Certifications

Please see online certificates for further details.

IECEx

Sensors without preamp – 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 (ORP 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

ATEX

Sensors without preamp – 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 (ORP 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

FM

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

CSA

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 – M1987, C22.2 No 157 – M1992, CAN/CSA E60079-0:07, CAN/CSA E60079 - 11:02, UL50 11th Ed, UL508 17th Ed, UL913 7th Ed, UL 60079-0: 2005, UL 60079-11: 2002

Dimensional and Installation Drawings

Figure 1. Proper sensor installation orientation

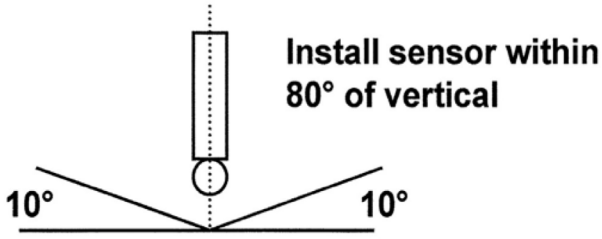


Figure 2. Rosemount 3500VP sensor dimensional drawing

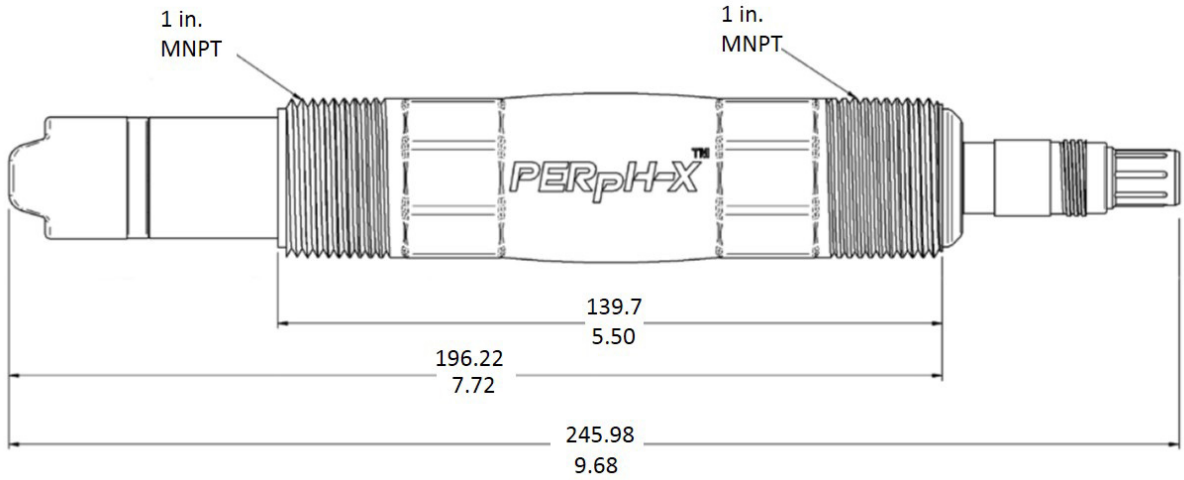


Figure 3. Rosemount 3300HT/3300HTVP sensor dimensional drawing

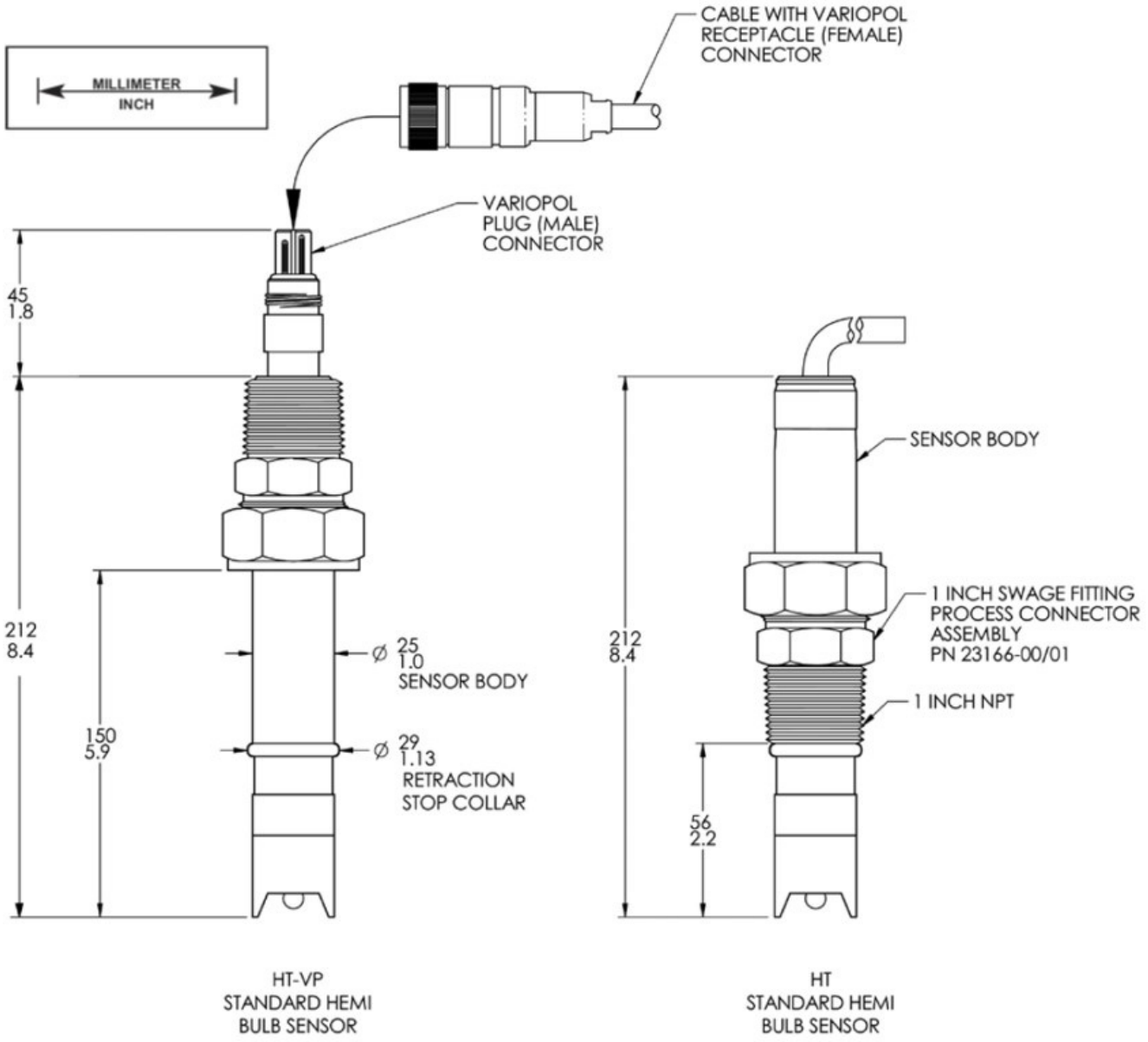
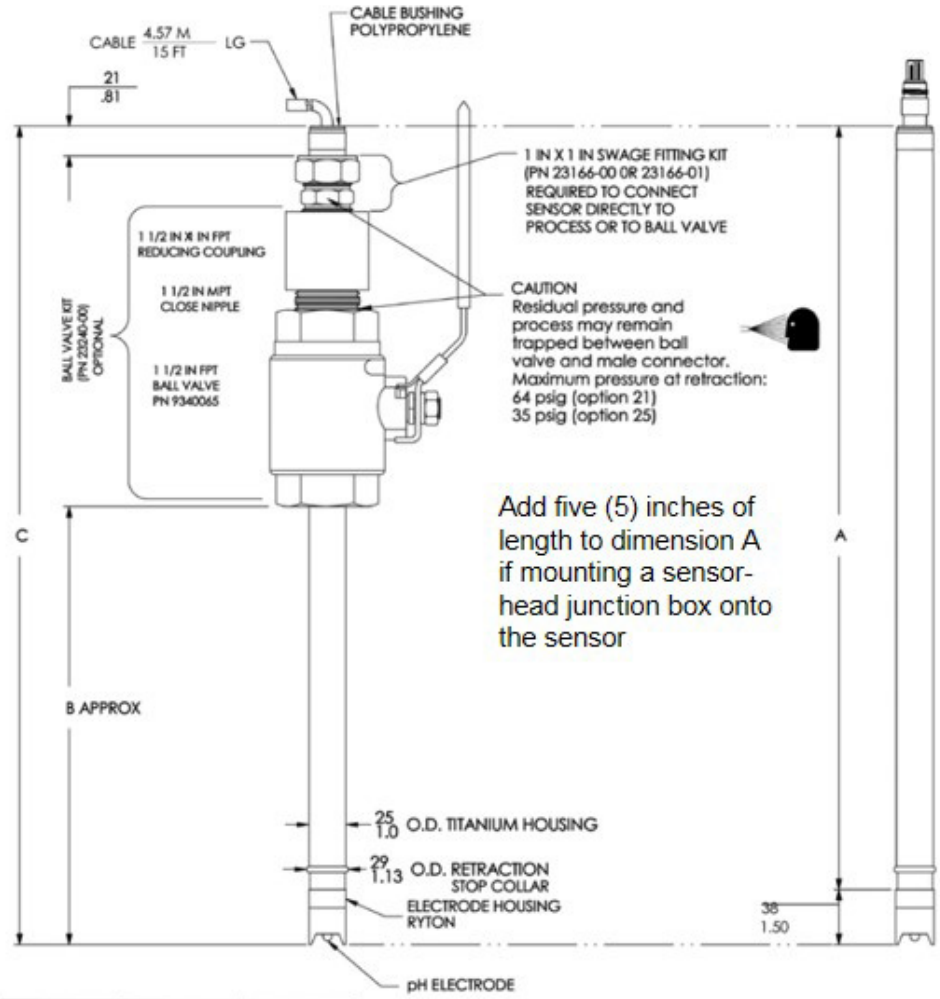


Figure 4. Rosemount 3400HT/3400HTVP sensor dimensional drawing (with and without 1 ½ in. Ball Valve assembly)



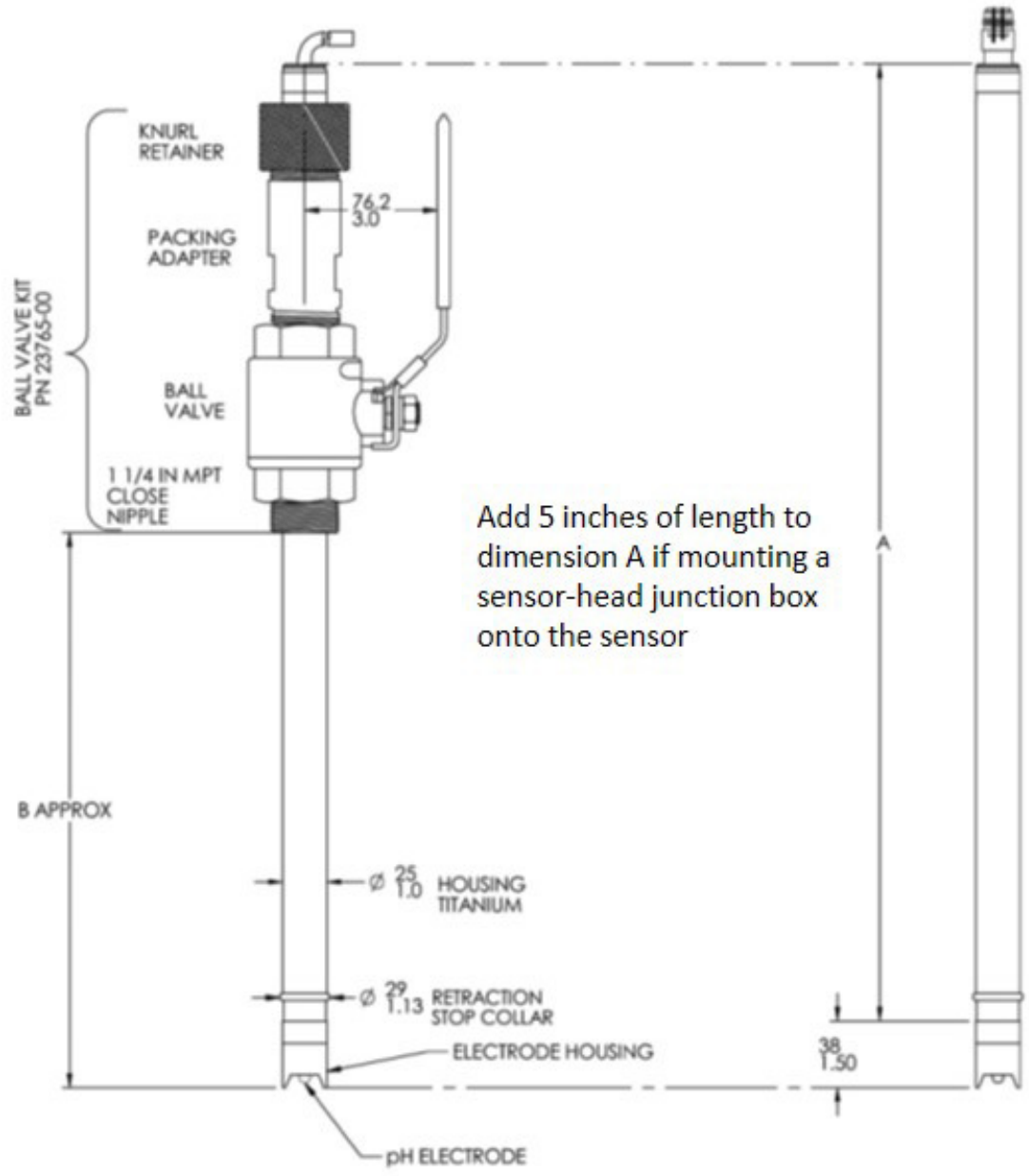
A	B	C	
MM /IN	MM /IN	MM /IN	OPTION
549/21.6	355/14.0	587/23.1	21
917/36.1	724/28.5	955/37.6	25

Ball Valve Kit (P/N 23240-00) used with extended length retractable sensor.

A process connector (P/N 23166-00 or -01) must be used to connect the sensor to Ball Valve Kit 23240-00. (Process connectors sold separately)

Figure 5. Rosemount 3400HT/3400HTVP dimensional drawing (with and without 1 ¼ in. ball valve assembly)

A	B	
IN / MM	IN / MM	OPTION
21.6/549	12.2/310	21
36.1/917	26.7/678	25



Ball Valve Kit P/N 23765-00 contains a 1 ¼" full port ball valve, 1 ¼" close nipple, and a retraction kit P/N 23796-00 with carbon graphite packing for easy sensor insertion and removal

Figure 6. Typical flow through/insertion installation for the Rosemount 3300HT/3300HTVP sensor

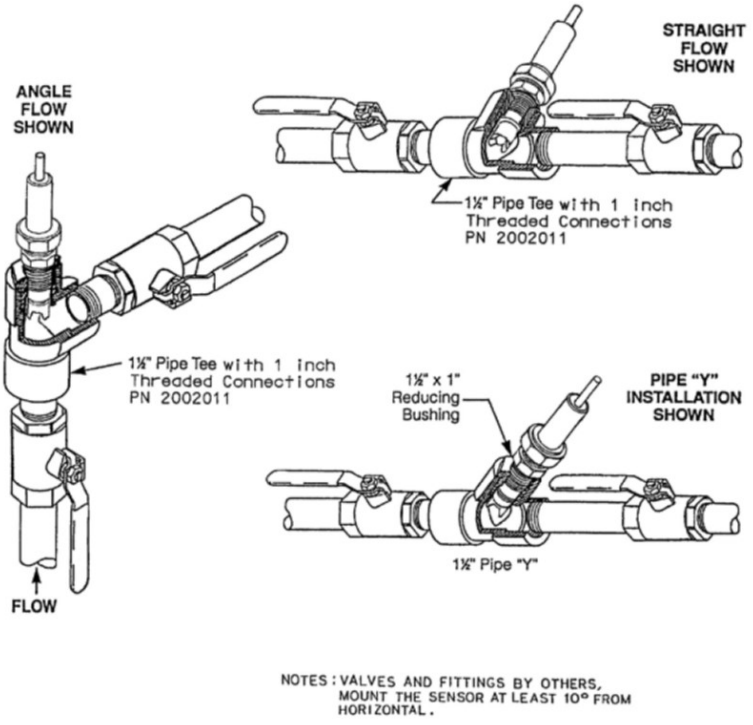
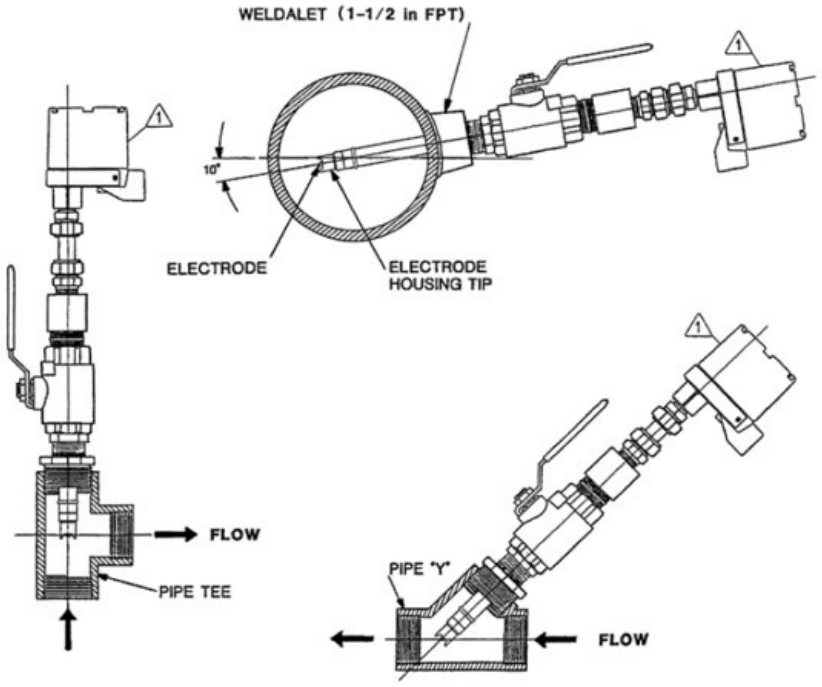
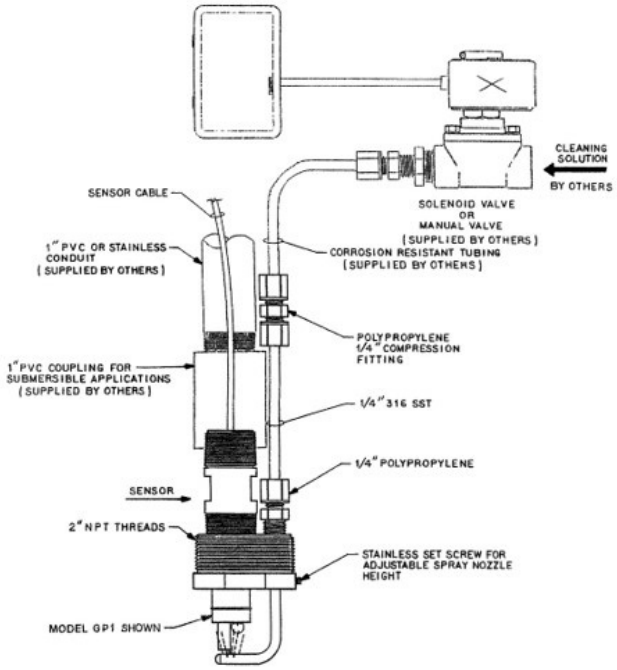


Figure 7. Typical retraction mounting for the Rosemount 3400HT sensor (shown with sensor head junction box)



Note: Sensor must be mounted at an angle between 10° and 90° above the horizontal. Pipe tees and weldalets provided by customer.

Figure 8. Rosemount 3500P/3500VP sensor with jet spray cleaner (P/N 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 the Handrail Mounting Assembly or a similar submersion accessory.

Figure 9. Rosemount 3500P sensor flow through installations

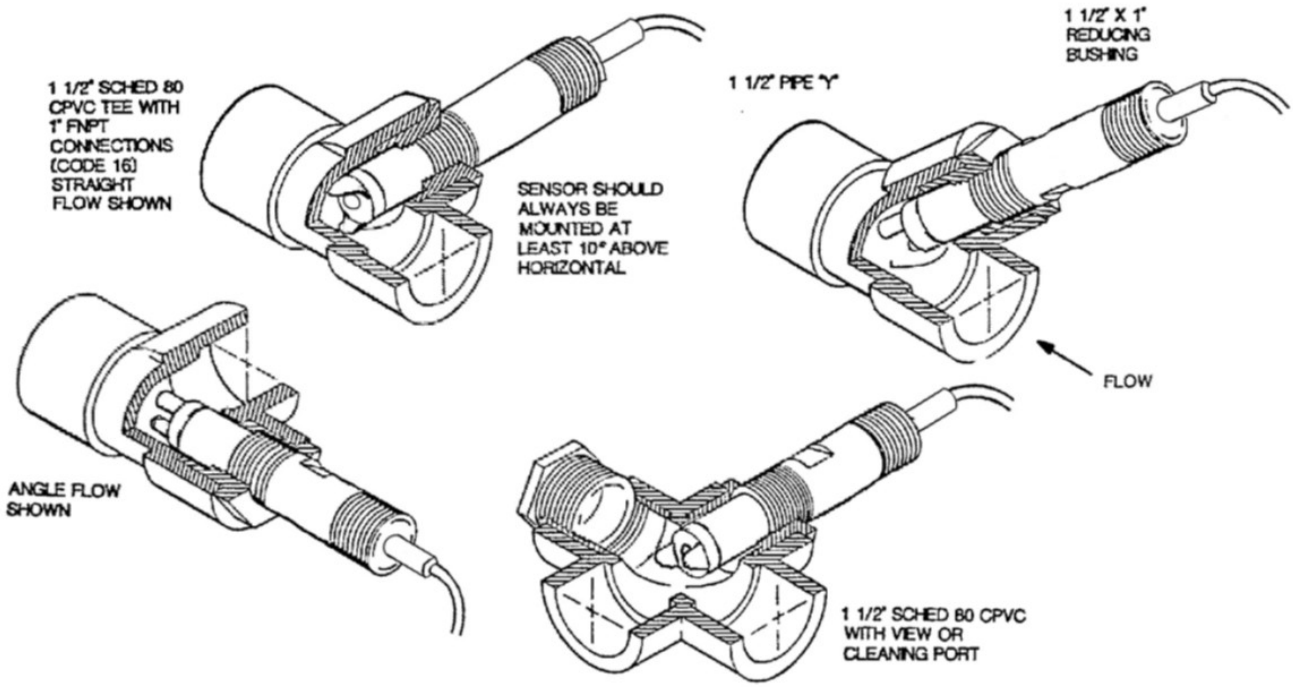


Figure 10. Submersion installation using the handrail mounting assembly (P/N 11275-01)

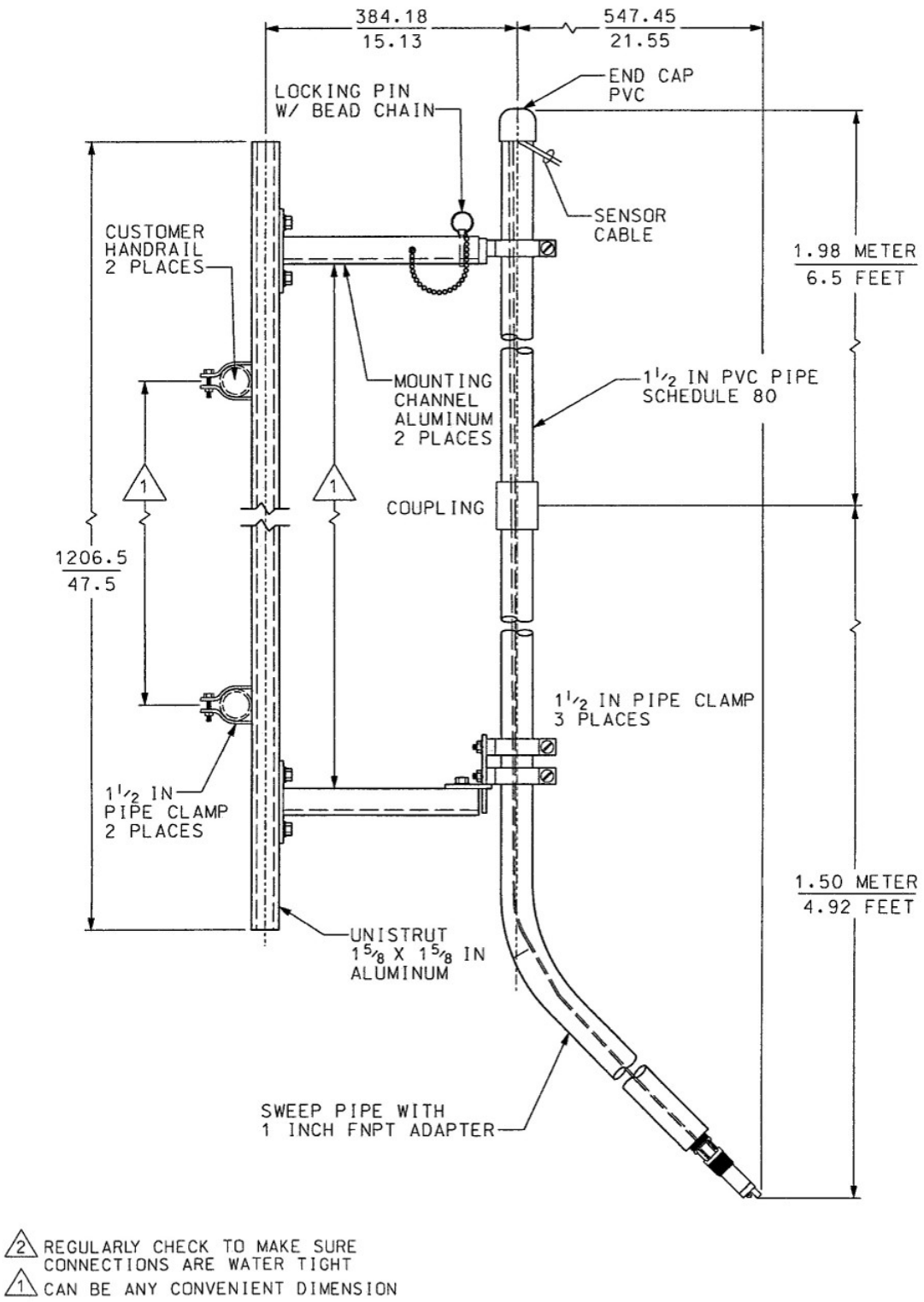


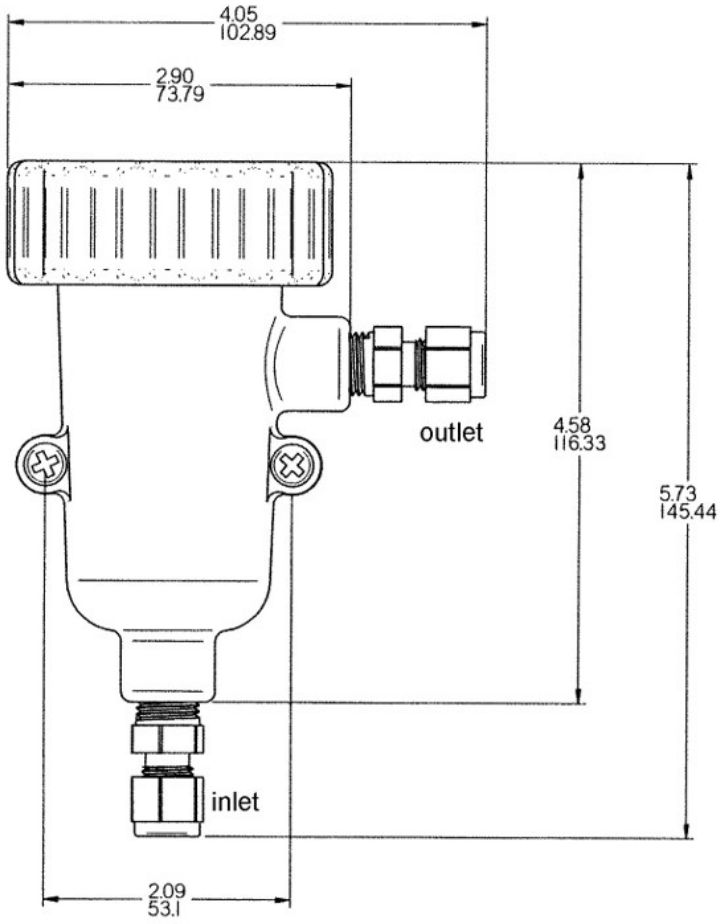
Figure 11. Low flow cell P/N 24091-00 for use with Rosemount 3500P/3500VP sensors

Inlet and outlet connections are stainless steel and take ¼-inch OD tubing. Flow cell is polycarbonate with ¼-inch FNPT fittings.

Wetted Materials:
Body & Nut – Polyester/Polycarbonate
Fittings – 316 SST
Seals – Silicone

Flow Cell Ratings:
Temperature: 32 to 158 °F (0 to 70 °C)
Maximum Pressure: 90 psig (721 kPa [abs])
Flow Rate: 2 to 5 GPH (7.6 to 18.9 LPH)

Sensor Threaded Connection:
24091-00 – 1" NPT Adapter



Accessories

Table 11. Accessories information

Part number	Description
For Rosemount 3300HT/3300HTVP/3400HT/3400HTVP Sensors	
23166-00	1 in. MNPT process connector, stainless steel with EPDM O-ring
23166-01	1 in. MNPT process connector, titanium with EPDM O-ring
23796-00 (1)	316 SST retraction kit for use with a 1-1/4 in. full port ball valve
9550220	Process connector O-ring, Kalrez, 2-214
23594-01	Process connector O-ring, EPDM, 2-214
23555-00	Remote junction box with preamplifier
2002565	Mounting bracket kit (for remote junction box)
23709-00 (1)	Sensor head junction box with preamplifier
23646-01	Extension cable, 11 conductor, shielded, prepped (for use with junction box)
9200273	Extension cable, 11 conductor, shielded, unprepped (for use with junction box)
For Rosemount 3500P/3500VP Sensors	
23555-00	Remote junction box with preamplifier
23646-01	Extension cable, 11 conductor, shielded, prepped (for use with junction box)
9200273	Extension cable, 11 conductor, shielded, unprepped (for use with junction box)
915240-03	PVC flow through Tee, ¾ in. NPT process connection
915240-04	PVC flow through Tee, 1 in. NPT process connection
915240-05	PVC flow through Tee, 1-½ in. NPT process connection
2002011	CPVC Flow Through Tee, 1-½ in. NPT process connection
11275-01	Handrail mounting assembly
24091-00	Low flow cell, 1 in. NPT adapter
12707-00	Jet spray cleaner
Common Accessories	
24281-00	15 ft. cable with mating VP8 connector
24281-01	25 ft. cable with mating VP8 connector
24281-02	2.5 ft. cable with mating VP8 connector
24281-03	50 ft. cable with mating VP8 connector (2)
24281-04	100 ft. cable with mating VP8 connector (2)
24281-05	4 ft. cable with mating VP8 connector
24281-06	10 ft. cable with mating VP8 connector
24281-07	20 ft. cable with mating VP8 connector
24281-08	30 ft. cable with mating VP8 connector
9210012	Buffer solution, 4.01 pH, 16 oz
9210013	Buffer solution, 6.86 pH, 16 oz

Table 11. Accessories information

9210014	Buffer solution, 9.18 pH, 16 oz
R508-8OZ	ORP solution, 475 mV, 8 oz
Solution kits [3]	
24231-00	High temperature solution kit (0 to 145 °C) with EPDM O-rings
24231-01	Bio-film resistant solution kit (0 to 60 °C) with EPDM O-rings
24231-02	Poisoning resistant solution kit (0 to 100 °C) with Viton O-rings
24231-03	Oil resistant solution kit (0 to 100 °C) with Viton O-rings
24231-04	Scaling resistant solution kit (0 to 100 °C) with EPDM O-rings
24231-05	Metals resistant solution kit (0 to 145 °C) with EPDM O-rings
Reference junction kits [4]	
24238-00	High temperature porous Teflon liquid junction (EPDM O-rings)
24239-00	High temperature porous Teflon liquid junction (Viton O-rings)
24240-00	High temperature porous Teflon liquid junction (Kalrez O-rings)
24238-01	Bio-film resistant porous Teflon liquid junction (EPDM O-rings)
24238-02	Poisoning resistant porous Teflon liquid junction (Viton O-rings)
24238-03	Oil resistant porous Teflon liquid junction (Viton O-rings)
24238-04	Scaling resistant porous Teflon liquid junction (EPDM O-rings)
24238-05	Metals resistant porous Teflon liquid junction (EPDM O-rings)
Refill kits [5]	
9210392	High temperature refill kit (0 to 145 °C)
9210426	Bio-film resistant refill kit (0 to 60 °C)
9210425	Poisoning resistant refill kit (0 to 100 °C)
9210423	Oil resistant refill kit (0 to 100 °C)
9210424	Scaling resistant refill kit (0 to 100 °C)
9210422	Metals resistant refill kit (0 to 145 °C)
Replacement O-rings for Teflon junction	
24250-00	Viton O-ring Kit
24251-00	Kalrez O-ring Kit
24270-00	EPDM O-ring Kit

1. For 21 in. and 36 in. Extended length sensors only
2. For use with sensors containing preamplifiers.
3. Solution kits contain one Teflon junction, replacement O-rings, and a syringe with reference electrolyte
4. Reference junction kits include one Teflon junction and listed O-rings
5. Refill kits include one syringe with 30 cc of electrolyte refill. (Approximately 4 to 5 refills per syringe)

HIGH ACCURACY

measurement instruments

Our offering:

	Pressure Measurement		Level Measurement
	Temperature Measurement		Flow Measurement
	Marine Measurement & Analytical		Gas Analysis
	Liquid Analysis		Flame and Gas Detection
	Tank Gauging		Wireless Infrastructure
	Acoustic & Discrete	HIGH ACCURACY measurement instruments	

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