

PERPH-X High Performance pH Sensors



- **HIGH TEMPERATURE DESIGN INCREASES SENSOR LIFE** when used in elevated temperature applications.

- LONG LASTING REBUILDABLE REFERENCE
- FIELD PROVEN ACCUGLASS^{®1} pH glass formulations minimize glass cracking, resulting in enhanced performance and increased life.
- PRESSURE/TEMPERATURE RATINGS of 100 psig (790 kPa [abs]) at 145°C (293°F) or 250 psig (1825 kPa [abs]) at 100°C (212°F).
- SEVERAL MOUNTING AND CABLING OPTIONS including VP connector.



MODELS 3400HT & 3400HTVP

RETRACTABLE DESIGN allows sensor to be removed for calibration and maintenance without process shutdown



MODELS 3300HT & 3300HTVP

INSERTION/SUBMERSION DESIGN allows for variable insertion depths and simple sensor removal without cable twisting

FEATURES AND APPLICATIONS

The Rosemount Analytical **PERPH-X**² high performance pH sensors incorporate several design innovations that prolong the life of the sensor in difficult applications. The 3300/3400 sensors were engineered for and evaluated in high temperature processes which provide the harshest test of pH sensor design. This process validated the improved durability of the pH glass electrode, the increased stability of the reference electrode and the overall reliability of the mechanical design. The resulting sensors live longer, respond faster and drift less thereby minimizing maintenance and lowering the total cost of ownership.

The ACCUGLASS pH glass electrode provides exceptional resistance to thermal degradation, even at temperatures above 140°C. This translates to less breakage from thermal stress or shock and improved speed of response for fast and accurate calibrations even after months of service. The beneficial pH traits of near theoretical response, even at extreme values, and min-

imal hysteresis carryover from previous ACCUGLASS designs. A slotted tip protects the glass bulb from direct impacts while in service and during calibration.

The **PERPH-X** sensors utilize an enhanced double junction reference electrode that excels in harsh applications. The KCl based reference electrolyte is a temperature insensitive viscous gel that resists the fouling caused by thermal or pressure cycling. The specially designed porous Teflon^{®3} liquid junction has a large surface area to maintain a steady reference signal in dirty fouling applications. In the event that it becomes fouled or plugged the porous Teflon reference junction can be easily replaced. With the junction removed the outer reference electrolyte can be recharged using a gel filled syringe supplied in the Refill Kit, available as an accessory.

¹ ACCUGLASS is a registered trademark of Rosemount Analytical.

² PERPH-X is a trademark of Rosemount Analytical.

³ Teflon is a registered trademark of E.I. du Pont de Nemours and Company.

Most pH measurements fail due to reference electrode problems, fouled electrolytes or clogged reference junctions. Replacing a clogged junction or recharging the electrolyte will rejuvenate most failed sensors. Preventive maintenance on the reference electrolyte can dramatically extend the ultimate life of the sensor by minimizing the depletion or poisoning of the primary reference. Specialty electrolyte solutions are available for certain troublesome measurements.

The successful measurement of pH requires more than just a great pH glass electrode, the AccuGlass electrode, and a great reference electrode, the double junction porous Teflon reference, it requires that these electrodes are built into a sensor that can withstand the demanding environments present in Chemical Processing Industries. The 3300/3400 pH sensors accomplish this through the use of a molded Ryton® body housed in a titanium tube. The chemically resistant construction is further enhanced by the choice of either EPDM, Viton or Kalrez o-rings.

The **PERpH-X** High Performance pH sensors were not only evaluated in high temperature applications but in numerous chemically aggressive, dirty, fouling

applications. This design provides superior performance in most applications including pulp stock, lime slurries, scrubbers, carpet dyeing and waste neutralizations containing organic solvents.

Models 3300HT and 3400HT are available with 15 ft. of cable for wiring directly to an analyzer/transmitter or a remote junction box. The Model 3400HT retractable sensor is also available with 9.5 in. of cable for use with a sensor head junction box which attaches to the sensor tube via a compression fitting. A variopol VP connector is also available to facilitate quick sensor replacement.

When the 3300/3400 sensors are installed more than 15 feet from the analyzer/transmitter a remote preamplifier should be used to protect the integrity of the high impedance pH signal. The preamplifier can be in a remote junction box or integral to the analyzer/transmitter. All 3300HT and 3400HT sensors are compatible with Rosemount Analytical's Models 54e, 1055, 5081, Xmt instruments, and other manufacturers' instruments that do not require a preamp in the sensor.

PERFORMANCE AND PHYSICAL SPECIFICATIONS FOR MODELS 3300HT AND 3400HT

Measured Range:

pH: 0 - 14 pH

Percent Linearity Over pH Ranges:

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

Reference: Replaceable Teflon® junction with refillable electrolyte

Wetted Materials: Titanium, Ryton®, Teflon®, glass, and user specified o-ring material

Process Connections: NONE

Must use 1 inch compression process connector (PN 23166-00 or 23166-01).

Also, Model 3400HT can be inserted through a ball valve

Cable: Standard integral 15 ft , optional 9.5 in. (for Model 3400 only); or VP6 connector
Recommended Interconnect: PN 9200273

Operating Temperature: 5°C to 145°C (41°F to 293°F)

Storage Temperature: -10°C to 70°C (14°F to 138°F)

Maximum Process Pressure and Temperature:
100 psig (790 kPa [abs]) at 293°F (145°C)
250 psig (1825 kPa [abs]) at 212°F (100°C)

Maximum Pressure at Retraction or Insertion (Model 3400HT only):

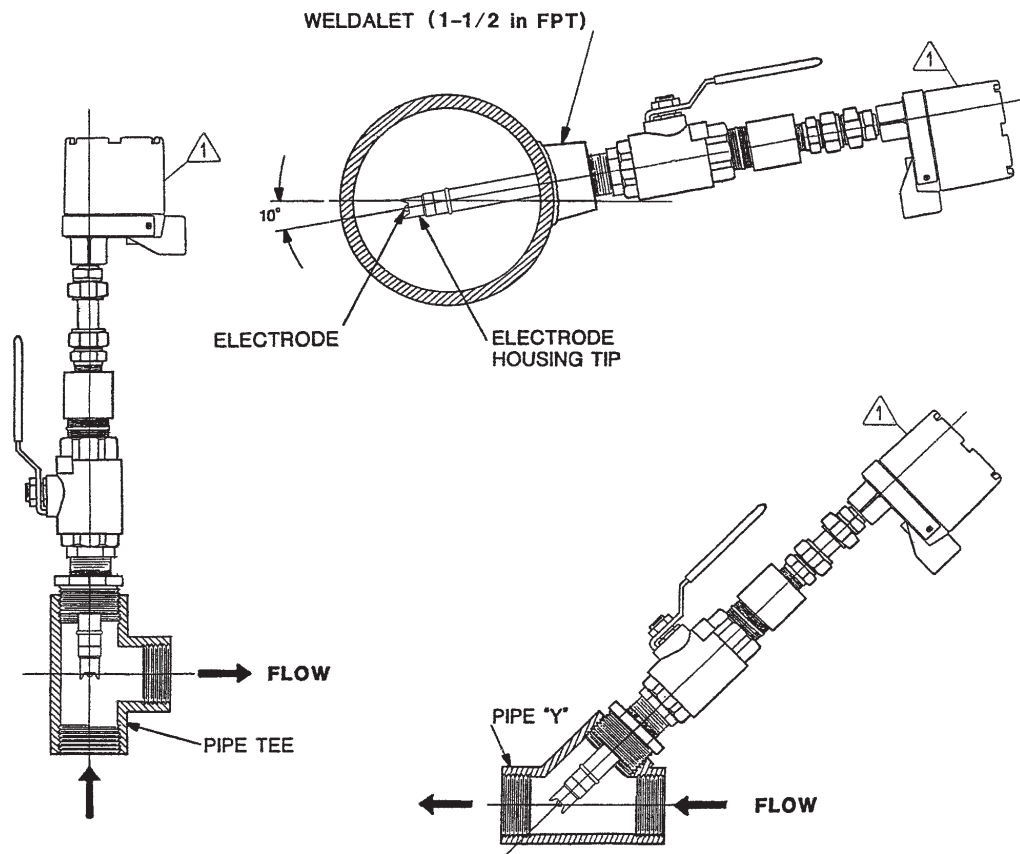
64 psig (524 kPa [abs]) Code 21
35 psig (343 kPa [abs]) Code 25

Weight/Shipping Weight:

Model 3300HT sensor: 1 lb/2 lb (0.5 kg/0.9 kg)

Model 3400HT sensor:
Code 21; 2 lb/3 lb (0.9 kg/1.4 kg)
Code 25; 3 lb/4 lb (1.4 kg/1.8 kg)

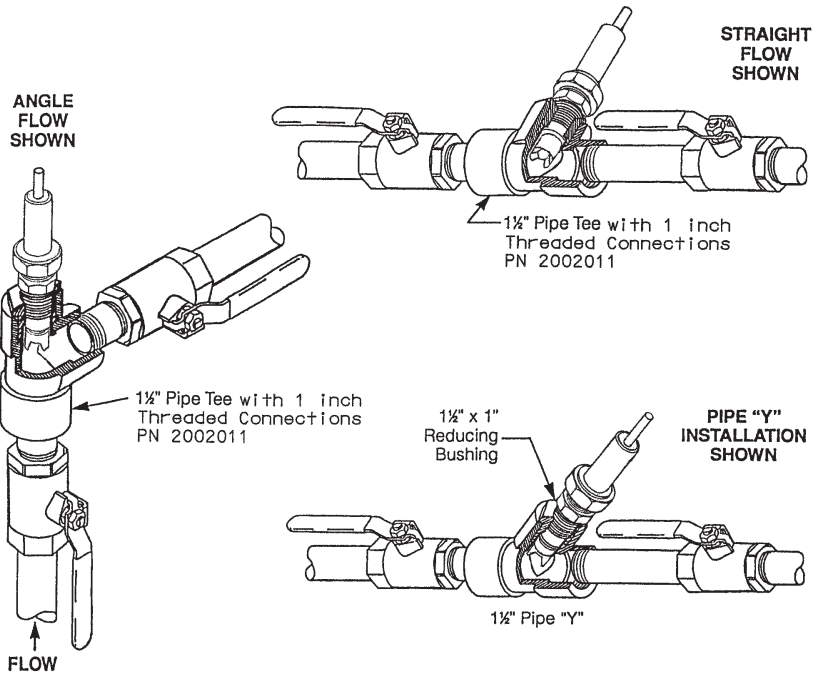
¹ Ryton is a registered trademark of Chevron Phillips Chemical Company.



1 JUNCTION BOX IS OPTIONAL

Typical Mounting Details - Model 3400HT Retraction Version

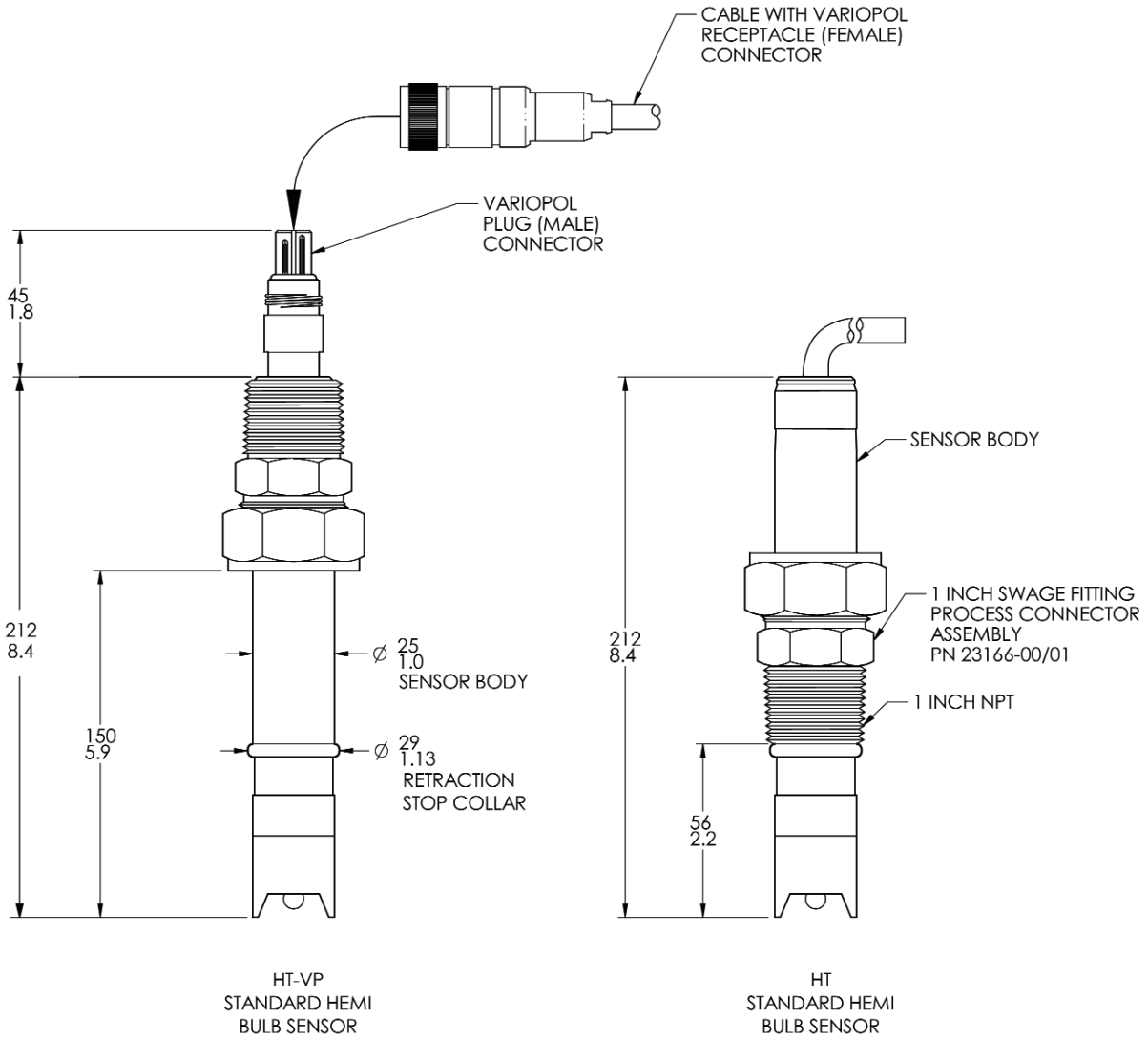
*Note: Sensor must be mounted at an angle between 10° and 90° above the horizontal.
Pipe tees and weldalets provided by customer.*



Recommended Flow-Through and Insertion Installation for Model 3300HT
1-1/2 inch Pipe Tee (PN 2002011) with 1 inch threaded connections

WHEN INCH AND METRIC DIMS
ARE GIVEN
MILLIMETER
INCH

REVISIONS			
LTR	DESCRIPTION	DATE	APVD



NOTES: UNLESS OTHERWISE SPECIFIED

Dimensional Drawing - Model 3300HT and 3300HTVP Insertion/Submersion Sensor

The process connector can be placed onto Model 3300HT with the threads facing down for insertion mounting into a tee or the threads facing up for a submersion pipe mount connection.

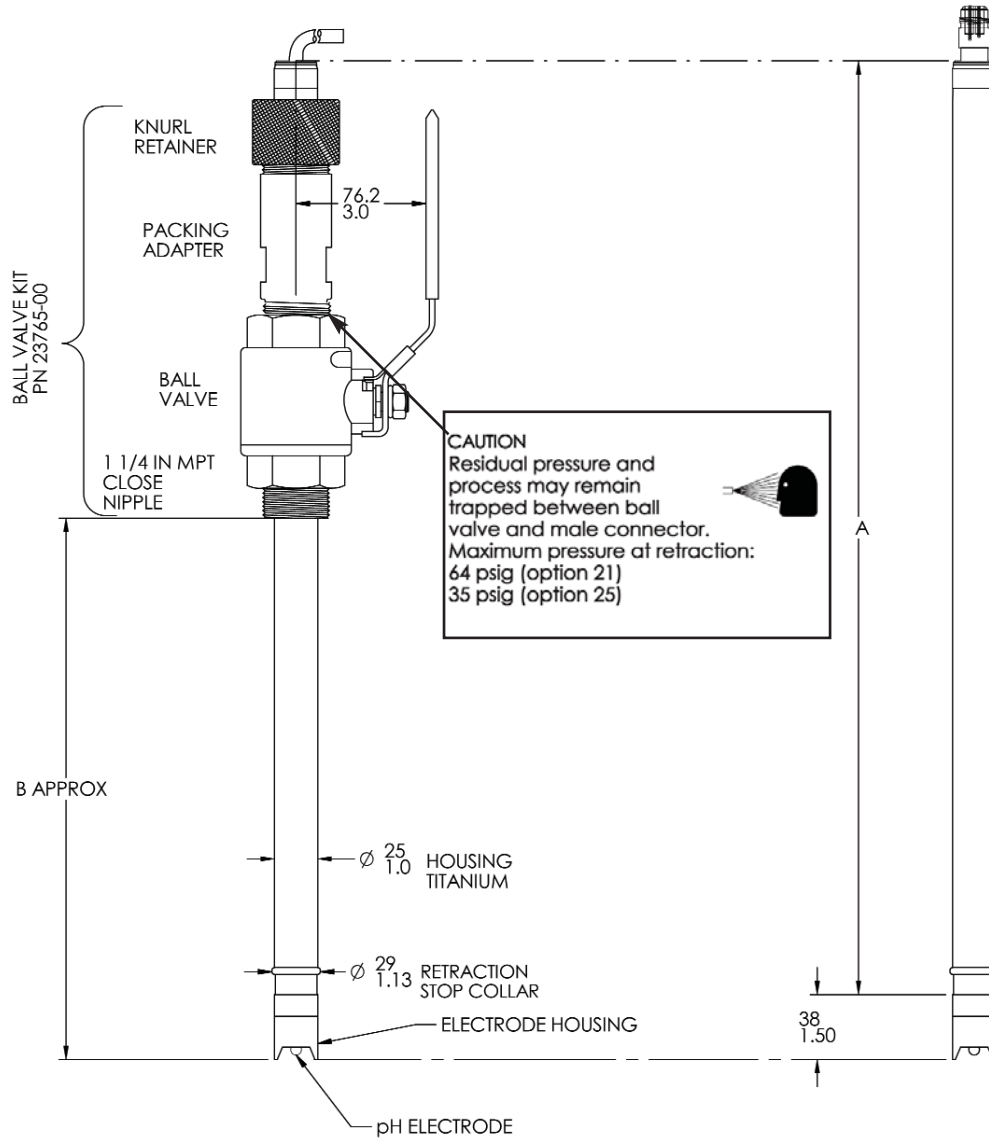
WHEN INCH AND METRIC DIMS
ARE GIVEN

MILLIMETER
INCH

REVISIONS

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



NOTES: UNLESS OTHERWISE SPECIFIED

Dimensional Drawing — Model 3400HT with Optional Ball Valve PN 23765-00

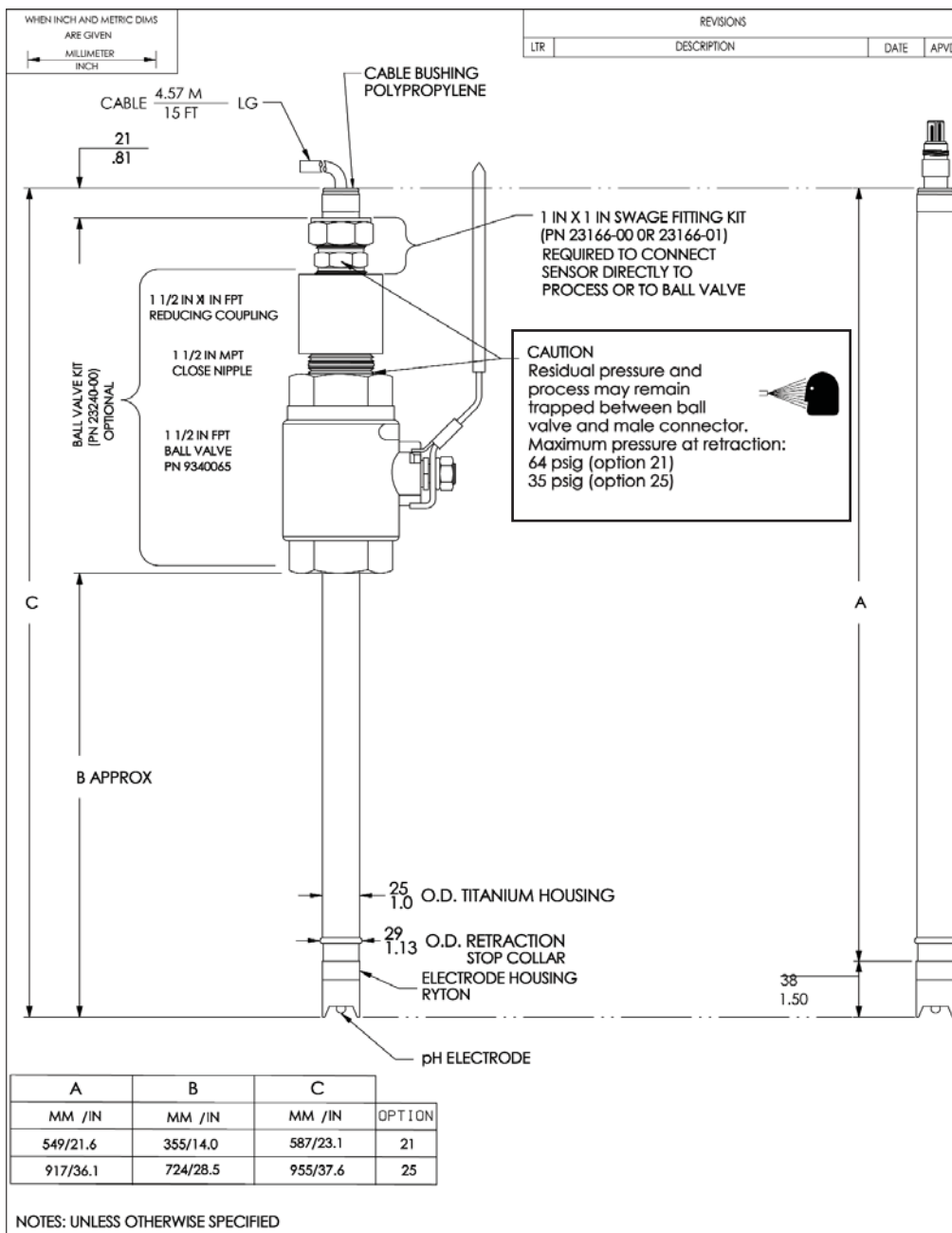
Note: Add five (5) inches to dimension A if mounting a sensor head junction box onto the sensor.



Ball Valve Kit (PN 23240-00) used with Model 3400HT retractable sensor



A process connector (PN 23166-00 or -01) must be used to connect the sensor to Ball Valve Kit 23240-00. Process connector can be purchased separately.



Dimensional Drawings of Model 3400HT with and without 1-1/2 in. Ball Valve PN 23240-00

For the ball valve installation shown, the ball valve kit (PN 23240-00) and 1 in. x 1 in. process connector (PN 23166-00 or 23166-01) must be purchased separately.

Note: Add five (5) inches to length of sensor if mounting a sensor-head junction box onto the sensor.

The **Model 3300HT Sensor** is designed for use at high temperatures and is fabricated with a Ryton[®] body. The sensor assembly is housed in a titanium tube and requires a process connector (PN 23166-00 or 23166-01, ordered separately) for installation. The sensor includes a hemi glass pH electrode bulb, a Teflon[®] reference junction, and a Pt100 RTD for temperature compensation. Two wiring configurations are available: Variopol connector (3300HTVP), and 15 foot lead for connecting directly to an analyzer or transmitter (3300HT). A Junction box kit with preamplifier (ordered separately) is required if the sensor cannot be installed within 15 feet of the analyzer/transmitter.

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² Teflon is a registered trademark of E.I. du Pont de Nemours and Company.

MODEL 3300HT INSERTION/SUBMERSION pH SENSOR 3300HTVP INSERTION/SUBMERSION pH SENSOR/VP CONNECTOR	
CODE	MEASURING ELECTRODE TYPE (Required Selection)
10	GPHT hemi glass, General Purpose High Temperature (0-14 pH)
CODE	O-RING MATERIAL (Required Selection)
30	EPDM
31	Viton [®]
32	Kalrez [®]
3300HT - 10 - 30 EXAMPLE	



FOR FIRST TIME MODEL 3300HT INSERTION OR SUBMERSION INSTALLATIONS, ROSEMOUNT ANALYTICAL RECOMMENDS USING THE FOLLOWING GUIDE:

<p>1. Process Connector Accessories (required for all first time installations with 1-inch process connection threads)</p> <p>Choose one: PN 23166-00, 316 SST, 1 in. x 1 in. NPT process connector, with EPDM o-ring</p> <p> PN 23166-01, Titanium, 1 in. x 1 in. NPT process connector, with EPDM o-ring</p> <p>Choose one (optional process connector o-rings)</p> <p> PN 9550220, Kalrez[®] o-ring, 2-214</p> <p> PN 23238-00, Viton[®] o-ring, 2-214</p>	<p>Weight/Shipping Weight</p> <p>0.5 lb (0.3 kg)/1.0 lb (0.5 kg)</p> <p>0.5 lb (0.3 kg)/1.0 lb (0.5 kg)</p> <p>0.1 lb (0.05 kg)/1.0 lb (0.5 kg)</p> <p>0.1 lb (0.05 kg)/1.0 lb (0.5 kg)</p>
<p>2. Remote Junction Boxes (optional, recommended for sensor to analyzer distances of more than 15 ft)</p> <p>Choose one: PN 23555-00 includes preamplifier for Models 54e, 1055, 5081, Xmt</p>	<p>1.3 lb (0.6 kg)/2.0 lb (1.0 kg)</p>
<p>3. Extension cables (used with remote junction boxes)</p> <p>Choose one: PN 23646-01, 11 conductor, shielded, prepped</p> <p> PN 9200273, 11 conductor, shielded, unprepped</p> <p> PN 23645-07 cable, 15' with VP connector</p>	<p>0.5 lb/ft (0.3 kg/ft)/ 1.0 lb/ft (0.5 kg/ft)</p> <p>0.5 lb/ft (0.3 kg/ft)/ 1.0 lb/ft (0.5 kg/ft)</p> <p>0.5 lb/ft (0.3 kg/ft)/ 1.0 lb/ft (0.5 kg/ft)</p>



Metal Process Connector PN 23166-xx (xx = 00 for 316 SST and xx = 01 for Titanium) can be used for insertion or submersion connection to 1-inch tee fittings. It also must be used to connect Model 3400HT to ball valve PN 23240-00 or directly to the process.



The metal process connector gives the sensor various insertions depths, depending on where the user locates the compression fitting. Also the threads can be switched to face the cable end of the sensor for connection to submersion pipes.

ORDERING INFORMATION

The **Model 3400HT Sensor** is designed for use at high temperatures and is fabricated with a Ryton[®] body. The sensor assembly is housed in a titanium tube and requires a process connector (PN 23166-00 or 23166-01, ordered separately) for installation. The sensor can be used in a ball valve (ordered separately) for hot tap (retractable) applications. The sensor includes a hemi glass pH electrode bulb, a Teflon[®] reference junction, and a Pt100 RTD for temperature compensation. Three wiring configurations are available: Variopol connector (3400HTVP), 9.5 inch lead for sensor head junction box mounting (-61), and 15 foot lead for connecting directly to an analyzer or transmitter(-62). Junction box kits with preamplifiers (ordered separately) are required if the sensor cannot be installed within 15 feet of the analyzer/transmitter.

MODEL
3400HT RETRACTABLE pH SENSOR
3400HTVP RETRACTABLE pH SENSOR/VP CONNECTOR

CODE	MEASURING ELECTRODE TYPE (Required Selection)
10	GPHT hemi glass, General Purpose High Temperature (0-14 pH)

CODE	SENSOR LENGTH (Required Selection)
21	21 in. Titanium Tube
25	36 in. Titanium Tube

CODE	O-RING MATERIAL (Required Selection)
30	EPDM
31	Viton [®]
32	Kalrez [®]

CODE	CABLE LENGTH (required selection for 3400HT, not available for 3400HTVP)
61	9.5 in. Cable no BNC (for use with Models 54e, 1055, 5081 and Xmt sensor head junction boxes)
62	15 ft Cable, no BNC for wiring directly to 1055, 54/54e, 5081, and Xmt Transmitter/Analyzers/J-box

3400HT - 10 - 21 - 30 - 62 EXAMPLE



FOR FIRST TIME INSTALLATIONS OF MODEL 3400HT RETRACTABLE SENSOR, ROSEMOUNT ANALYTICAL RECOMMENDS USING THE FOLLOWING GUIDE

ACCESSORIES	WEIGHT/SHIPPING WEIGHT
1. Retractable Mounting	
<p>A. Choose one (required for all first time installations without ball valves or with 1-1/2 in. ball valve):</p> <p>PN 23166-00, 1 in. MNPT process connector, Stainless Steel with EPDM O-ring</p> <p>PN 23166-01, 1 in. NPT process connector, Titanium with EPDM O-ring</p> <p>B. Choose one (Optional; Process Connector O-rings):</p> <p>PN 9550220, O-ring, Kalrez[®], 2-214</p> <p>PN 23238-00, O-ring, Viton[®], 2-214</p> <p>C. Choose one:</p> <p>PN 23240-00, 1-1/2 in. ball valve assembly, 316 SST (process connector required)</p> <p>PN 23765-00, 1-1/4 in. ball valve assembly, 316 SST</p>	<p>0.5 lb (0.3 kg)/1.0 lb (0.5 kg)</p> <p>0.5 lb (0.3 kg)/1.0 lb (0.5 kg)</p> <p>0.1 lb (0.05 kg)/1.0 lb (0.5 kg)</p> <p>0.1 lb (0.05 kg)/1.0 lb (0.5 kg)</p> <p>6.0 lb (3.0 kg)/7.0 lb (3.5 kg)</p> <p>6.0 lb (3.0 kg)/7.0 lb (3.5 kg)</p>
2. Junction Boxes (Optional; Choose either Sensor Head or Remote)	
<p>A. Sensor Head Junction Boxes (used with 9.5 in. cable length sensor) Choose one:</p> <p>PN 23709-00; includes preamplifier for Models 54e, 1055, 5081, Xmt</p> <p>B. Remote Junction Boxes (used with 15 ft cable length sensor) Choose one:</p> <p>PN 23555-00; includes preamplifier for Models 54e, 1055, 5081, Xmt</p>	<p>3.3 lb (1.5 kg)/4.0 lb (2.0 kg)</p> <p>1.3 lb (0.6 kg)/2.0 lb (1.0 kg)</p>
3. Extension Cables - Choose one:	
<p>PN 23646-01, 11 conductor, shielded, prepped</p> <p>PN 9200273, 11 conductor, shielded, unprepped</p> <p>PN 23645-07 cable, 15' with VP connector</p>	<p>0.1 lb/ft (0.05 kg/ft)/1.0 lb/ft (0.5 kg/ft)</p> <p>0.1 lb/ft (0.05 kg/ft)/1.0 lb/ft (0.5 kg/ft)</p> <p>0.1 lb/ft (0.05 kg/ft)/1.0 lb/ft (0.5 kg/ft)</p>



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the right answers,
right now.*

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Emerson Process Management

Liquid Division

2400 Barranca Parkway
Irvine, CA 92606 USA
Tel: (949) 757-8500
Fax: (949) 474-7250

<http://www.raihome.com>

