

PER_{PH}-X High Temperature pH Sensors

For additional information, please refer to the Instruction Manuals CD shipped with this product, or visit our website at www.emersonprocess.com/raihome/liquid/.

SPECIFICATONS MODELS 3300HT AND 3400HT

Measured Range:

pH: 0 - 14 pH

Reference: Replaceable Teflon® junction with refill-able electrolyte

Wetted Materials: Titanium, Ryton™, Teflon®, glass, and EPDM

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 3400HT only); or VP6 connector
 Recommended Interconnect: PN 9200273

Operating Temperature: 5 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)

***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%

DANGER

DO NOT CONNECT SENSOR TO POWER LINES. SERIOUS INJURY MAY RESULT.

WARNING

GLASS ELECTRODE MUST BE WETTED AT ALL TIMES (IN STORAGE AND IN LINE) TO MAXIMIZE SENSOR LIFE.

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.

WARNING

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!



STORAGE

1. It is recommended that electrodes be stored in their original shipping containers until needed.
2. Do not store at temperatures below -5°C (23°F).
3. Electrodes should be stored 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. A pH glass electrode does have a limited shelf life of one year.

ELECTRODE PREPARATION

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

CAUTION

The buffer in the protective boot may cause skin or eye irritation.

INSTALLATION

For sensor dimensions, see Figures 1 - 3.
 For sensor orientation and installation, see Figures 4 - 8.
 For wiring, see Figures 9 - 19.

pH SENSOR CALIBRATION

TWO POINT pH BUFFER CALIBRATION

Select two stable buffer solutions, preferably pH 4.0 and 10.0 (pH buffers other than pH 4.0 and pH 10.0 can be used as long as the pH values are at least two pH units apart).

NOTE

A pH 7 buffer solution reads a mV value of approx. zero, and pH buffers read approximately ± 59.1 mV for each pH 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.

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. Value of buffer can now be acknowledged by analyzer/transmitter.
2. Once the first buffer has been acknowledged by the analyzer/transmitter, rinse the buffer solution off of the sensor with distilled or deionized water.
3. Repeat steps 1 and 2 using the second buffer solution.
4. The theoretical slope value, according to the Nernst equation for calculating pH, is approximately 59.17 mV/pH. Over time the sensor will age, both in the process and in storage, and will result in reduced slope values. To ensure accurate readings, it is recommended that the electrode be replaced when the slope value falls below 47 to 49 mV/pH.

RECOMMENDED pH SENSOR STANDARDIZATION

For maximum accuracy, the sensor can be standardized on-line or with a process grab sample after a buffer calibration has been performed and the sensor has been conditioned 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 analyzer's reading to match that of the known process pH.

MAINTENANCE

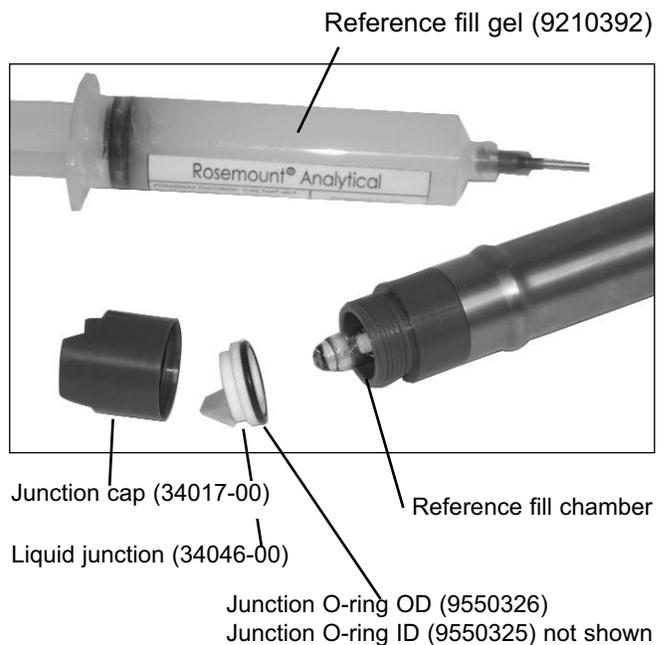
Electrodes should respond rapidly. Sluggishness, offsets, and erratic readings are indicators that the electrodes may need cleaning or replacement.

1. To remove oil deposit, clean the electrode with a mild non-abrasive detergent.
2. To remove scale deposits, soak electrodes for 30 to 60 minutes in a 5% hydrochloric acid solution.

REFERENCE JUNCTION REPLACEMENT AND SENSOR ELECTROLYTE RECHARGE

The reference junction and reference fill gelled solution is replaceable to facilitate longer sensor life due to electrolyte depletion and junction plugging and contamination. Use the junction replacement kit (24192-00) and reference fill gel (9210392) to accomplish this procedure.

1. Remove the junction cap by turning counter clockwise.
2. Remove the liquid junction by pulling the junction straight out.



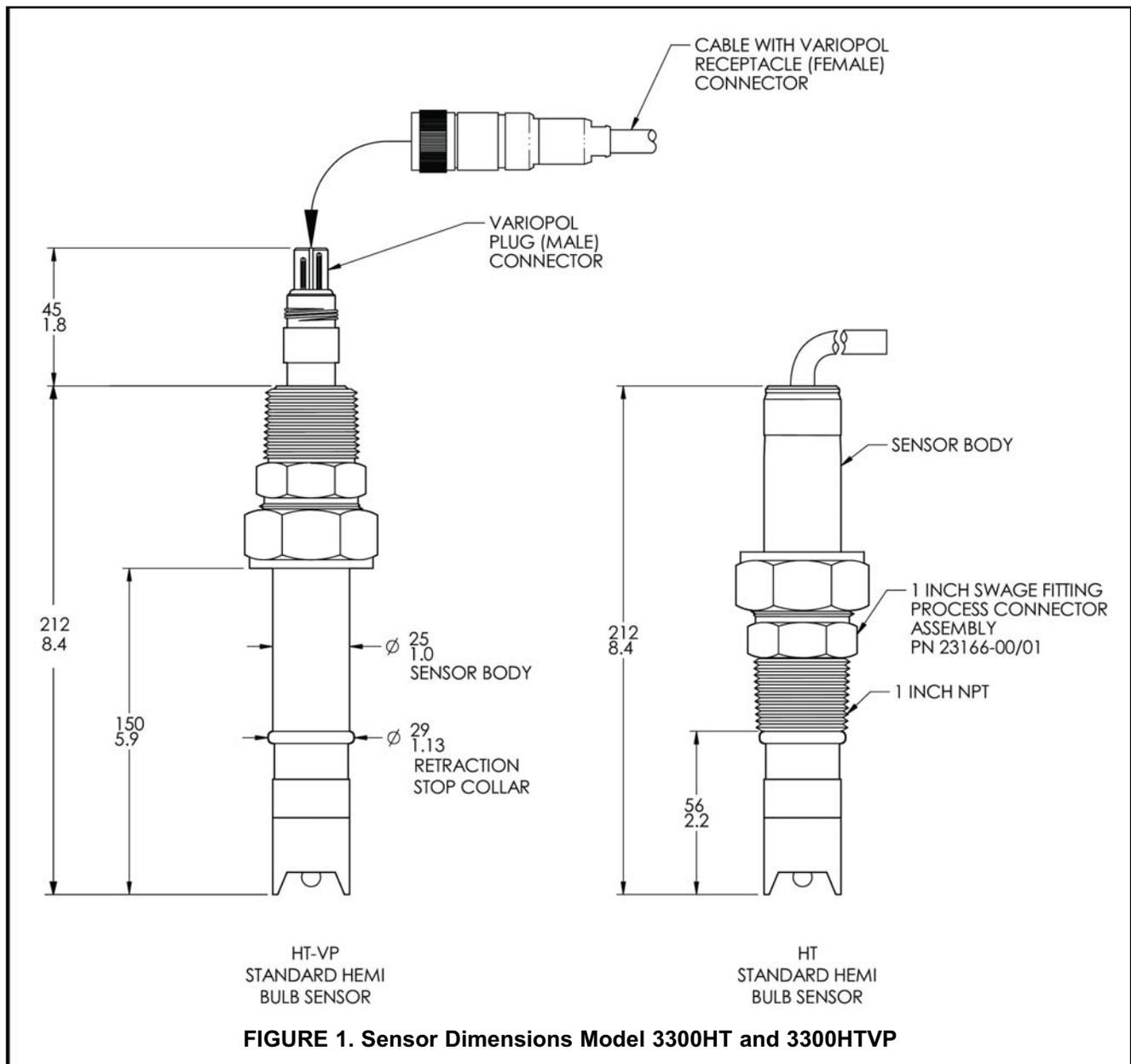
CAUTION

The reference electrolyte may cause skin or eye irritation.

3. Remove the old reference fill gel by rinsing with water.
4. Fill the reference fill chamber with the reference fill gel using the syringe and remove any air bubbles. Top off the reference fill chamber until it is completely filled.
5. Replace the junction O-ring and liquid junction by sliding over the glass electrode. Excess reference gel should flow out.
6. Replace junction cap by turning clockwise. Hand tighten the junction cap only do not use pliers to tighten the cap.
7. Buffer check and calibrate the sensor as described in the previous section.

WARNING

System pressure may cause the sensor to blow out with great force unless care is taken during removal.

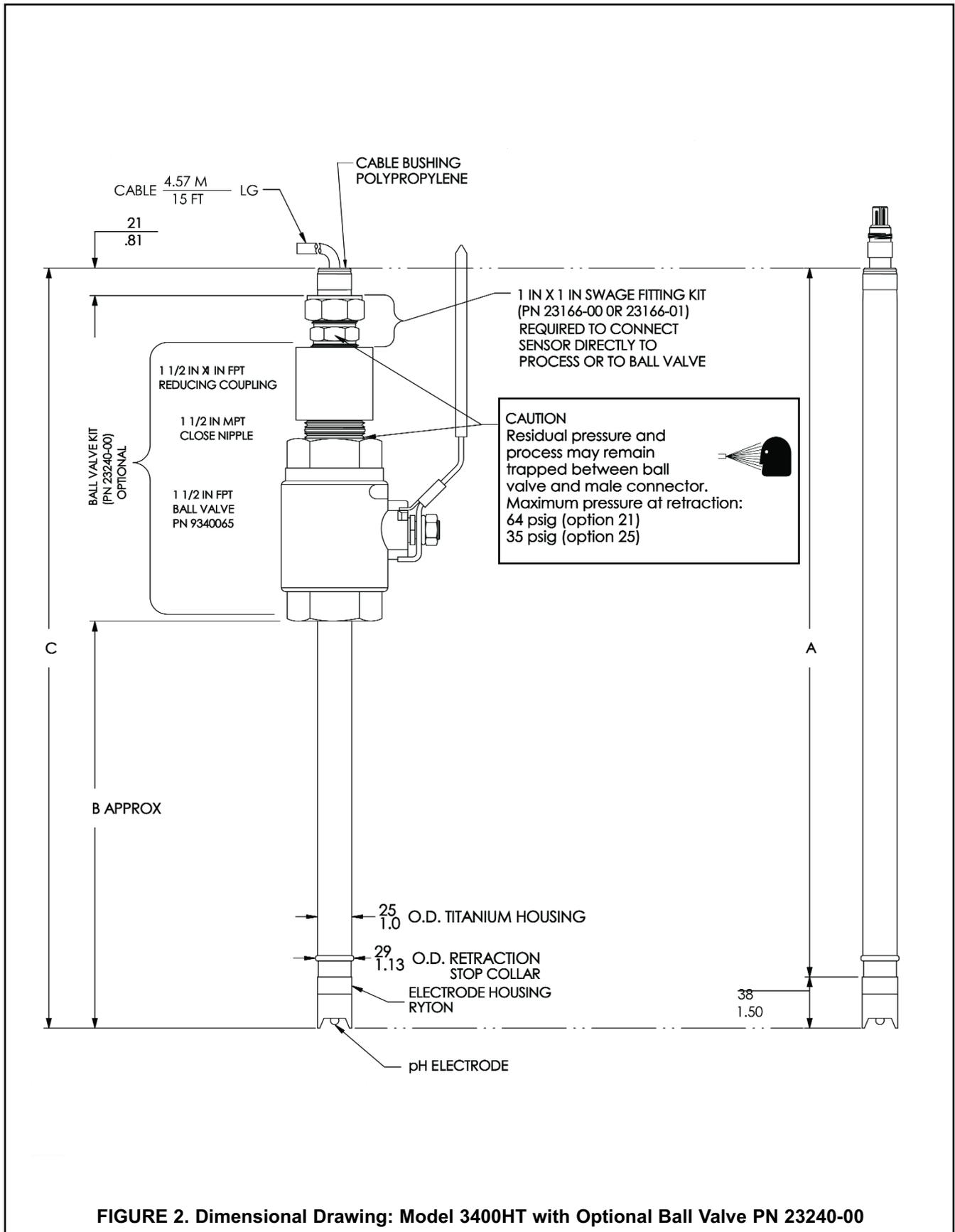


FIGURE 2. Dimensional Drawing: Model 3400HT with Optional Ball Valve PN 23240-00

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

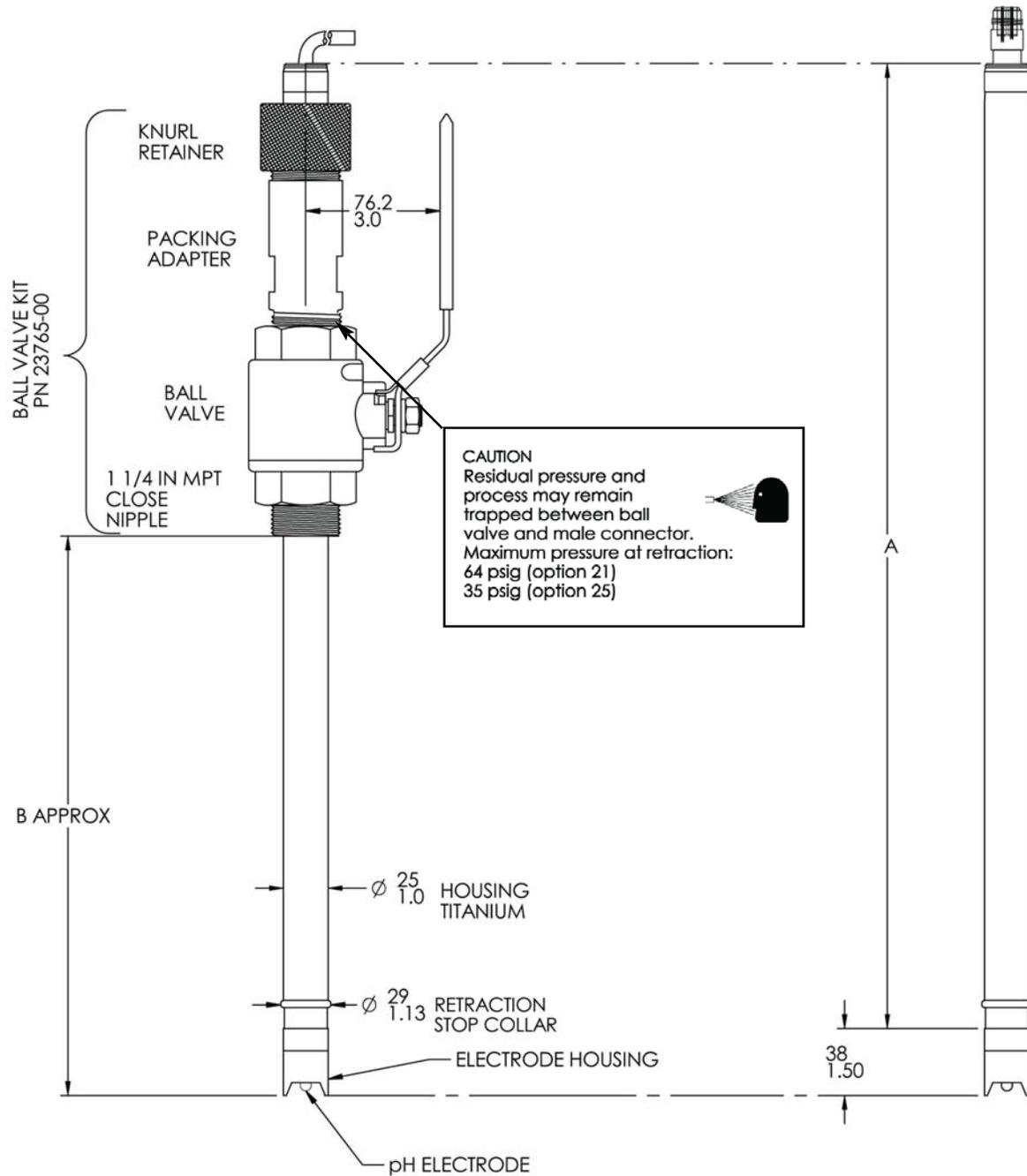
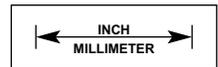


FIGURE 3. Dimensional Drawing: Model 3400HT with Optional Ball Valve PN 23765-00

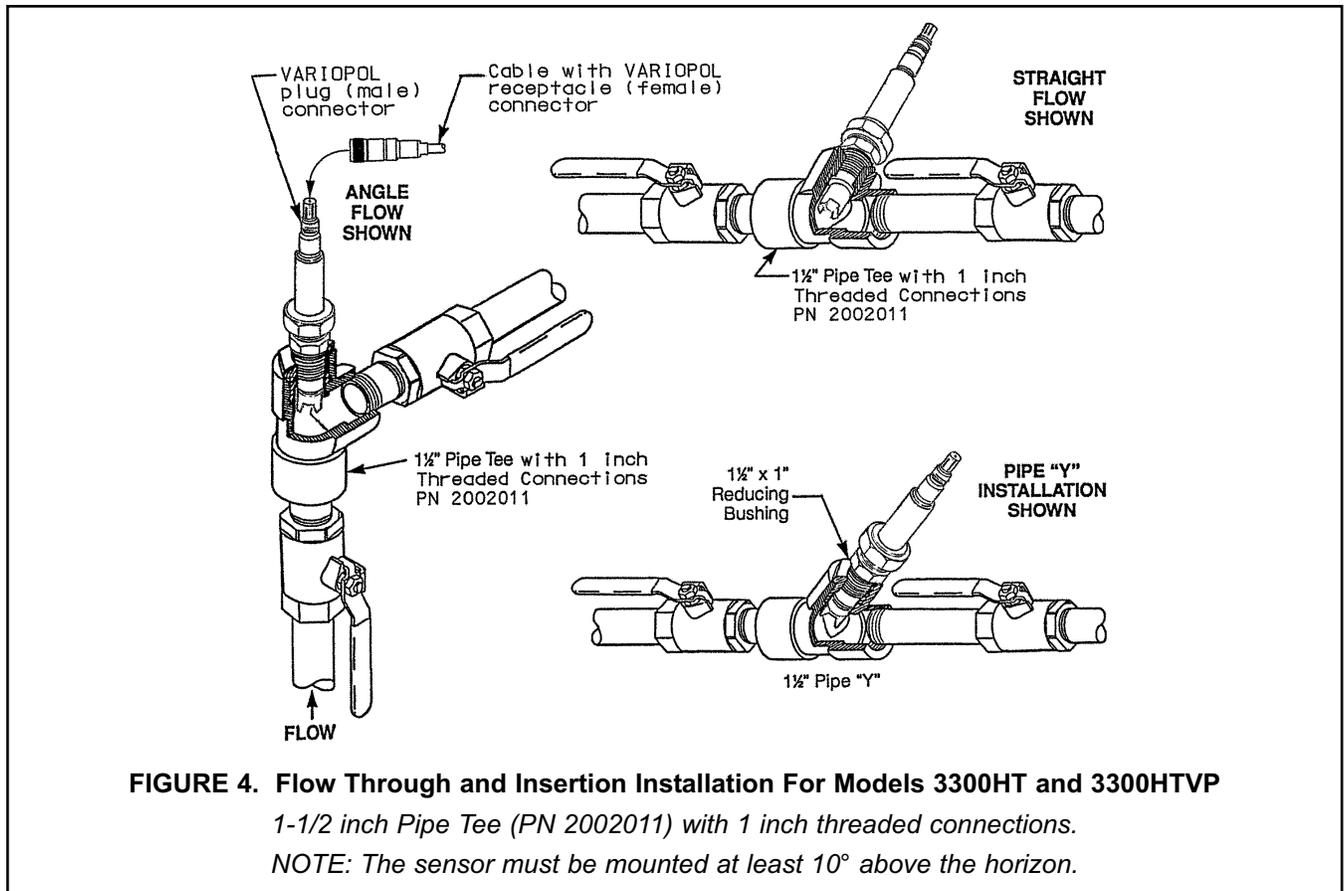
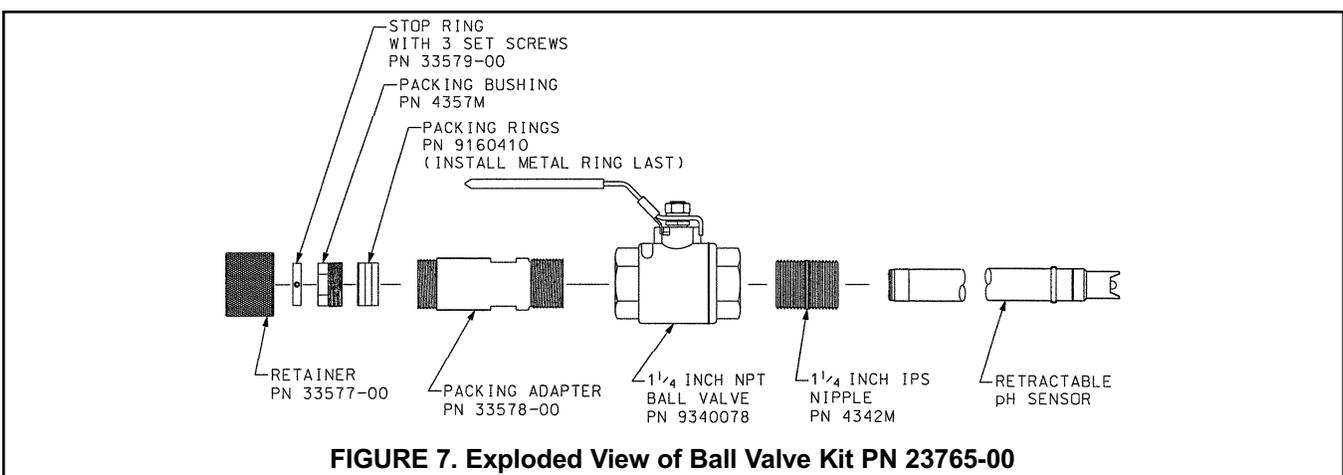
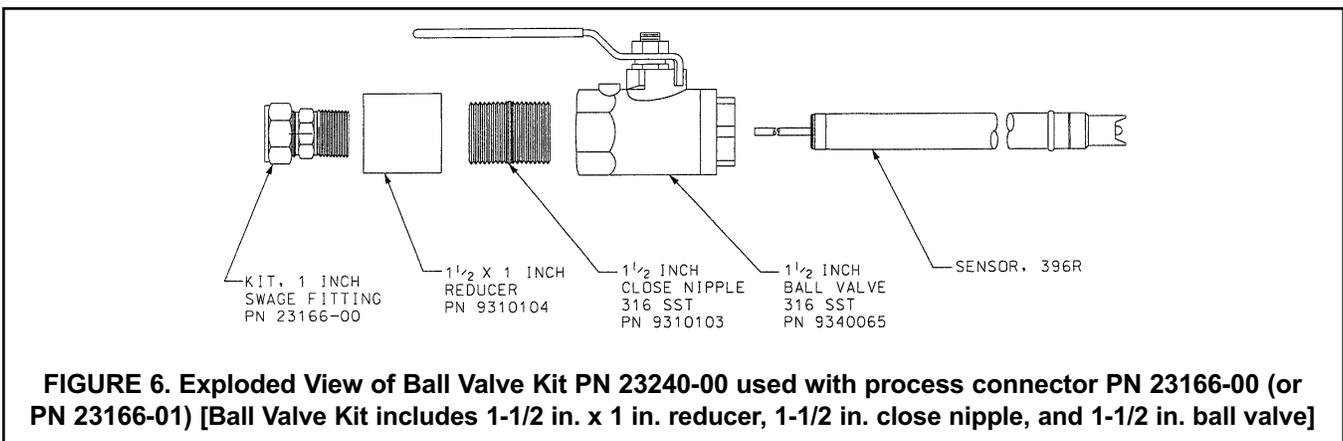
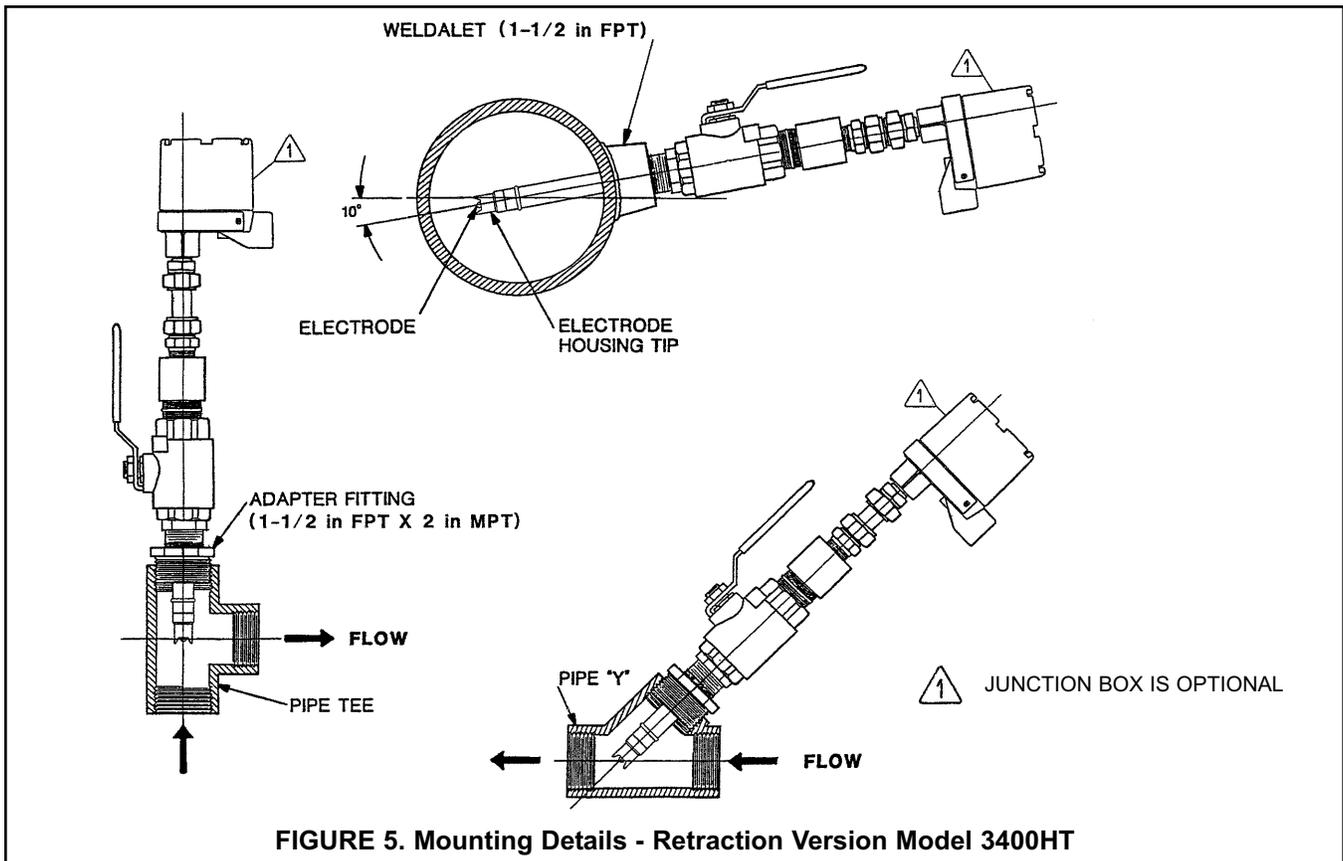


FIGURE 4. Flow Through and Insertion Installation For Models 3300HT and 3300HTVP

1-1/2 inch Pipe Tee (PN 2002011) with 1 inch threaded connections.

NOTE: The sensor must be mounted at least 10° above the horizon.



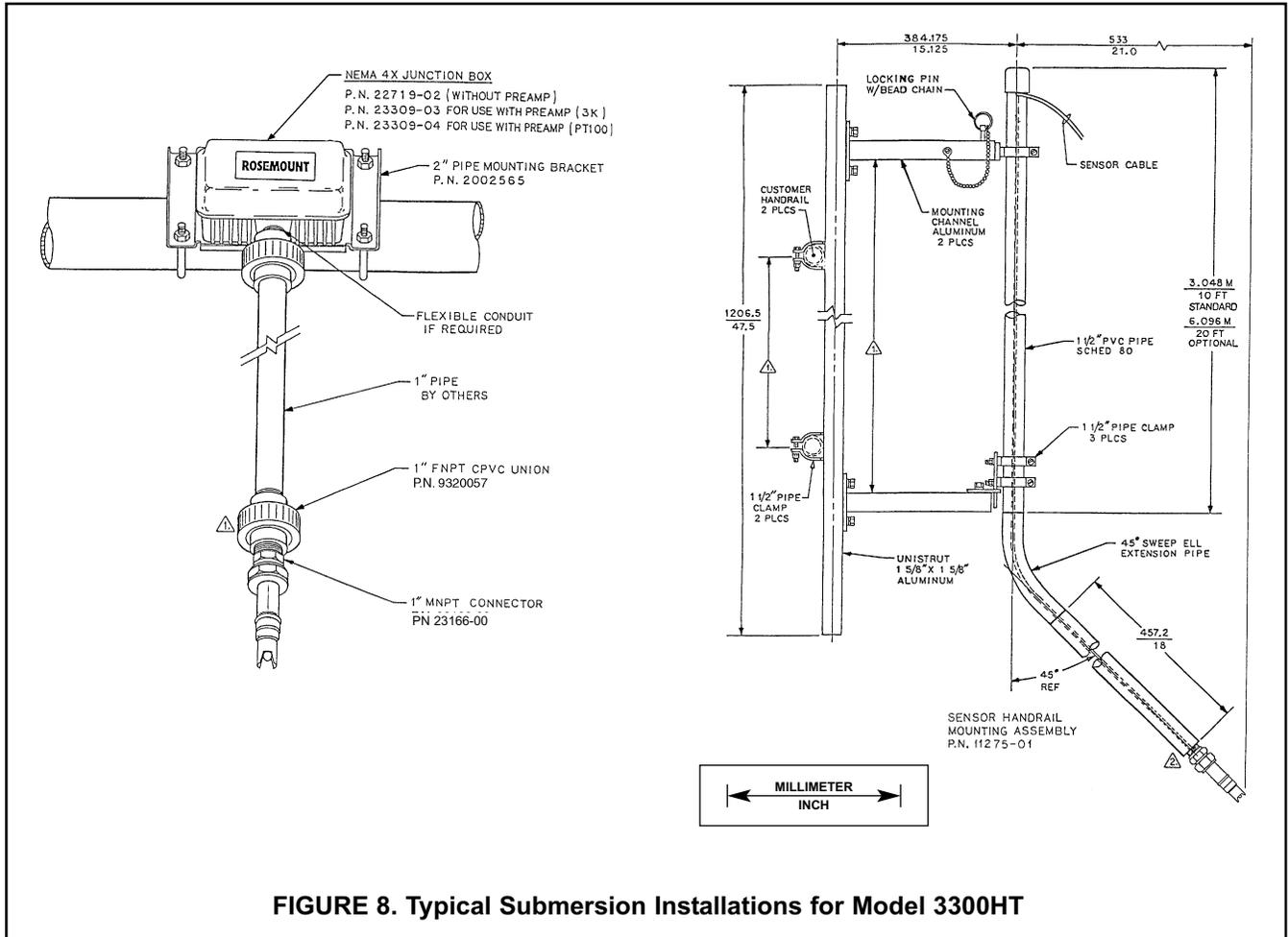


FIGURE 8. Typical Submersion Installations for Model 3300HT

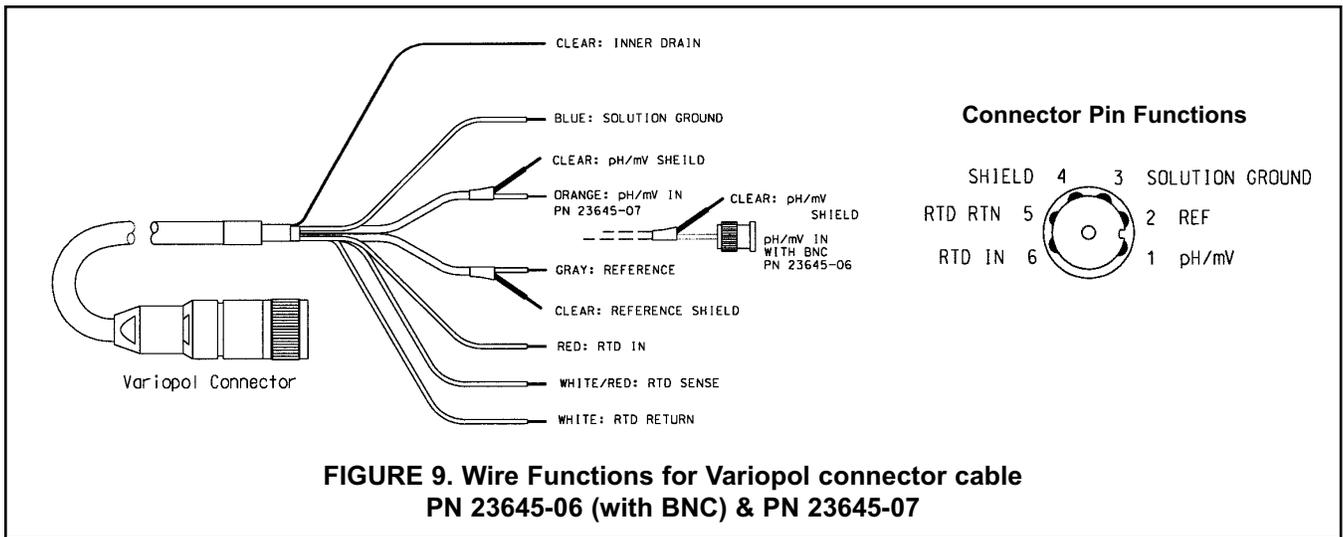


FIGURE 9. Wire Functions for Variopool connector cable PN 23645-06 (with BNC) & PN 23645-07

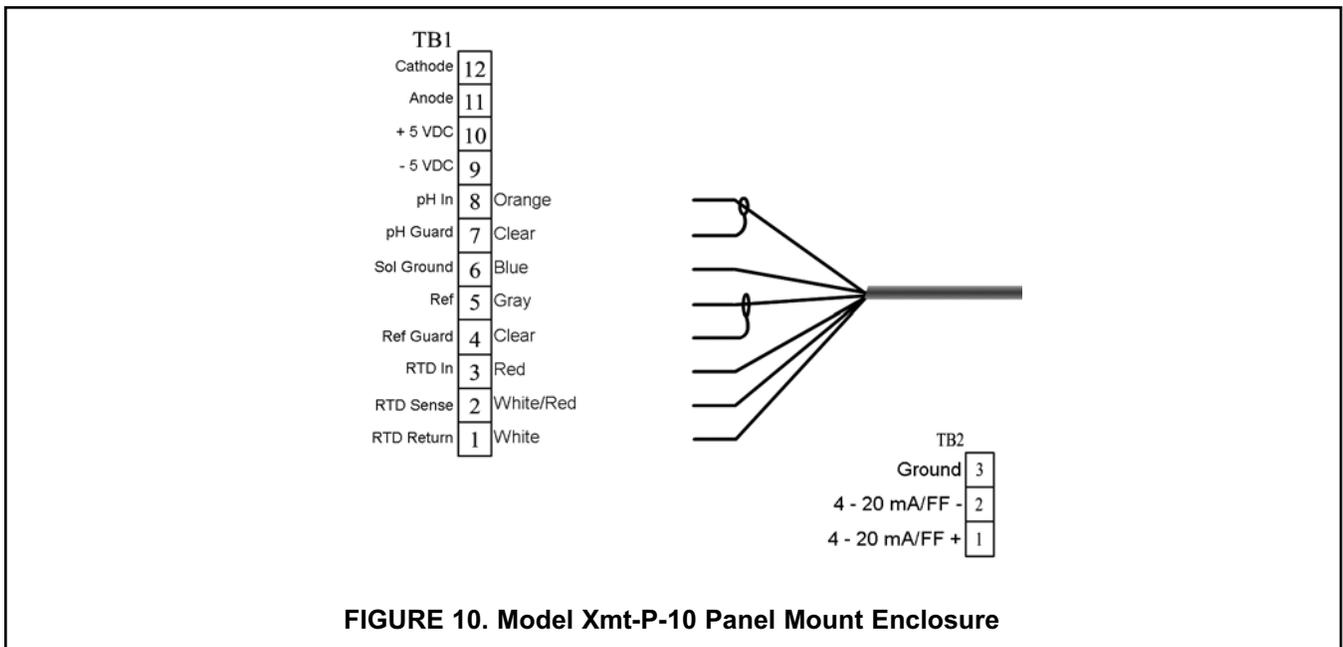


FIGURE 10. Model Xmt-P-10 Panel Mount Enclosure

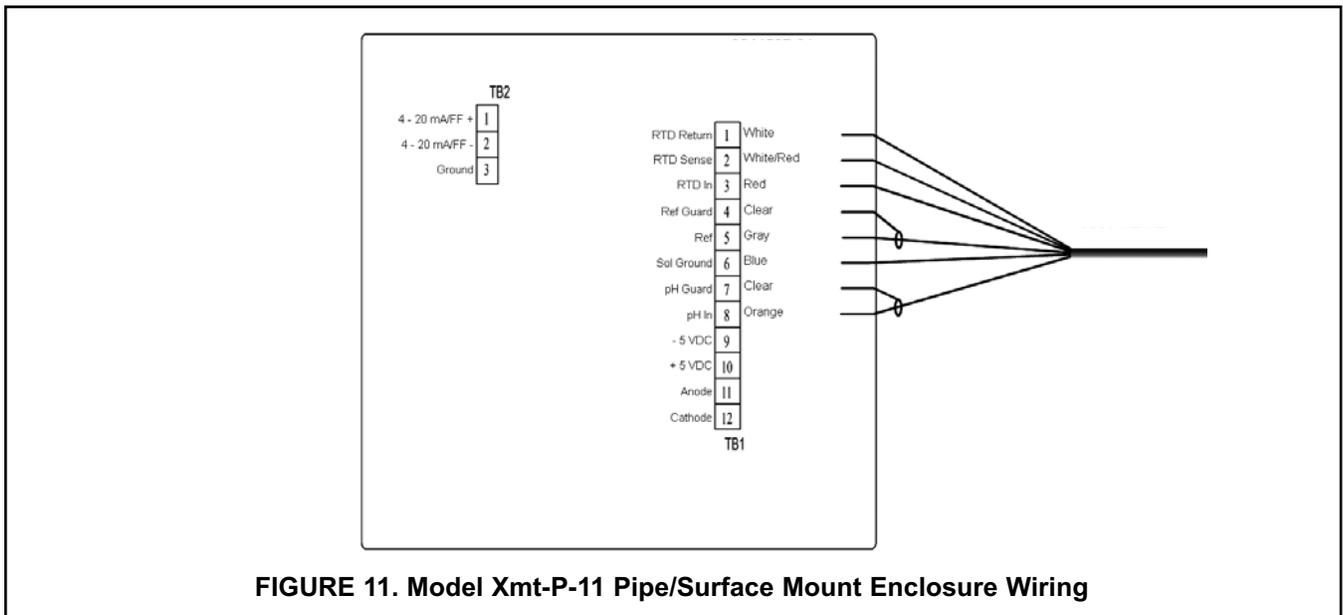


FIGURE 11. Model Xmt-P-11 Pipe/Surface Mount Enclosure Wiring

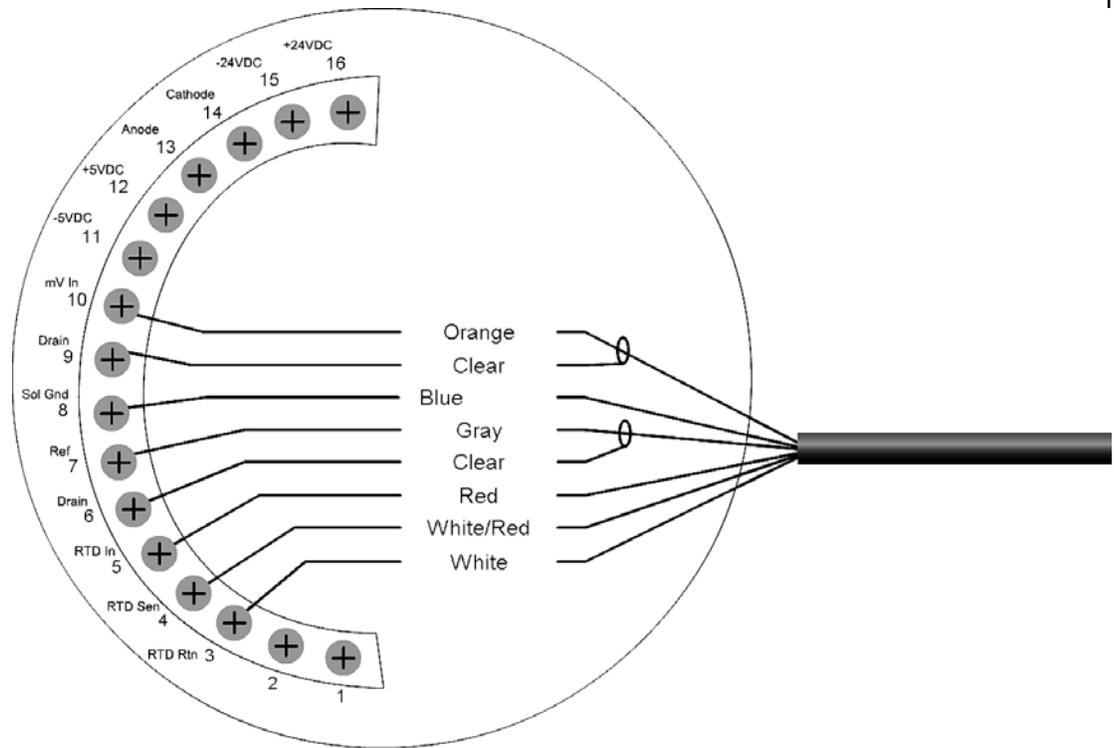


FIGURE 12. Model 5081-P Wiring

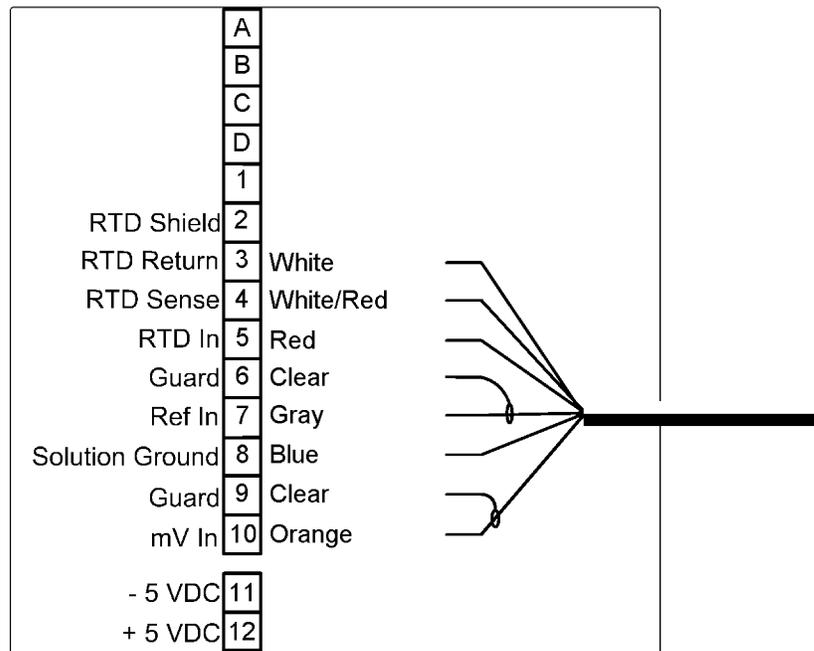


FIGURE 13. Model 54e Wiring

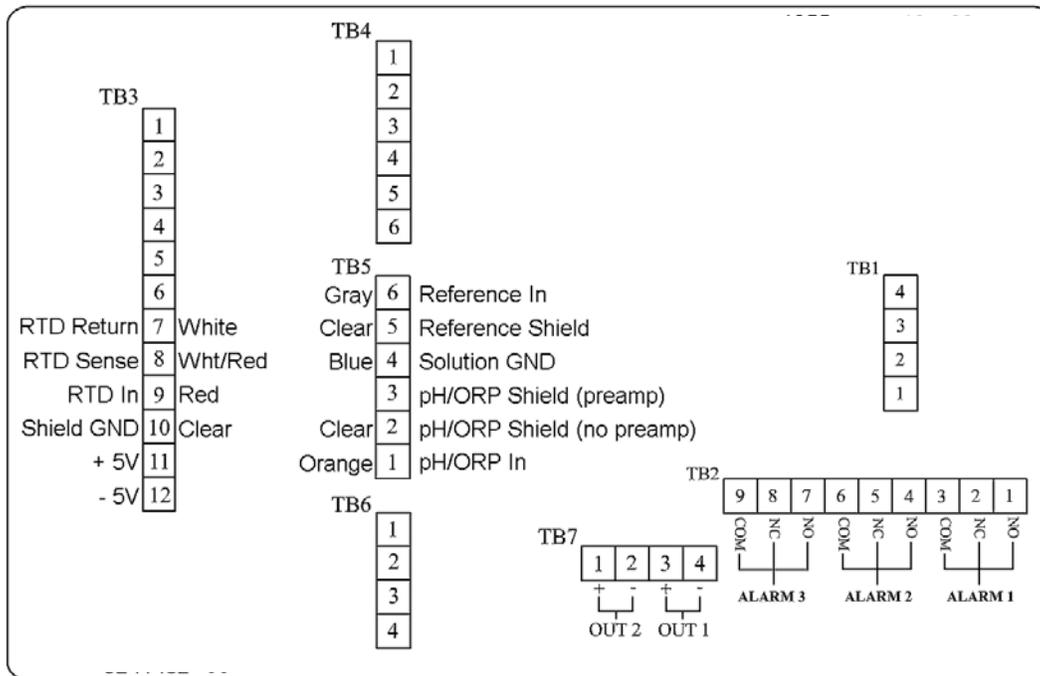


FIGURE 14. Model 1055-10-22 Panel Mount Enclosure Wiring

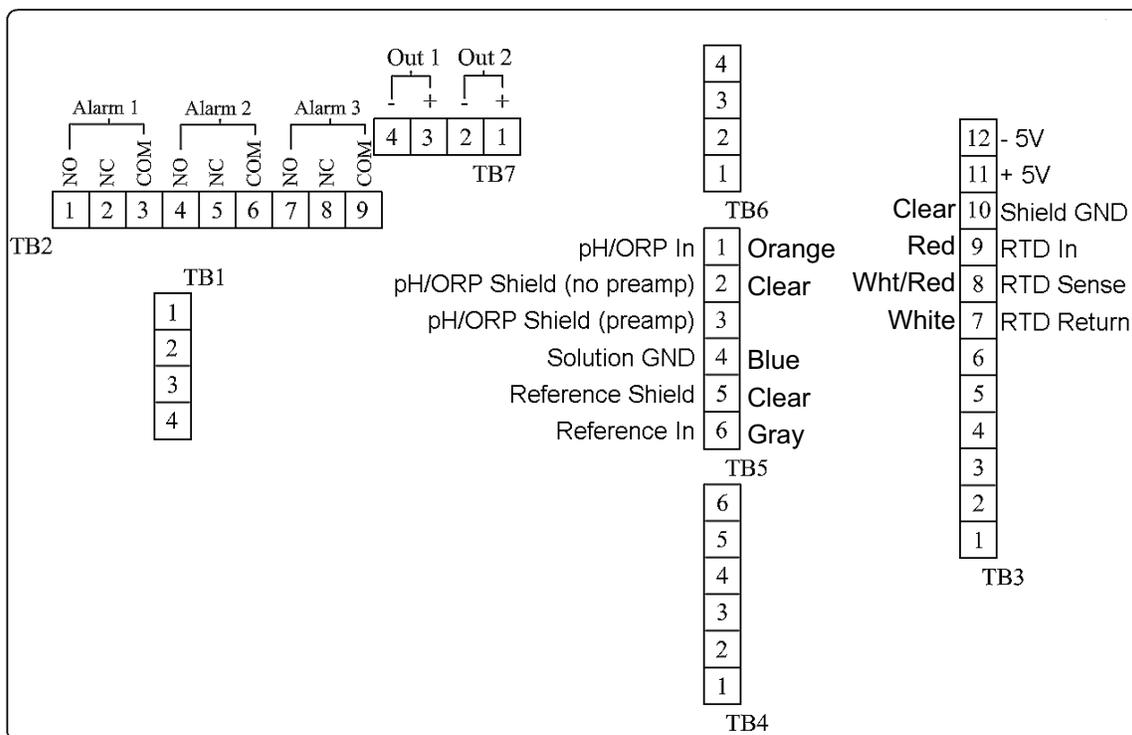


FIGURE 15. Model 1055-11-22 Pipe/Surface Mount Enclosure Wiring

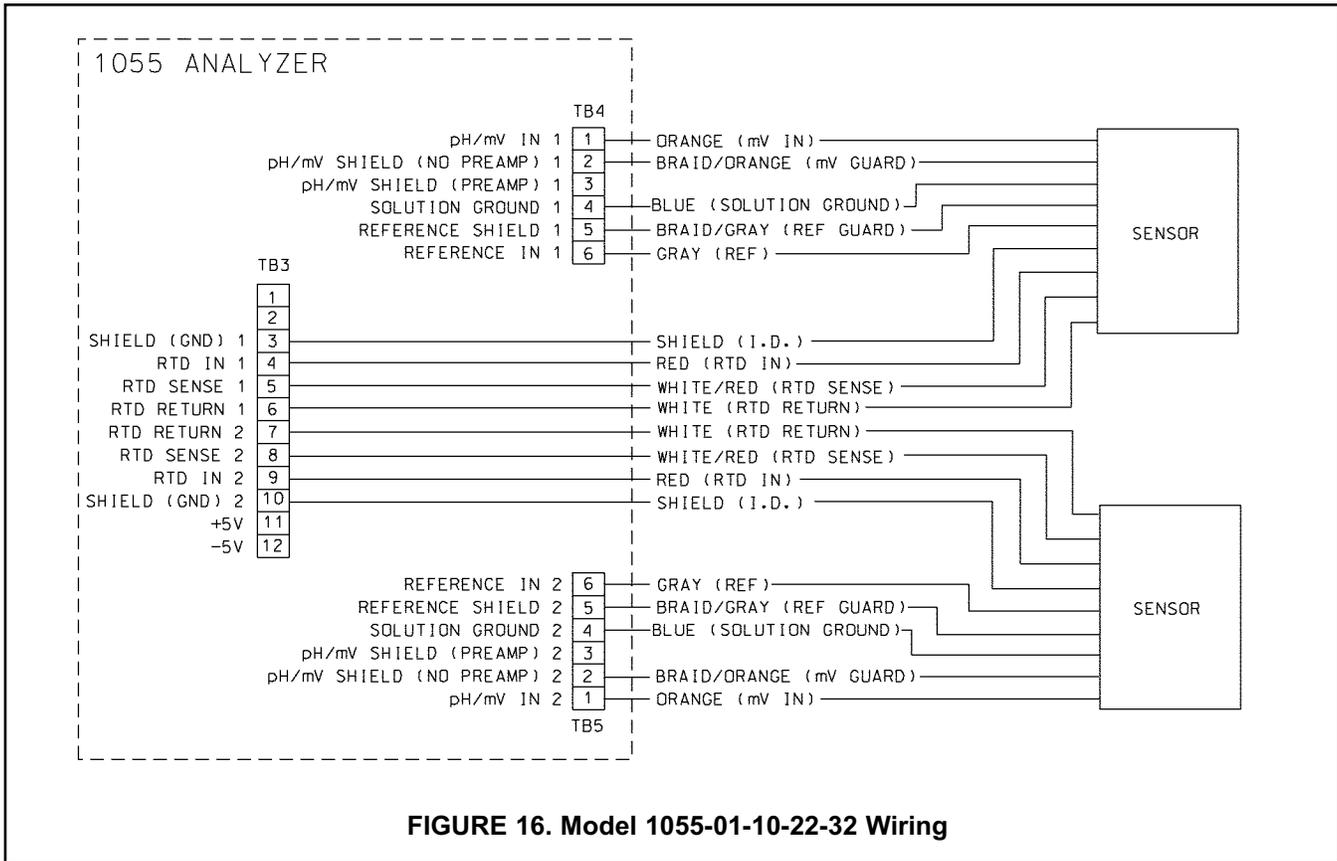


FIGURE 16. Model 1055-01-10-22-32 Wiring

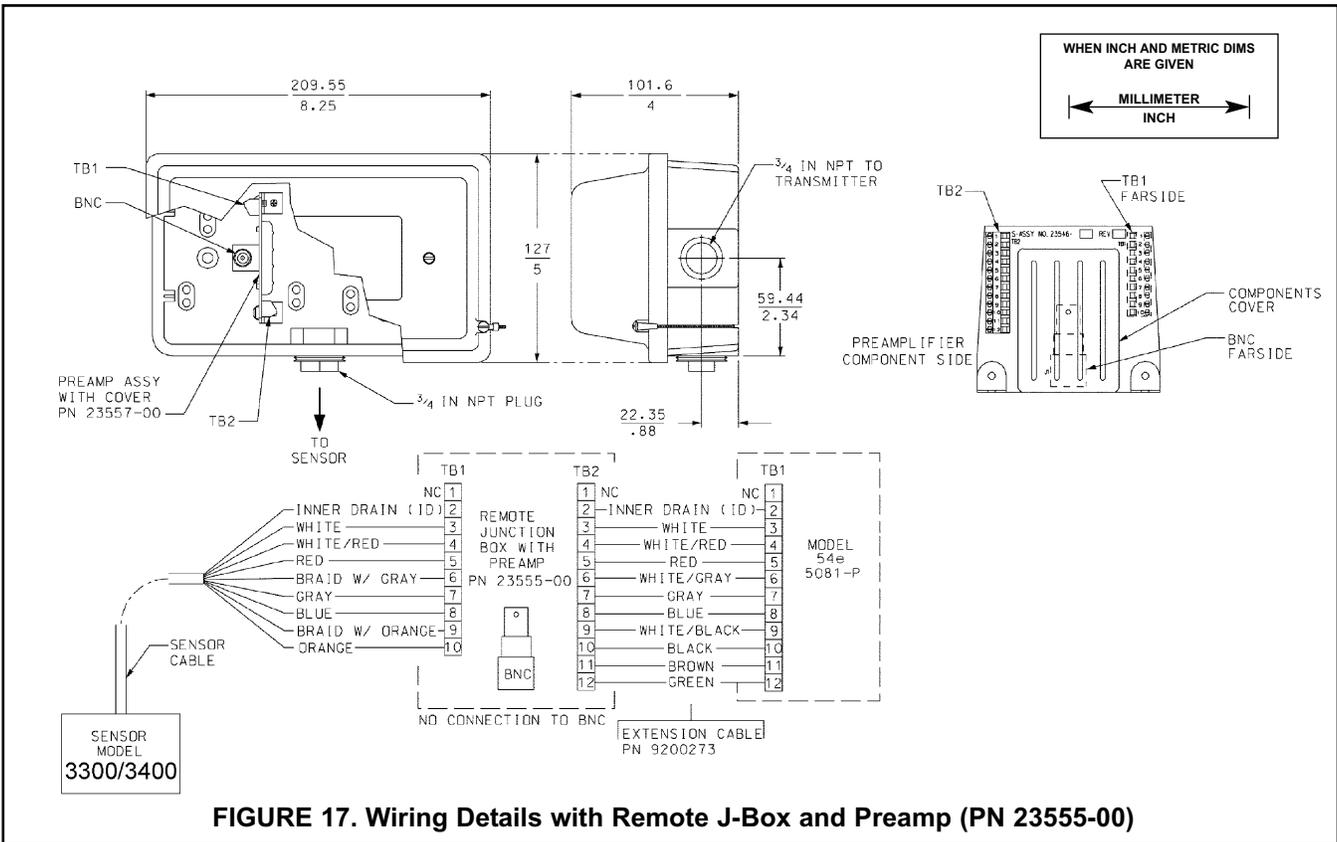
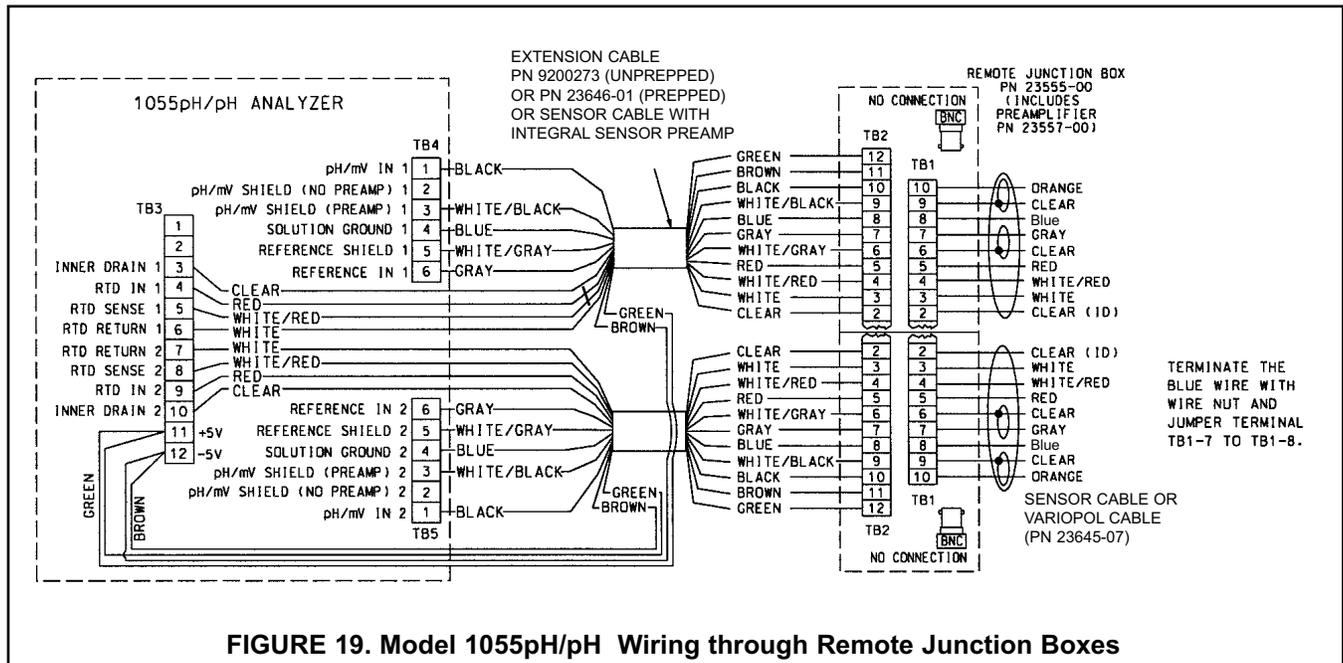
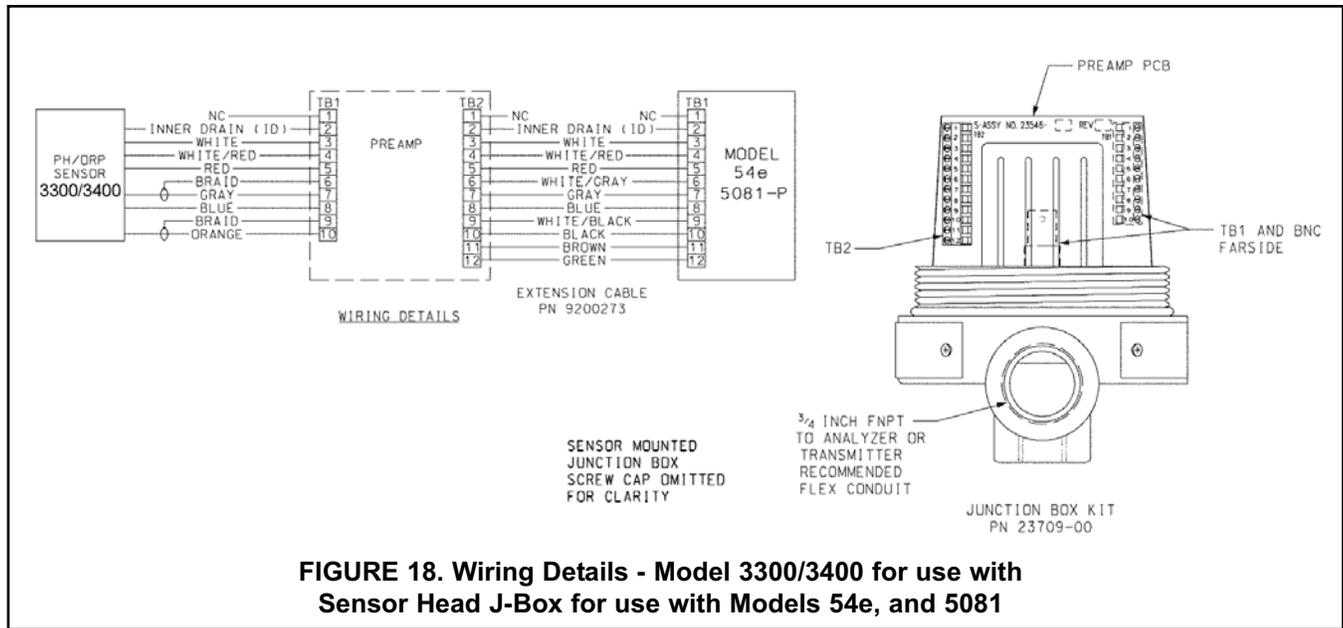


FIGURE 17. Wiring Details with Remote J-Box and Preamp (PN 23555-00)



RETRACTION WITH KIT PN 23240-00

WARNING

System pressure may cause the sensor to blow out with great force unless care is taken during removal.



CAUTION

Failure to withdraw the sensor completely may result in damage to the sensor when the valve is closed.

A. Model 3400-21 (21" tube)

1. Be certain system pressure at the sensor is below 64 psig (542 kPa) before proceeding with the retraction. It is also recommended that the personnel wear a face shield and have a stable footing. Refer to Figures 21 and 22. Push in on the sensor end or the top of the J-box and slowly loosen the hex nut (B) of the process end male connector (A).

B. Model 3400-25 (36" tube)

2. Be certain that pressure at the sensor is below 35 psig (343 KPa) before proceeding with the retraction. It is also recommended that the personnel wear a face shield and have a stable footing. Refer to Figures 21 and 22. Push in on the sensor end or the top of the J-box and slowly loosen the hex nut (B) of the process end male connector (A).

CAUTION

Do not remove nut at this time.

3. When the hex nut is loose enough, slowly ease the sensor back completely until the retraction stop collar is reached.

4. Close the ball valve slowly. If there is resistance, the valve may be hitting the sensor. Double check that the

WARNING

Before removing the sensor from the ball valve, be absolutely certain that the ball valve is fully closed. Leakage from the male connector threads may indicate that the male connector is still under pressure. Leakage through a partially open valve could be hazardous, however with the ball valve closed, some residual process fluid may leak from the connector's pipe threads.

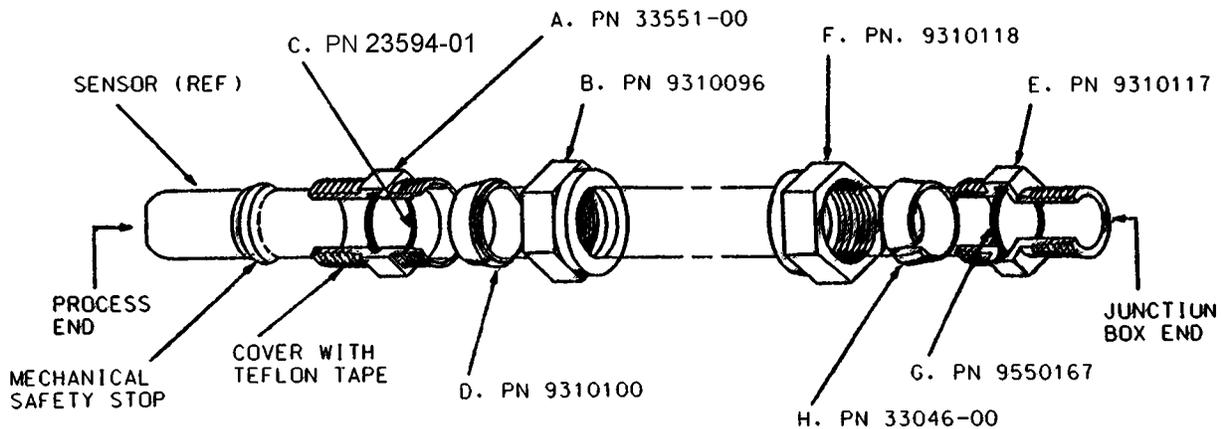


sensor has been retracted to the retraction stop collar.

5. The Male Connector Body (A) may now be completely unthreaded from the reducing coupling and the sensor removed for servicing.

CAUTION

If the male connector leaks during insertion or retraction, replace the O-ring (PN 23594-01) in the male connector A.



PROCESS END (A,B,C. & D SOLD TOGETHER AS SST. PROCESS CONNECTOR KIT PN 23166-00 OR TITANIUM PROCESS CONNECTOR KIT PN23166-01)

- A. MALE CONNECTOR BODY
- B. HEX NUT
- C. O-RING
- D. TEFLON FERRULE (SST. FERRULE AVAILABLE AS PN 9310094)

JUNCTION BOX END (E, F, G, & H SOLD TOGETHER AS SENSOR HEAD JUNCTION BOX FITTING KIT PN 23472-00)

- E. MALE CONNECTOR BODY
- F. HEX NUT
- G. O-RING
- H. SST. SPLIT FERRULE

FIGURE 20. Example of Sensor Tube Replacement



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Emerson Process Management

Liquid Division

2400 Barranca Parkway
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Tel: (949) 757-8500
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