

# High Purity Water pH Sensor with pHaser™ Flowing Junction

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

## SPECIFICATIONS

**Sensor Type:** 3200HP

**Part Number:** 3200HP-01, -02, -03, HPO and 3200HP-OEM, -OEM-01, -OEM-02, -OEM-03

**Accuracy:** ±0.05 pH

**Noise:** < 0.02pH

**Drift:** < 0.05 pH per week

**Conductivity Range:** > 0.4 µS/cm

**Sample flow rate:** 1 - 3 gph (60 - 180 mL/min)

**Wetted Materials:** Silicone, polycarbonate/polyester, glass, stainless steel, PVDF, Viton<sup>1</sup>

**Sample Temperature:** 0°C - 70°C (32°F to 160°F)

**Sample pressure:** 5 - 10 psig – drain to atmosphere.

**Process connection:** 1/4 inch FNPT

**Reference Electrode:** Flowing open capillary

**Weight/Shipping Weight:** 5.4lb/7.6lb (2.5kg/3.5kg)

**VP6 Cable Connection:** 10ft use PN 23645-10

20ft use PN 23645-11

30ft use PN 23645-12

1. Viton is a registered trademark of DuPont Performance Elastomers.

**NOTICE**  
**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.

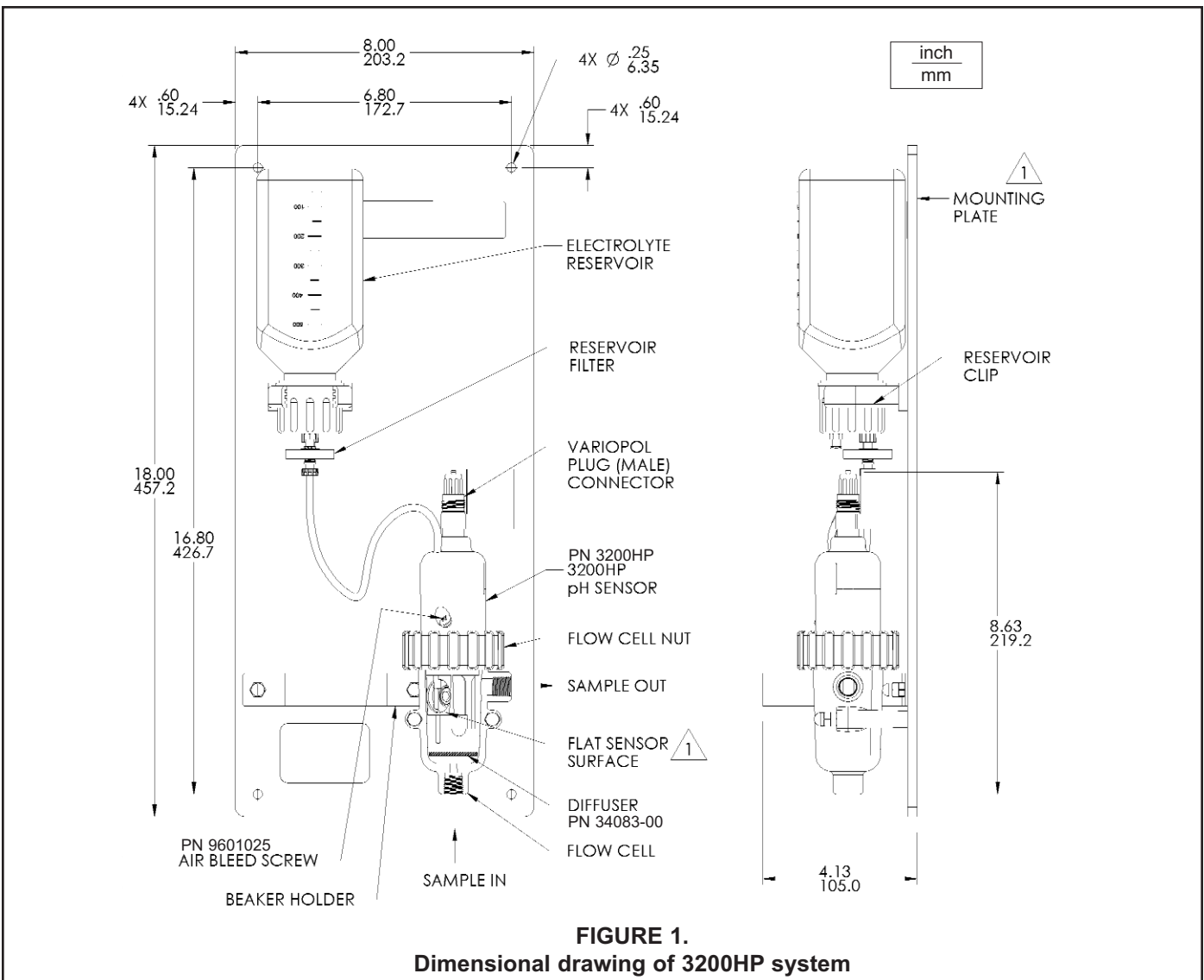


## REPLACEMENT PARTS

| Part Number | Description  |
|-------------|--|
| 34132-00    | Flowing junction reference capillary disc and O-ring |
| 9160590     | Cartridge filter for reference electrolyte solution  |
| 9210391     | Reference fill solution, 500 mL                      |
| 3200HP      | Replacement 3200HP pH sensor                         |
| 9601025     | Air bleed screw                                      |
| 9913804     | Washer for air bleed screw                           |

## INSTALLATION

1. Refer to Figure 1.
2. Mount the back plate on a wall or Sample Panel
3. Remove the bag containing the Diffuser from the flow cell. Remove the Diffuser from the bag and place it in the bottom of the flow cell.
4. Connect the sample line and provide a drain line to the flow cell. The flow cell fittings are 1/4" FNPT.
5. Set sample flow to between 1 and 4 gallons per hour, flow must remain constant for maximum measurement accuracy.

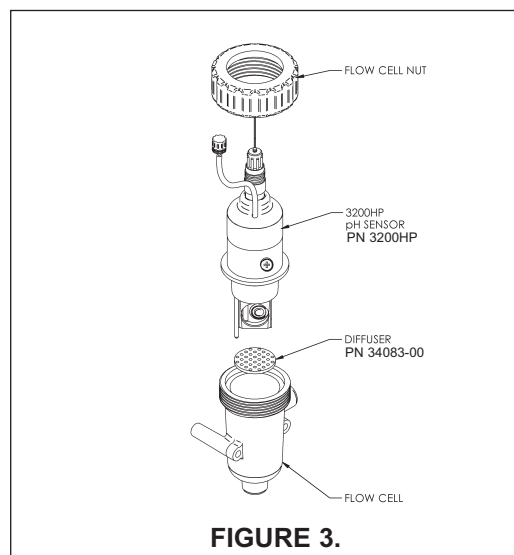
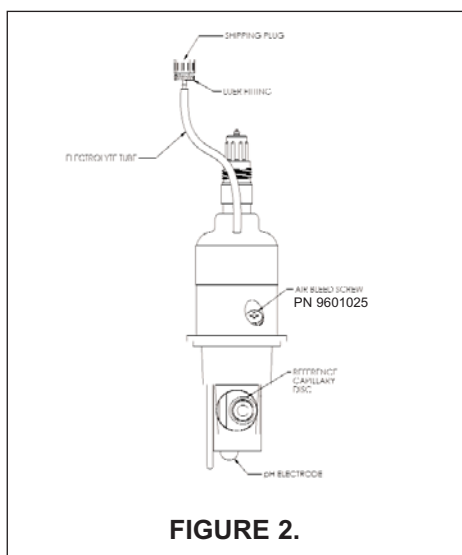


## PUTTING THE 3200 HP IN SERVICE

1. Wire the Varipol (VP) cable to the analyzer. See the wiring diagrams in the WIRING section.
2. Start the sample flow. Adjust flow to between 1 and 4 gph (60 - 240mL/min).
3. Unscrew the clear plastic nut on the flow cell and slip the nut over the sensor.
4. Connect the VP cable to the sensor. The sensor connector is keyed to ensure proper mating with the cable receptacle. Once the key has slid into the mating slot, hand tighten the connection by turning the knurled ring clockwise.
5. Remove the vinyl cap from the end of the sensor.



6. Place the sensor in the flow cell with the cavity containing the reference capillary disc facing forward, away from the back panel. Tighten the flow cell nut securing the sensor in place. Verify the sample is flowing.
7. Remove the square reservoir bottle from the clip on the back plate.
8. Turn the bottle upright. Unscrew the cap and put it in a clean place. **DO NOT REMOVE THE PLUG FROM THE FILTER.**
9. Pour 500 mL of reference fill solution (PN 9210391) into the reservoir. Replace the cap.
10. Remove the shipping plugs from the reservoir filter and reference electrolyte tube. **Save both plugs.** Connect the electrolyte tube to the filter. The luer fitting on the tube presses onto the fitting on the filter.
11. Invert the reservoir and slip it into the clip on the back plate. A few drops of liquid may fall out of the air vent inlet.
12. Bleed air bubbles from the tube and sensor.
  - a. Loosen the bleed screw until it is engaged by only about one thread.
  - b. Watch for bubbles flowing down the electrolyte tube and out the bleed port.
  - c. Allow about 2 mL of fill solution to escape through the port. Use a paper towel to absorb the liquid.
  - d. Tighten the bleed screw.
13. Note the reference impedance, if this information is available on the instrument. It should be less than about 350k $\Omega$ .
14. If the reference impedance is high, air bubbles maybe trapped in the sensor. To clear air bubbles, hold the sensor with the bulb end pointing down and give it a few sharp shakes as though shaking down a fever thermometer. Keep the reference electrolyte tube connected to the reservoir while doing this. Repeat step 12 to bleed air bubbles.



## CALIBRATION

1. Select two stable buffer solutions, preferably pH 7.0 and 10.0. Ideally, the calibration buffers should bracket the expected pH of the sample and be at least two pH units apart. Use the ring at the bottom of the back plate to hold the beaker containing the buffer.
2. Most pH meters offer automatic buffer recognition. Automatic buffer recognition means the instrument automatically calibrates using the correct pH for the buffer temperature. (The pH of a buffer, particularly one with alkaline pH, changes as temperature changes.) If the meter does not have automatic buffer recognition, refer to the label on the buffer bottle for a table of pH versus temperature.
3. Rinse the sensor with deionized water and immerse it in the first buffer. Gently swirl the sensor in the buffer for a few seconds. Allow the sensor and buffer to reach the same temperature. Once pH readings are stable, start the calibration. Follow the procedure in the analyzer instruction manual.
4. After the sensor has been calibrated in the first buffer, remove and rinse it with deionized water. Place the sensor in the second buffer and complete the calibration.
5. After the calibration is complete, check the slope and intercept of the sensor. The slope should be between 56 and 60 mV/pH and the offset should be between -20 and 20 mV.

## REPLACING THE ELECTROLYTE SOLUTION

The reference electrolyte solution should last two to three months. To replace the electrolyte solution...

1. Remove the reservoir bottle from the clip on the back plate. Turn the bottle upright.
2. Unscrew the cap and discard the remaining fill solution. To avoid twisting the electrolyte tube, turn the bottle, not the cap. To keep the cap and air inlet tube clean, use the electrolyte tube to hang the cap from the reservoir clip.
3. Pour 500 mL of reference fill solution (PN 9210391) into the reservoir. Replace the cap. Turn the bottle, not the cap.
4. Invert the bottle and reattach it to the clip.
5. Bleed air bubbles from the tube and sensor.
  - a. Loosen the bleed screw until it is engaged by only about one thread.
  - b. Watch for bubbles flowing down the electrolyte tube and out the bleed port.
  - c. Allow about 2 mL of fill solution to escape through the port. Use a paper towel to absorb the liquid.
  - d. Tighten the bleed screw to reseal bleed port.

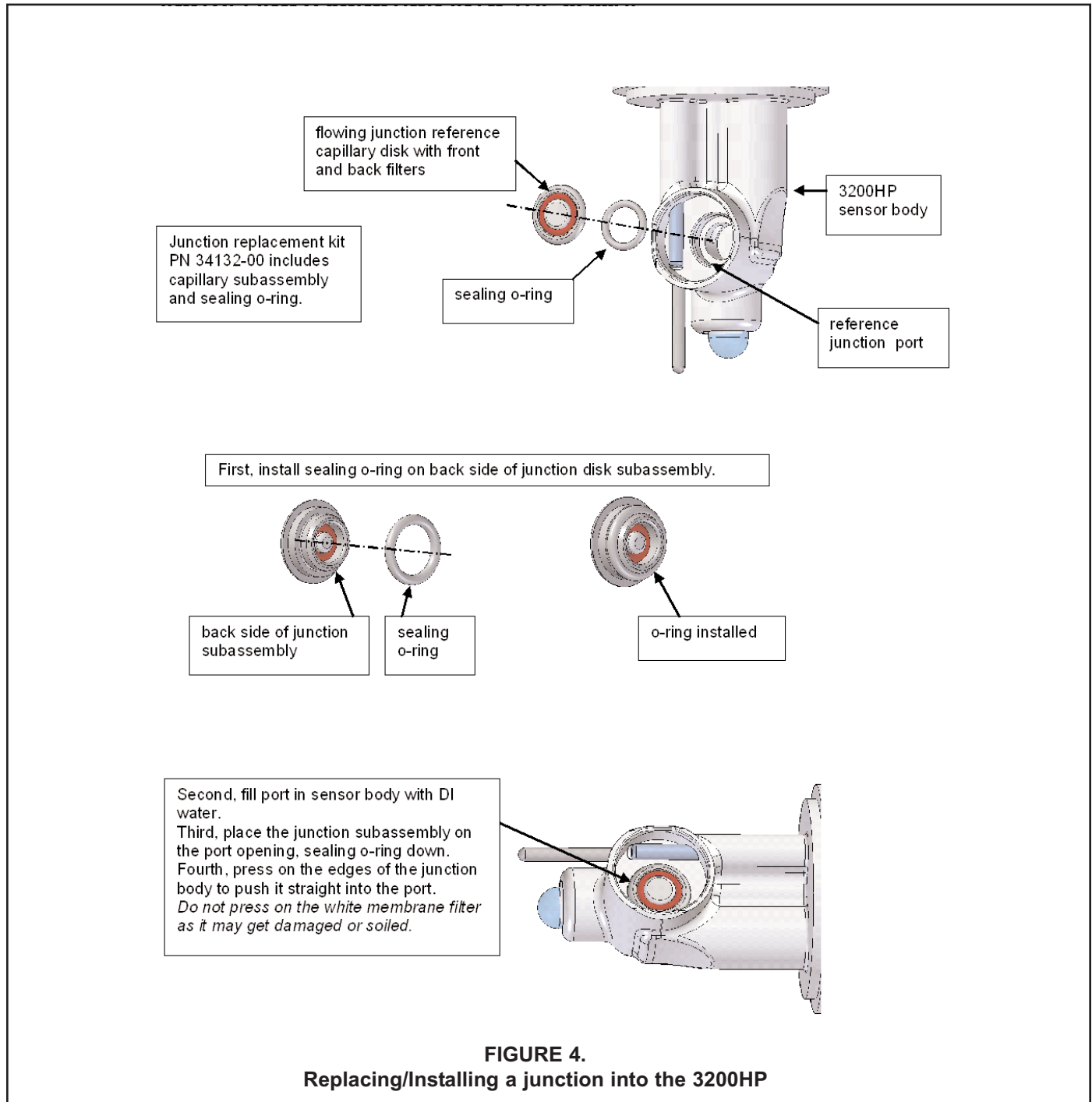
## REPLACING THE CAPILLARY DISC

The reference capillary junction is protected by a filter that prevents suspended solids from plugging the capillary. During normal operation, suspended solids will gradually coat the filter. Eventually, the electrolyte flow becomes too low, and the capillary disc must be replaced. Typical symptoms of low flow are an abnormally low pH reading and high reference impedance ( $> 600 \text{ k}\Omega$ ). To replace the capillary disc...

1. Remove the electrolyte reservoir from the clip on the back plate. Turn the reservoir upright. Disconnect the electrolyte tube from the reservoir cap. Place the shipping plug on the reservoir filter.
2. Disconnect the VP cable from the sensor. Remove the sensor from the flow cell.
3. Remove the capillary disc (PN 34132-00) from the storage vial and place it on a **clean** surface. **Don't let the new capillary disc dry out.**
4. Hold the sensor in a horizontal position with the capillary disc pointing up. With a small screw driver, gently pry the old disc and O-ring out of the sensor.
5. Place a new O-ring in the opening.
6. Put a few drops of deionized water in the port until liquid slightly overflows it.
7. Place the new capillary disc in the port, without touching the filter membrane. Use your finger tips to gently push the disc into place. The disc should easily slide into place. **Do not touch the filter with your fingers** as the transfer of oils from your skin will diminish the performance of the membrane.

## REPLACING THE CAPILLARY DISC CONT.

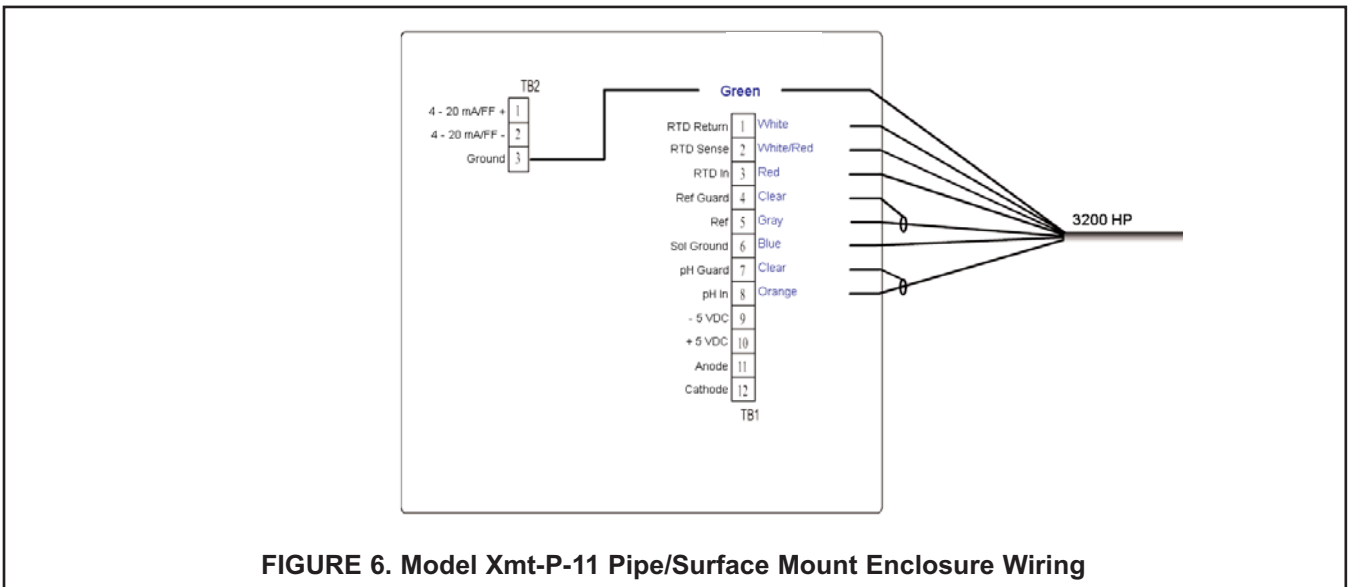
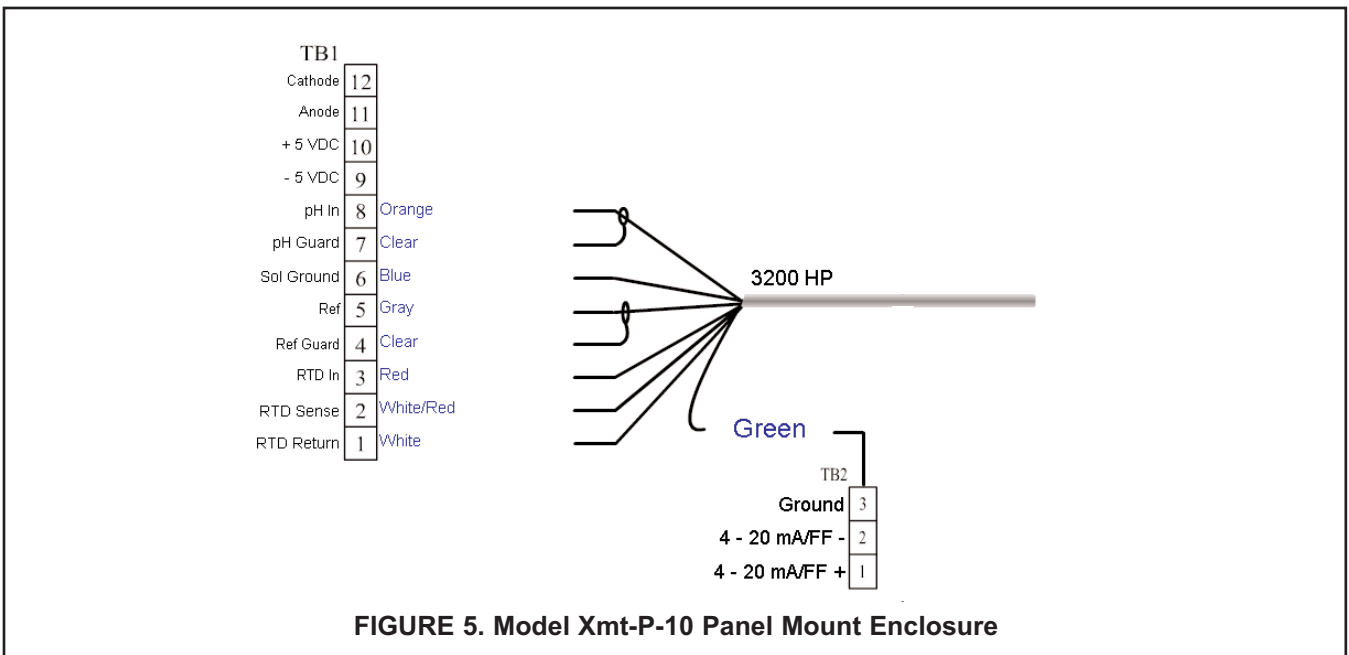
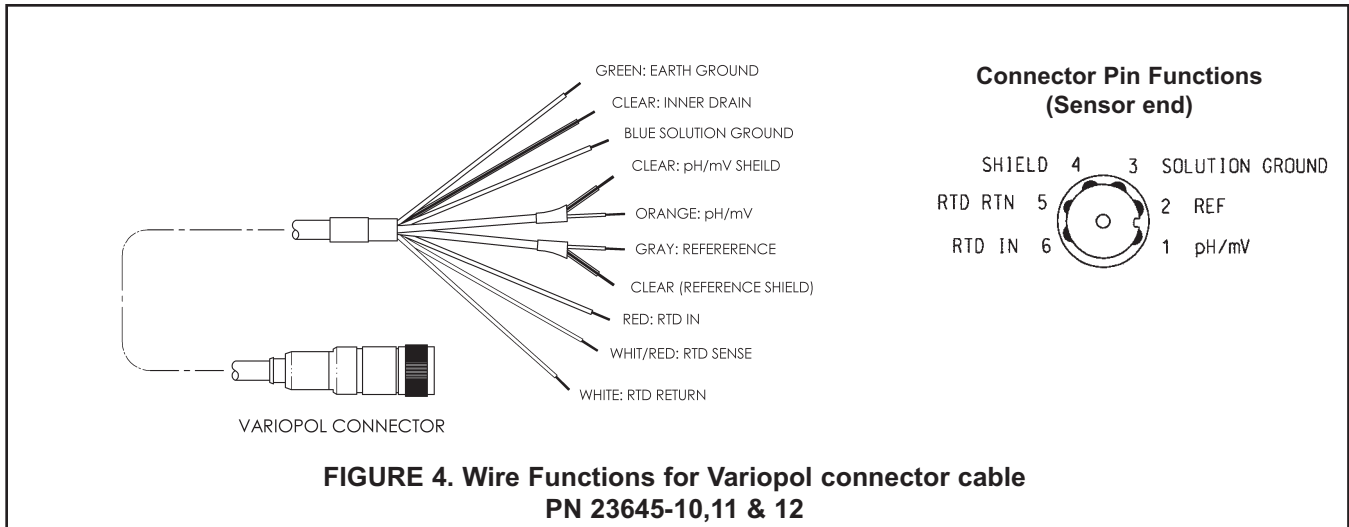
8. Remove the shipping plug from the reservoir filter. Attach the tube to the reservoir filter.
9. Place the reservoir back in the clip.
10. Bleed air bubbles from the tube and sensor.
  - a. Loosen the bleed screw PN 9601025 until it is engaged by only about one thread.
  - b. Watch for bubbles flowing down the electrolyte tube and out the bleed port.
  - c. Allow about 2 mL of fill solution to escape through the port. Use a paper towel to absorb the liquid.
  - d. Tighten the bleed screw. (PN 9601025)

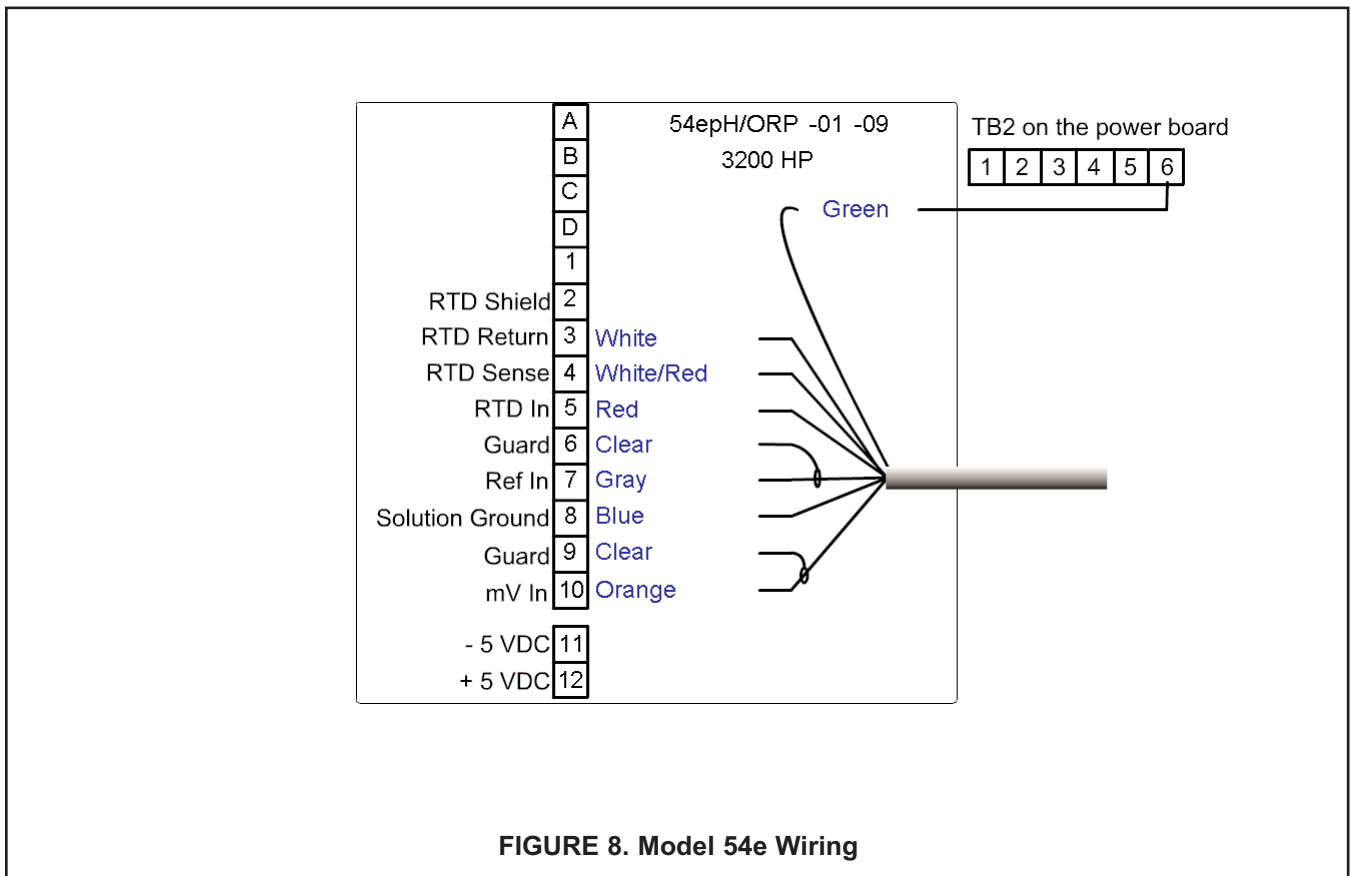
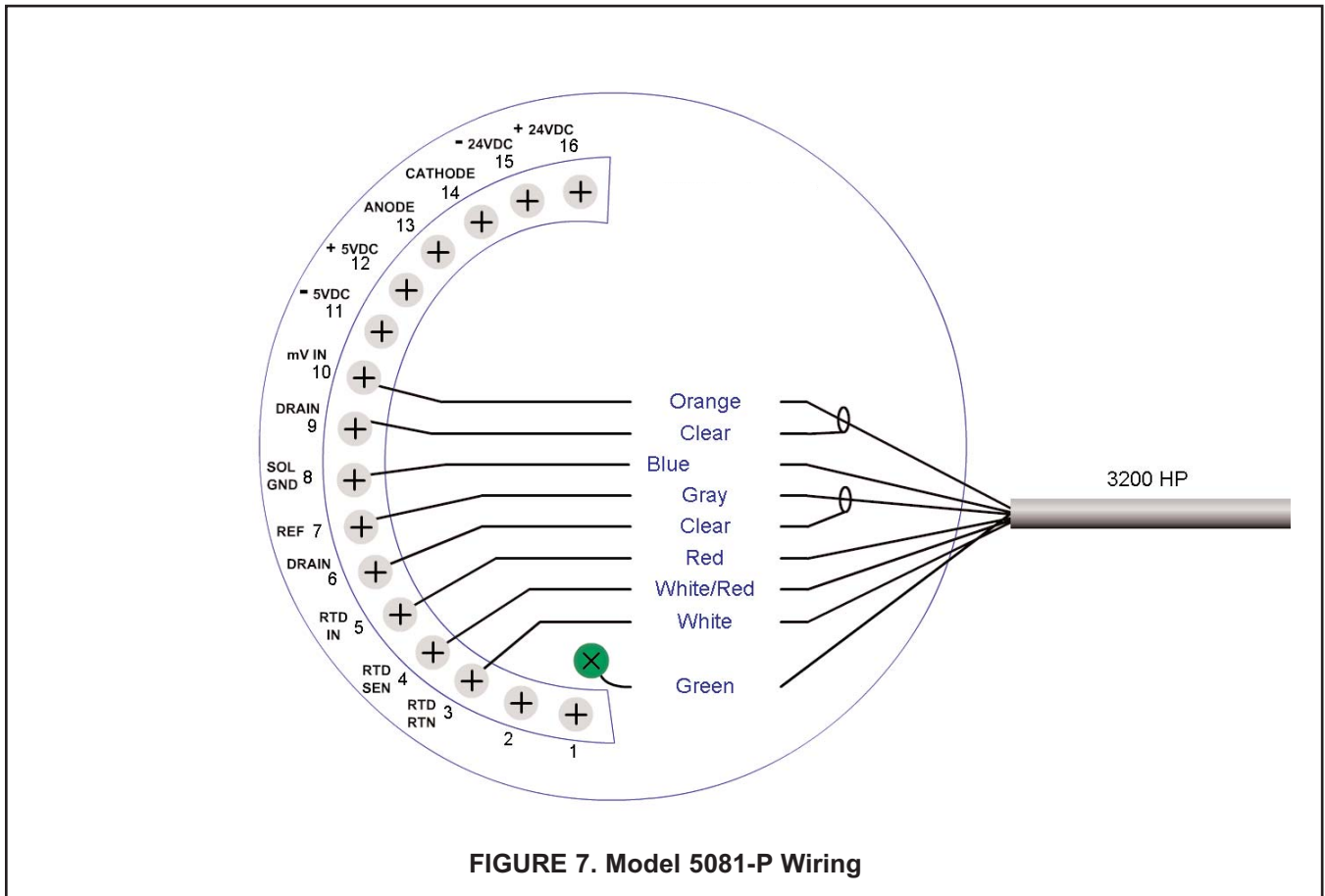


## TROUBLESHOOTING

| Problem             | Cause  | Solution  |
|---------------------|--|---|
| pH reading in error | Air is blocking capillary causing low electrolyte flow.  | To clear air bubbles, hold the sensor with the bulb end pointing down and give it a few sharp shakes as though shaking down a fever thermometer. Keep the electrolyte tube connected to the reservoir. Bleed air bubbles by loosening the screw in the air vent port.   |
|                     | Capillary is plugged.  | Replace capillary disc.   |
|                     | Sensor was not properly calibrated.  | Check buffers for freshness and replace buffers if necessary. Pay particular attention to alkaline buffers, which can become contaminated with atmospheric carbon dioxide. Review calibration procedure and repeat calibration.   |
| Noisy pH reading    | Sample flow is too high.   | Adjust sample flow to between 60 and 240 mL/min (1 – 4 gph).  |
|                     | Sensor is not properly oriented in flow cell.  | Orient sensor so that the capillary disc faces front.   |
| pH readings drift   | Reference electrolyte flow is too low. As flow drops, pH decreases. Air might be blocking the capillary or the capillary might be plugged. (Replace with PN 34132-00) Check to see if the filter is plugged. (If so, replace with PN 9160590). | To clear air bubbles, hold the sensor with the bulb end pointing down and give it a few sharp shakes as though shaking down a fever thermometer. Keep the electrolyte tube connected to the reservoir. Bleed air bubbles by loosening the screw in the air vent port. If repeated efforts to clear air bubbles do not work, replace the capillary disc. |
|                     | Sensor is dirty.   | Clean the sensor by rinsing the capillary filter with deionized water. Clean the pH glass bulb by rinsing with dilute hydrochloric acid. Re-calibrate the sensor after cleaning.  |
|                     | Flow is not stable   | Fluctuations in sample flow can cause slight changes in the pH reading. Keep flow constant.   |

# WIRING







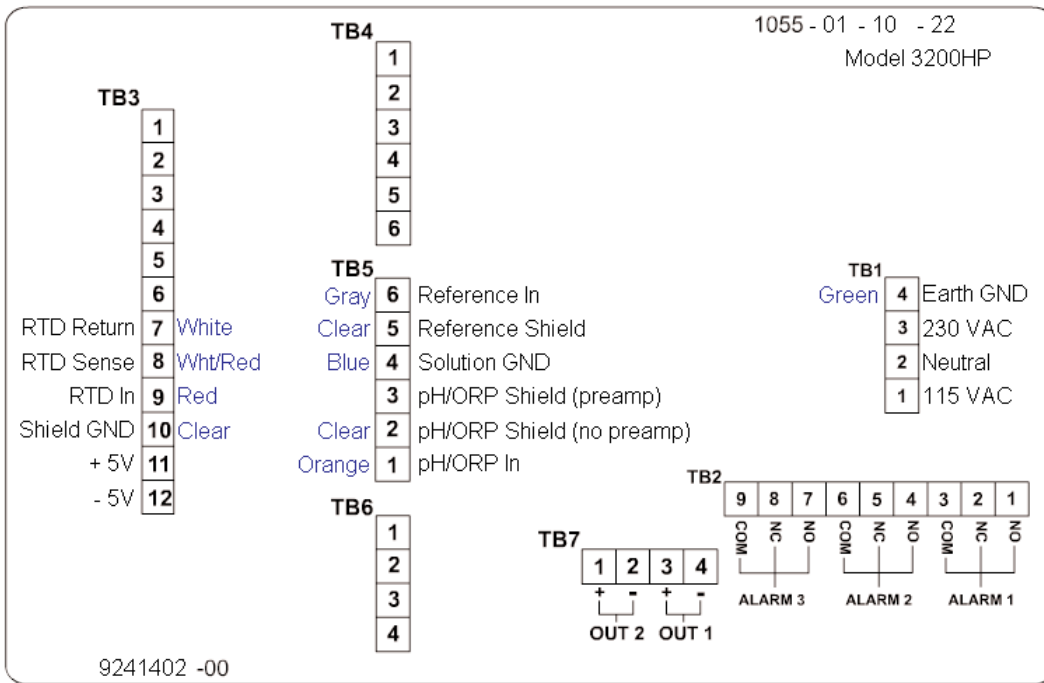


FIGURE 9. Model 1055-10-22 Panel Mount Enclosure Wiring

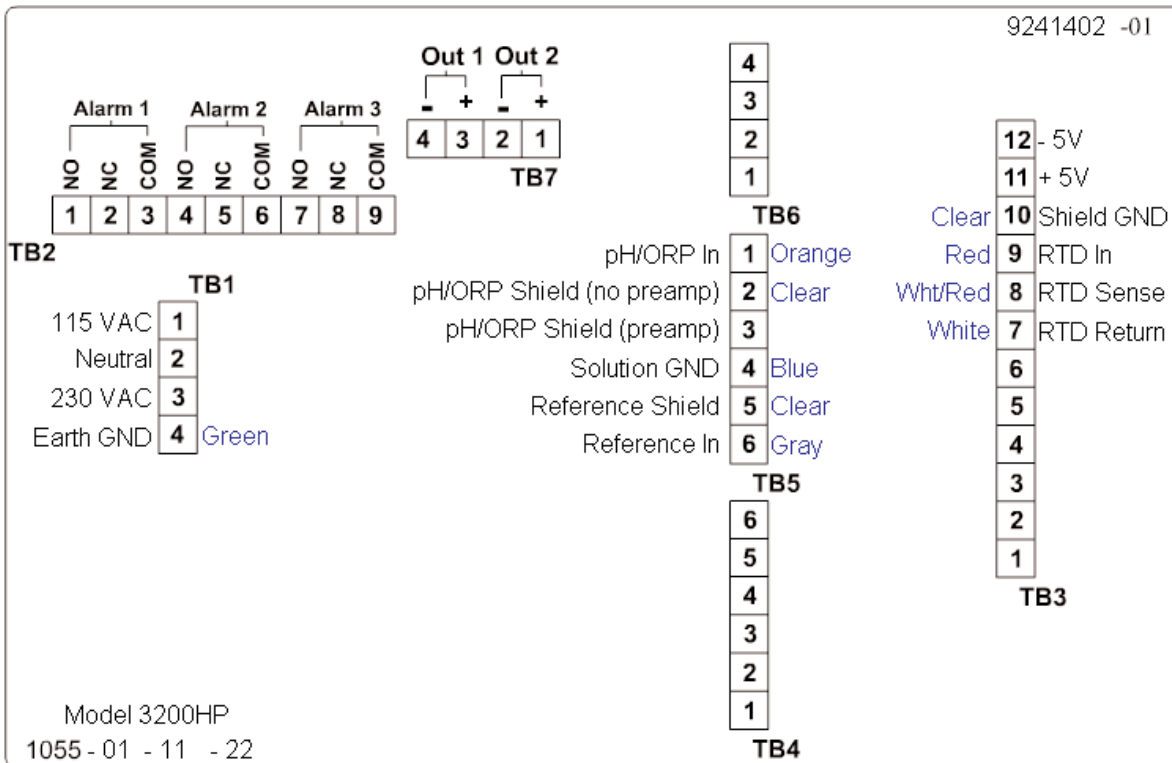


FIGURE 10. Model 1055-11-22 Pipe/Surface Mount Enclosure Wiring

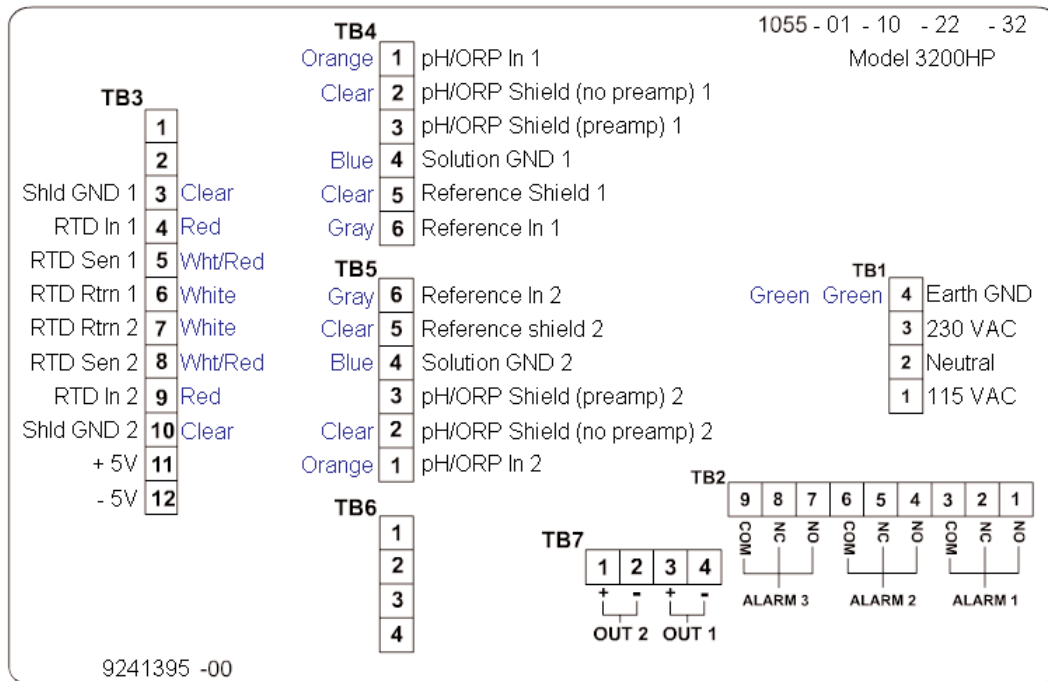


FIGURE 11. Model 1055-01-10-22-32 Wiring

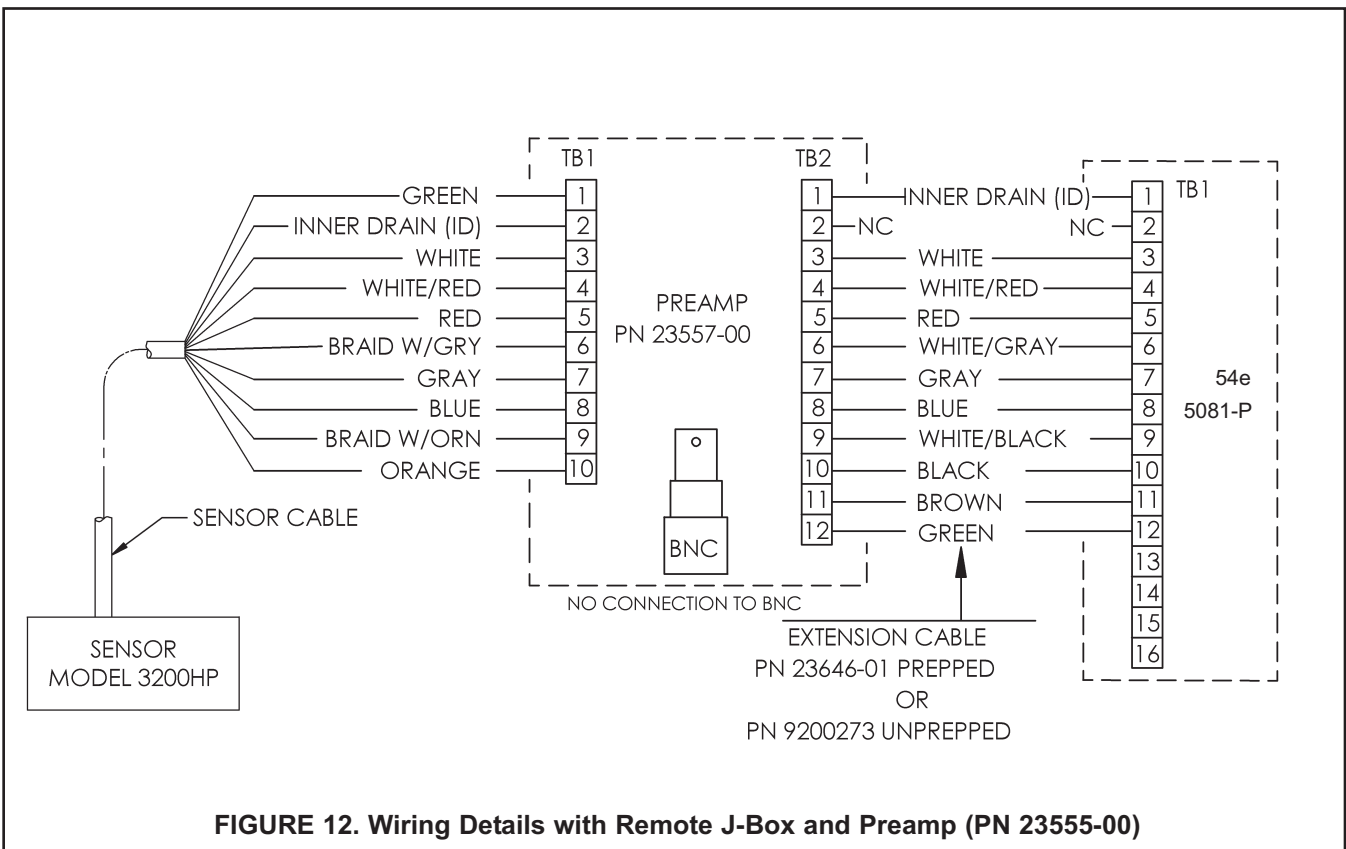


FIGURE 12. Wiring Details with Remote J-Box and Preamp (PN 23555-00)

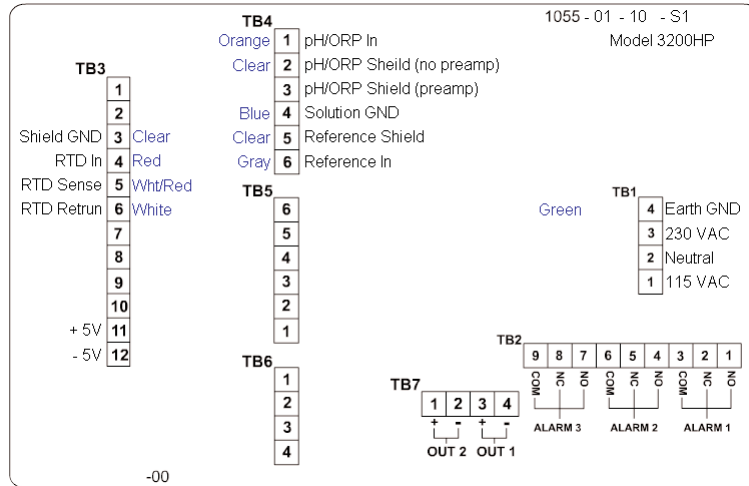


FIGURE 13. Model 1055-01-10-SI

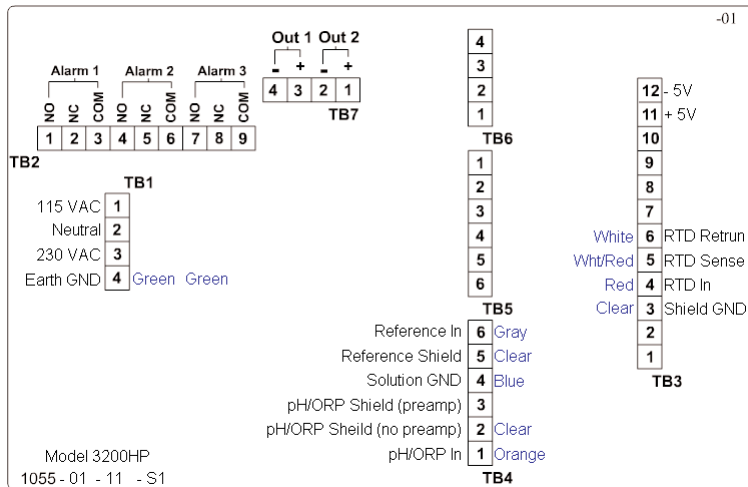


FIGURE 14. Model 1055-01-11-SI

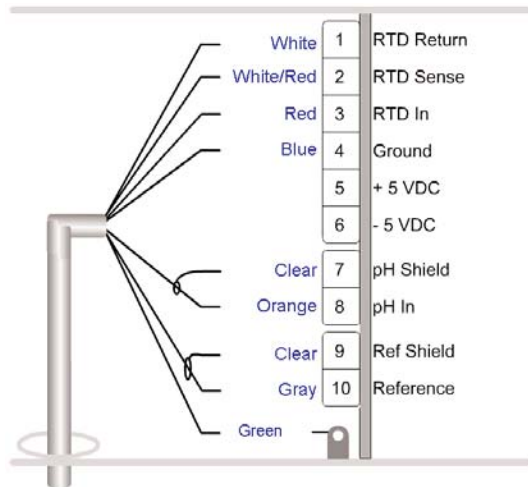


FIGURE 15. Model 1056-01-22-38-AN



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