

## Instruction Sheet

PN 51A-3800/3800VP/rev.C

January 2011

Models 3800 and 3800VP

# **PUR-SENSE™** Autoclavable and Steam Sterilizable pH Sensors

For additional information visit our website at  
[www.emersonprocess.com/raihome/liquid/](http://www.emersonprocess.com/raihome/liquid/).

## SPECIFICATIONS

**Sensor Type:** PUR-SENSE™ 3800, 3800VP, GPHT glass with hemi bulb

**Range:** pH 0 to 14

**Temperature Range:** up to 105°C (steam up to 140°C) / up to 221 F°  
(steam up to 284 F°)

**Pressure Range:** max 6 bar at 105°C/ max 72 psig (600kPa) at 221 F°

**Temperature sensor:** Pt 100

**Wetted Materials:** Glass, ceramic and EPDM o-ring USP VI

**Reference Junction:** Single Ceramic junction

**Electrolyte:** Gelled polymer

**Cable Connector:** Type VP 8 - multipin pH connector head, or coaxial S8

**Process Connector:** Pg 13.5 connector

**Dimensions:** 12 mm OD, shaft length -01= 120 mm , -02 = 225 mm , -03  
= 325 mm

**Remarks:** Suitable for all Rosemount pH-instruments. Quality certification includes list of wetted materials and calibration records



**MODELS 3800  
& 3800VP**

### **⚠ 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!

### **ATEX DIRECTIVE**

#### **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.

### **⚠ 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**

Do not exceed temperature and pressure limitations of 140°C (284°F) and 72 psig (600 kPa, 6 bar).

### **⚠ CAUTION**

Internal electrolyte fill solution may cause skin or eye irritation.

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## STORAGE

1. It is recommended that electrodes be stored in their original shipping containers until needed.
2. Do not store at temperatures below  $-5^{\circ}\text{C}$  ( $23^{\circ}\text{F}$ ).
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 shake the electrode so that the internal solution fills the bulb, thus removing any air trapped there.

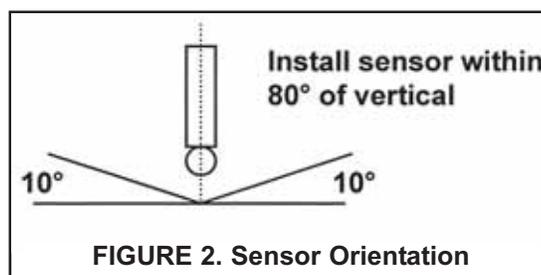
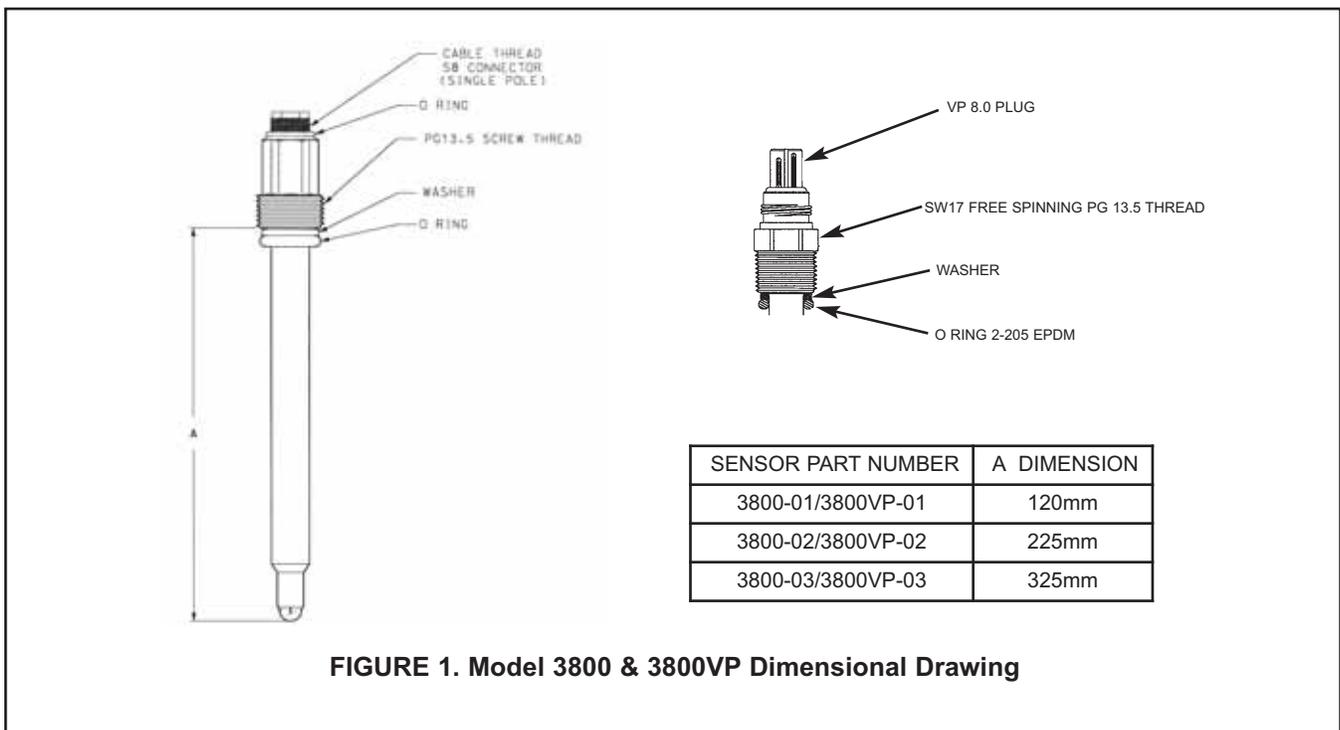
### NOTE

Do not allow lubricant to coat electrode bulb or reference junction. If it does, wipe it clean before installation.

## INSTALLATION

For sensor orientation, see Figure 2.

For wiring, see Figures 3 through 13.



## TWO POINT 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  $\pm 59.1$  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.

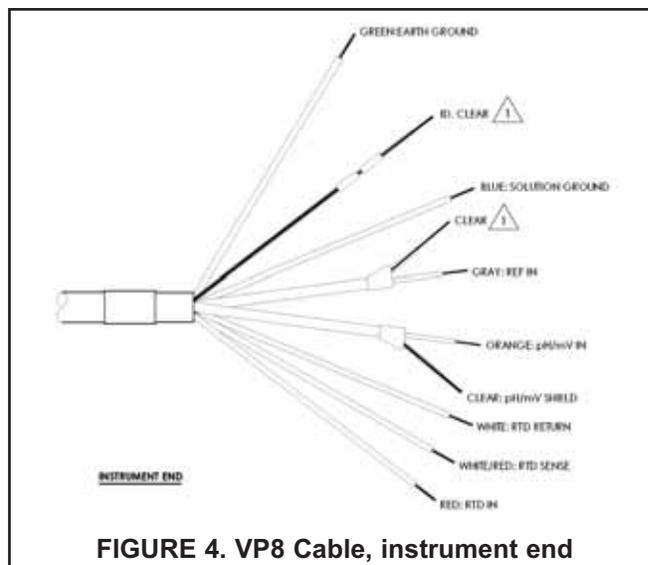
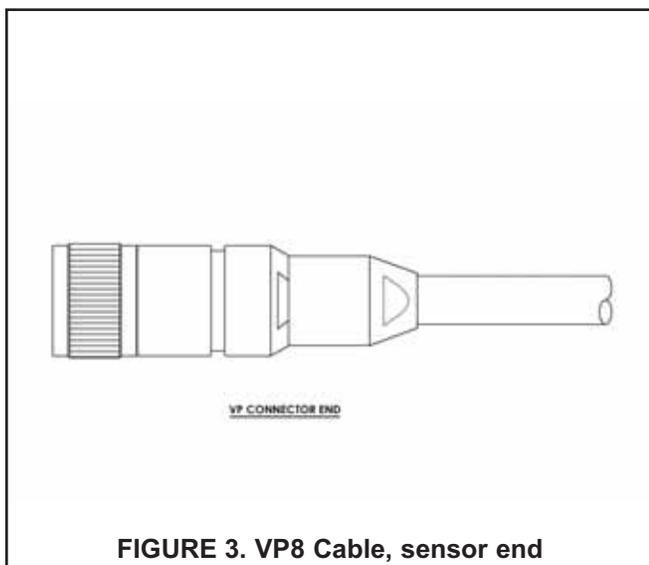
## RECOMMENDED pH SENSOR STANDARDIZATION

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.

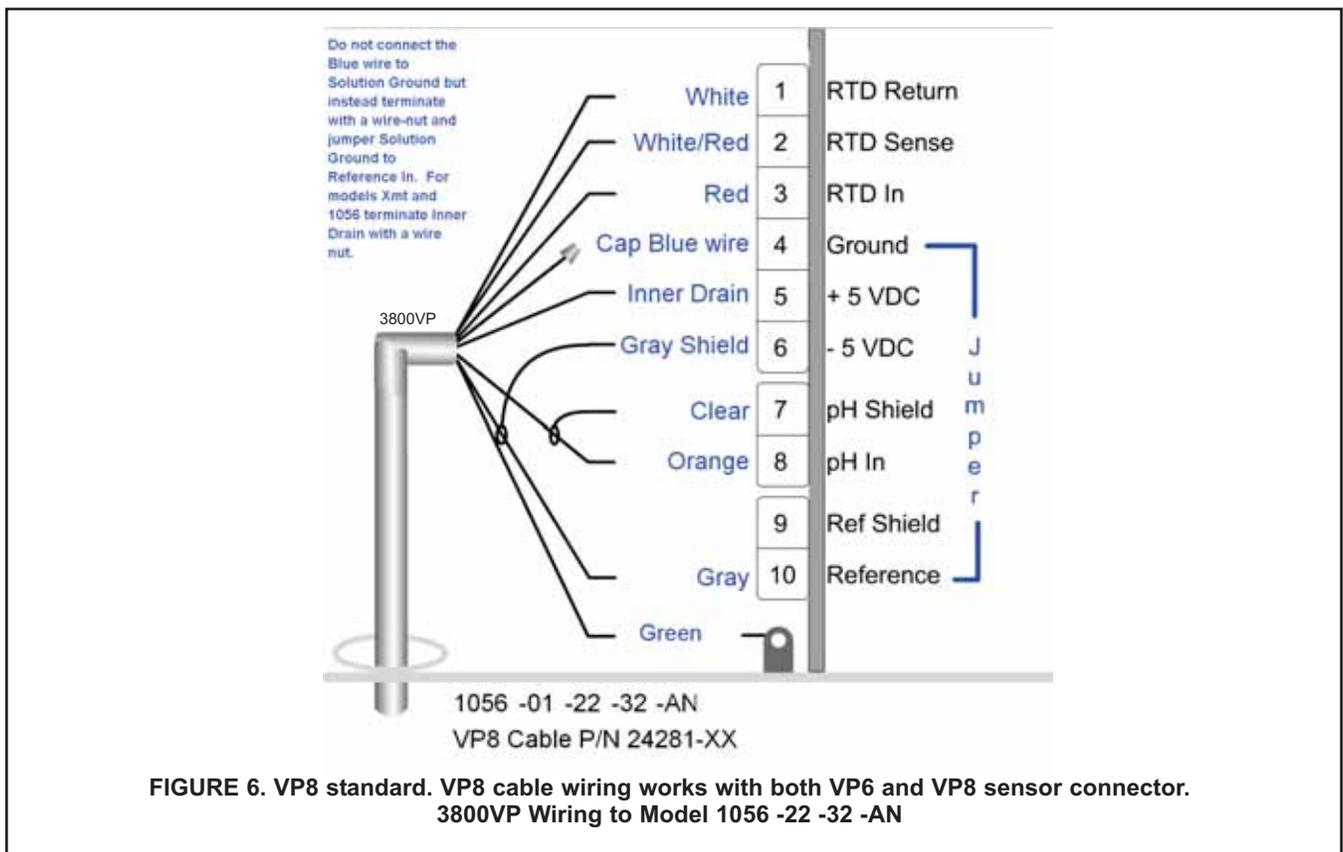
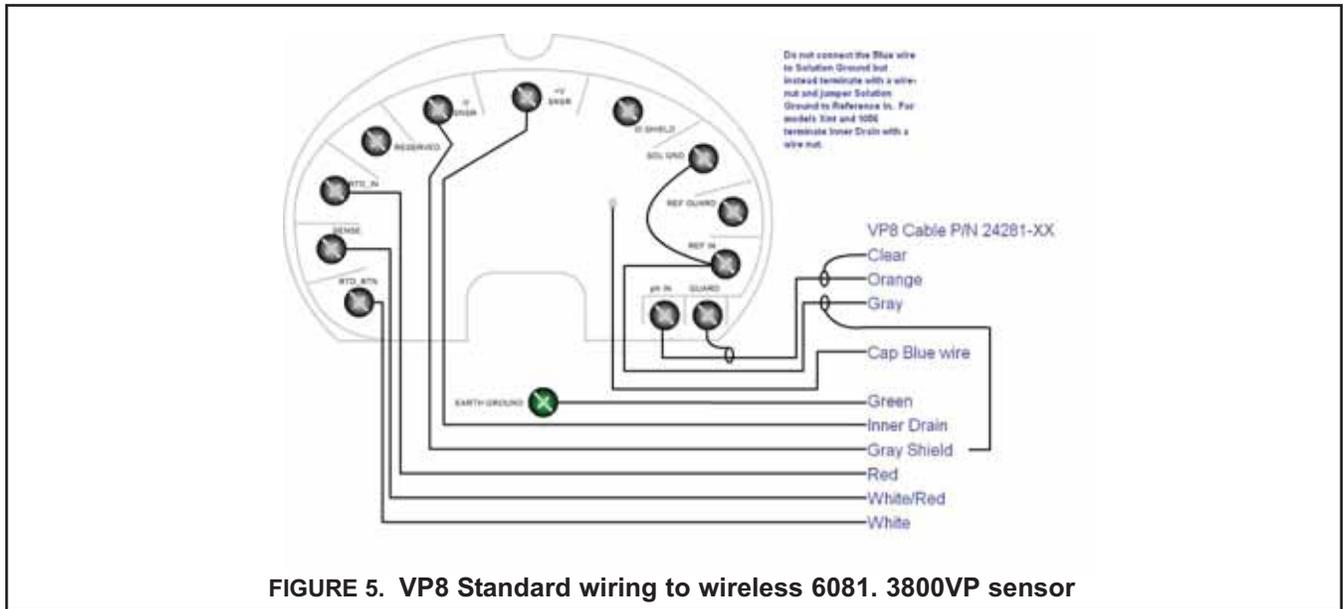
## MAINTENANCE

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.
3. Temperature effect on life expectancy: If glass electrode life expectancy is 100% @ 25°C (77°F), then it will be approximately 25% @ 80°C (176°F), and approximately 5% @ 120°C (248°F).



# WIRING



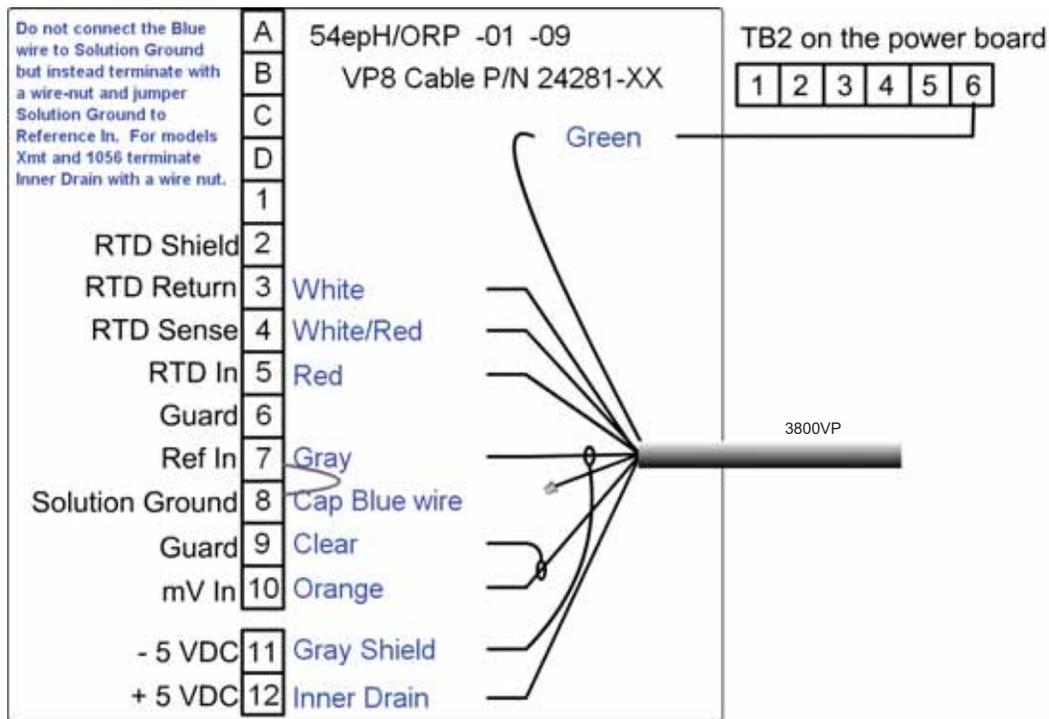


FIGURE 7. 3800VP Wiring to Model 54e.

This is the standard wiring for VP8 cable assembly. VP8 works both with VP6 and VP8 sensor connector.

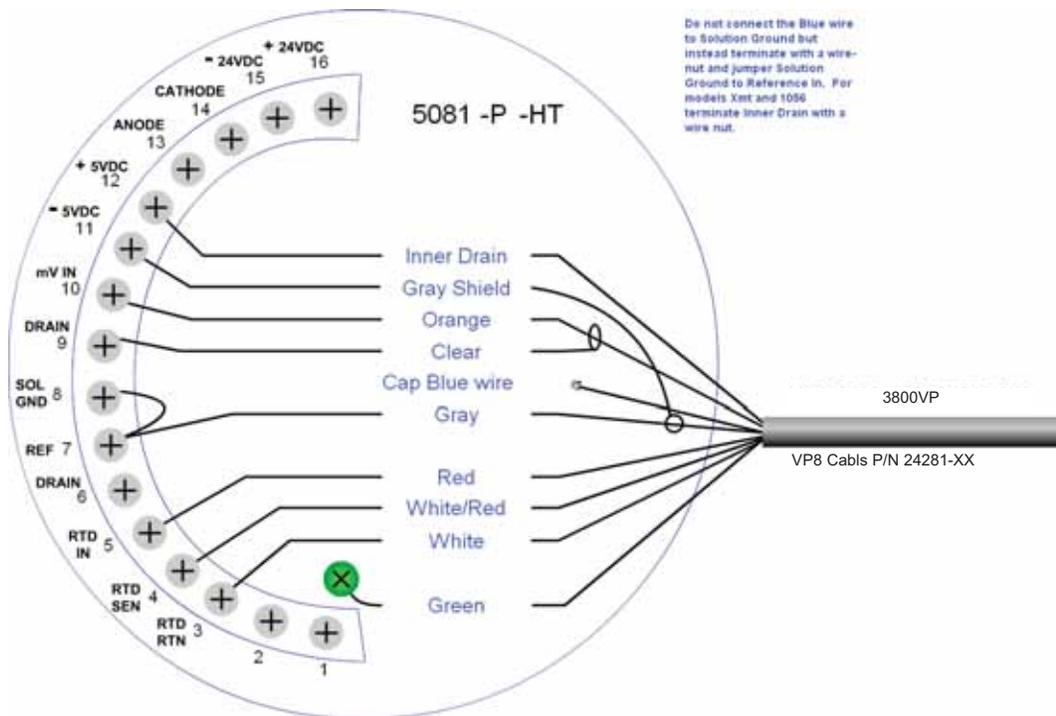


FIGURE 8. 3800VP Wiring to Model 5081.

This is the standard wiring for VP8 cable assembly. VP8 works both with VP6 and VP8 sensor connector.

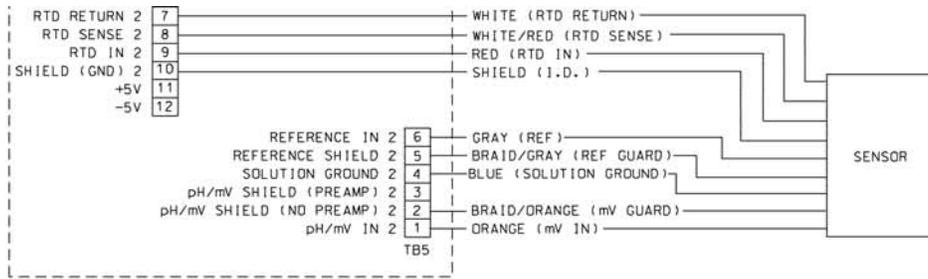


FIGURE 9. Model 1055-01-10-22 single sensor wiring to 3800VP VP6 (28645-XX)

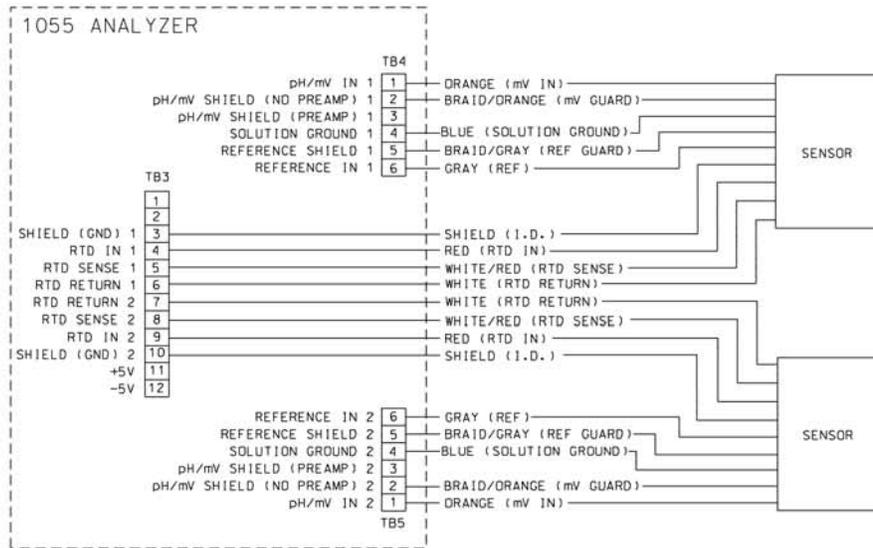


FIGURE 10. 3800VP Wiring to Model 1055-01-10-22-32 dual sensor wiring VP6 (28645-XX)

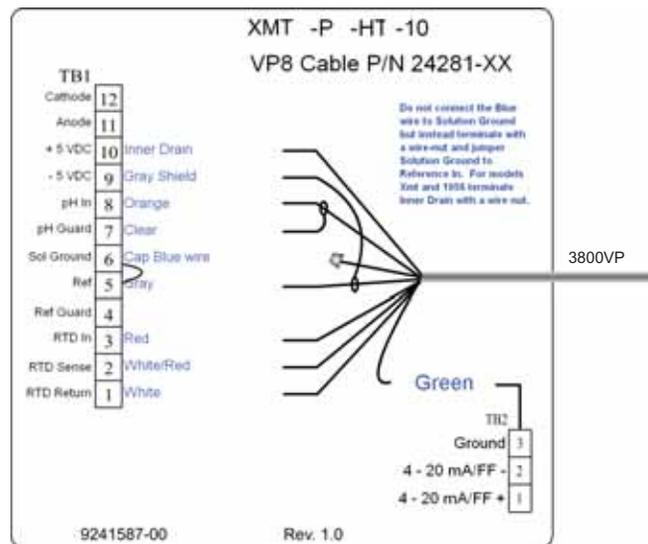


FIGURE 11. VP8 Wiring 3800VP to Model Xmt-P-HT-11 (Pipe Surface Mount)

Note: If no there is no temperature compensation (RTD), then install a 100-ohm resistor between TB1-1 and TB1-3, and install a jumper between TB1-1 and TB1-2.

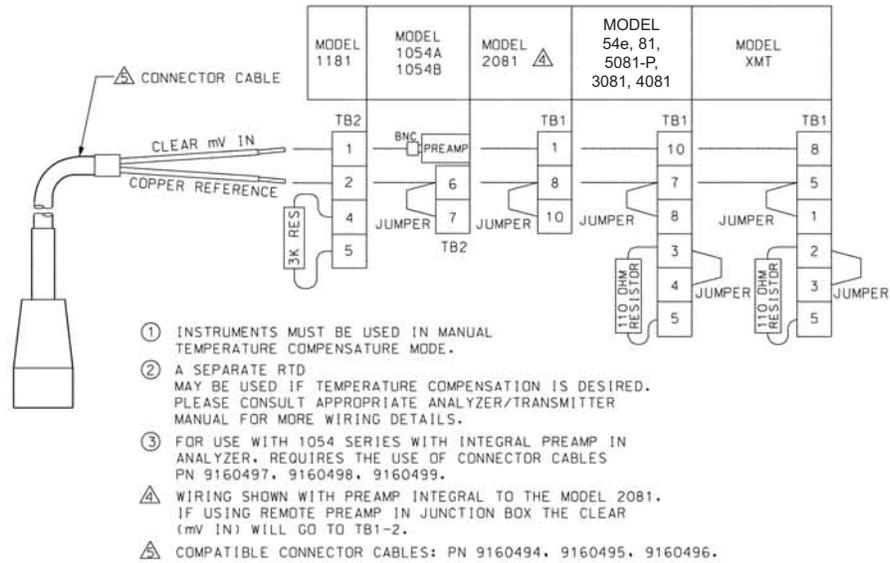


FIGURE 12. Wiring Drawing For Model 3800 with S8 Connector

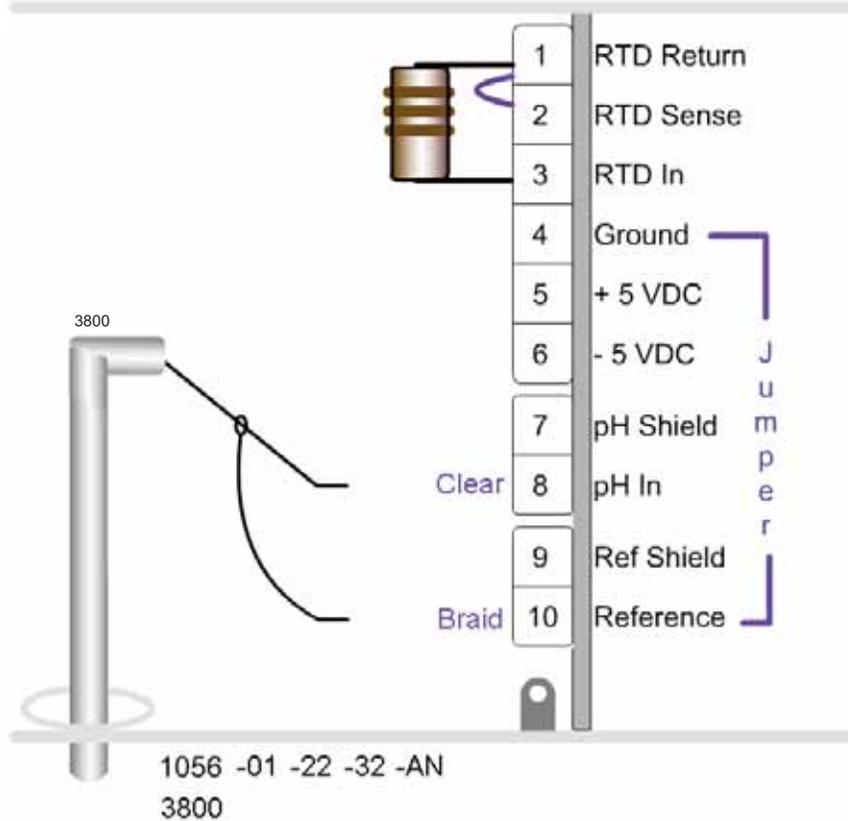


FIGURE 13. S8 cable Wiring to Model 1056 -22 -32 -AN

## ACCESSORIES

Part Number	Description
23645-07	VP6 external cable 15 ft long ( no ground wire)
23645-10	VP6 external cable 10 ft long
23645-11	VP6 external cable 20 ft long
23645-12	VP6 external cable 30 ft long
23645-13	VP6 external cable 4 ft long
9200338	S8 cable, free rotating connector, single pole 5m long
9200339	S8 cable, free rotating connector, single pole 10m long
9160478	G 1 1/4" x Pg 13.5 insertion adapter
9999SQ8940	1.5" Tri-Clamp adapter
24167-03	3/4" NPT 1" x Pg 13.5 insertion adapter
9999SQ10057	1" NPT x Pg 13.5 insertion adapter
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
24281-04	100 ft. cable with mating VP8 connector
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
24167-03	Pg 13.5 insertion kit 3/4" threads
34012-03	Pg 13.5 insertion 3/4" threads 316 SS
24166-00	EDPM O-Ring
24313-00	VP connector cap for Sterilization



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