Instruction Sheet
PN 51A-499AOZ/rev.H
September 2010

Ozone Sensor

For additional information, please visit our website at *www.emersonprocess.com/raihome/liquid/*.

⚠ 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.

⚠ CAUTION

Do not exceed pressure and temperature specifications.
Pressure: 65 psig max (549 kPa abs max)
Temperature: 32 to 122°F (0 to 50°C)

SPECIFICATIONS - SENSOR

Pressure: 0 to 65 psig (101 to 549 kPa abs)
Temperature: 32 to 122°F (0 to 50°C)
Process Connection: 1 inch MNPT
Wetted Parts: Polysulfone, Viton[1], Teflon[2] TFE, silicone
Cathode: gold

[1] Viton is a registered trademark of E.I. duPont de Nemours & Co.
[2] Teflon is a registered trademark of E.I. duPont de Nemours & Co.

SPECIFICATIONS - FLOW CELLS

Type	PN	Wetted Materials	Process Connection	Maximum Temperature	Maximum Pressure
1-1/2 in. tee	23567-00	CPVC, Buna N	1-1/2 in. socket	122°F (50°C)	65 psig (549 kPa abs)
2 in. tee	915240-03	PVC, Buna N	3/4 in. NFPT	120°F (49°C)	60 psig (515 kPa abs)
	915240-04		1 in. NFPT		
	915240-05		1-1/2 in. NFPT		
Low Flow*	24091-00	Polyester/polycarbonate, 316SS, silicone	Compression fitting for 1/4 in. OD tubing	158°F (70°C)	90 psig (722 kPa abs)

* Pressure and temperature specifications for the low flow cell exceed the temperature and pressure specifications for the sensor.

INSTALLATION

Install the sensor in a flowing sample. Keep the sample flow as constant as possible at a value within the limits below.

Flow through	1 to 5 gpm (3.8 to 19 L/min)
Open channel	1 ft/sec (0.3 m/sec)
Low flow cell	2 to 5 gph (7.6 to 19 L/hr)

*The Model 499AOZ sensor is **NOT** recommended for submersion into tanks, basins, or ponds.*

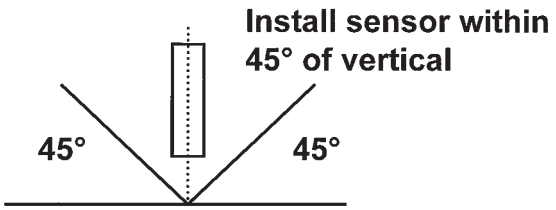

FIGURE 1. Sensor Orientation

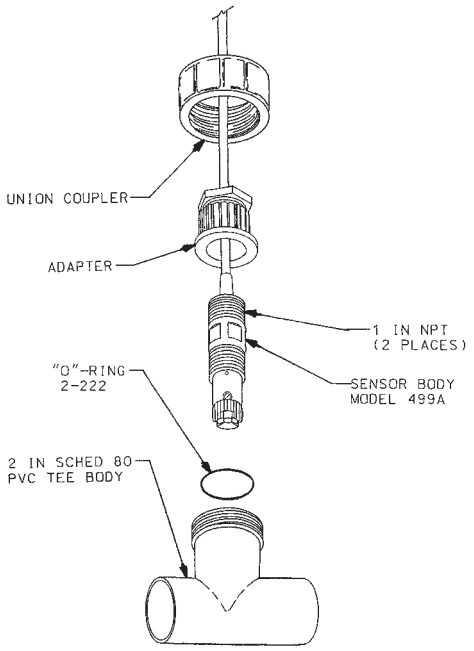

FIGURE 2. Flow-Through 2 in. Tee

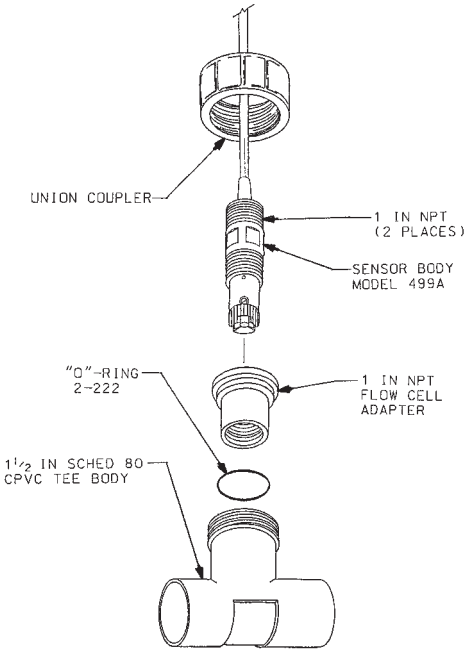

FIGURE 3. Flow-Through 1-1/2 in. Tee

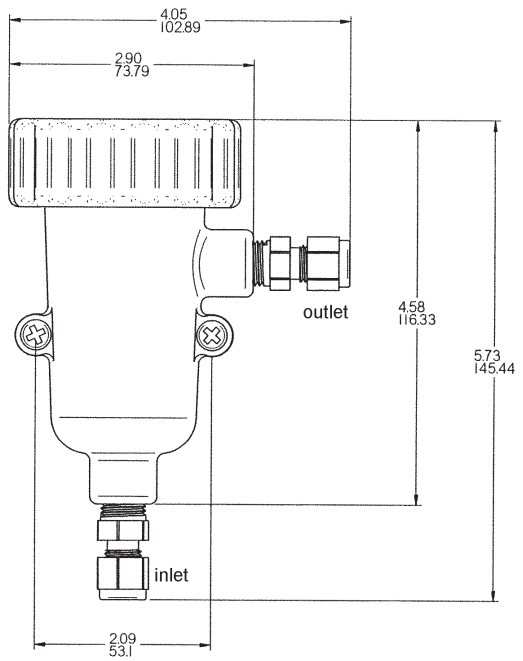

FIGURE 4. Low Flow Cell (PN 24091-00)

WIRING

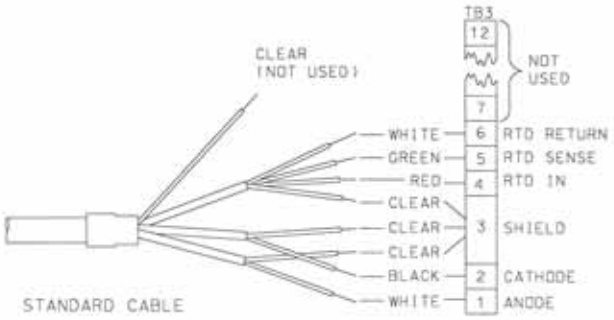

FIGURE 5. Wiring Sensor with Standard Cable to Model 54eA Analyzer

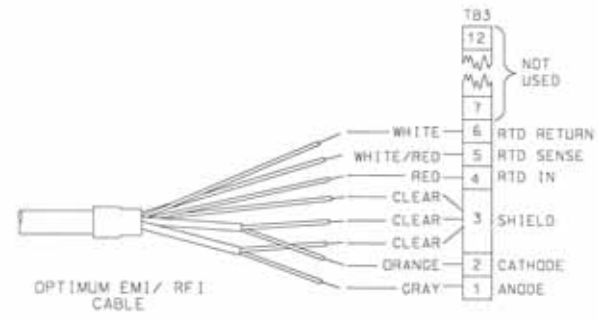

FIGURE 6. Wiring Sensor with OptimumEMI/RFI or Variopol Cable to Model 54eA Analyzer

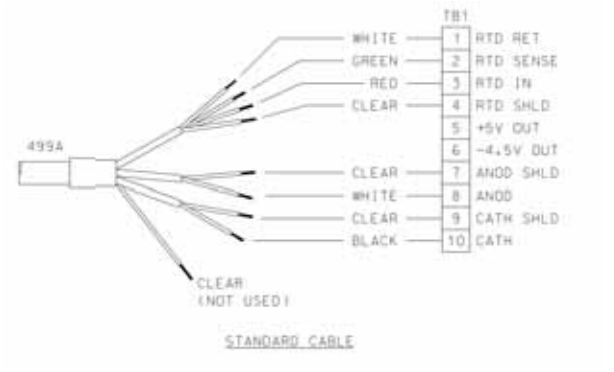

FIGURE 7. Wiring Sensor with Standard Cable to Model 1056 and Model 56 Analyzer

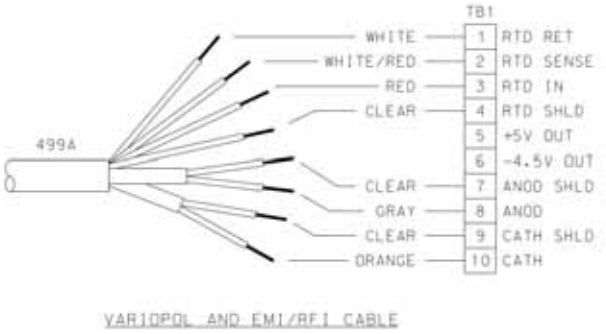

FIGURE 8. Wiring Sensor with Optimum EMI/RFI or Variopol Cable to Model 1056 and Model 56 Analyzer

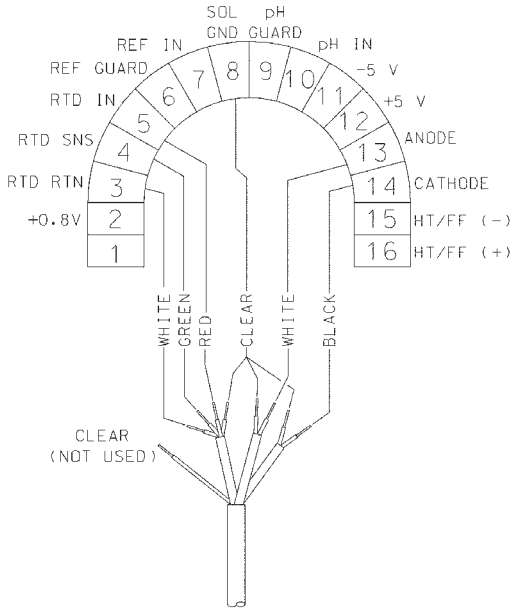

FIGURE 9. Wiring Sensor with Standard Cable to 5081-A Transmitter.

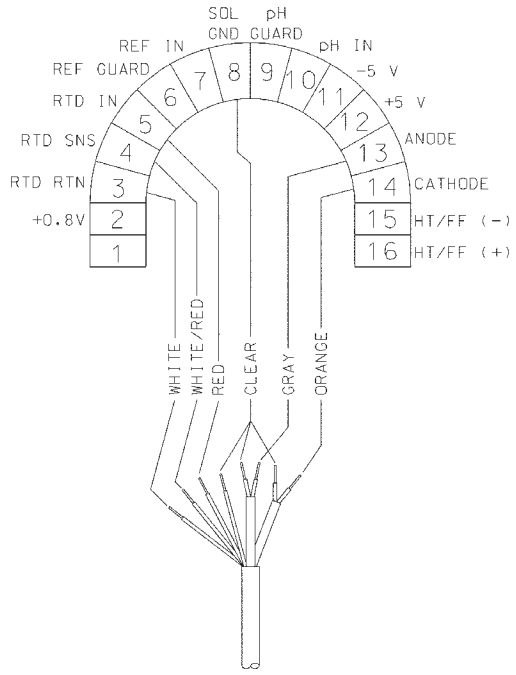

FIGURE 10. Wiring Sensor with Optimum EMI/RFI or Variopol Cable to 5081-A Transmitter.

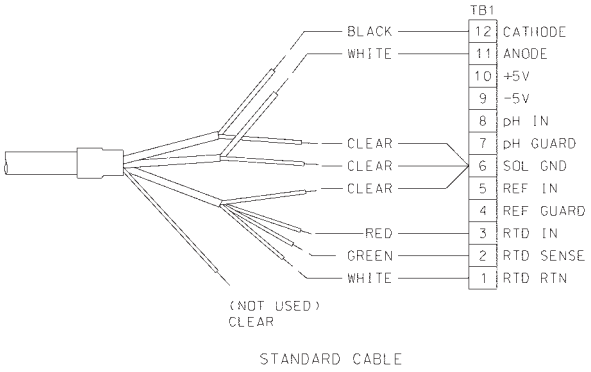

FIGURE 11. Wiring Sensor with Standard Cable to Xmt-A Transmitter.

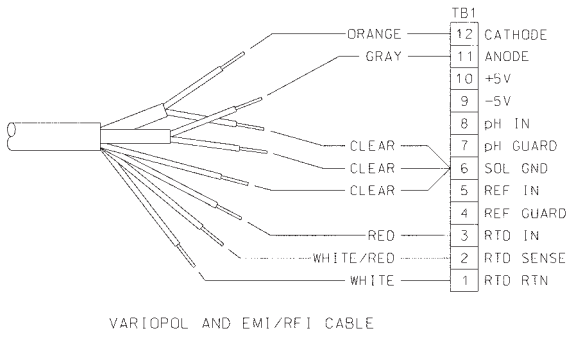

FIGURE 12. Wiring Sensor with Optimum EMI/RFI or Variopol Cable to Xmt-A Transmitter.

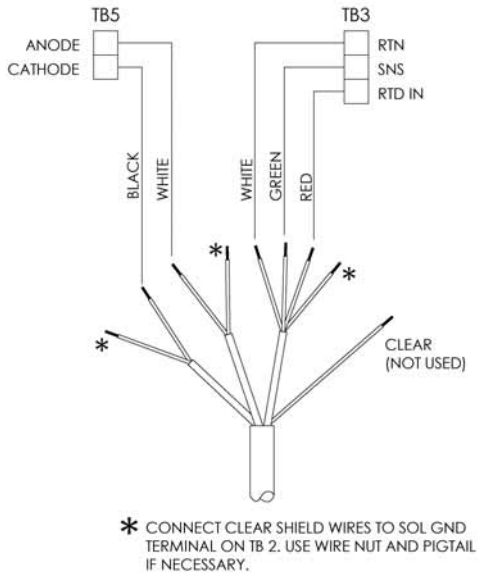

FIGURE 13. Wiring Sensor with Standard Cable to Model 1066 Transmitter.

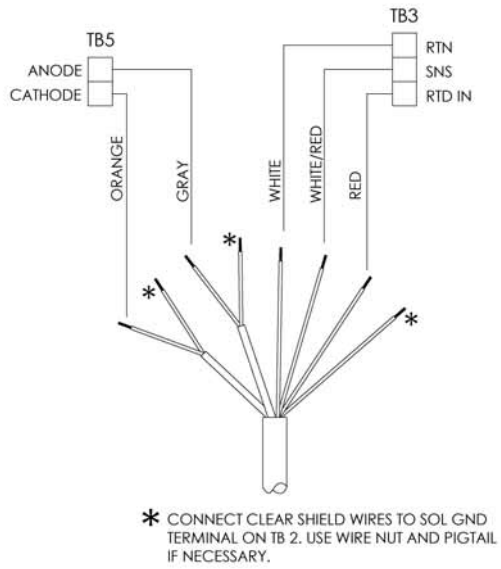

FIGURE 14. Wiring Sensor with Optimum EMI/RFI or Variopol Cable to Model 1066 Transmitter.

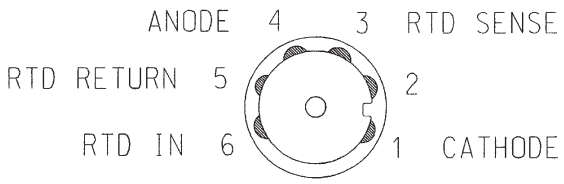

FIGURE 15. Pin Out Diagram for Model 499AOZ-VP Sensor (top view of connector end of sensor)

When making connections through a junction box (PN 23550-00), wire point-to-point.

NOTE:

Use a wire nut and pigtail (included) when connecting several wires to the same terminal.

CALIBRATION

Zero point: Even in the absence of ozone, the 499AOZ sensor generates a small signal called the zero current. Failing to correct for the zero current can introduce a bias, particularly if the ozone concentration is small (<0.4 ppm). Zero the sensor when it is first placed in service and every time the fill solution is changed. To zero the sensor, place it in a cup of deionized or bottled water. Once the sensor current has reached a stable low value, which takes at least two hours, follow the analyzer prompts for zeroing the sensor. The zero current should be between -10 and 10 nA. For more information refer to the analyzer manual.

Full Scale: Because stable dilute ozone standards are not available, the sensor must be calibrated against the results of a laboratory test run on a grab sample of the process liquid. Place the sensor in the flow cell and adjust the sample flow to the correct range. Also, adjust the concentration so that it is near the upper end of the operating range. Once readings are stable, follow the analyzer prompts to complete the calibration. Be sure taking the sample does not alter flow to the sensor, and test the sample immediately after collection. After calibration, go to the diagnostics menu and check the sensitivity. It should be between 250 and 450 nA/ppm. For more information, refer to the analyzer manual.

MAINTENANCE

Periodic maintenance and cleaning is required for best performance of the sensor. Generally, the membrane and fill solution should be replaced every four to six months. Sensors installed in harsh or dirty environments require more frequent maintenance. The optimum maintenance frequency is best determined by experience.

⚠ WARNING

Before removing the sensor from the process stream for maintenance, be sure the process pressure is reduced to 0 psig and the process temperature is at a safe level.

CLEANING THE MEMBRANE.

Keep the membrane clean and free from dirt. Clean the membrane with water sprayed from a wash bottle. Use a soft tissue to **gently** wipe the membrane.

REPLACING THE ELECTROLYTE SOLUTION AND MEMBRANE.

⚠ CAUTION

Fill solution may cause irritation. May be harmful if swallowed. Read and follow manual.

1. Unscrew the membrane retainer and remove the membrane assembly and O-ring. See Figure 16.
2. Hold the sensor over a container with the cathode pointing down.
3. Remove the fill plug and allow the electrolyte solution to drain out.
4. Inspect the cathode. If it is tarnished, clean it by gently rubbing in the direction of the existing scratches (do not use a circular motion) with 400-600 grit silicon carbide finishing paper. Rinse the cathode thoroughly with water.
5. Wrap the plug with one or two turns of pipe tape and set aside. Remove old tape first.
6. Prepare a new membrane. Hold the membrane assembly with the cup formed by the membrane and membrane holder pointing up. Fill the cup with electrolyte solution. Leave the membrane assembly filled with electrolyte solution and set it aside.
7. Hold the sensor at about a 45-degree angle with the cathode end pointing up. Add electrolyte solution through the fill hole until the liquid overflows. Tap the sensor near the threads to release trapped air bubbles. Add more electrolyte solution if necessary.
8. Place the fill plug in the electrolyte port and begin screwing it in. After several threads have engaged, rotate the sensor so that the cathode is pointing up and continue tightening the fill plug. Do not overtighten.
9. Place a new O-ring in the groove around the cathode post. Cover the holes at the base of the cathode stem with several drops of electrolyte solution.
10. Insert a small **blunt** probe, like a toothpick with the end cut off, through the pressure equalizing port. See Figure 16.

NOTE

Do not use a sharp probe. It will puncture the bladder and destroy the sensor.

Gently press the probe against the bladder several times to force liquid through the holes at the base of the cathode stem. Keep pressing the bladder until no air bubbles can be seen leaving the holes. Be sure the holes remain covered with electrolyte solution.

11. Place a drop of electrolyte solution on the cathode, then place the membrane assembly over the cathode. Screw the membrane retainer in place.
12. The sensor may require several hours operating at the polarizing voltage to equilibrate after the electrolyte solution has been replenished.

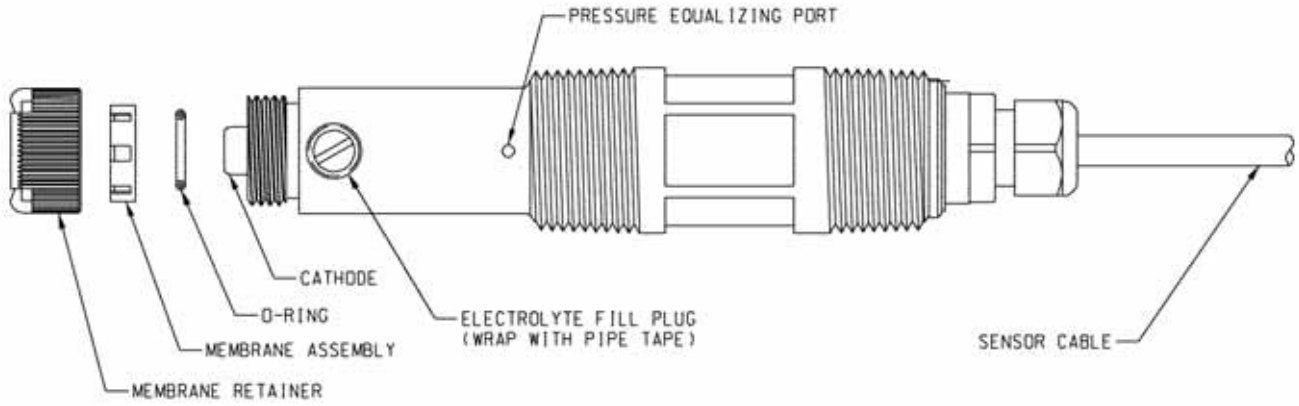

FIGURE 16. Sensor Parts

SPARE PARTS

33523-02	Electrolyte Fill Plug
9550094	O-Ring, Viton 2-014
33521-02	Membrane Retainer
23501-11	Ozone Membrane Assembly: includes one membrane assembly and one O-ring
23502-11	Ozone Membrane Kit: includes 3 membrane assemblies and 3 O-rings
9210299	#3 Ozone Sensor Fill Solution, 4 oz (120 mL)

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