

## Dissolved Ozone Sensor

- RUGGED CONSTRUCTION.
- EASILY REPLACEABLE MEMBRANE; no special tools required.
- AUTOMATIC COMPENSATION for changes in membrane permeability with temperature.
- AUTOMATIC PRESSURE EQUALIZATION maintains correct membrane tension.
- COMPATIBLE with most Delta and Rosemount Analytical analyzers.
- VARIOPOL CONNECTOR OPTION allows the sensor to be replaced without running new cable.



### FEATURES AND APPLICATIONS

The Model 499AOZ sensor is intended for the continuous determination of dissolved ozone. The primary application is ozonation basins in municipal water filter plants. Pretreating the raw water with ozone reduces the amount of filter aid chemicals needed and reduces the amount of chlorine required to disinfect the finished water. Lowered chlorine dosage means a reduced level of harmful chlorination byproducts in the finished water. Ozone is also used as a disinfectant in bottling and food processing plants.

The Model 499AOZ is a membrane-covered amperometric sensor. The sensor consists of a gas-permeable membrane stretched tightly over a gold cathode. A silver anode and an electrolyte solution complete the internal circuit. During operation, ozone diffuses from the sample through the membrane. Once inside the sensor, the ozone reacts with the electrolyte solution to form an intermediate compound. A polarizing voltage applied to the cathode completely reduces the intermediate. The reduction produces a current, which the analyzer measures. The current is directly proportional to the rate at which ozone diffuses through the membrane into the sensor, which is ultimately proportional to the concentration of ozone in the sample.

Because the rate of diffusion of ozone through the membrane depends on temperature, sensor response must be corrected for changes in membrane permeability caused by temperature. A Pt 100 RTD in the

sensor (Delta-compatible sensors use a thermistor) measures the temperature, and the analyzer automatically performs the correction.

Because ozone standards do not exist, the sensor must be calibrated against the results of a laboratory test run on a grab sample of the process liquid. Ozone solutions are unstable, so the sample must be tested immediately. Portable test kits are available from other manufacturers.

Maintenance is fast and easy. Replacing the membrane requires no special tools or fixtures. Simply place a few drops of electrolyte solution in the membrane assembly, place it over the cathode, and screw the retainer in place. To replenish the electrolyte solution, unscrew the fill plug, add the reagent from a squeeze bottle, and replace the plug.

Pressure changes have little influence on sensor response. A flexible bladder in the sensor prevents distortion of the membrane by keeping the pressure inside the sensor equal to the sample pressure.

Several mounting configurations are possible. For most applications the low flow cell is recommended.

The Model 499AOZ sensor is available with a Variopol (VP) watertight connector. Wire the interconnecting cable to the analyzer and run the cable to the sensor. The sensor plugs into the cable receptacle. To replace the sensor, simply disconnect the Variopol fitting and plug in a new sensor.

## SENSOR SPECIFICATIONS

**Range:** 0 to 3 ppm (mg/L) as O<sub>3</sub>. For prolonged exposure to ozone levels greater than 1 ppm, consult the factory.

**Wetted Parts:** Noryl<sup>1</sup>, Viton<sup>2</sup>, Teflon<sup>3</sup>, silicone

**Cathode:** gold (not normally wetted)

**Accuracy:** Accuracy depends on the accuracy of the chemical test used to calibrate the sensor.

**Linearity:** ±5% of reading or ±3 ppb (whichever is greater) at 25°C

**Repeatability:** ±2% of reading at constant temperature

**Response time:** 30 sec to 90% of final reading at 25°C

**Pressure:** 0 to 65 psig (0 to 549 kPa abs)

**Temperature (Operating):** 32 to 122°F (0 to 50°C)

**Membrane Permeability Correction:** Defined between 41 and 95°F (5 and 35°F)

**Process Connection:** 1 inch MNPT

**Electrolyte Volume:** 25 mL (approx.)

**Electrolyte Life:** 3 months (approx.); for best results, replace electrolyte monthly

**Cable Length (standard integral cable):** 25 ft (7.6 m)

**Cable Length (maximum):** 300 ft (91 m)

**Sample Flow:**

Flow through	1-5 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)

**Weight/Shipping Weight:** 1 lb/3 lb (0.5 kg/1.5 kg)

<sup>1</sup> Noryl is a registered trademark of General Electric.

<sup>2</sup> Viton is a registered trademark of E.I. duPont de Nemours & Co.

<sup>3</sup> Teflon is a registered trademark of E.I. duPont de Nemours & Co.

## FLOW CELL SPECIFICATIONS

**LOW FLOW CELL** PN 24091-00

**Wetted Parts:** polycarbonate, 316 stainless steel, Buna N

**Process Connection:** 1/4-inch OD tubing compression fitting or 1/4-inch FNPT

**Maximum Pressure:** 65 psig (549 kPa abs)

**Maximum Temperature:** 122°F ( 50°C)

**FLOW-THROUGH TEE** (1½ inch body) PN 23567-00

**Wetted Parts:** CPVC and Buna N; body is schedule 80 CPVC

**Process Connection:** 1-½ inch socket

**Maximum Pressure:** 65 psig (549 kPa abs)

**Maximum Temperature:** 122°F ( 50°C)

**FLOW-THROUGH TEE** (2 in. body) PN 915240-03/04/05

**Wetted Parts:** PVC and Buna N; body is schedule 80 PVC

**Process Connection:** ¾ inch NFPT, 1 inch NFPT, or 1½ inch NFPT

**Maximum Pressure:** 60 psig (515 kPa abs)

**Maximum Temperature:** 120°F (49°C)

**VALVED ROTAMETER** PN 9390004  
for use with Flow Cell

**Flow:** 0.4 to 5 gph (1.5 to 19 L/hr)

**Wetted Parts:** acrylic, 316 stainless steel, Viton

**Process Connection:** ¼ inch NFPT (316 SS)

**Maximum Pressure:** 100 psig (858 kPa abs)

**Maximum Temperature:** 150°F (65°C)

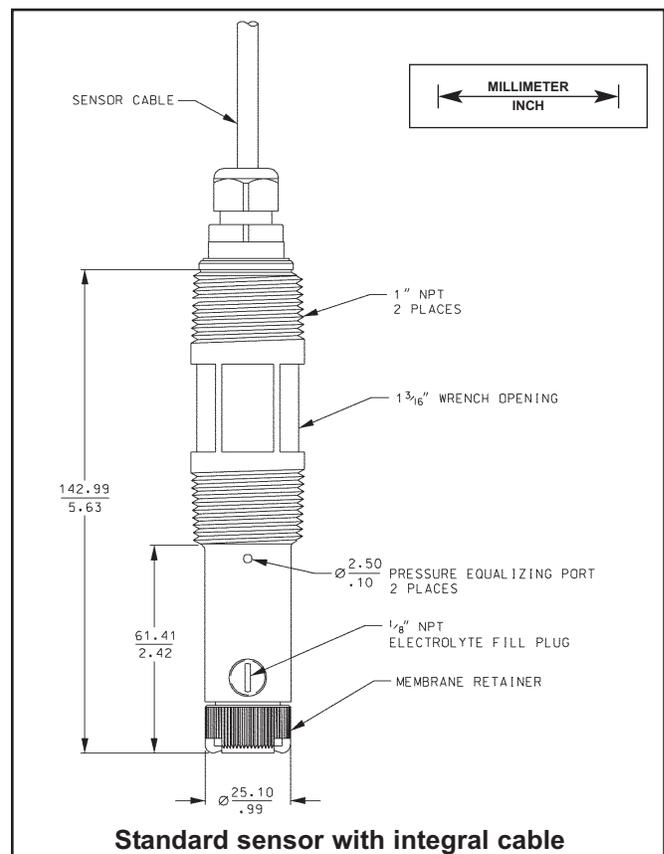
## RECOMMENDED ANALYZERS

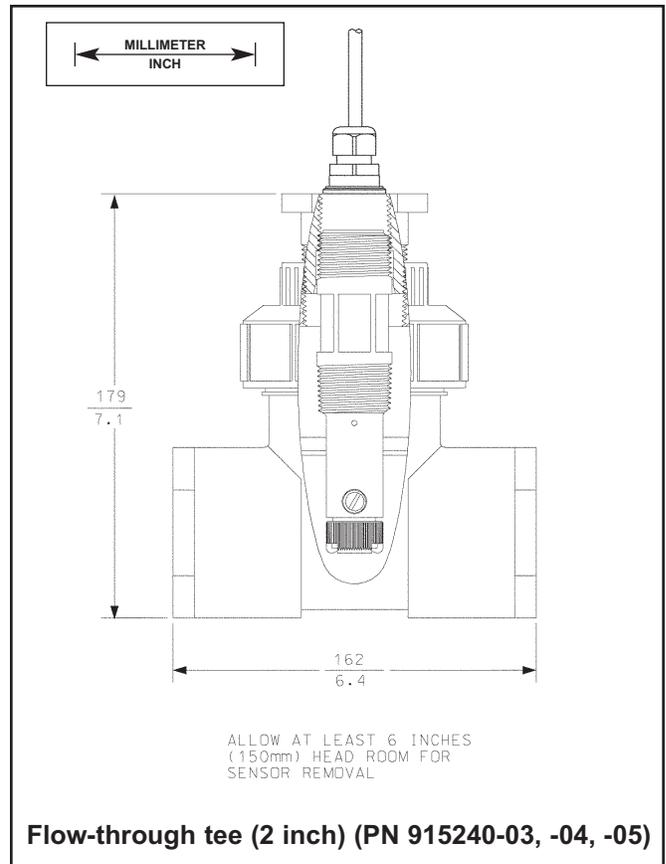
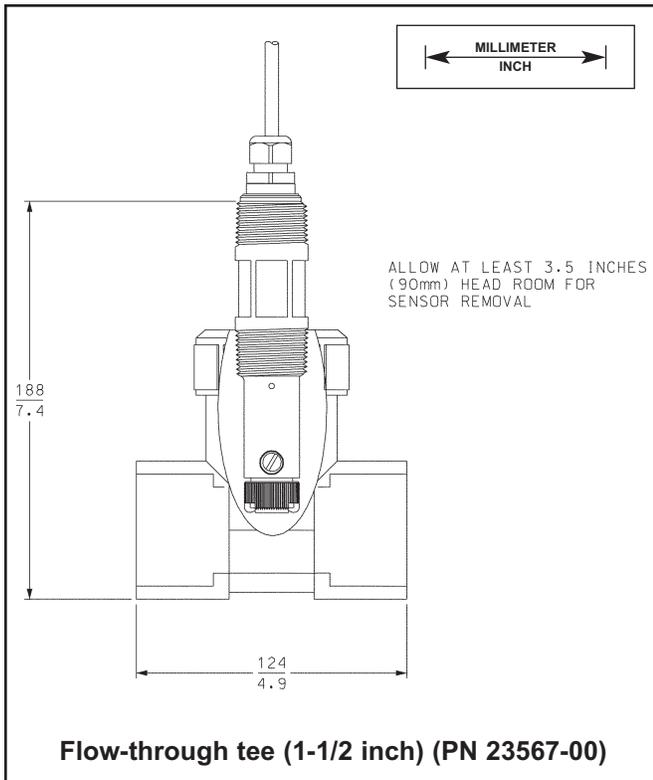
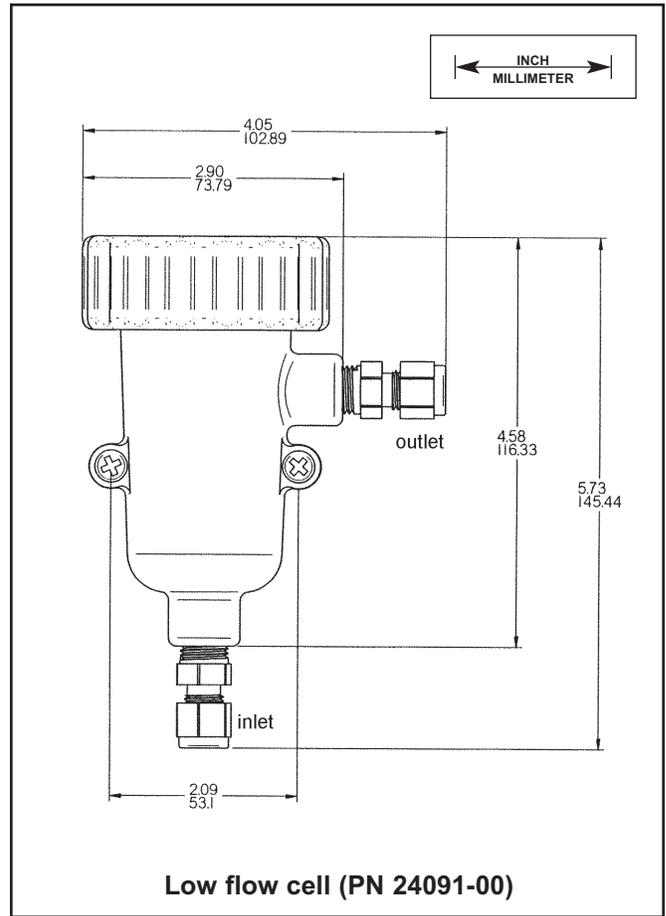
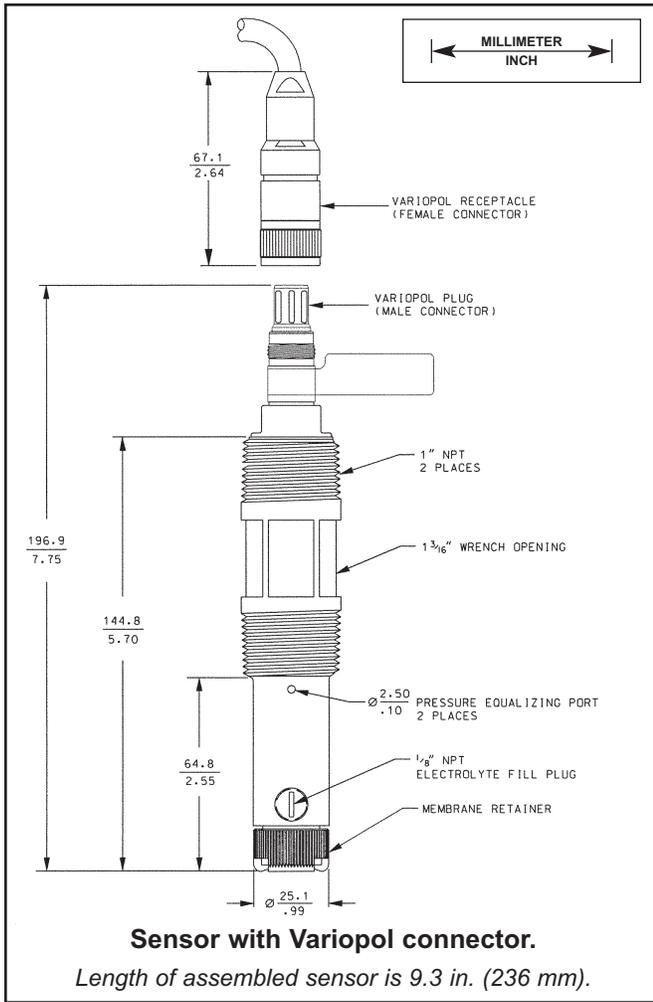
**Rosemount Analytical:** 1054AOZ, 1054BOZ, 1055-26, 54eA, 5081-A, and Xmt-A.

**Delta:** 940, 8240, and 8340. (Note: Delta analyzers are obsolete; information is provided for customers using Delta equipment.)

## OBSOLETE SENSORS

The 499AOZ sensor replaces Rosemount Analytical Model 499OZ and Delta Model 921403. Both sensors are obsolete.





## ORDERING INFORMATION

The **Model 499AOZ sensor** is intended for the determination of dissolved ozone in a variety of municipal and industrial applications. The sensor is generally intended for mounting in an off-line flow cell. The sensor is available with either an integral cable or a VP6.0 quick disconnect fitting. Three replacement membrane assemblies, three o-rings and a 4-oz (125 mL) bottle of electrolyte solution are provided with each sensor.

MODEL 499AOZ DISSOLVED OXYGEN SENSOR	
CODE	Required selection
54	For use with Model 1054AOZ, 1054BOZ, 1055-26, 54eA, 5081-A, and Xmt-A analyzers
56	For use with Delta analyzers*
CODE	Optional selection
60	Optimum EMI/RFI cable (not available with -VP and -56 options)
VP	Sensor with Variopol 6.0 fitting (interconnecting cable must be ordered separately, not available with option -56)
<b>499AOZ</b>	<b>-54 -VP EXAMPLE</b>

\* **For first time replacement of Delta sensors:** If a Delta ozone sensor (Model 921403) is being replaced for the first time, a retrofit adapter must be ordered. Use PN 33211-00 to adapt the 499AOZ 1-in. MNPT to the Delta 1-½ in. FNPT flow-through tee.

## FOR FIRST TIME VARIOPOL INSTALLATIONS

PART #	DESCRIPTION
23747-02	VP 6.0 interconnecting cable, 10 ft (3 m)
23747-03	VP 6.0 interconnecting cable, 50 ft (15 m)

For junction box and connecting cable between junction box and analyzer, see **ACCESSORIES**. The cable in PN 9200275 (unterminated) and PN 23747-00 (terminated) is the same cable used in the VP interconnecting cable.

## ACCESSORIES

PART #	DESCRIPTION
23567-00	1-½ in. flow through tee with 1-½ socket connections
914240-03	2-in. flow through tee with ¾-in FNPT connections
915240-04	2-in. flow through tee with 1-in FNPT connections
915240-05	2-in. flow through tee with 1-½-in FNPT connections
24091-00	Low flow cell with ¼-in OD tubing compression fittings
9390004	Rotameter: 0.5 - 5.0 gph
22719-02	Junction box, 8 terminals
9200266	Extension cable for option -54, unterminated (specify length)
ED0011	Extension cable for option -56, unterminated (specify length)
9200275	Extension cable for optimum EMI/RFI cable, unterminated (specify length)
23747-00	Extension cable for optimum EMI/RFI cable, terminated (specify length)
2001492	Stainless steel tag
23501-04	Dissolved ozone membrane assembly: includes one membrane assembly and O-ring.
23502-04	Dissolved ozone membrane assembly: includes three membrane assemblies and three O-rings.
9210299	#3 Dissolved ozone sensor fill solution, 4 oz (125 mL)



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