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Rosemount™ 499ACL-01

Free Chlorine Sensor



The simplest way to reliably measure free chlorine in water

The Rosemount™ 499ACL-01 sensor is designed to measure free chlorine in water without sample pretreatment. These amperometric sensors are ideal for use in drinking water applications.

Overview



A Simple Free Chlorine Design

- Measure free chlorine without having to deal with messy and expensive reagents.
- Continuous pH correction compatible when used with an auxiliary pH sensor.
- Integral Pt-100 RTD allows for automatic temperature compensation.
- Operates in samples up to 50 °C (122 °F) and 65 psig.

Ease of Maintenance and Installation

- 1 in. MNPT process connections suitable for mouting in a low flow cell installed in a sidestream sample.
- Replacing the membrane and electrolyte solution is fast and easy and requires no special tools or fixtures.
- Variopol (VP6) cable connection option, for quick cable-to-sensor release, eliminates cable twisting.

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Ordering Information



Rosemount 499ACL-01 free chlorine sensors are available with either a 25 ft integral cable or a Variopol (VP6) interconnecting cable (sold separately). These sensors are generally mounted in a flow cell installed in a sidestream sample. Three replacement membrane assemblies, three O-rings, and a 4 oz (125 mL) bottle of electrolyte solution are provided with each sensor.

Table 1. Rosemount 499ACL-01 Free Chlorine Sensor ordering information

Model	Sensor type
499ACL	Chlorine Sensor
Sensor Type	
01	Free Chlorine
Transmitter compatibility	
54	For use with Rosemount 1056, 56, 1066, and 5081 transmitters

Options

Cable options	
-	No selection - standard 25 ft cable
60	Optimum EMI/RFI protected 25 ft cable
VP	Variopol (VP6) cable connection
Typical model number: 499A CL-01-54-VP	

Specifications

Table 2. Sensor specifications

Free Chlorine Sensor	
Range	0 to 10 ppm (mg/L) as Cl_2 . For higher ranges, consult the factory.
Wetted parts	Noryl ¹ , Viton ² , silicone, platinum, and polyethersulfone
Accuracy	Accuracy depends on the accuracy of the chemical test used to calibrate the sensor.
pH range	6.0 to 9.5. For samples having pH between 9.5 and 10.0, consult the factory. Samples with ranges below 6.0 require no pH correction.
pH correction	Use continuous pH correction (requires an auxiliary pH sensor) if sample pH varies more than 0.2 pH (peak to peak). If pH variability is less or seasonal, the pH sensor is generally not required.
Interferences	Peroxides, permanganate, and chloramines
Sample conductivity	>50 $\mu S/cm$
Response time	22 sec to 95% of final reading at 25 °C (77 °F)
Pressure	0 to 65 psig (101 to 549 kPa abs)
Temperature	0 to 50 °C (32 to 122 °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)
Weight/shipping weight	1 lb/3 lb (0.5 kg/1.5 kg)
Sample flow	
Flow through	2 to 5 gpm (3.8 to 19 L/min)
Open channel	1 ft/sec (0.3 m/sec)
Low flow cell (PN 24091-00)	8 to 15 gph (30 to 57 L/hr)
Low flow cell (PN 24901-01)	2 to 5 gph (8 to 19 L/hr)

(1) Noryl is a registered trademark of General Electric.

(2) Viton is a registered trademark of E.I. duPont de Nemours & Co.

Table 3. Low flow cell specifications

PN 24091-00 and 24091-01. PN 24091-01 contains a bubble sweeping nozzle to keep bubbles from accumulating against the membrane. It is intended for samples where high flows are not available. See flow specifications above.	
Wetted parts	Polycarbonate, polyester, 316 stainless steel, and silicone
Process connection	1/4 inch OD tubing compression fitting or 1/4 inch FNPT
Maximum pressure	90 psig (722 kPa abs)
Maximum temperature	70 °C (158 °F)

Note: The temperature and pressure specifications of the flow cell exceed the specifications for the sensor.

Table 4. Flow-through tee specifications

1-1/2 inch body, PN 23567-00	
Wetted parts	CPVC and Buna N; body is schedule 80 CPVC
Process connection	1-1/2 inch socket
Maximum pressure	65 psig (549 kPa abs)
Maximum temperature	50 °C (122 °F)
2 inch body, PN 915240-03, 04, 05	
Wetted parts	PVC and Buna N; body is schedule 80 PVC
Process connection	3/4 inch NFPT, 1 inch NFPT, or 1-1/2 inch NFPT
Maximum pressure	60 psig (515 kPa abs)
Maximum temperature	49 °C (120 °F)

Table 5. Valved rotameter specifications

PN 196-898754	
Flow	2 to 10 gph (7.6 to 76 L/hr)
Wetted parts	Polycarbonate, 316 stainless steel, brass, Buna N
Process connection	1/8 inch NFPT (brass)
Maximum pressure	100 psig (858 kPa abs)
Maximum temperature	54 °C (130 °F)
2PN 939004 for use with low flow cell PN 24091-01	
Flow	0.4 to 5 gph (1.4 to 19 L/hr)
Wetted parts	Acrylic, 316 stainless steel, Viton
Process connection	1/4 inch NFPT (316 stainless steel)
Maximum pressure	100 psig (858 kPa abs)
Maximum temperature	65 °C (150 °F)

Dimensional Drawings

Figure 1. Rosemount 499ADO with Integral Cable Sensor Dimensions

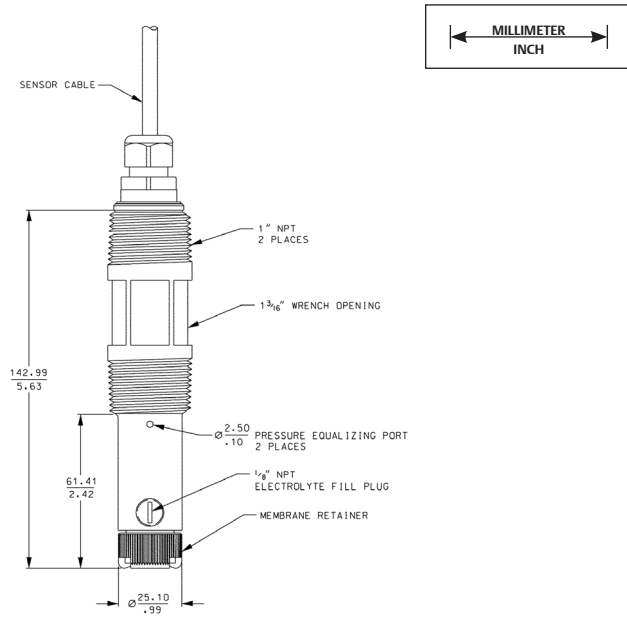
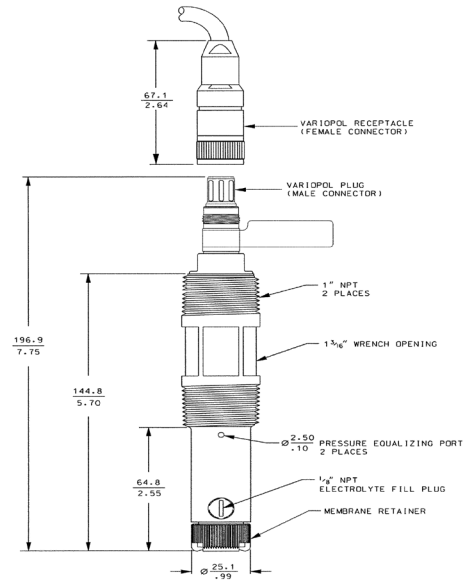


Figure 2. Rosemount 499ADO with Variopool Cable Connection Sensor Dimensions



Length of assembled sensor is 9.3 in. (236 mm).

Figure 3. Low Flow Cell (PN 24091-00)

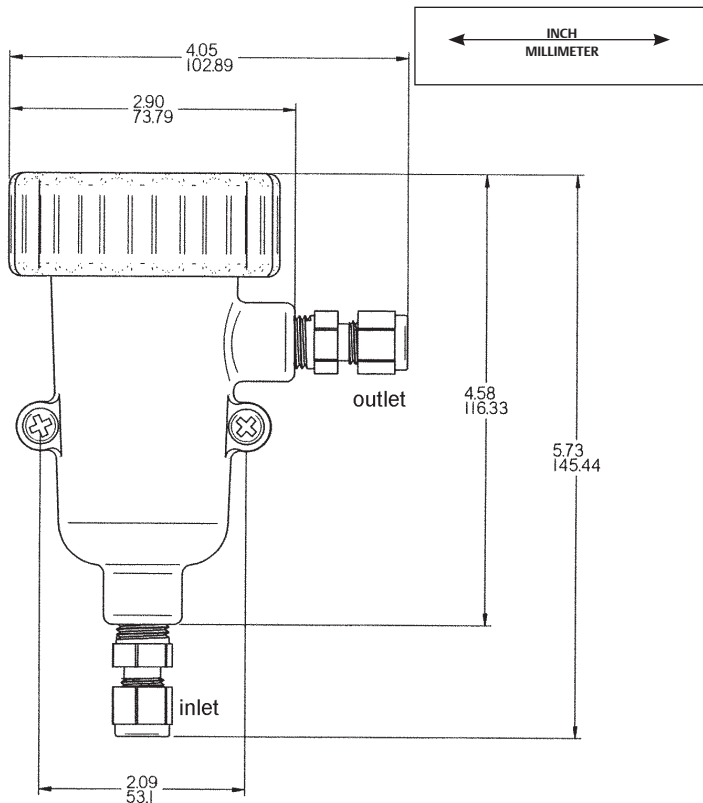


Figure 4. Flow-Through Tee (1-1/2 in.) (PN 23567-00)

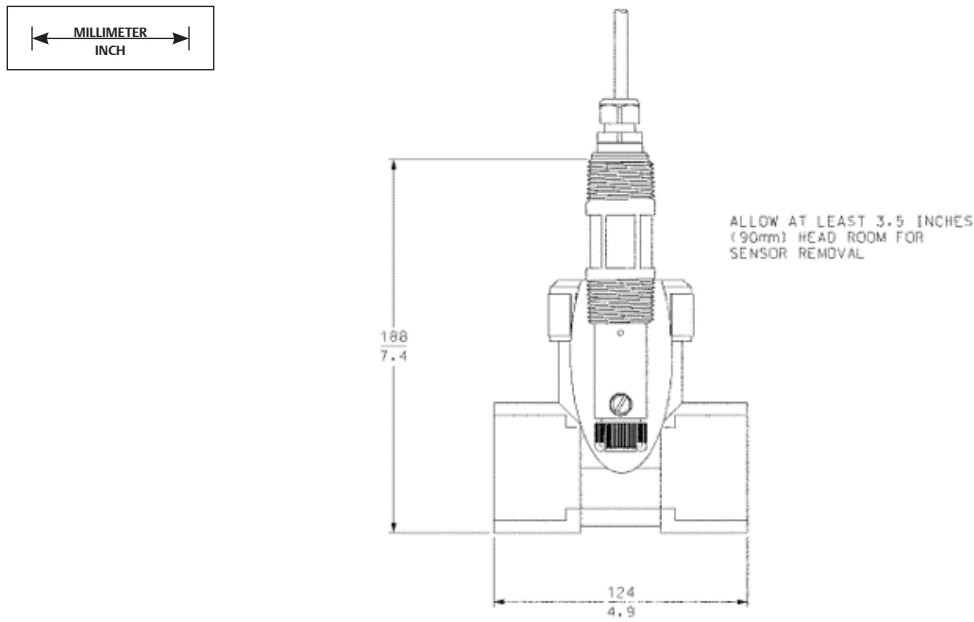
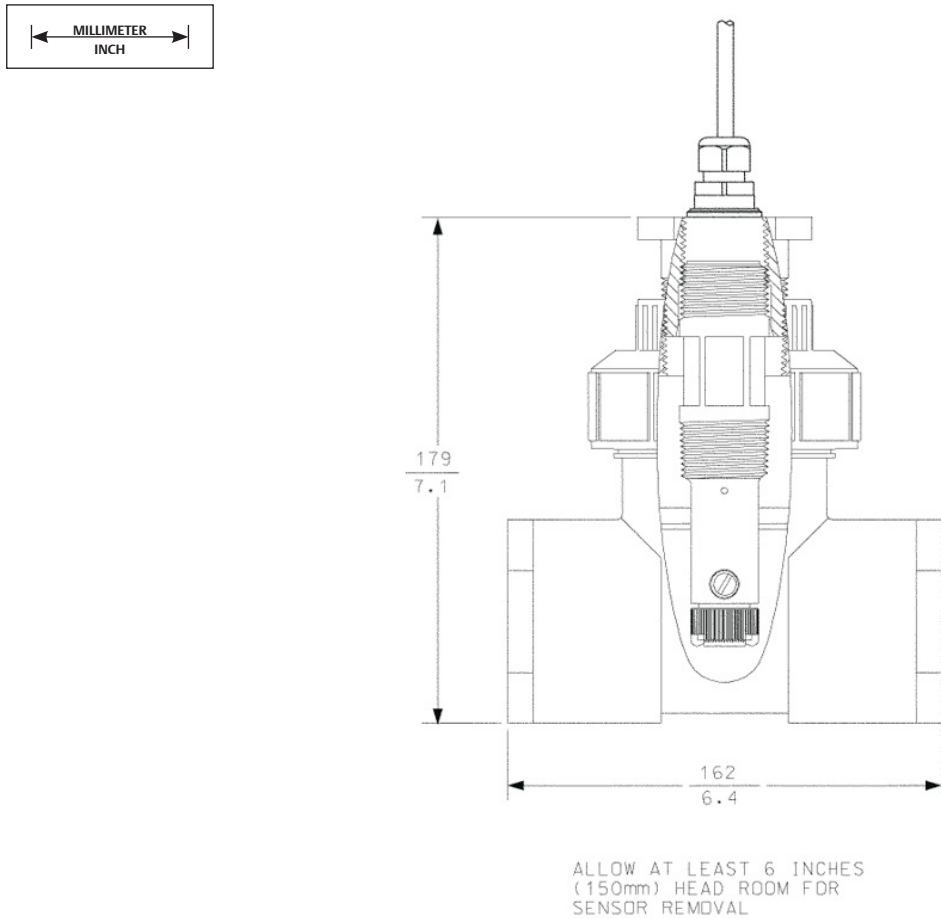


Figure 5. Flow-Through Tee (2 in.) (PN 915240-03, -04, -05)



Accessories

Part number	Description
23567-00	1-1/2 inch flow through tee with 1-1/2 inch socket connections
914240-03	2 inch flow through tee with 3/4 inch FNPT connections
914240-04	2 inch flow through tee with 1 inch FNPT connections
915240-05	2 inch flow through tee with 1-1/2 inch FNPT connections
23747-06	Interconnecting cable, VP 6, 2.5 ft. (0.8 m)
23747-04	Interconnecting cable, VP 6, 4 ft. (1.2 m)
23747-02	Interconnecting cable, VP 6, 10 ft. (3.0 m)
23747-07	Interconnecting cable, VP 6, 15 ft. (4.6 m)
23747-08	Interconnecting cable, VP 6, 20 ft. (6.1 m)
23747-09	Interconnecting cable, VP 6, 25 ft. (7.6 m)
23747-10	Interconnecting cable, VP 6, 30 ft. (9.1 m)
23747-03	Interconnecting cable, VP 6, 50 ft. (15.2 m)
23747-11	Interconnecting cable, VP 6, 100 ft. (30.5 m)
24091-00	Low flow cell with for 8-15 gph
24091-01	Low flow cell with bubble sweeping nozzle for 2-5 gph
196-898574	Rotameter: 2.0 - 20.0 gph
23550-00	Junction box, 12 terminals
9200266	Extension cable (standard), unterminated (specify length)
9200275	Extension cable (optimum EMI/RFI), unterminated (specify length)
23747-00	Extension cable (optimum EMI/RFI), terminated (specify length)
2001492	Stainless steel tag
24552-00	Electrolyte fill plug and O-ring kit
24555-00	O-rings for electrolyte fill plug, 5 each
23502-08	Free chlorine membrane assembly: includes 3 membrane assemblies and 3 O-rings
9210356	#4 free chlorine sensor fill solution, 4 oz (125 mL)

Rosemount 499ACL-01 Engineering Specification

1. The sensor shall be suitable for the determination of free chlorine in water without the use of sample conditioning agents. Sensors that require sample conditioning are not acceptable.
2. An auxiliary pH sensor to compensate for the effect of pH on the chlorine sensor response shall be required if the pH variability is more than 0.2 units (peak-to-peak). Otherwise, a pH sensor shall not be required.
3. The sensor shall be a two-electrode membrane-covered sensor with a silver/silver chloride anode and a platinum cathode. The fill solution shall be potassium chloride.
4. Flow cells designed for the sensor shall be available. A low flow cell requiring no more than about 2 gal/hour (8 L/hour) of sample shall be available.
5. The response time to a step change in free chlorine concentration shall be about 22 seconds to 95% of final value.
6. Sensor maintenance shall require no special tools or fixtures.
7. The sensor fill solution shall require replacing no more often than once a month.
8. The sensor shall be available with either integral cable or a VP 6 quick disconnect fitting.
9. The sensor shall be Rosemount Model 499ACL-01-54 (standard integral cable), 499-ACL-01-54-60 (optimum EMI/RFI resistant cable), 499 ACL-01-54-VP (VP 6 connection), or approved equivalent.