Quick Start Guide
LIQ-QSG-499ACL-01, Rev M
July 2017

Rosemount™ 499ACL-01

Free Chlorine Sensor

ROSEMOUNT™

EMERSON™

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Safety information

⚠ CAUTION!

SENSOR/PROCESS APPLICATION COMPATIBILITY

The wetted sensor material may not be compatible with process composition and operating conditions. Application compatibility is entirely your responsibility.

⚠ CAUTION!

EQUIPMENT DAMAGE

Do not exceed pressure and temperature specifications.

Pressure: 65 psig (549 kPa abs) max. Temperature: 32 to 122 °F (0 to 50 °C)

Contents

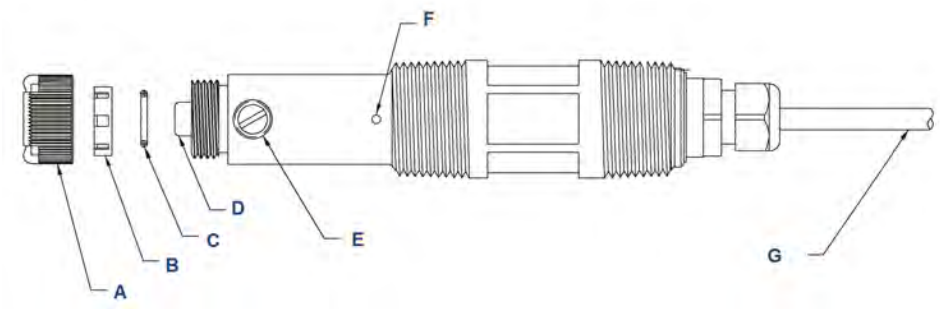
1 Plan

1.1 Unpacking and inspection

1. Inspect the shipping container. If it is damaged, contact the shipper immediately for instructions.
2. Save the box.
3. If there is no apparent damage, unpack the container. Be sure all items shown on the packing list are present. If items are missing, notify Rosemount immediately.

1.2 Product description

Figure 1-1: Rosemount 499ACL-01 Sensor Parts



A. Membrane retainer
B. Membrane assembly
C. O-ring
D. Cathode
E. Electrolyte fill plug (wrap with pipe tape)
F. Pressure equalizing port
G. Sensor cable (integral cable shown)

1.3 Specifications

Table 1-1: Sensor specifications

Physical characteristics	Specifications
Pressure	0 to 65 psig (101 to 549 kPa abs)
Temperature (operating)	0 to 50 °C (32 to 122 °F)
Process connection	1 in. MNPT

Table 1-1: Sensor specifications *(continued)*

Physical characteristics	Specifications
Wetted parts	Noryl®(1), Viton®(2), platinum, polyethersulfone, polyester, wood, and silicone
Process connections	Sensor must be used in flow cell PN 24091-01

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

(2) Viton is a registered trademark of DuPont Performance Elastomers.

Table 1-2: Other specifications

Type	PN	Wetted materials	Process connection	Maximum temperature	Maximum pressure
1-1/2 in. tee	23567-00	CPVC and Buna N	1-1/2 in. socket	122 °F (50 °C)	65 psig (549 kPa abs)
2 in. tee	915240-03	PVC and 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 cell (1)	24091-00	Polycarbonate/polyester, 316 stainless steel, and silicone	Compression fitting for 1/4 in. O.D. tubing	158 °F (70 °C)	90 psig (722 kPa abs)

(1) Temperature and pressure specifications for the low flow cell exceed the temperature and pressure specifications for the sensor.

2 Install

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

Sample flow unit	Flow limits
Flow through	1 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 (20 to 47 L/hr)
Low flow cell (PN 24091-01)	2 to 3 gph (120 to 190 mL/min)

Figure 2-1: Sensor Orientation

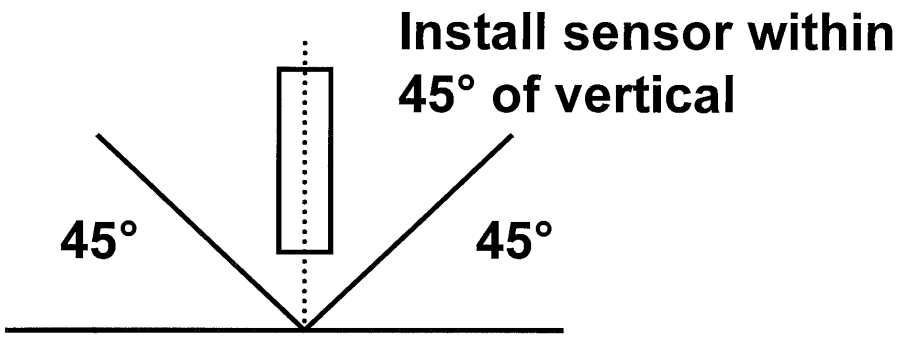


Figure 2-2: Flow through 1-1/2 in. Tee

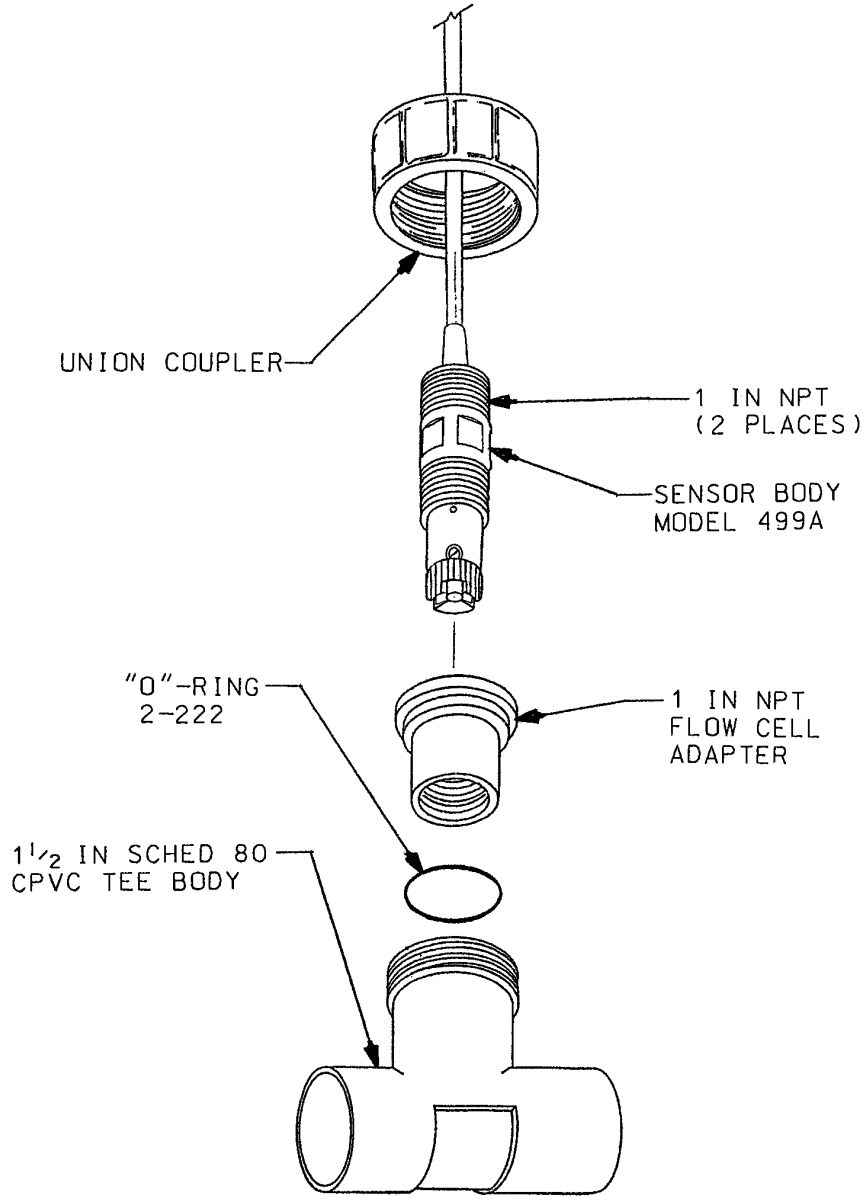


Figure 2-3: Flow through 2 in. Tee

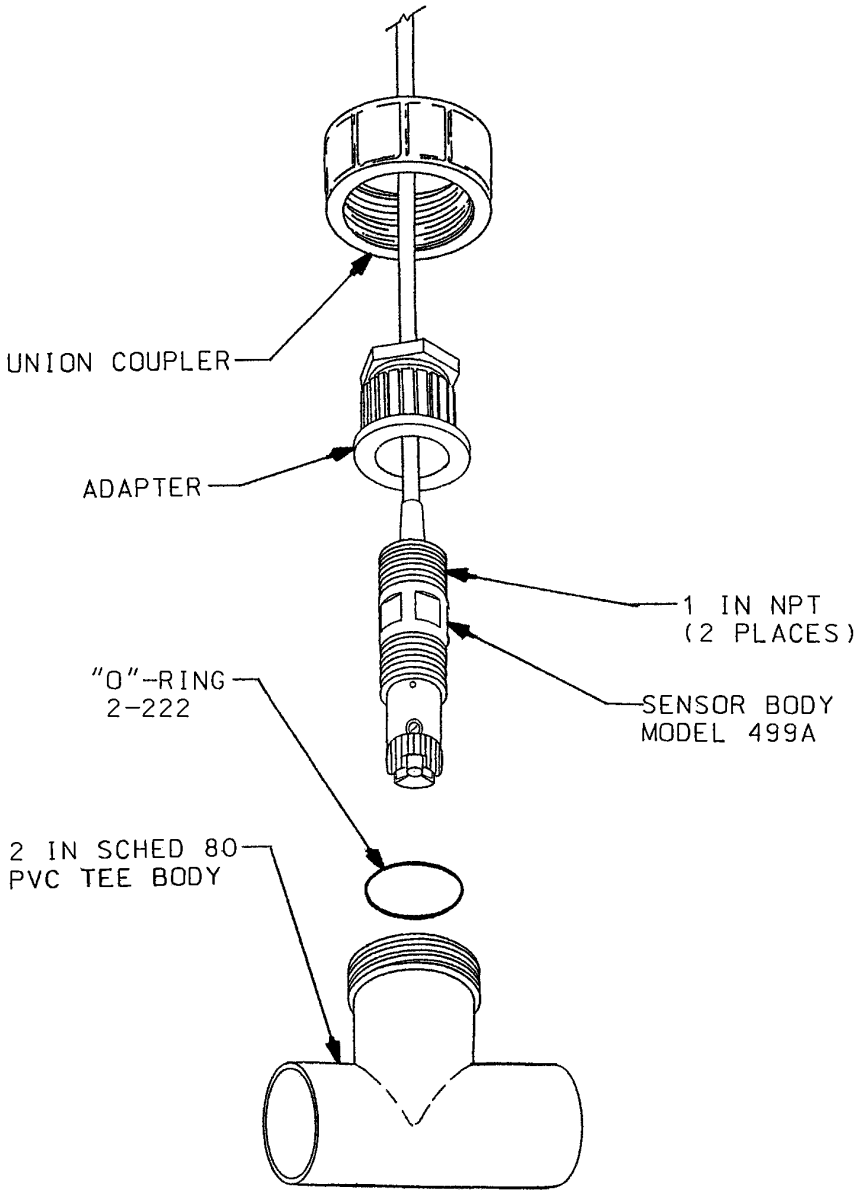
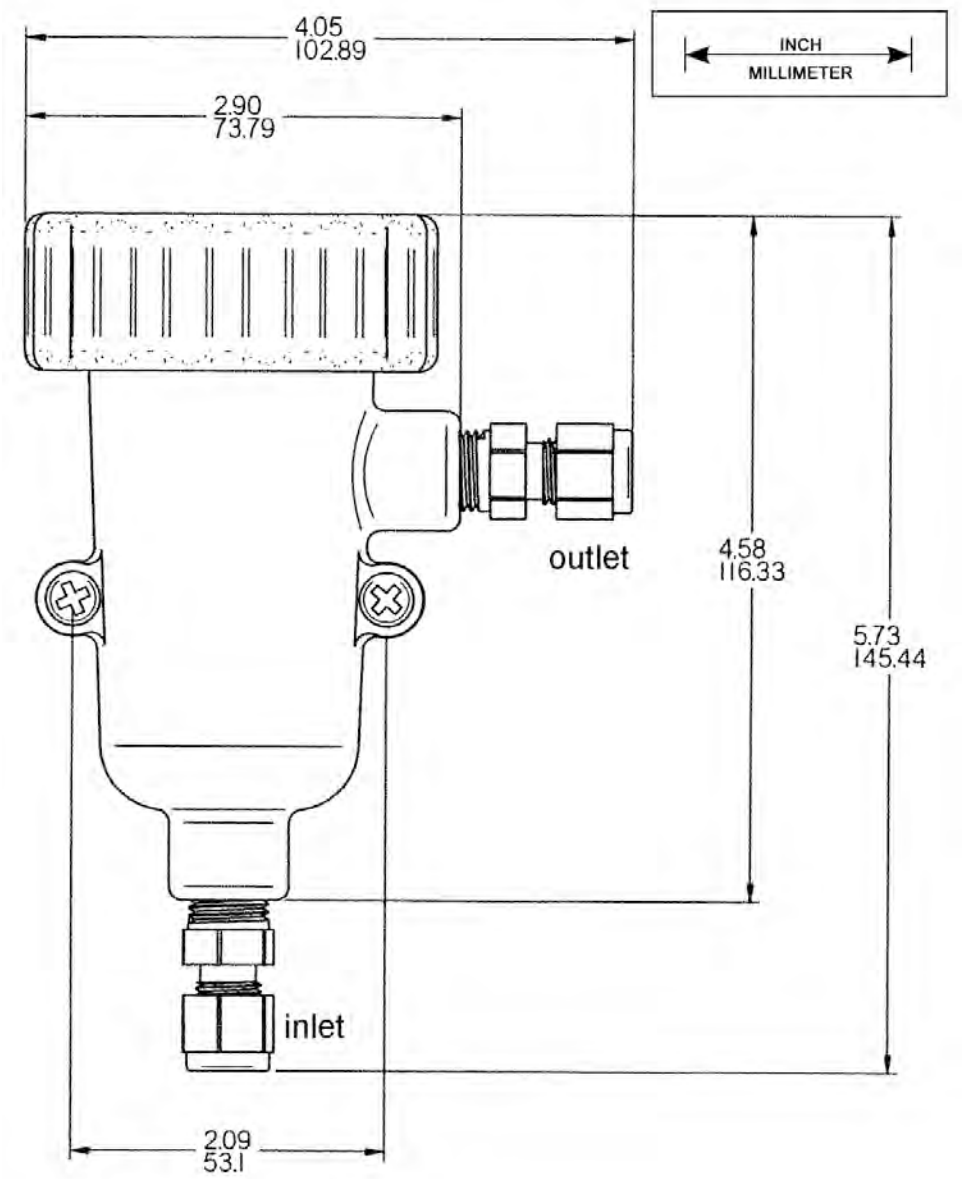


Figure 2-4: Low Flow Cell



3 Wire

NOTICE

For additional wiring information on this product, including sensor combinations not shown here, please refer to the *Liquid Transmitter Wiring Diagrams*.

Figure 3-1: Rosemount 499ACL-01-54 Sensor Wiring to Rosemount 1056 and 56 Transmitters

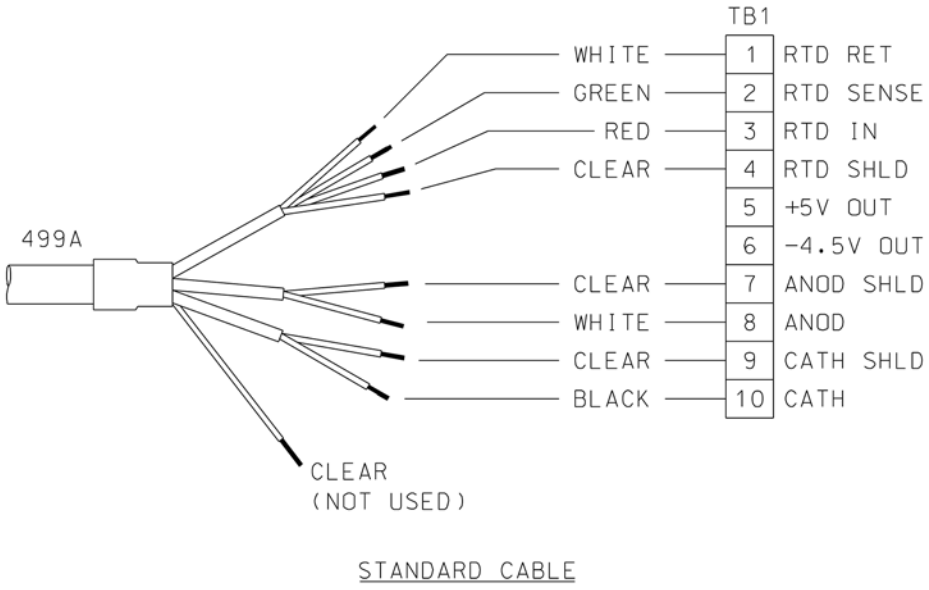


Figure 3-2: Rosemount 499ACL-01-54-60/499ACL-01-54-VP Sensor Wiring to Rosemount 1056 and 56 Transmitters

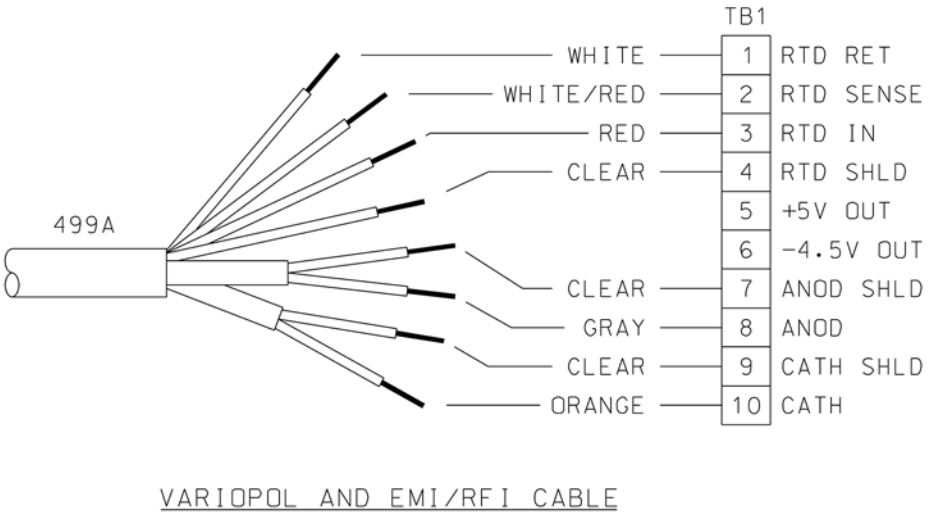


Figure 3-3: Rosemount 499ACL-01-54 Sensor Wiring to Rosemount 5081 transmitter

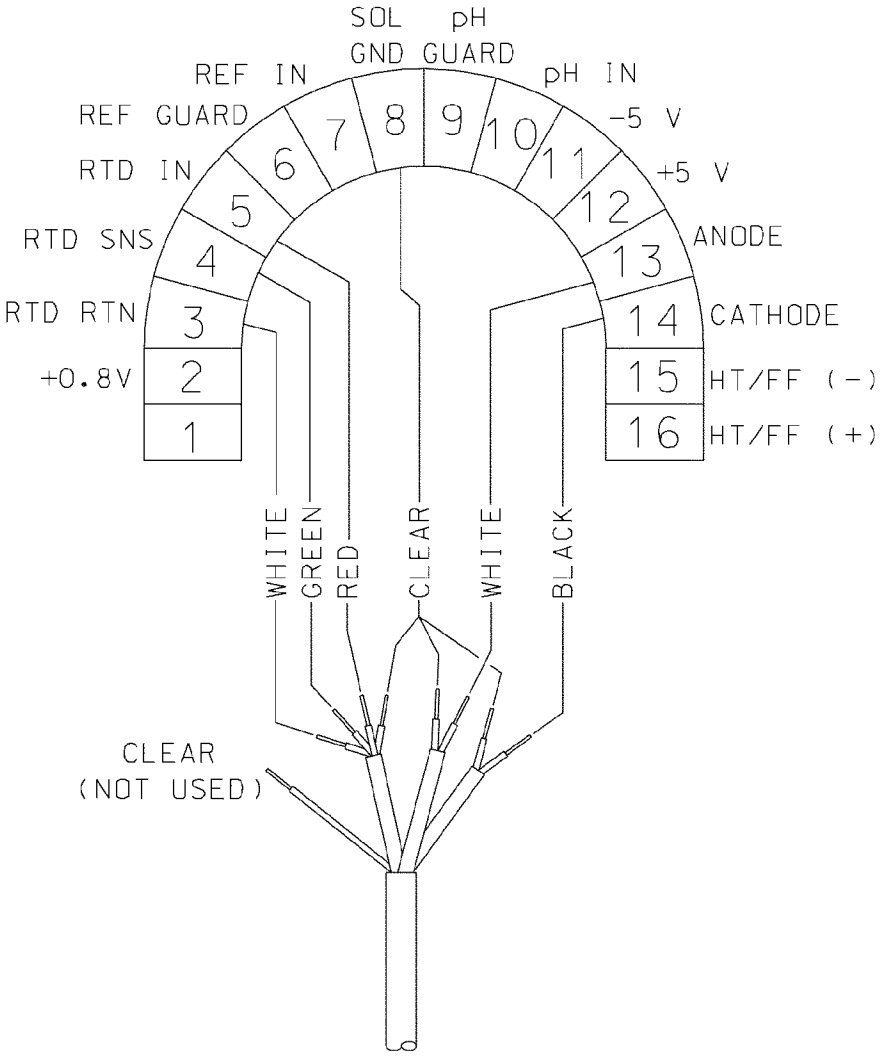


Figure 3-4: Rosemount 499ACL-01-54-60/499ACL-01-54-VP Sensor Wiring to Rosemount 5081 Transmitter

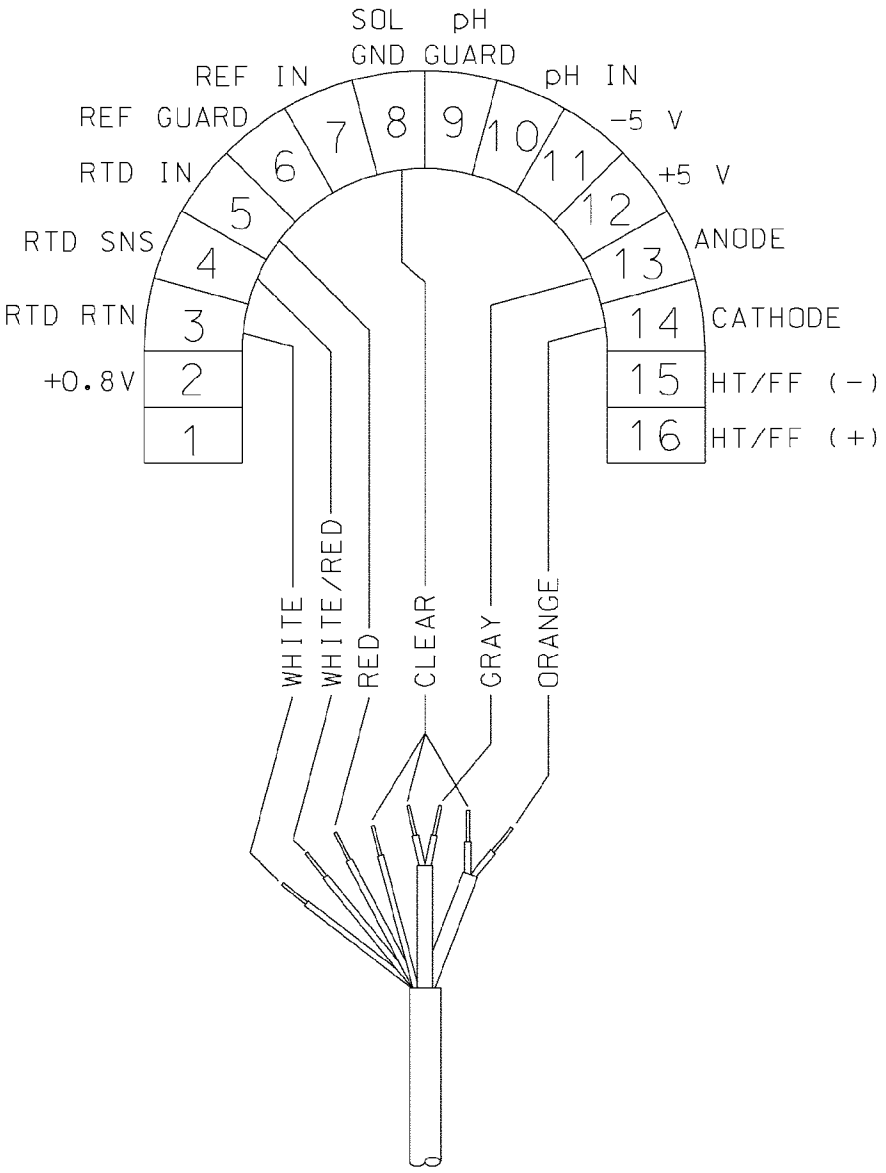


Figure 3-5: Rosemount 499ACL-01-54 Sensor Wiring to Rosemount 1066 Transmitter

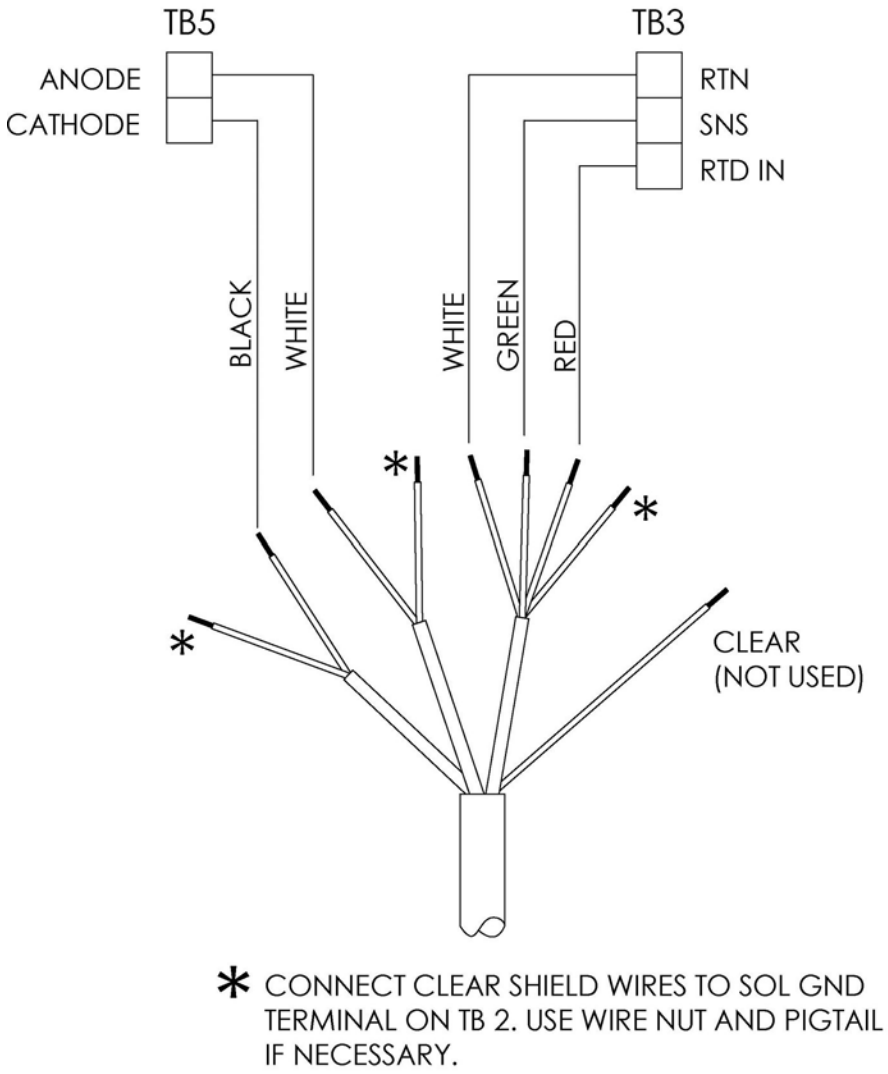


Figure 3-6: Rosemount 499ACL-01-54-60/499ACL-01-54-VP Sensor Wiring to Rosemount 1066 Transmitter

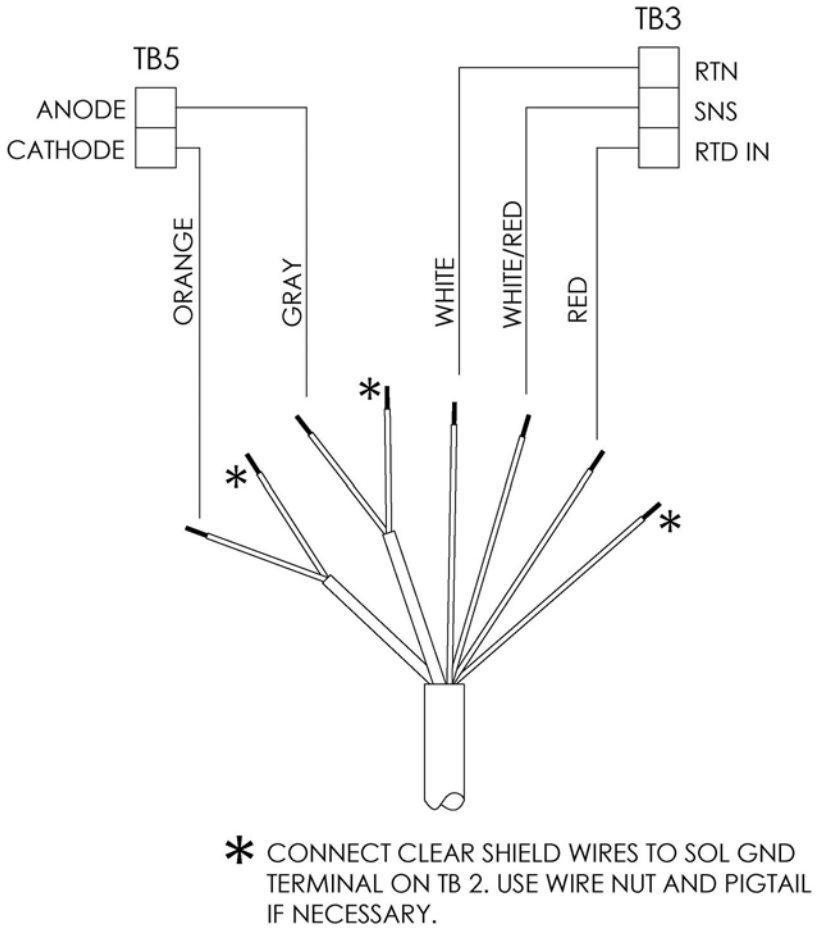
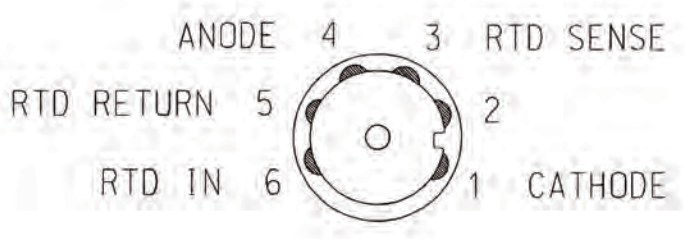


Figure 3-7: Rosemount 499ACL-01-54-VP Sensor Pin-out Diagram (Top View of Connector End of Sensor)



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

NOTICE

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

4 Calibrate

4.1 Zero point calibration

Even in the absence of free chlorine, the Rosemount 499ACL-01 sensor generates a small signal called the zero current. Failing to correct for the zero current can introduce a bias, particularly if the chlorine 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:

Procedure

1. Pour a cup of deionized or bottled water.
2. Add a few pinches of table salt to the water to increase the conductivity.
3. Place the sensor in the water.
4. Wait until the sensor current has reached a stable low value (at least two hours).
5. Follow the transmitter prompts for zeroing the sensor.

Note
Refer to the manual for the transmitter you are using (56, 1056, 5081, or 1066).

The zero current should be between -10 and +10 nA. For more information, refer to the Rosemount TCL Manual.

4.2 Full scale calibration

Because stable dilute chlorine 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.
Be sure taking the sample does not alter flow to the sensor and test the sample immediately after taking it.

Procedure

1. Place the sensor in the flow cell.
2. Start the sample and reagent flow.
3. Adjust the sample flow to within the range given in the table in *Chapter 2*.
4. Adjust the concentration so that it is near the upper end of the operating range.
5. Wait for the readings to stabilize.
6. Follow the transmitter prompts to complete the calibration.

Note
Refer to the manual for the transmitter you are using (56, 1056, 5081, or 1066).

7. After calibration, go to the Diagnostics menu and check the sensitivity.

The sensitivity should be between 200 and 450 nA/ppm. For more information, refer to the transmitter manual.

5 Maintenance

Periodic maintenance and cleaning are required for best performance of the sensor. Generally, the membrane and fill solution should be replaced every one to three months. If the sensor is being used in water having conductivity less than about 100 µS/cm, it might be necessary to replace the fill solution (but not the membrane) more often. Sensors installed in harsh or dirty environments require more frequent maintenance. The optimum maintenance frequency is best determined by experience.

⚠ WARNING!

PRESSURIZED SPRAY INJURY
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!

5.1 Cleaning the membrane

Keep the membrane clean and free from dirt and algae. Clean the membrane with water sprayed from a wash bottle. Do not use tissues to clean the membrane.

5.2 Replacing the electrolyte solution and membrane

⚠ WARNING!

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

Procedure

1. Unscrew the membrane retainer.
2. Remove the membrane assembly and O-ring.

   See *Figure 1-1*.
3. Hold the sensor over a container with the cathode pointing down.
4. Remove the fill plug.
5. Allow the electrolyte solution to drain out.
6. Inspect the cathode.

   a. If it is tarnished, clean it using a cotton-tipped swab dipped in baking soda or alumina.

Use type A dry powder alumina intended for metallographic polishing of medium and soft metals.

b. Rinse thoroughly with water.

7. Remove the old pipe tape from the plug.
8. Wrap the plug with one or two turns of pipe tape.
9. Prepare a new membrane.

   a. Hold the membrane assembly with the cup formed by the membrane and membrane holder pointing up.
   b. Fill the cup with electrolyte solution.
   c. Wait for the wooden ring to soak up the solution.

   This usually takes several minutes.
10. Hold the sensor at about a 45° angle with the cathode end pointing up.
11. Add electrolyte solution through the fill hole until the liquid overflows.
12. Tap the sensor near the threads to release trapped air bubbles.
13. Add more electrolyte solution if necessary.
14. Place the fill plug in the electrolyte port and begin screwing it in.
15. After several threads have engaged, rotate the sensor so that the cathode is pointing up and continue tightening the fill plug.

    Do not overtighten.
16. Place a new O-ring in the groove around the cathode post.
17. Cover the holes at the base of the cathode stem with several drops of electrolyte solution.
18. Insert a small blunt probe, like a toothpick with the end cut off, through the pressure equalizing port.

    See *Figure 1-1*.

⚠ CAUTION!

EQUIPMENT DAMAGE

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

19. 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.
20. Place a drop of electrolyte solution on the cathode; then place the membrane assembly over the cathode.
21. Screw the membrane retainer in place.

    The sensor may require several hours operating at the polarizing voltage to equilibrate after the electrolyte solution has been replenished.

6 Accessories

Part #	Description
33523-00	Electrolyte fill plug
9550094	O-ring, Viton 2-014
33521-00	Membrane retainer
23501-08	Free chlorine membrane assembly: includes one membrane assembly and one O-ring
23502-08	Free chlorine membrane kit: includes three membrane assemblies and three O-rings
9210356	#4 free chlorine sensor fill solution, 4 oz (120 mL)

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