

# Rosemount™ 499ACL-02

Total Chlorine Sensor



## 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.

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### 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)

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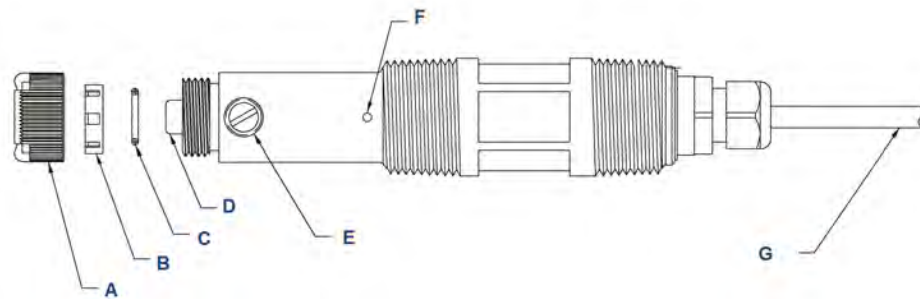
# 1 Plan

## 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-02 Sensor Parts



- Membrane retainer*
- Membrane assembly*
- O-ring*
- Cathode*
- Electrolyte fill plug (wrap with pipe tape)*
- Pressure equalizing port*
- 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)**

| <b>Physical characteristics</b> | <b>Specifications</b>  |
|---------------------------------|--|
| Wetted parts                    | Noryl <sup>®(1)</sup> , Viton <sup>®(2)</sup> , and silicone |
| Cathode                         | Gold   |
| 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.*

## 2 Install

The sensor is intended for use only in the Rosemount TCL sample conditioning system for total chlorine. Consult the instruction manual for the Rosemount TCL sample conditioning system for more information.



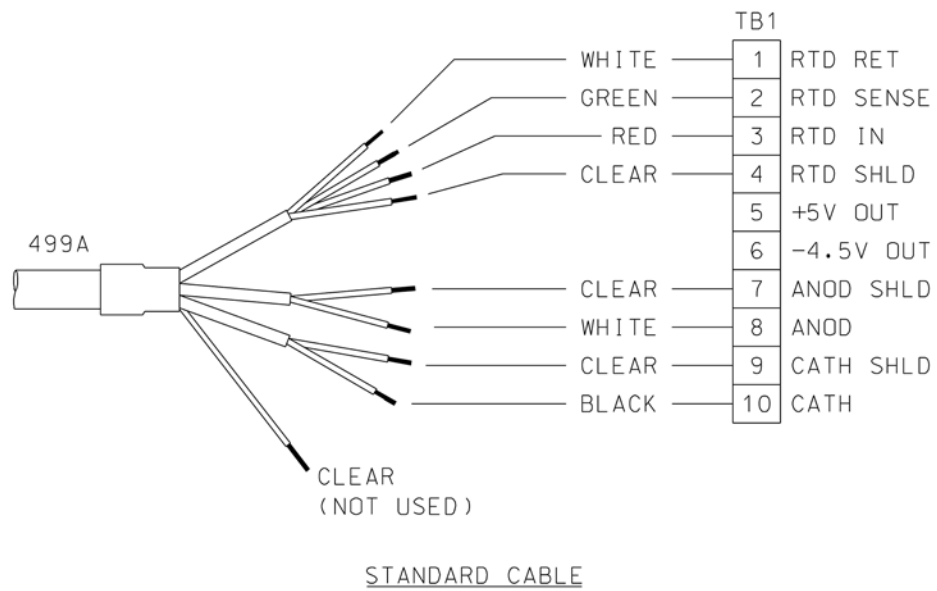


# 3 Wire

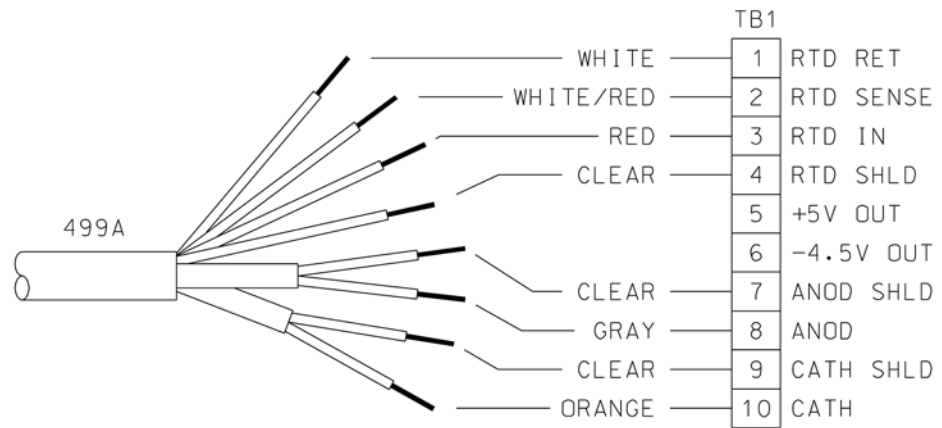
## NOTICE

For additional wiring information on this product, including sensor combinations not shown here, please refer to the [Liquid Transmitter Wiring Diagrams](#).

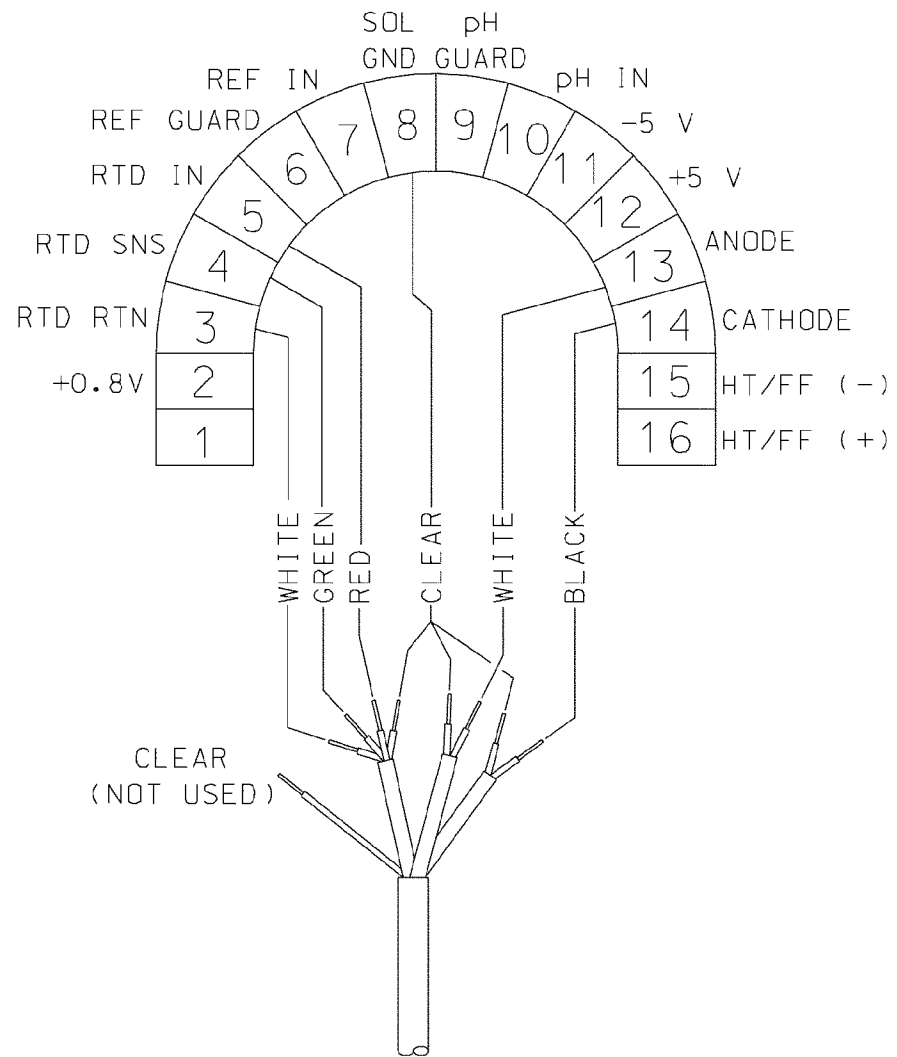
Figure 3-1: Rosemount 499ACL-02-54 Sensor Wiring to Rosemount 1056 and 56 Transmitters



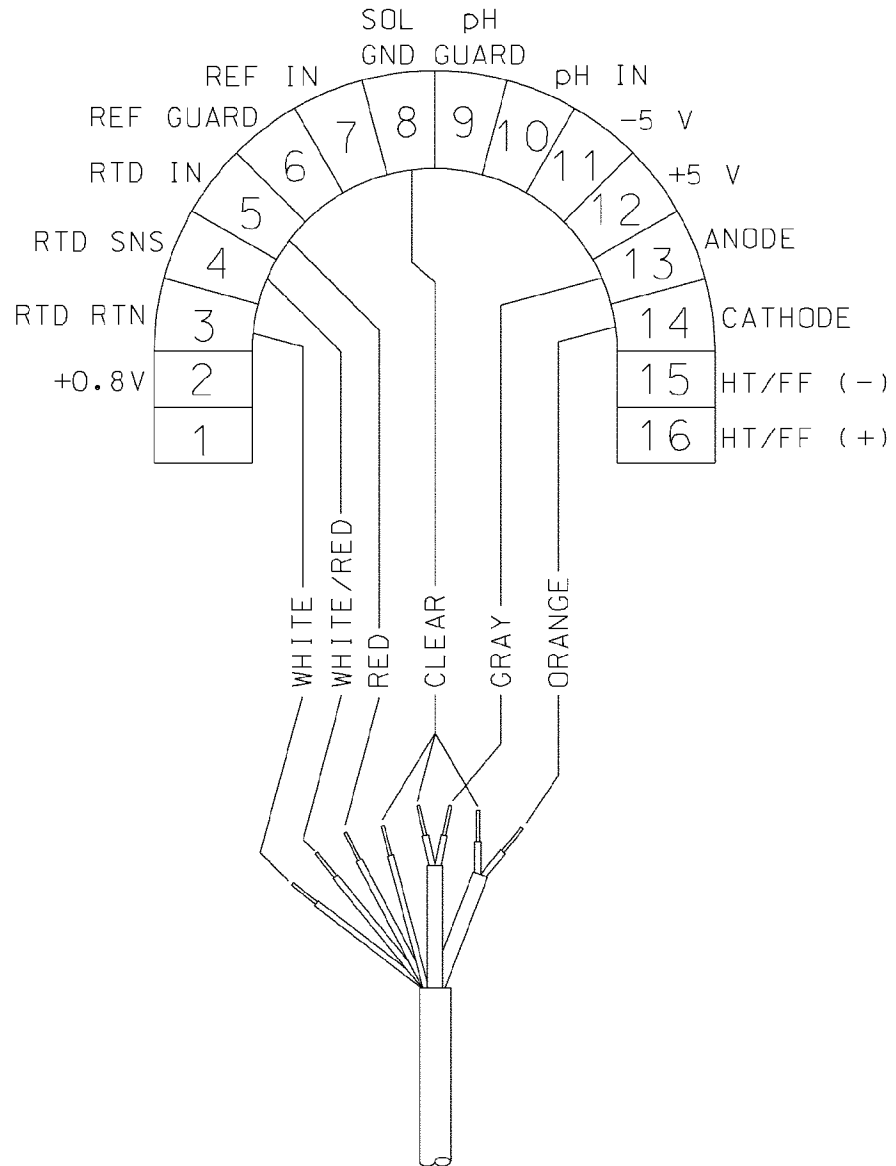
**Figure 3-2: Rosemount 499ACL-02-54-60/499ACL-02-54-VP Sensor Wiring to Rosemount 1056 and 56 Transmitters**

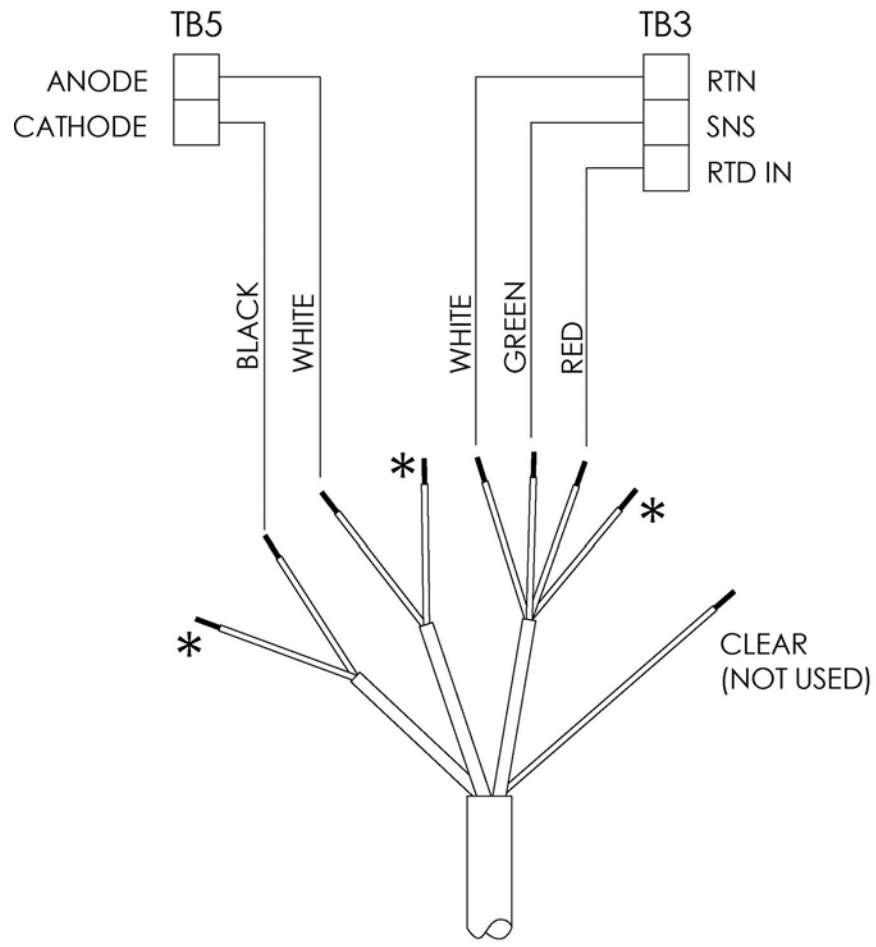


VARIOPOL AND EMI/RFI CABLE

**Figure 3-3: Rosemount 499ACL-02-54 Sensor Wiring to Rosemount 5081 transmitter**

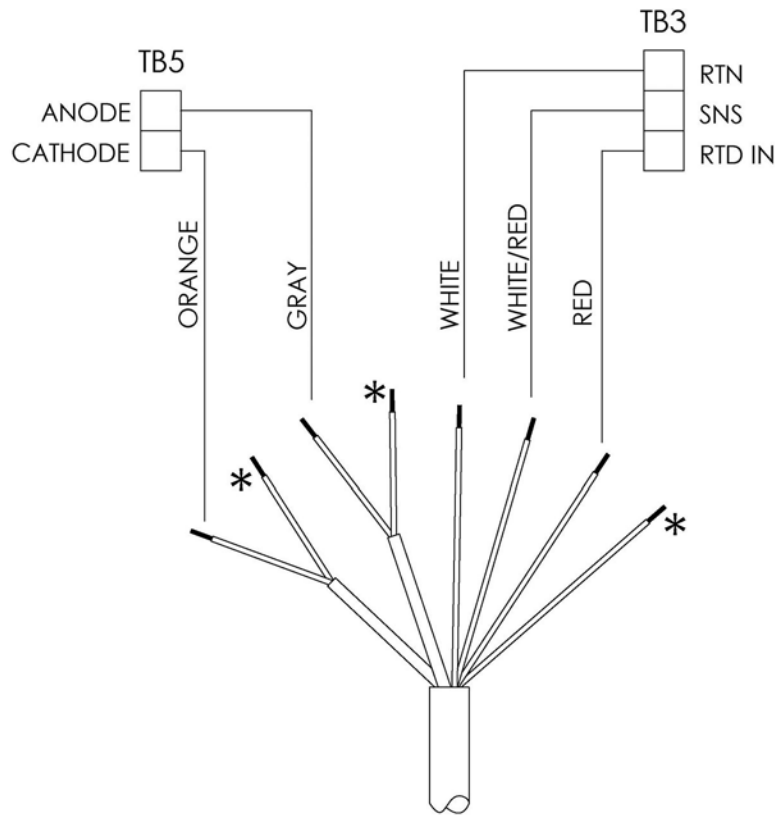
**Figure 3-4: Rosemount 499ACL-02-54-60/499ACL-02-54-VP Sensor Wiring to Rosemount 5081 Transmitter**



**Figure 3-5: Rosemount 499ACL-02-54 Sensor Wiring to Rosemount 1066 Transmitter**

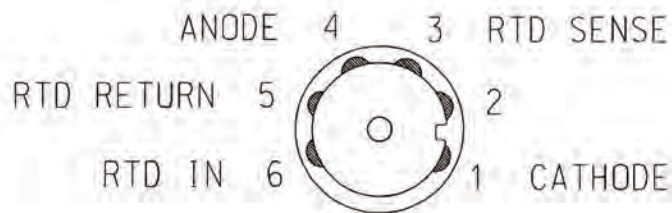
\* CONNECT CLEAR SHIELD WIRES TO SOL GND TERMINAL ON TB 2. USE WIRE NUT AND PIGTAIL IF NECESSARY.

**Figure 3-6: Rosemount 499ACL-02-54-60/499ACL-02-54-VP Sensor Wiring to Rosemount 1066 Transmitter**



\* CONNECT CLEAR SHIELD WIRES TO SOL GND TERMINAL ON TB 2. USE WIRE NUT AND PIGTAIL IF NECESSARY.

**Figure 3-7: Rosemount 499ACL-02-54-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

The sample conditioning system converts total chlorine into iodine, which the Rosemount 499ACL-02 sensor measures. Even in the absence of iodine, the Rosemount 499ACL-02 sensor generates a small signal called the zero current. Failure to correct for the zero current can produce a bias, particularly if the total chlorine concentration is small (<0.2 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. Place the sensor in the water.
3. Wait until the sensor current has reached a stable low value (at least two hours).
4. Follow the transmitter prompts for zeroing the sensor.

The zero current should be between -10 and +50 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.

1. Place the sensor in the flow cell inside the TCL.
2. Start the sample and reagent flow.
3. Adjust the concentration so that it is near the upper end of the operating range.
4. Wait for the readings to stabilize.
5. Follow the transmitter prompts to complete the calibration.
6. After calibration, go to the Diagnostics menu and check the sensitivity.

The sensitivity should be between 900 and 1,200 nA/ppm. For more information, refer to the Rosemount TCL manual.



## 5 Maintenance

When used in clean water, the total chlorine sensor requires little maintenance. Generally, the sensor needs maintenance when the response becomes sluggish or noisy or when readings drift following calibration. Maintenance frequency is best determined by experience. Sensors used in dirty water require more frequent maintenance and calibration. However, if experience shows that the sensor is holding calibration and not drifting appreciably between calibration intervals, the maintenance interval can be extended.

### **⚠ 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. Clean the membrane with water sprayed from a wash bottle. Use a soft tissue to gently wipe 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. Remove the old pipe tape from the plug.
7. Wrap the plug with one or two turns of pipe tape..
8. 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.
9. Hold the sensor at about a 45° angle with the cathode end pointing up.
10. Add electrolyte solution through the fill hole until the liquid overflows.
11. Tap the sensor near the threads to release trapped air bubbles.
12. Add more electrolyte solution if necessary.
13. Place the fill plug in the electrolyte port and begin screwing it in.
14. After several threads have engaged, rotate the sensor so that the cathode is pointing up and continue tightening the fill plug.

Do not overtighten.

15. Place a new O-ring in the groove around the cathode post.
16. Cover the holes at the base of the cathode stem with several drops of electrolyte solution.
17. 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.**

18. 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.
19. Place a drop of electrolyte solution on the cathode; then place the membrane assembly over the cathode.
20. 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

| <b>Part #</b> | <b>Description</b>  |
|---------------|---|
| 33523-00      | Electrolyte fill plug   |
| 9550094       | O-ring, Viton 2-014   |
| 33521-00      | Membrane retainer   |
| 23501-02      | Total chlorine membrane assembly: includes one membrane assembly and one O-ring   |
| 23502-02      | Total chlorine membrane kit: includes three membrane assemblies and three O-rings |
| 9210438       | Total chlorine sensor fill solution, 4 oz (120 mL)                                |





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