Quick Start Guide
00825-0100-3491, Rev AB
November 2019

Rosemount™ 499ADO

Dissolved Oxygen Sensor

ROSEMOUNT™

EMERSON.

Safety information

⚠ CAUTION

Sensor/process application compatibility

The wetted sensor materials may not be compatible with process composition and operating conditions.

Application compatibility is entirely the operator's 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)

⚠ WARNING

Physical access

Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

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Contents

1 First steps

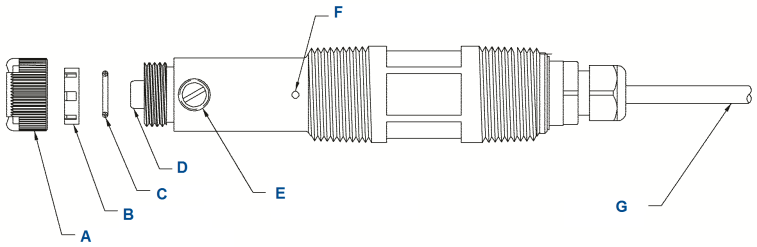
1.1 Unpack and inspect

Procedure

1. Inspect the shipping container. If it is damaged, contact the shipper immediately for instructions.
2. 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 Emerson immediately.

1.2 Product description

Figure 1-1: Rosemount 499ADO 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
Range	0 to 20 ppm (mg/L) as O_2. For measurements at the ppb level, choose Rosemount 499ATrDO.
Pressure	0 to 65 psig (101 to 549 kPa abs)
Temperature (operating)	32 to 122 °F (0 to 50 °C)
Process connection	1-in. male national pipe thread (MNPT)

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

Physical characteristics	Specifications
Wetted parts	Noryl®, Viton®, EPDM, Teflon® (TFE), and silicone
Cathode	Gold (not normally wetted)
Accuracy	±0.2 ppm at 77 °F (25 °C)
Linearity	2% (typical)
Repeatability	±0.05 ppm at 77 °F (25 °C)
Response time	< 30 sec to 90% of final reading (0 to 2 ppm) at 77 °F (25 °C)
Electrolyte volume	0.8 oz. (25 mL), approximately
Electrolyte life	4 to 6 months (approximately)
Cable length	See *Ordering information* table in the Product Data Sheet for cable length options.
Cable length (maximum)	300 ft. (91 m), up to 100 ft. (30.5 m) is standard.
Sample flow	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) Agitation produced by bubbles in aeration basins usually provides adequate flow.
Weight/shipping weight	1 lb./3 lb. (0.5 kg/1.5 kg)

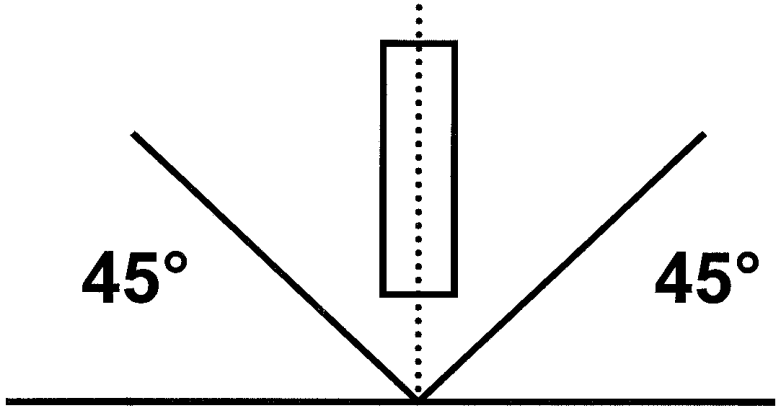
2 Install

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	2 to 5 gph (7.6 to 19 L/hr)

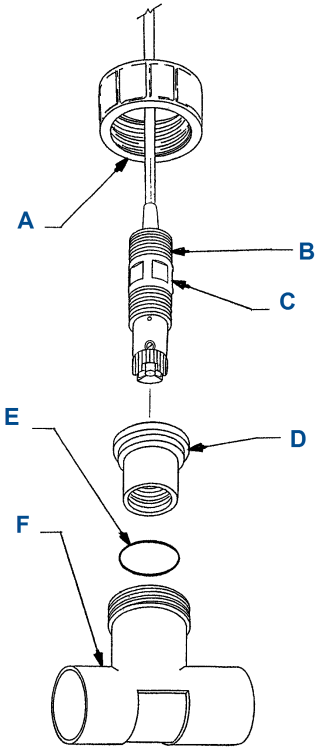
The Rosemount 499ADO sensor can be installed in ponds or basins. Use a pipe screwed into the back-facing threads to protect the cable and keep liquid away from the back end of the sensor. The cable end of the sensor is not intended for submersion under liquid. See Figure 2-5. For additional mounting hardware, see product data sheet 71-HRMS.

Figure 2-1: Sensor Orientation



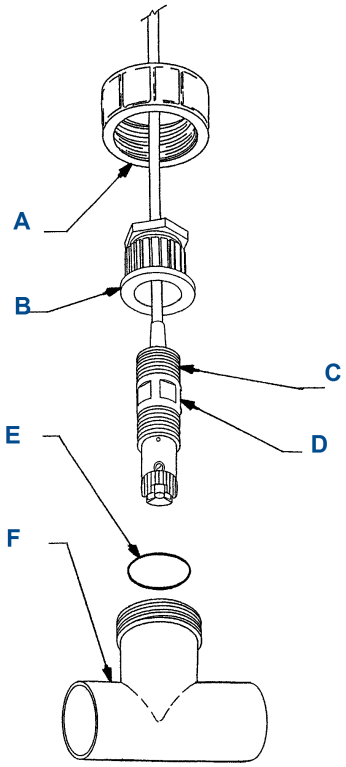
Install sensor within 45 degrees of vertical.

Figure 2-2: Flow Through 1½-in. Tee



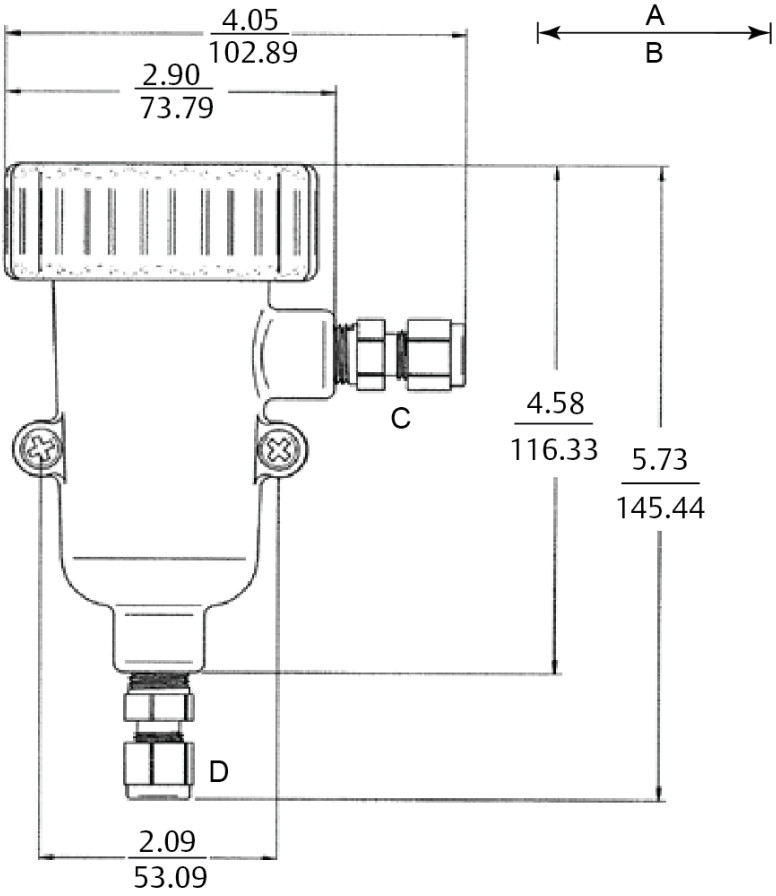
A. Union coupler
B. 1-in. national pipe thread (NPT), two places
C. Sensor body: Rosemount 499A
D. 1-in. NPT flow cell adapter
E. O-ring 2-222
F. 1½-in. sched 80 CPVC tee body

Figure 2-3: Flow Through 2-in. Tee



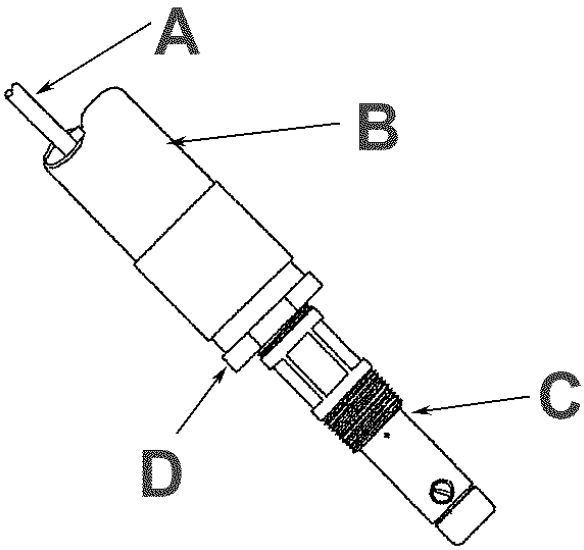
A. Union coupler
B. Adapter
C. 1-in. NPT (two places)
D. Sensor body: Rosemount 499A
E. O-ring 2-222
F. 2-in. sched 80 PVC tee body

Figure 2-4: Low Flow Cell (PN 24091-00)



A. *Inches*
B. *Millimeters*
C. *Outlet*
D. *Inlet*

Figure 2-5: Sensor Installed in a Stand Pipe for Submersion Applications



A. Cable
B. Pipe (supplied by others)
C. Rosemount 499ADO sensor
D. 1-in. female national pipe thread (FNPT) adapter

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 499ADO Sensor Wiring to Rosemount 1056 and 56 Transmitters

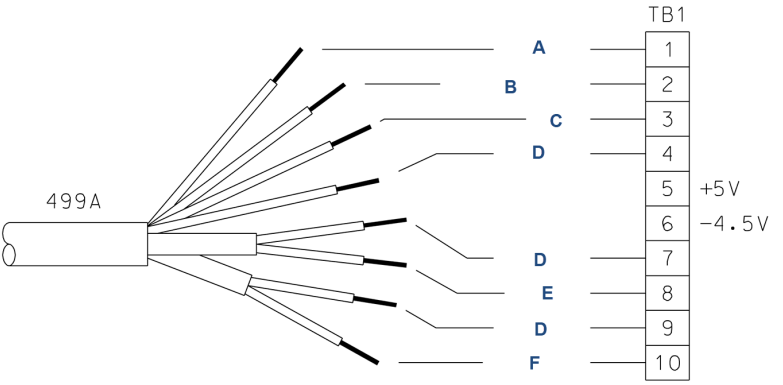


Table 3-1: Rosemount 499ADO Sensor Wiring to Rosemount 1056 and 56 Transmitters

Terminal number	Letter	Wire color	Description
1	A	White	Resistance temperature device (RTD) return
2	B	White/red	RTD sense
3	C	Red	RTD in
4	D	Clear	RTD shield
5	N/A	N/A	+5 V out
6	N/A	N/A	-4.5 V out
7	D	Clear	Anode shield
8	E	Gray	Anode
9	D	Clear	Cathode shield

Table 3-1: Rosemount 499ADO Sensor Wiring to Rosemount 1056 and 56 Transmitters *(continued)*

Terminal number	Letter	Wire color	Description
10	F	Orange	Cathode

Figure 3-2: Rosemount 499ADO Sensor Wiring to Rosemount 5081 Transmitter

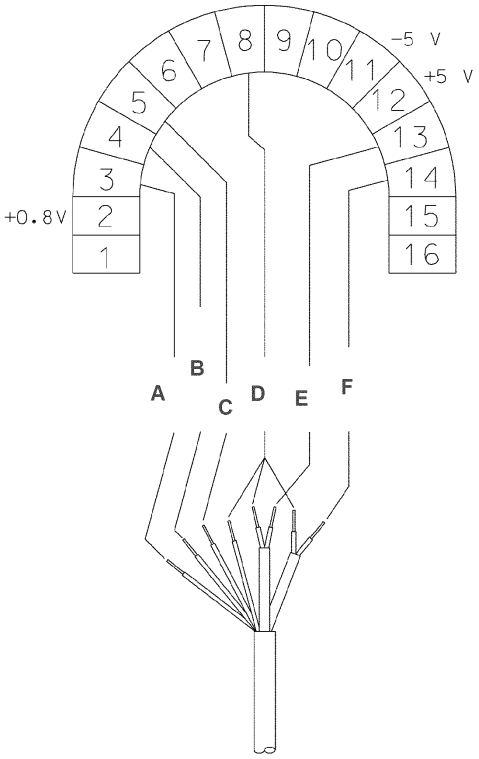


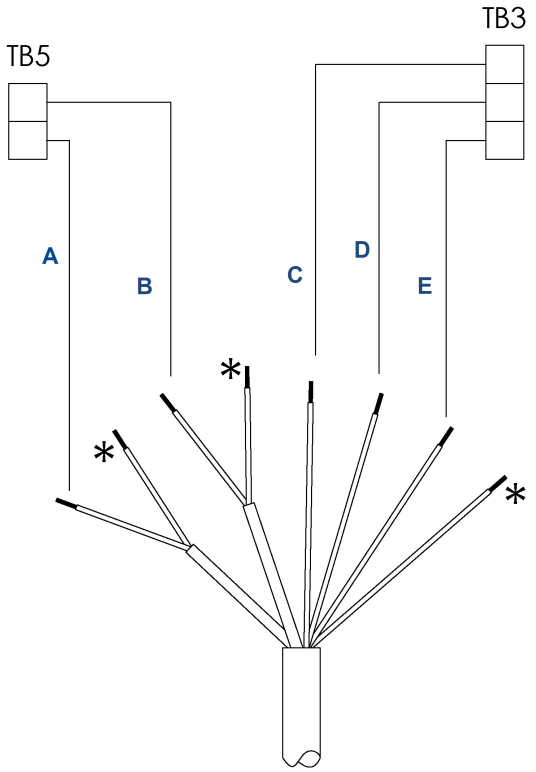
Table 3-2: Rosemount 499ADO Sensor Wiring to Rosemount 5081 Transmitter

Terminal number	Letter	Wire color	Description
1	N/A	N/A	N/A
2	N/A	N/A	+0.8 V
3	A	White	RTD return

Table 3-2: Rosemount 499ADO Sensor Wiring to Rosemount 5081 Transmitter *(continued)*

Terminal number	Letter	Wire color	Description
4	B	White/red	RTD sense
5	C	Red	RTD in
6	N/A	N/A	Reference guard
7	N/A	N/A	Reference in
8	D	Clear	Solution ground
9	N/A	N/A	pH guard
10	N/A	N/A	pH in
11	N/A	N/A	-5 V
12	N/A	N/A	+5 V
13	E	Gray	Anode
14	F	Orange	Cathode
15	N/A	N/A	HART®/FOUNDATION™ Fieldbus (-)
16	N/A	N/A	HART/FOUNDATION Fieldbus (+)

Figure 3-3: Rosemount 499ADO Sensor Wiring to Rosemount 1066 Transmitter



Note

Connect clear shield wires to solution ground terminal on TB 2. Use wire nut and pigtail if necessary.

Table 3-3: Rosemount 499ADO Wiring to Rosemount 1066 Transmitter

Letter	Color	Terminal description
A	Orange	Cathode
B	Gray	Anode
C	White	Return
D	White/red	Sense
E	Red	RTD in

Figure 3-4: Rosemount 499ADO Sensor Pin-out Diagram

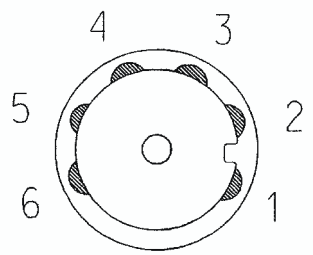


Table 3-4: Pin-out Diagram

Terminal number	Description
1	Cathode
2	N/A
3	RTD sense
4	Anode
5	RTD return
6	RTD in

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 oxygen, the sensor generates a small signal called the zero current. Failing to correct for the zero current can introduce a bias, particularly if the oxygen concentration is small (<1 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 teaspoon of sodium sulfite to the water.
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 (Rosemount 56, 1056, 5081, or 1066).

The zero current should be <200 nA.

4.2 Full scale

The best way to calibrate the sensor is to expose it to to water-saturated air.

Procedure

1. Pour a small amount of water into a cup.
2. Suspend the sensor, keeping the membrane dry, about ¼-in. (6 mm) above the surface of the water.
3. Once readings are stable, follow the transmitter prompts to complete the calibration.

   The transmitter automatically calculates the equilibrium solubility of atmospheric oxygen in water under the prevailing temperature and barometric pressure.
4. After calibration, go to the ***Diagnostics*** menu and check the sensitivity.

   The sensitivity should be between 1,800 and 3,000 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 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

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 and sensor tip clean and free from dirt. 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 the instructions.

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 by gently rubbing in the direction of the existing scratches (do not use a circular motion) with 400-600 grit silicon carbide finishing paper.
   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) Leave the membrane assembly filled with electrolyte solution and set it aside.
10. Hold the sensor at about a 45 degree 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

A sharp probe may puncture the bladder and destroy the sensor.

Do not use a sharp probe.

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 number	Description
23747-06	Interconnecting cable, Variopol (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)
23567-00	1½-in. flow through tee with 1½-in. socket connections
915240-03	2-in. flow through tee with ¾-in. female national pipe thread (FNPT) connections
915240-04	2-in. flow through tee with 1-in. FNPT connections
915240-05	2-in. flow through tee with 1½-in. FNPT connections
24091-00	Low flow cell
9390004	Rotameter: 0.5 - 5.0 gph
11275-01	Sensor handrail mounting assembly
12707-00	Jet spray cleaner
22550-00	Junction box without preamplifier
9200266	Extension cable for option -54 cable, unprepped
9200275	Extension cable for optimum EMI/RFI cable, unprepped
23747-00	Extension cable for optimum EMI/RFI cable, prepped
9210264	Dissolved oxygen sensor fill solution, 4 oz. (125 mL)
23501-00	Dissolved oxygen membrane assembly: includes one membrane assembly and one O-ring
23502-00	Dissolved oxygen membrane assembly: includes three membrane assemblies and three O-rings
33521-02	Membrane retainer
33523-03	Fill plug

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