

Dissolved Oxygen Sensors

For additional information, please refer to the Instruction Manuals CD shipped with this product, or visit our website at www.emersonprocess.com/raihome/liquid/.

1.0 SPECIFICATIONS

Temperature Range: -10 to 130°C (14 to 266°F)

Maximum Pressure: 43 psig (400 kpa abs, 4 bar)

Measurement Range: 0 to 20 ppm or 0 to 250% saturation, depending on instrument

Wetted materials: Stainless Steel (type AISI-ASTM 316 Ti; DIN 1.4571) and EPDM

Process connections:

Model Hx438: PG 13.5 thread

Model Gx448: G 1-1/4 in. Thread

Cable Connector: 4-pin

Cable Compatibility: Standard 4-pin connector cable

Compatible Analyzers: Rosemount Analytical Models, 1055, 1056, 54eA, XMT, and 5081

Compatible Mounting Accessory:

Model Hx438: Insertion or Retractable Mounting Assembly

Model Gx448: None, mounts directly to the 61mm, G 1-1/4 in. weld-in socket (PN 9160504)

WARNING

Do not exceed temperature and pressure limitations of 130°C (266°F) and 72 psig (600 kpa abs, 6 bar).

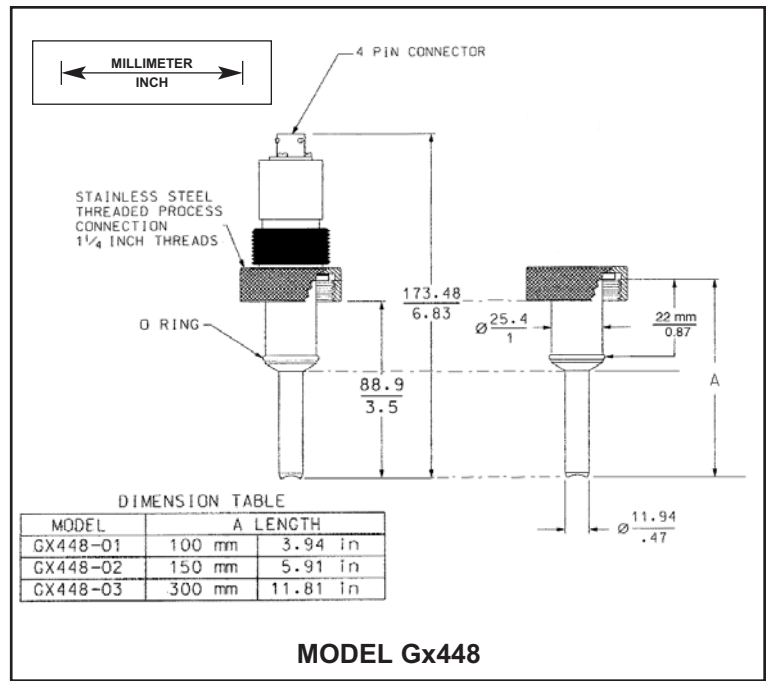
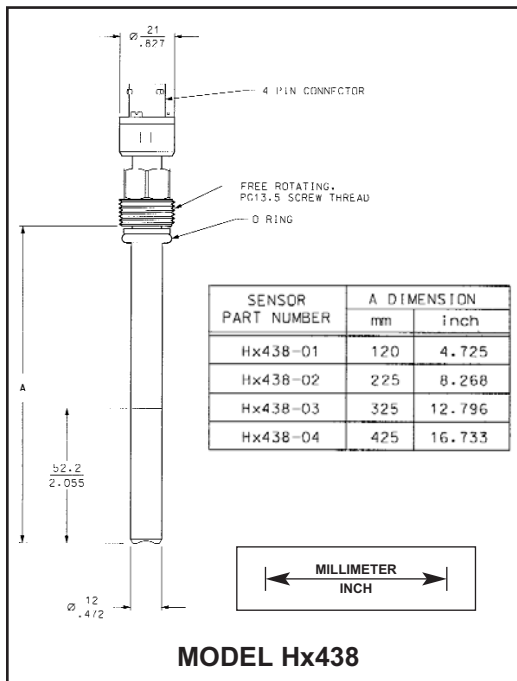
WARNING



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!

WARNING

The electrolyte is highly alkaline. Protect your hands with gloves and use safety goggles. Avoid contact of the electrolyte with the skin, eyes, and mucous membranes



2.0 INSTALLATION

2.1 UNPACKING AND INSPECTION

Inspect the carton for damage. If damage is found, contact the carrier immediately.

2.2 SENSOR PREPARATION

Sensor Preparation Guidelines: Carefully remove the plastic cap covering the sensing end of the sensor. Avoid causing a vacuum by gently and slowly twisting the sensor and cap until it is removed. Sensor is shipped dry, so electrolyte must be added prior to installation.

Remove membrane cartridge. Add 1.5 ml of electrolyte to the membrane cartridge. Screw membrane cartridge back onto sensor body. Refer to Section 5.3 for additional details.

Connection of the Sensor to the Analyzer/ Transmitter:

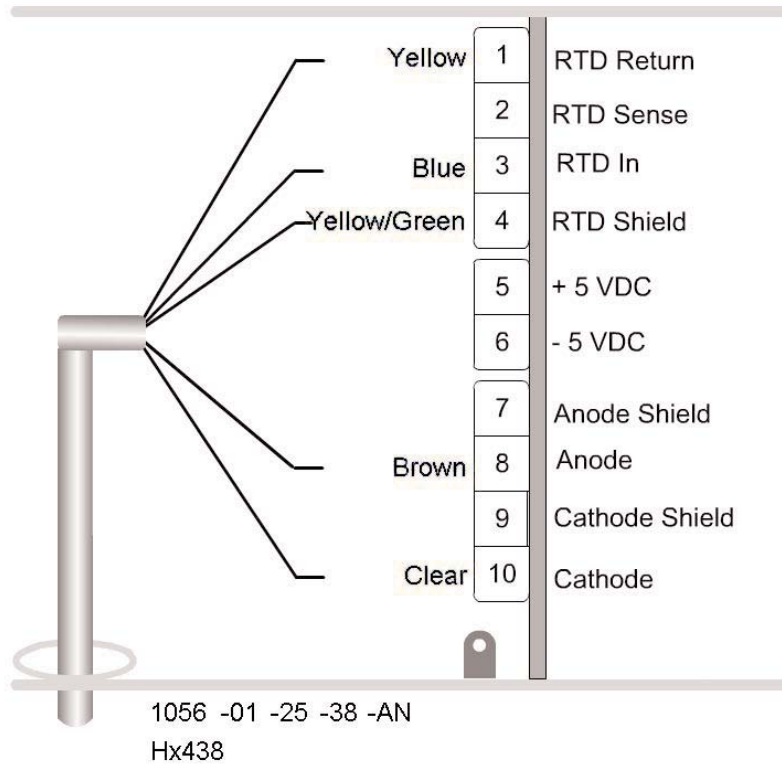
1. Wire the sensor to the analyzer/transmitter. See the wiring tables in Section 3.0.
2. Apply power to the analyzer/transmitter. After 2 hours, the sensor should be ready for calibration. The polarization time is necessary to get stable signals from the sensor. If the sensor is disconnected from the analyzer/transmitter for a short time, allow the sensor to stabilize for at least two times longer than the time it was disconnected. Time needed for stabilization should not exceed 2 hours.

Mounting Guidelines: Mount the sensor using the PG 13.5 process thread (Model Hx438) or the G 1-1/4 inch thread (Model Gx448).

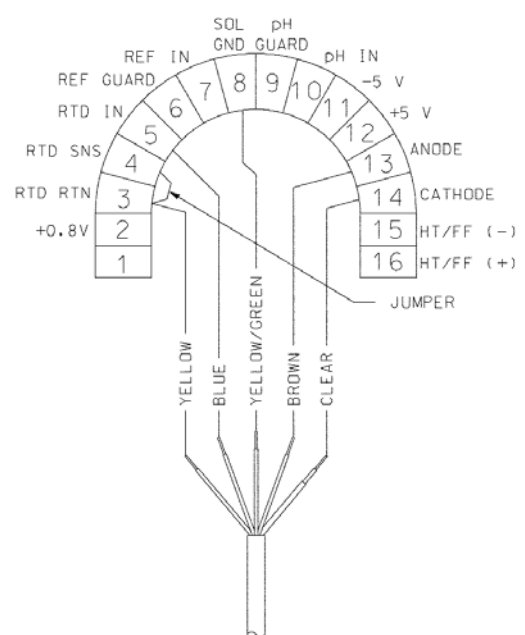
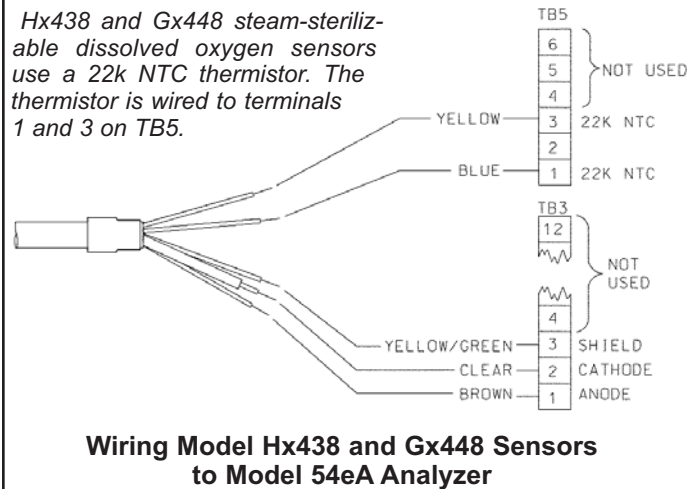
NOTE

Do not install the sensor upside down.

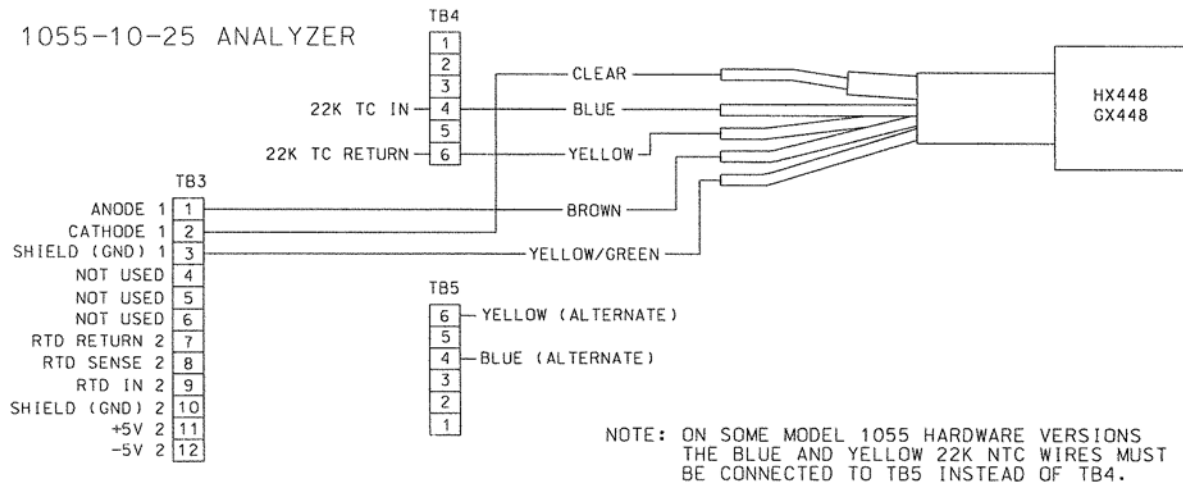
3.0 WIRING



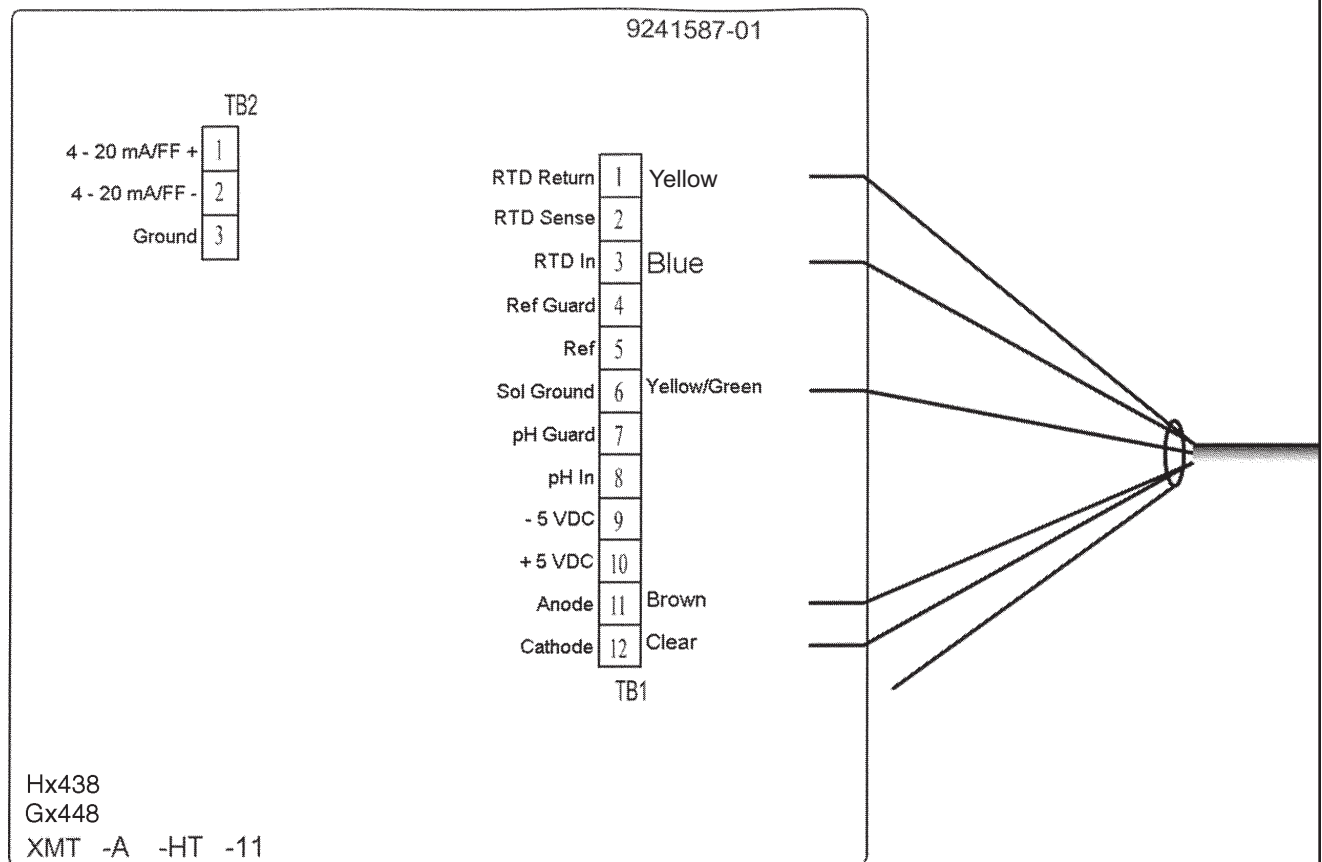
Wiring Model 1056 Wiring diagram to Hx438



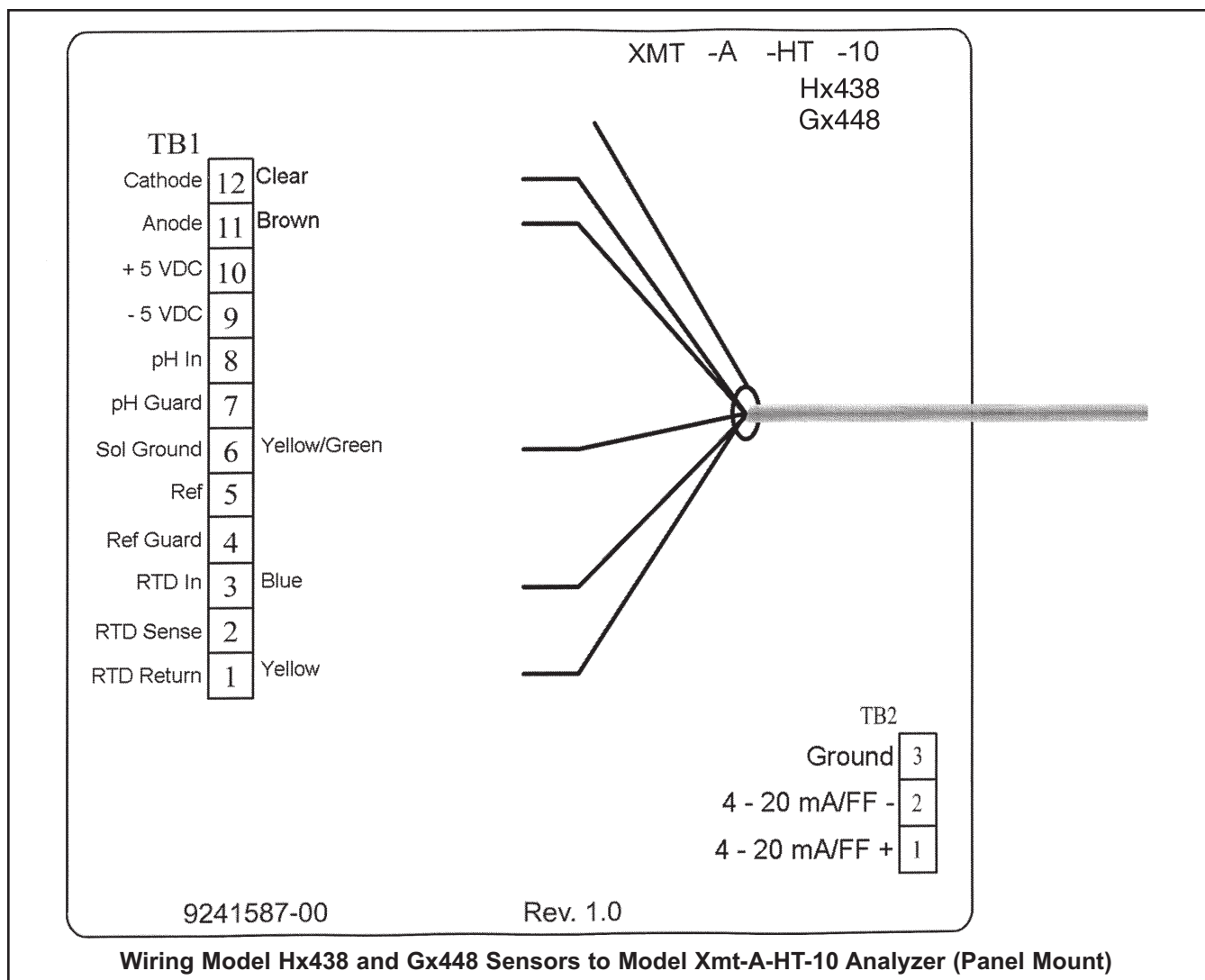
1055-10-25 ANALYZER



Wiring Model Hx438 and Gx448 Sensors to Model 1055 Analyzer



Wiring Model Hx438 and Gx448 Sensors to Model Xmt-A-HT-11 Analyzer (Pipe Mount)



4.0 STERILIZATION

Before autoclaving the sensor, cover the connector end of the sensor with a tight protective cap (PN 9160490). If the connector end gets wet despite the protective cap, dry the connector with pressurized air or a hair dryer. Drying prevents corrosion and damage to insulation.

No protection is necessary when doing in-situ sterilization.

5.0 CALIBRATION AND MAINTENANCE

Dismounting the sensor: Unscrew the free rotating PG 13.5 threaded connector and pull the sensor out of the process or mounting assembly.

5.1 CALIBRATION

1. Refer to the analyzer instruction manual for details.
2. Be sure the sensor has been operating for at least two hours before zeroing and calibrating.
3. Zero the sensor by placing it in nitrogen gas or in water containing about 5% sodium sulfite. If using nitrogen gas, be sure the membrane is dry. Once the reading is stable, zero the sensor. Refer to the analyzer instruction manual for details.
4. If sodium sulfite was used to zero the sensor, rinse the sensor with water and gently dry the membrane. Place the sensor in water-saturated air. Once the reading is stable, complete the full-scale calibration. Consult the analyzer instruction manual for details.
5. Calibration can also be done using air-saturated water or air-saturated medium. Although the sensor has an extremely low oxygen consumption rate, the liquid should be gently stirred during calibration.

5.2 SENSOR MAINTENANCE

Periodically check sensor response in air and nitrogen.

1. Place the sensor in air. Allow the reading to become stable and note the value. Also note the sensor current, which should be between 40 and 80 nA.
2. Place the sensor in nitrogen. A small plastic bag with a stream of nitrogen gas discharging into the bottom works well.
3. After one minute, the sensor current should be less than 2% of the value in air.

For troubleshooting information, see Section 7.0.

5.3 REPLACING THE ELECTROLYTE AND THE MEMBRANE CARTRIDGE:

Replace the membrane cartridge (membrane kit PN 9160487) as follows:

1. Hold the sensor vertically with the membrane pointing down. Carefully unscrew the membrane cartridge.
2. Carefully clean the tip of the glass body with the polishing cloth included with membrane kit, or clean with the polishing tool in one direction only.

WARNING

Do not polish in a circular motion.

NOTE

When replacing the membrane cartridge, do not touch the anode wire.

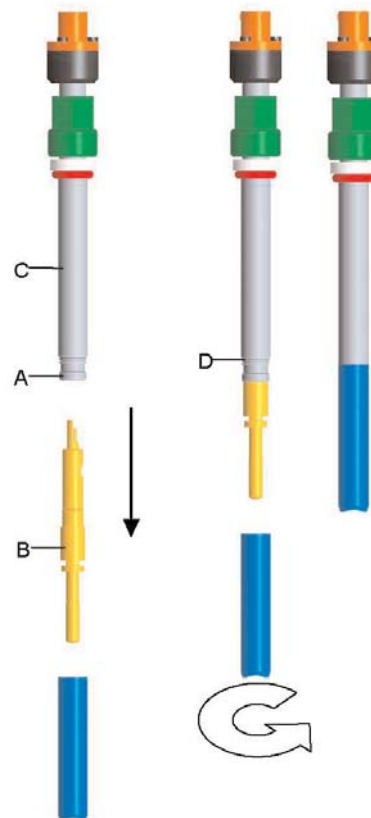
3. Rinse the sensor under running water and dry it carefully.
4. Check the small o-ring above the glass body. If it is damaged, replace it.
5. Use the plastic pipette in the membrane kit to add 2 ml of electrolyte solution to the new membrane cartridge.
6. Carefully screw the cartridge onto the sensor shaft. If too much electrolyte solution was used, the excess will be pushed out. Wash off the excess electrolyte with water.

5.3 REPLACING THE CATHODE

If the sensor still has a sluggish response to saturated air after step 5.3 and/or too small current in air, then the cathode should be replaced.

NOTE: The membrane should be changed whenever the cathode is replaced.

1. Put the sensor in an upright position and carefully unscrew the membrane cartridge.
2. Flush the replaceable cathode with deionized water then dry the metal parts. Do not touch anode and cathode.
3. Hold the cathode on the metal part (B) in front of the thread (A) and the sensor on the shaft (C) and pull apart. Just pull, do not turn!
4. Please check that all contacts are dry and clean.
5. Replace cathode. (Part number 24262-00) Rotate the cathode until the correct position is found and then push cathode into the shaft.
6. Check the small O-ring (D) above the cathode. Replace if damaged.
7. Add 1.5 ml of electrolyte into the new membrane cartridge. The pipette must NOT touch the membrane itself!
8. Screw the membrane cartridge onto the sensor shaft. Any spillage of electrolyte should be rinsed away with water (see "Safety aspects").



6.0 TROUBLESHOOTING

Below is a list of possible problems and solutions for Models Hx438 and Gx448 dissolved oxygen sensors.

CURRENT IN AIR TOO HIGH (>80 nA at 25°C)		SLUGGISH RESPONSE		CURRENT IN AIR TOO LOW (<40 nA at 25°C)	
Problem	Solution	Problem	Solution	Problem	Solution
Very thin or defective membrane	Replace with new membrane cartridge	Contaminated, fouled, or dirty membrane	Clean membrane or replace with new membrane cartridge	Contaminated, fouled, or dirty membrane	Clean membrane or replace with new membrane cartridge
Defective glass body or connector	Return to Rosemount Analytical, Liquid Div.	Loose membrane	Replace with new membrane cartridge	Dried out electrolyte film	Loosen membrane cartridge and tighten
Poisoned anode	Return to Rosemount Analytical, Liquid Div.	Dried out electrolyte film	Loosen membrane cartridge and tighten	Cathode contaminated by silver	Clean cathode with polishing paper. If cleaning does not restore the sensor, then replace the cathode
Cathode contaminated by silver	Clean cathode with polishing paper. If cleaning does not restore the sensor, then replace the cathode	Cathode contaminated by silver	Clean cathode with polishing paper. If cleaning does not restore the sensor, then replace the cathode	Exhausted electrolyte	Return to Rosemount Analytical, Liquid Div.
—	—	—	—	Defective glass body or connector	Fill with new electrolyte

Membrane replacement kit, which includes electrolyte solution and polishing paper, is PN 9160487.

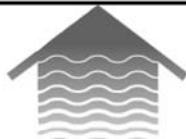
7.0 SPARE PARTS

Part No.	Description
9160600	Membrane Service Kit, FAO Style
24262-00	Replacement Cathode/Anode cartridge
9160489	Electrolyte (50m) bottle
9160490	Connector cap for Auto Cleaning
9160484	Service kit for insertion mounting Assembly
9160486	Service kit for retractable mounting assembly
99SQ9275	Special Membrane service kit for harsh CIP
9160487	Membrane Service Kit



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