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CDE-600/610 Conductivity Cells



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The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, human applications.

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CDE-600/610 SERIES CONDUCTIVITY CELLS INSTRUCTION MANUAL

1.0 GENERAL INFORMATION

1.1 Introduction

1.1.1 This manual provides information on CDE-600/610 Series flow-through and submersion sensors. Conductivity sensors have long been called cells. The two terms, cell and sensor, are used interchangeably in this manual.

1.2 Cautions To Be Observed

- 1.2.1 Consult the factory before using sensor in extremely strong solvents such as ethylene dichloride. Also, do not exceed the sensor's maximum ratings listed in Section 2 of this manual.
- 1.2.2 Before placing sensor into service, remove protective plastic cap.
- 1.2.3 Do not exceed the maximum sensor-to-analyzer distance specified for the analyzer you are using.
- 1.2.4 Be sure the cell constant is appropriate for the scaling of the analyzer. The constant is given in the numerical part of the model number. For example, CDE-600-001 has a constant of 0.01; CDE-600-1 has a constant of 1.

2.0 SPECIFICATIONS

CELL CONSTANTS: 0.01 to 50

THREADED SIZE: 3/4" NPT

SAFETY FEATURE: Shoulder on cells provides an integral safety stop

 TEMPERATURE COMPENSATION:
 Automatic 0-120°C (32-248°F)

 CABLE LENGTH:
 4m (13ft)

INSERTION LENGTH: Variable (see Section 4.1.5)

WETTED MATERIALS:

CDE-600: Graphite, Epoxy, EPDM, CPVC CDE-610: Graphite, Epoxy, Polypropylene, 316 stainless steel

TEMPERATURE and PRESSURE:

Type	<u>Max. Press. (psi)</u>	<u>Max. Temp. (°C)</u>
CDE-600	50	60
	100	50
	150	20
CDE-610	250	120

3.0 PRINCIPLE OF OPERATION

- **3.1** All solutions containing water conduct electricity to some extent. The ability of the solution to conduct electricity is called "conductance" (the reciprocal of resistance). Addition of electrolytes such as salts, acids, or bases to pure water will increase the ability of the liquid to conduct electricity and hence, increase the solution's conductance (decreases the resistance).
- **3.2** An electrolytic conductivity system measures solution conductance by using an analyzer interconnected with cable to a sensor immersed in the solution. The conductivity sensor is composed of two or more electrodes and a temperature sensor. The electrodes are in contact with the solution. The analyzer circuitry impresses an alternating voltage between the electrodes and the magnitude of the resulting current is linearly related to the solution conductivity.
- **3.3** When the temperature of a solution changes, its conductivity changes. The temperature change is compensated with a thermistor (temperature sensitive resistor) in the conductivity sensor to alter the gain of the measuring circuit. This is accomplished such that, regardless of actual solution temperature, the instrument display indicates what the solution conductivity would be if the solution temperature was 25°C (an internationally accepted reference).

4.0 INSTALLATION

4.1 Installation of Flow-Through Sensors Refer to Dwg# N105-134

- 4.1.1 Flow-through sensors are secured with the supplied compression fitting. The insertion length is adjustable within the limits shown in DWG# N106-157. If your sensor has a cross hole it must be inserted far enough to be sure the cross hole is in the solution. Use thread sealant such as Teflon tape on the sensor and the mounting hardware threads.
- 4.1.2 Install a 3/4" NPT tee into the process line. Tee material should be compatible with sensor materials of construction for best chemical resistance and pressure/temperature ratings. A 1" NPT tee with a 1x3/4" reducer may also be used.
- 4.1.3 Electrically connect sensor to the instrument as described in Section 4.3.
- 4.1.4 Remove the protective cap from the sensor and calibrate the system as described in the instrument operating instruction manual before installing sensor into the mounting tee.
- 4.1.5 Screw sensor and fitting into the tee. Locate <u>end</u> of the sensor or cross <u>hole</u> in sensor at the approximate center of the stream.

If you disassembled the cell be sure to re-assemble the components as shown in DWG# $\ensuremath{\mathsf{N105-135}}$

4.2 Installation of Submersion Sensor Refer to Dwg# N105-134

- 4.2.1 Run the sensor cable through the desired length of 3/4" CPVC pipe and screw on the cell using a thread sealant to keep the cable end of the sensor dry.
- 4.2.2 Electrically connect the sensor to the instrument as described in Section 4.3.
- 4.2.3 Remove the protective cap from the sensor and calibrate the system as described in the instrument's operating instruction manual before installing sensor in the tank.
- 4.2.4 Place the cell in the liquid and secure to the tank in an appropriate manner.

4.3 Electrical Connection

The sensor is electrically connected directly to the instrument or indirectly with a junction box and interconnect cable. A suitable junction box with a terminal strip is available from OMEGA (PHE-600-JB).

- 4.3.1 Direct Hook-Up
 - A. Route sensor cable to instrument.
 - B. Connect sensor cable lead wires in accordance with instrument hook-up diagram.
- Note: If you are using this conductivity cell with an OMEGA instrument, connect the four wires to the cell terminals, matching the colors.

If you are using it with an instrument, which accepts 3 wires, connect as follows:

- Join the black wire and green wire together and connect to the black terminal.
- Connect the red and the white as usual to their respective terminals. CAUTION: If connecting to a GLI instrument, reverse the red and white wires.
- The shield is not required so there will be no connection to the SHEILD terminal.
- 4.3.2 Indirect Hook-Up with Junction Box
 - A. Mount junction box with terminal strip (PHE-600-JB) on flat surface such that its cover is removable when installed.
 - B. Route sensor cable to junction box. Keep terminal strip dry to prevent problems caused by wet and/or corroded terminals.
 - C. Route interconnect cable to junction box and instrument. It is recommended that this cable be run in 1/2" metal conduit for protection against moisture and mechanical damage.

Do not run line power in the same conduit with interconnect cable because "electrical noise" may interfere with the sensor signal.

- D. Connect sensor and interconnect cable lead wires by matching colours to the junction box terminal strip. Fasten cover onto junction box.
- E. Connect interconnect cable lead wires to instrument in accordance with instrument hook-up diagram.
- 4.3.2 Wire Designations

White / Black: Electrodes Red / Green: Thermistor (Temperature compensation)

5.0 CLEANING THE SENSOR

- 5.1 Wipe the electrodes end with a soft cloth and rinse with clean water.
- **5.2** Clean the sensor electrodes in a soap solution using a soft cloth, brush, Q-tip or pipe cleaner. If soap solution cleaning is unsuccessful, place the sensor electrode in 10% HCl (hydrochloric acid) for 1 to 5 minutes to remove the contaminants that are acid soluble. Acid clean only if absolutely necessary. Never use abrasive cleaners on the sensor or its electrodes.

6.0 TROUBLESHOOTING AND SERVICE

6.1 Use the troubleshooting section in the analyzer instruction manual to determine whether the sensor or analyzer is defective.









WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

- 1. Purchase Order number under which the product was PURCHASED,
- 2. Model and serial number of the product under warranty, and
- 3. Repair instructions and/or specific problems relative to the product.

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