

# Instruction Manual



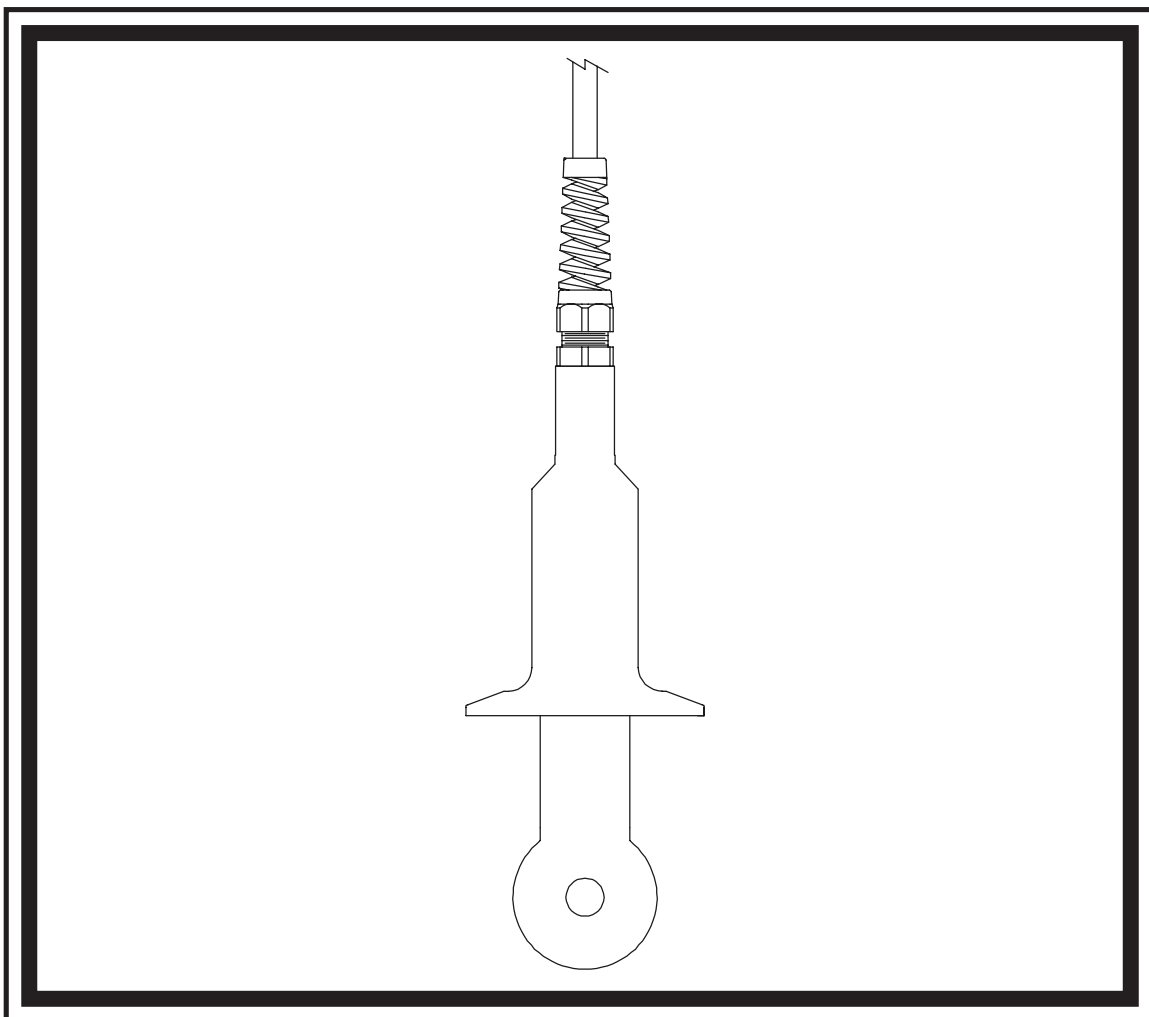
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Instrument Model Number \_\_\_\_\_

Instrument Serial Number \_\_\_\_\_



## **Model HC1 Series Electrodeless Conductivity Sensors**

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## Section 1 - General

### 1.1 MOUNTING

The Model HC1-series electrodeless conductivity sensor measures the conductivity of solutions from 0-200 up to 0-2,000,000 microSiemens/cm.

The sensor is constructed of 3A approved materials and has a sanitary 2" tri-clamp process connection. The sensor may be installed in a special 2" x 2" sanitary tee (available from Anderson), or in a standard 2 1/2" x 2", or 3" x 2" short outlet reducing tee.

### 1.2 WETTED MATERIALS

The sensor is constructed of PVDF or PFA Teflon depending on option choice.

### 1.3 OPERATING PRECAUTIONS

Always consider the temperature/pressure ratings of the mounting hardware used to install the sensor. The sensor and hardware combine to become an integrated system. The hardware material usually limits the system's temperature/pressure rating. Refer to Section 2 for complete specifications.

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## Section 2 - Specifications

Wetted Materials	PVDF or PFA Teflon®
Operating Temperature Range	14 to 347°F (-10 to 175°C)
Measuring Range	From 0-200 to 0-2,000,000 microSiemens/cm
Temperature Compensator	Pt 1000 RTD
Sensor Cable:	5 conductor (plus two isolated shields) cable with Teflon-coated jacket; rated to 175°C (347°F); 20 ft. (6 m) long
Pressure/Temperature Limits:	200 psi at 347°F (13.8 bar at 175°C)

\* Ratings for above sensor are based upon water service. More severe service may require a correction factor.

Teflon® is a registered DuPont Co. Trademark.

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## Section 3 - Location Requirements

Locate the sensor as close as possible to the instrument. Depending on the instrument model and full-scale range, the maximum allowable distance between sensor and instrument varies (refer to instrument manual for distances).

**NOTE:** *When indirectly wiring the sensor to the instrument with interconnect cable and a junction box, use only an Anderson specified cable. When using a different cable, it must have equivalent construction: five conductors and two separate isolated shields — one shielding the signal, and one shielding the overall cable. These specific cable characteristics protect the measurement signal from electromagnetic interference. Using a cable with different construction may interfere with the measuring system's performance.*

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## **Section 4 - Sanitary Mounting**

The sanitary style sensor may be clamp-mounted for clean-in-place applications by using a sanitary clamp-type tee or ferrule and clamp.

1. Install a 2-inch sanitary clamp-type tee or ferrule into the process line or vessel.

**NOTE:** *For a 2" line a special 2" x 2" tee is available from Anderson. Use of a 2" x 2" standard, or short-outlet tee will introduce calibration errors. Alternatively, the sensor may be mounted in a 2 1/2" x 2", or 3' x 2' short-outlet reducing tee.*

2. Connect the sensor cable wires to the instrument.

- Direct Connection

- A) Route sensor cable into the instrument through a watertight fitting in a cable entry hole.
- B) Connect sensor wires to the instrument. Refer to the instrument operating manual for details.

- Indirect Connection with Junction Box (see Section 5.4 for details)

- C) Mount a junction box that has a terminal strip onto a flat surface. Make sure the junction box cover can be removed after installation.

3. Before installing the sensor into the process line or vessel, calibrate the measuring system with conductivity reference solution using the procedure in the instrument operating manual.

4. After calibration, mount the sensor into the sanitary tee or ferrule:

- A. Properly seat the sanitary gasket onto the mating surface of the tee or ferrule.
- B. Carefully place the sensor into the tee or ferrule, making sure the gasket is in place and contacting the bottom surface of the integral sensor flange.
- C. Rotate the HC1 sensor in the process line so that the arrow on the sensor housing is aligned with the direction of product flow.

**NOTE:** *If the sensor is not properly aligned with the product flow, calibration errors may result.*

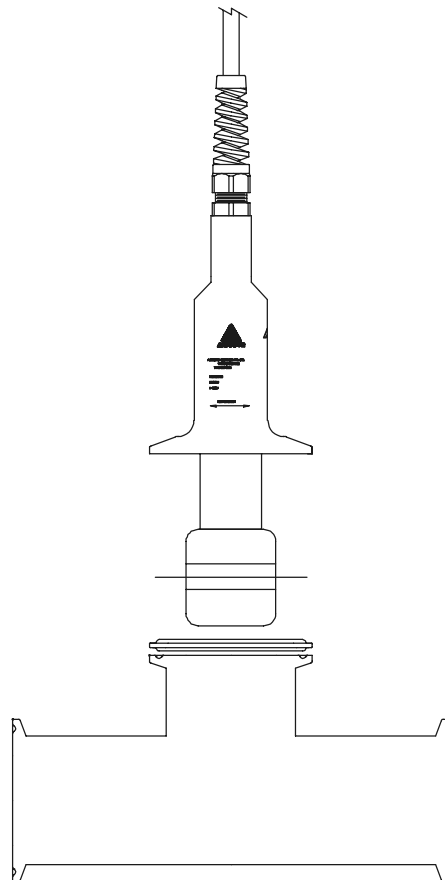
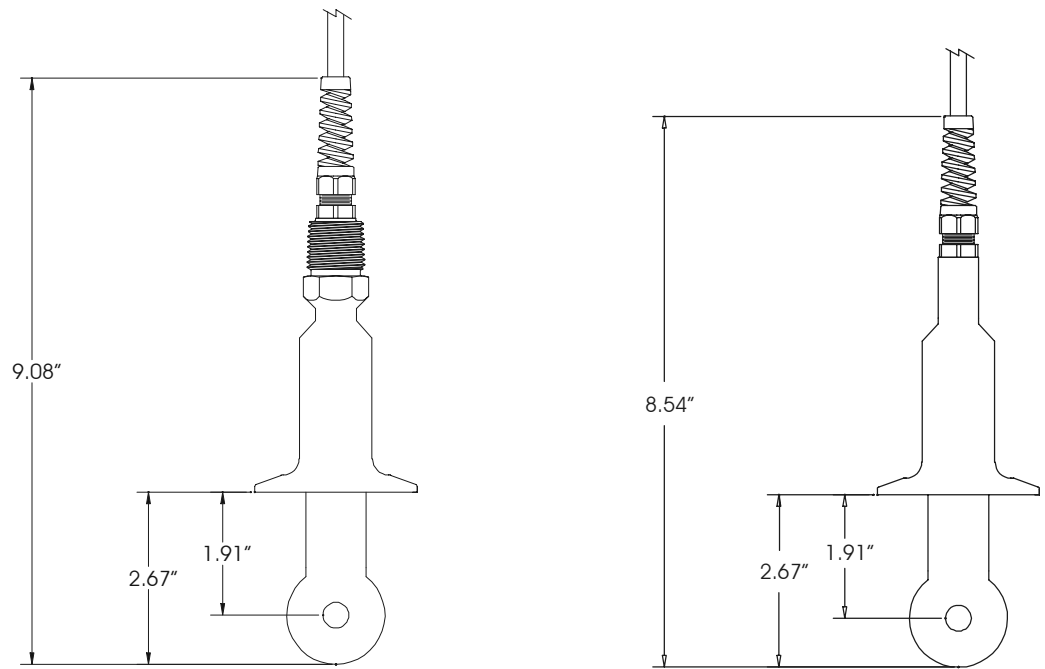
- D. Secure the sensor onto the tee or ferrule with a clamp.

**NOTE:** *If the sensor is installed in a temperature cycling process, the wing nut may need to be periodically re-tightened.*

**CAUTION:**

STEAM STERILIZATION IS NOT RECOMMENDED FOR CLEANING THE HC1 SANITARY STYLE ELECTRODELESS CONDUCTIVITY SENSOR.

FIGURE 4-1 Sanitary Mounting Details



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## **Section 5 - Sensor/Interconnect Cable Termination**

CAUTION:  
IF THE SENSOR OR INTERCONNECT CABLE IS NOT TERMINATED EXACTLY AS DESCRIBED IN THIS SECTION, THE MEASURING SYSTEM WILL NOT OPERATE PROPERLY.

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### **5.1 SENSOR CABLE DETAILS**

Depending on how the sensor was ordered, its integral cable is terminated one of two ways:

- **Standard Termination:** For all applications except those using instruments with the European Community “CE” label. The sensor cable is terminated with five colored wires (red, green, yellow, white, and blue) and one shield wire (signal shield wire and cable shield wire are electrically common).
- **CE Termination:** Available by special order for applications using instruments with the European Community “CE” label. The sensor cable is terminated with five colored wires (red, green, yellow, white, and blue), and two separate isolated shield wires (signal shield wire and cable shield wire is electrically isolated).

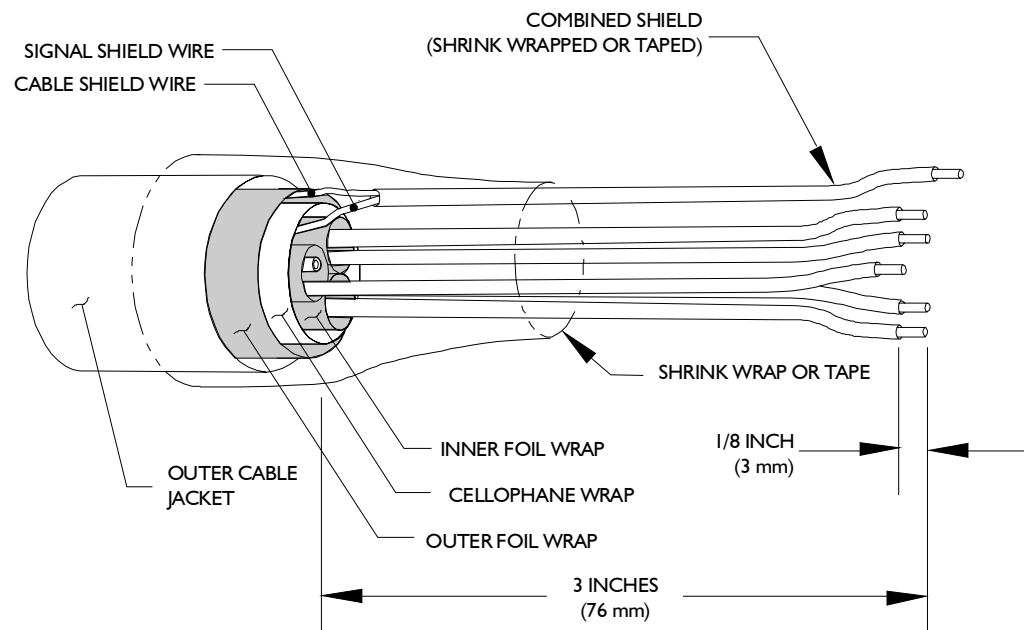
In either case, the integral sensor cable may require shortening during installation. When doing this, refer to the appropriate subsection (5.2 or 5.3) for the procedure to re-terminate the sensor cable.

**5.2 STANDARD TERMINATION PROCEDURE (FOR ALL APPLICATIONS EXCEPT CE)**

CAUTION:  
 USE THIS STANDARD TERMINATION PROCEDURE TO TERMINATE THE SENSOR OR INTERCONNECT CABLE UNLESS THE MEASURING INSTRUMENT HAS THE EUROPEAN COMMUNITY "CE" LABEL. IN THIS CASE, USE THE CE TERMINATION PROCEDURE DESCRIBED IN SECTION 5.3.

1. Refer to Figure 5-1 and strip back 3 inches (76 mm) of the outer cable jacket, outer foil wrap, cellophane wrap, inner foil wrap, and unused black wire. This exposes the signal shield wire, the cable shield wire, and five colored wire (red, green, yellow, white, and blue).
2. Twist the signal shield wire and cable shield wire together, and insulate the new combined shield wire with shrink wrap or tape.
3. Strip the insulation back 1/8 inch (3 mm) from each of the colored wires. Then tin each stripped wire.
4. Using shrink wrap or tape, secure the terminated bundle (outer cable jacket, five colored wires and combined shield wire). This completes the standard termination.

FIGURE 5-1 Standard Termination Details (for all applications except CE)



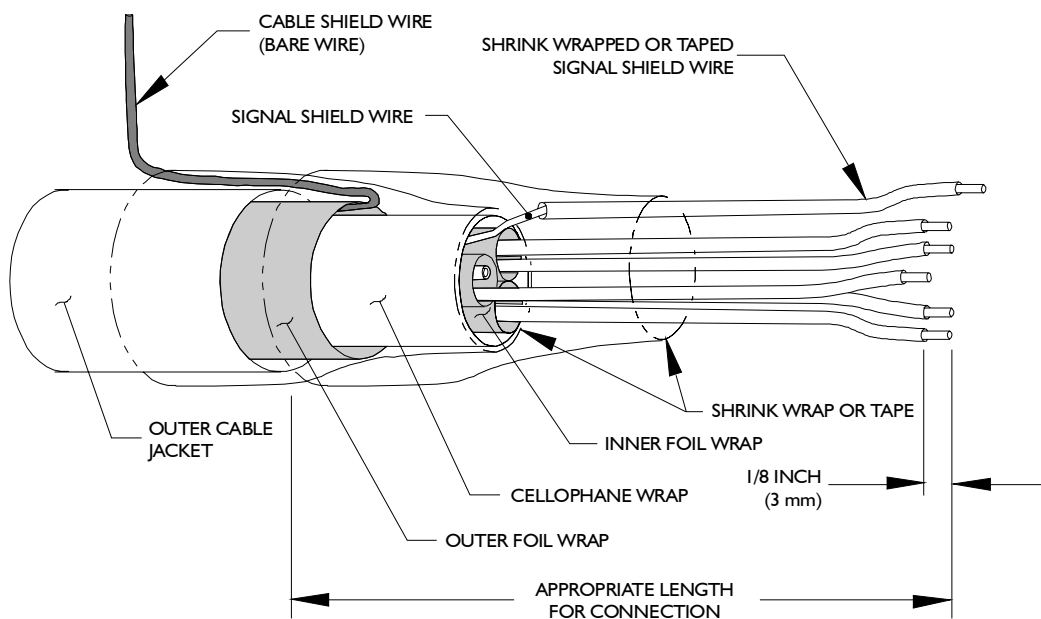
**5.3 CE TERMINATION PROCEDURE (FOR CE-ONLY APPLICATIONS)**

**CAUTION:**

USE THE FOLLOWING CE TERMINATION PROCEDURE WHEN THE MEASURING INSTRUMENT HAS THE EUROPEAN COMMUNITY "CE" LABEL. IF THE INSTRUMENT IS NOT "CE CERTIFIED," USE THE STANDARD TERMINATION PROCEDURE DESCRIBED IN SECTION 5.2

1. Refer to Figure 5-2 and carefully strip back an appropriate length of the outer cable jacket and outer foil wrap. This exposes the signal shield wire, cable shield wire, and cellophane-wrapped wire bundle.
2. Fold back the cable shield wire. Using shrink wrap or tape, equally cover the outer cable jacket, and the exposed cable shield wire/cellophane-wrapped wire bundle.
3. Carefully clip back the cellophane wrap, inner foil wrap, and unused black wire up to the end of the shrink wrap or tape applied in step 2. This exposes the signal shield wire, and the five colored wires (red, green, yellow, white, and blue).
4. Insulate the signal shield wire with shrink wrap or tape.
5. Strip the insulation back 1/8 inch (3 mm) from each of the colored wires. Then tin each stripped wire.
6. Using an ohmmeter or test light, verify that the signal shield wire is not shorted to the cable shield wire. If okay, shorten the cable shield wire to an appropriate length. If not, clip entire cable back to get a new unfinished end and start over at step 1.
7. Using shrink wrap or tape, equally overlap the existing shrink wrap or tape applied in step 2, and the five colored wires/signal shield wire. This secures and completes the terminated assembly.

FIGURE 5-2 CE Termination Details (for CE-only applications)





**5.4 INTERCONNECT CABLE DETAILS**

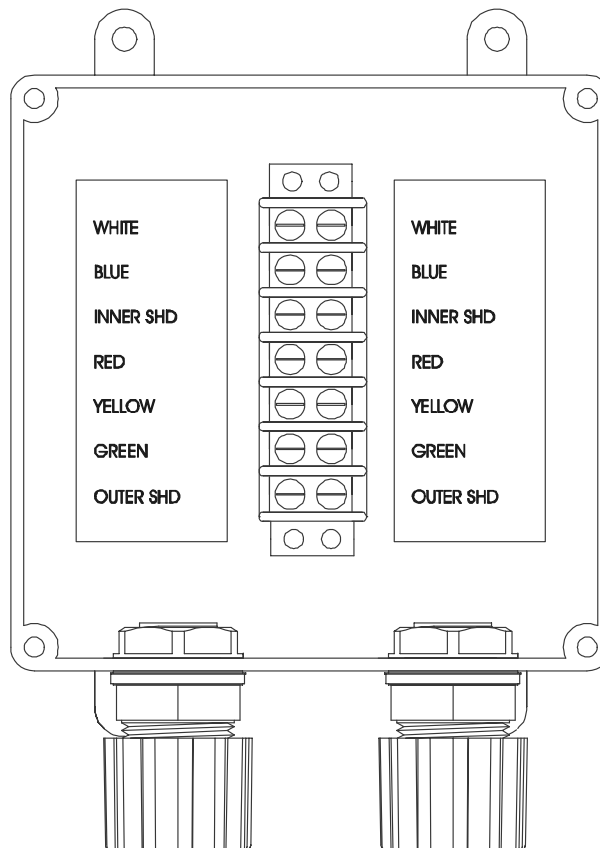
The Anderson specified interconnect cable, which is the same cable as the integral sensor cable, is provided with unfinished ends since it often needs to be shortened during installation. Use the appropriate procedure in subsection 5.3 or 5.4 to terminate either cable.

**NOTE:** Anderson Instrument Company strongly recommends using only its specified interconnect cable. If a different cable is used, it must have equivalent construction: five conductors, and two separate isolated shields — one shielding the signal, and one shielding the overall cable. These specific cable characteristics protect the measurement signal from electromagnetic interference. Using a cable with different construction may interfere with the measuring system’s ability to operate properly.

If the application requires interconnect beyond the standard 20' length the use of a Interconnect Cable / Junction box is required to ensure a quality connection.

1. Mount the junction box on a flat surface, within 20' of the electrodeless conductivity sensor.
2. Route the sensor and interconnect cable ends through the provided cord grips.
3. Prepare the ends of the cable as described in Section 5.3 keeping the two shield wires insulated from each other with shrink wrap or tape.
4. Terminate the wires to the appropriate terminals according to wire color.
5. Replace the junction box gasket and cover and tighten the cord grips to prevent moisture ingress.

FIGURE 5-3 Interconnect Cable / Junction Box Terminations



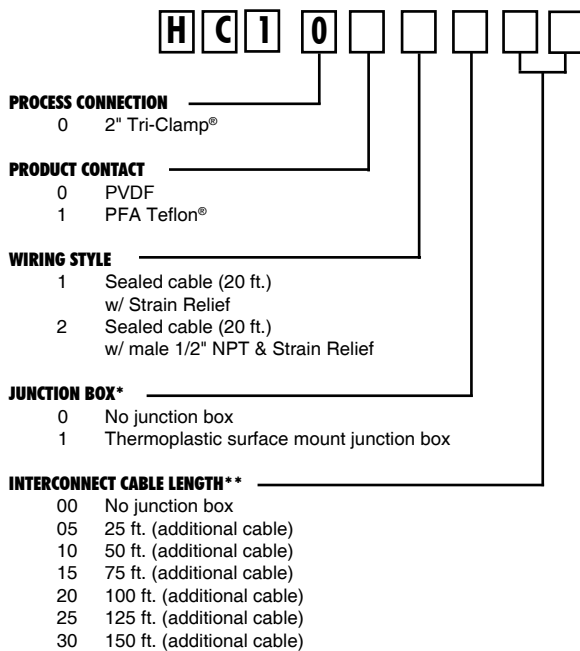
## **Section 6 - Troubleshooting**

### **6.1 CHECKING SENSOR OPERATION**

Determine whether the sensor or instrument is defective by using the troubleshooting section in the instrument operating manual. If the sensor is suspect, check it using this procedure:

1. Disconnect the sensor from the instrument (or junction box if interconnect cable is used).
3. With the sensor at a temperature between 23°C and 27°C, measure the resistance between the red and yellow wires with an ohmmeter. The reading should be between 1090 and 1105 ohms.
4. Measure the resistance between the white and blue wires. The reading should be less than 5 ohms. Now measure the resistance between the green and yellow wires. The reading should also be less than 5 ohms.
5. Place the ohmmeter to its highest range and measure the resistance between the shield and white wires. The reading should indicate infinity (open circuit).
  - If any one of the resistance checks in the previous steps is incorrect, the sensor is probably defective. Contact Anderson Instrument Company for details on arranging a sensor replacement.
  - If the resistance checks are correct, the sensor may still be defective. In this case, more extensive troubleshooting is required. Please consult the Anderson Instrument Company at (800) 833-0081 for details.

## **Section 7 - Ordering Matrix**



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## Section 8 - Warranty and Return Statement

These products are sold by The Anderson Instrument Company (Anderson) under the warranties set forth in the following paragraphs. Such warranties are extended only with respect to a purchase of these products, as new merchandise, directly from Anderson or from an Anderson distributor, representative or reseller, and are extended only to the first buyer thereof who purchases them other than for the purpose of resale.

### *Warranty*

These products are warranted to be free from functional defects in materials and workmanship at the time the products leave the Anderson factory and to conform at that time to the specifications set forth in the relevant Anderson instruction manual or manuals, sheet or sheets, for such products for a period of one year.

**THERE ARE NO EXPRESSED OR IMPLIED WARRANTIES WHICH EXTEND BEYOND THE WARRANTIES HEREIN AND ABOVE SET FORTH. ANDERSON MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE PRODUCTS.**

### *Limitations*

Anderson shall not be liable for any incidental damages, consequential damages, special damages, or any other damages, costs or expenses excepting only the cost or expense of repair or replacement as described above.

Products must be installed and maintained in accordance with Anderson instructions. Users are responsible for the suitability of the products to their application. There is no warranty against damage resulting from corrosion, misapplication, improper specifications or other operating condition beyond our control. Claims against carriers for damage in transit must be filed by the buyer.

This warranty is void if the purchaser uses non-factory approved replacement parts and supplies or if the purchaser attempts to repair the product themselves or through a third party without Anderson authorization.

### *Returns*

Anderson's sole and exclusive obligation and buyer's sole and exclusive remedy under the above warranty is limited to repairing or replacing (at Anderson's option), free of charge, the products which are reported in writing to Anderson at its main office indicated below.

Anderson is to be advised of return requests during normal business hours and such returns are to include a statement of the observed deficiency. The buyer shall pre-pay shipping charges for products returned and Anderson or its representative shall pay for the return of the products to the buyer.

Approved returns should be sent to:

ANDERSON INSTRUMENT COMPANY INC.  
156 AURIESVILLE ROAD  
FULTONVILLE, NY 12072 USA

ATT: REPAIR DEPARTMENT