

Safety information

Please read this entire document before unpacking, setting up, or operating this equipment. Pay attention to all danger and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment.

To ensure that the protection provided by this equipment is not impaired, do not use or install this equipment in any manner other than that specified in this document.

Important Note: *The manufacturer is not responsible for any damages due to misapplication or misuse of this product including, without limitation, direct, incidental and consequential damages, and disclaims such damages to the full extent permitted under applicable law. The user is solely responsible to identify critical application risks and install appropriate mechanisms to protect processes during a possible equipment malfunction.*

Use of hazard information

DANGER

Indicates a potentially or imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION



Indicates a potentially hazardous situation that may result in minor or moderate injury.

Important Note: *Information that requires special emphasis.*

Note: *Information that supplements points in the main text.*

Precautionary labels

Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed. A symbol, if noted on the instrument, will be included with a danger or caution statement in the manual.

	This symbol, if noted on the instrument, references the instruction manual for operation and/or safety information.
	Electrical equipment marked with this symbol may not be disposed of in European public disposal systems after 12 August of 2005. In conformity with European local and national regulations (EU Directive 2002/96/EC), European electrical equipment users must now return old or end-of life equipment to the Producer for disposal at no charge to the user. Note: <i>For return for recycling, please contact the equipment producer or supplier for instructions on how to return end-of-life equipment, producer-supplied electrical accessories, and all auxiliary items for proper disposal.</i>

Introduction

This quick-start booklet contains condensed instructions to assist the user in starting and operating the instrument. These condensed instructions pertain to basic conductivity measurement operation and wiring the transmitter in a two-wire hookup. Refer to the PRO-E3

manual for information about concentration or TDS, wire in a three or four-wire hookup, or use a specific instrument feature.

Mount the transmitter

Refer to the PRO-E3 manual for instructions on mounting the transmitter.

Connect the sensor/Configure the temperature element type

DANGER

Explosion Hazard. Do not connect or disconnect electrical components or circuits to the equipment unless power has been removed or the area is known to be non-hazardous.

WARNING

Multiple hazards. Only qualified personnel must conduct the tasks described in this section of the document.

1. Connect the electrodeless conductivity sensor, matching wire colors to terminals as indicated in [Table 1](#).
2. The transmitter is factory-set for automatic temperature compensation using the PT 1000 ohm temperature element built into all electrodeless conductivity sensors. If fixed Manual temperature compensation is required, change the temperature element type to "Manual" and enter a temperature. For details, refer to the PRO-E3 manual, section Select Temp Element Type.

Table 1 Sensor connections

Wire colors	TB2 Terminal connections
White	Terminal 1
Blue	Terminal 2
Clear	Terminal 3
Black	Terminal 3
Red	Terminal 4
Yellow	Terminal 5
No connection (not used)	Terminal 6
Green	Terminal 7

Connect the DC power

In a two-wire hookup, at least 14 VDC is required for operation. A load device can be connected in the current loop as shown in [Figure 1](#).

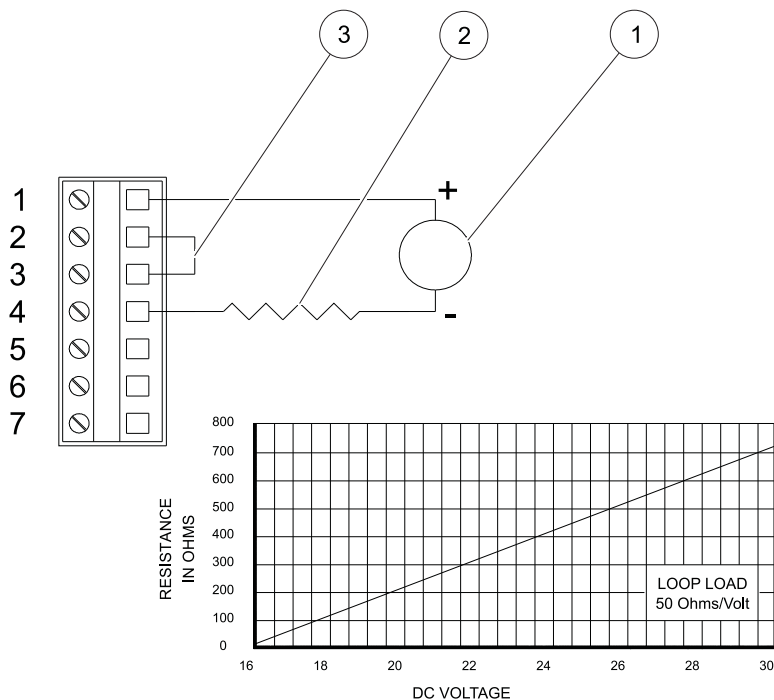


Figure 1 Load device connected in the current loop

1 Loop power 14–30 VDC, 4–20 mA	3 Jumper required
2 Loop resistance (see nomograph)	

Depending on how the transmitter is mounted, route the DC power/analog output wiring into the transmitter as follows:

- **Wall/Pipe-mounted transmitter:** Route the cable through the right side cable entry knockout hole in the back cover.
- **Panel-mounted transmitter:** Route the cable behind panel to the exposed TB1 terminal strip.
- **Integral Sensor-mounted transmitter:** Route the cable through the right side cable entry knockout hole in the back cover. (Do not open left side cable entry knockout hole in cover.)

Note: Use high quality, shielded instrumentation cable.

For more information about wiring the transmitter in a three three or four-wire hookup arrangement or monitor mode hookup, refer to the PRO-E3 manual.

Calibrate the transmitter

The transmitter must be calibrated so that measured values will correspond to actual process values. Use the "Cond Cal" calibration method to enter the known value of a properly prepared conductivity reference solution. (To calibrate with a sample of the process, use the "Sample Cal" method to enter its known value determined by laboratory analysis or a comparison reading.)

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sample of the process, use the "Sample Cal" method to enter its known value determined by laboratory analysis or a comparison reading.)

Each electrodeless conductivity sensor has a unique zero point and span. Consequently, when calibrating a sensor for the first time, always zero it according to step 1. Zeroing provides the best possible measuring accuracy.

An in-progress calibration can always be cancelled by pressing **ESC**. After the "Abort: Yes?" screen appears, do one of the following:

- Press **ENTER** to cancel. After the Confirm Active screen appears, press **ENTER** again to return the analog output to its active state (Measure screen appears).
 - Press the **UP** or **DOWN** arrow key to choose "Abort: No?" screen, and press **ENTER** to continue calibration.
1. Zero the sensor if it is being calibrated for the first time. If not, disregard this step and perform steps 2 through 13.

If the "Zero: Confirm Failure?" screen appears at any time during zeroing, press **ENTER**. Press the **UP** or **DOWN** arrow key to select between "Cal: Exit" or "Cal: Repeat" and do one of the following:

- Select "Zero? (Cal: Exit)" and press **ENTER**. After the "Zero: Confirm Active?" screen appears, press **ENTER** again to return the analog output to its active state (Measure screen appears).
 - Select "Zero? (Cal: Repeat)" and press **ENTER** to repeat zeroing.
 - a. Make sure that the sensor is dry before zeroing.
 - b. Press **MENU** to display the Main Menu screen. If the Main Menu screen is not displayed, press the **UP** or the **DOWN** arrow key to display it.
 - c. Press **ENTER** to display the Calibrate Sensor screen.
 - d. Press **ENTER** to display the Sensor Cond Cal screen.
 - e. Press the **DOWN** arrow twice to display the Sensor Zero screen.
 - f. Press **ENTER** to display the "Zero: In Dry Air?" screen.
 - g. With the dry sensor held in air, press **ENTER** to start automatic zeroing. (During zeroing, the analog output is automatically "held" at the last measured value.)
 - h. After the "Zero: Confirm Cal Ok?" screen appears, press **ENTER** to end zeroing.
 - i. After the "Zero: Confirm Active?" screen appears, press **ENTER** to return the analog output to its active state (Measure screen appears).
2. Prepare a reference solution that has a conductivity value within the measuring range that you set for the transmitter. For best accuracy, the value of the solution should be near the typical measured process value. For more information on preparing a solution, refer to the PRO-E3, section "Cond Cal Method".

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3. Thoroughly rinse the clean sensor in de-ionized water. Then immerse the sensor in the prepared reference solution.

Note: Allow the sensor and solution temperatures to equalize. Depending on their temperature differences, this may take up to 30 minutes.

Suspend the sensor to prevent it from touching the container. Simply laying it into the container will produce calibration error.

If the "Cond Cal: Confirm Failure?" screen appears at any time during calibration, press **ENTER**. Press the **UP** or the **DOWN** arrow key to select "Cal: Exit" or "Cal: Repeat" and do one of the following:

- Select "Cond? (Cal: Exit)" and press **ENTER**. After the "Cond Cal: Confirm Active?" screen appears, press **ENTER** to return the analog output to its active state (Measure screen appears).
 - Select "Cond? (Cal: Repeat)" and press **ENTER** to repeat calibration of the point.
4. Press **MENU** to display the Main Menu Calibrate screen.
 5. Press **ENTER** to display the Calibrate Sensor screen.
 6. Press **ENTER** again to display the Sensor Cond Cal screen.
 7. Press **ENTER** again to display the Set Ref Temp? (25 °C) screen. The default 25 °C reference temperature is fine for most applications. If a different reference is required, use the arrow keys to adjust the temperature. In either case, press **ENTER**.

Note: During calibration, the analog output is automatically "held" at the last measured value.

8. After the Set Slope? (2.00 %/ °C) screen appears, press the arrow keys to adjust the displayed slope value to match the known slope of the reference solution, and press **ENTER**.

Note: Measured values are normally compensated using the configured temperature compensation method. However, during calibration the measured value is linearly compensated by the entered reference temperature and slope value of the reference solution.

9. Place the sensor in the solution and from the "Cond Cal: Sample Ready?" screen displayed, press **ENTER**. The "xxxx μ S/cm Reading Stable" screen appears showing the measured reference solution value.
10. Wait for the reading to stabilize which may take up to 30 minutes. Then press **ENTER**. The "Please Wait" screen may appear if the reading is still too unstable. After the reading has stabilized, Cond Cal? (xxxx μ S/cm) screen appears showing the "last-measured" value.
11. Use the arrow keys to adjust the "last-measured" value to exactly match the known value of the reference solution, and press **ENTER** to complete the calibration ("Confirm Cal Ok?" screen appears).
12. Install the sensor into the process.

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13. Press **ENTER** to display the active measurement reading on the "Confirm Active?" output status screen. When the reading corresponds to the actual typical process value, press **ENTER** to return the analog output to its active state (Measure screen appears).

The transmitter is now ready to measure conductivity.

To change the display format of the Measure screen (for example, from 0–2000 $\mu\text{S}/\text{cm}$ to 0.000–2.000 mS/cm), refer to the PRO-E3 manual, section "Select Display Format."

Completing transmitter configuration

To further configure the transmitter to the application requirements, use the appropriate Configure screens to make selections and "key in" values. For more information about completing the configuration, refer to the PRO-E3 manual.

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