The BNC, Ref, and ATC connections are labeled as Channel 1 or Channel 2 on the ridge above the Thermo Scientific™ Orion™ Dual Star™ meter connections. Using the meter orientations shown in the figure below, the channel 2 connections are on the left and the channel 1 connections are on the right.

Connect pH electrodes, ion selective electrodes (ISE) or ORP electrodes with BNC or waterproof BNC connectors to the channel 1 and channel 2 BNC inputs.

Connect reference electrodes with 2.5 mm pin-tip connectors to the channel 1 and channel 2 Ref inputs.

Connect ATC probes with 8 pin MiniDIN connectors to the channel 1 and channel 2 ATC inputs.

Connect the Thermo Scientific™ Orion Star™ series stirrer probe to the Stirrer input. The stirrer probe can be purchased separately using catalog number 096019.

Select the appropriate wall outlet plug and slide the plug into the groove on the power adapter. Connect the power adapter to the Power input and to a wall outlet.

**EZ Startup Menu**

It is highly recommended that the EZ Startup™ menu be completed the first time that the Orion Dual Star meter is used. The EZ Startup menu sets important meter parameters, such as the displayed language, date and time, measurement mode and read type for each channel, and data output settings. To access the EZ Startup menu from the measurement mode, press the setup key, press the ▲/▼ keys to highlight EZ Startup and press the f2 (select) key.

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**Thermo Scientific Orion**

Dual Star pH/ISE Dual Channel Meter

**Meter Connections**

The BNC, Ref, and ATC connections are labeled as Channel 1 or Channel 2 on the ridge above the Thermo Scientific™ Orion™ Dual Star™ meter connections. Using the meter orientations shown in the figure below, the channel 2 connections are on the left and the channel 1 connections are on the right.

Connect pH electrodes, ion selective electrodes (ISE) or ORP electrodes with BNC or waterproof BNC connectors to the channel 1 and channel 2 BNC inputs.

Connect reference electrodes with 2.5 mm pin-tip connectors to the channel 1 and channel 2 Ref inputs.

Connect ATC probes with 8 pin MiniDIN connectors to the channel 1 and channel 2 ATC inputs.

Connect the Thermo Scientific™ Orion Star™ series stirrer probe to the Stirrer input. The stirrer probe can be purchased separately using catalog number 096019.

Select the appropriate wall outlet plug and slide the plug into the groove on the power adapter. Connect the power adapter to the Power input and to a wall outlet.

**EZ Startup Menu**

It is highly recommended that the EZ Startup™ menu be completed the first time that the Orion Dual Star meter is used. The EZ Startup menu sets important meter parameters, such as the displayed language, date and time, measurement mode and read type for each channel, and data output settings. To access the EZ Startup menu from the measurement mode, press the setup key, press the ▲/▼ keys to highlight EZ Startup and press the f2 (select) key.
Setting the Measurement Mode
The measurement mode (displayed to the right of the measurement value) determines the type of calibration that the meter will perform on each channel.
1. In the measurement mode, press the mode key.
2. Dual channel display only: Press the \( \Delta \) and \( \nabla \) keys to highlight Channel 1 or Channel 2 and press the \( \text{f2 (accept)} \) key.
3. Press the \( \Delta \) and \( \nabla \) keys to highlight pH, ISE, mV, RmV or ORP as the measurement mode and press the \( \text{f2 (accept)} \) key.
4. If the ISE mode is selected, the meter will prompt the user to select the ISE units. Press the \( \Delta \) and \( \nabla \) keys to highlight the units and press the \( \text{f2 (accept)} \) key.
5. The meter will return to the measurement mode.

Setting the Electrode ID
The electrode ID (displayed below the channel number) is used for ISE incremental techniques and included with the datalog and calibration entries. The electrode ID numbers may not be accessible, depending on the selected measurement mode for the channel.
1. In the measurement mode, press the setup key.
2. Press the \( \Delta \) and \( \nabla \) keys to highlight Channel 1 or Channel 2 and press the \( \text{f2 (select)} \) key.
3. Press the \( \Delta \) and \( \nabla \) keys to highlight Electrode ID and press the \( \text{f2 (select)} \) key.
4. Press the \( \Delta \) and \( \nabla \) keys to highlight pH, ORP, F (fluoride), NH (ammonia), NH\(_4\) (ammonium), NO\(_3\) (nitrate), NO\(_2\) (nitrite), S\(_2\) (sulfide), Cl\(_2\) (chloride), Cl\(_3\) (chlorine), Br (bromide), I (iodide), CN (cyanide), Na\(_2\) (sodium), K\(_2\) (potassium), Ca\(_2\) (calcium), Ag\(_2\) (silver), Cu\(_2\) (copper), Pb\(_2\) (lead), Cd\(_2\) (cadmium), Ca\(_2\) (calcium), P\(_2\) (phosphate), Br\(_2\) (bromide), SCN\(_2\) (thiocyanate), NO\(_2\) (nitrogen oxide), CO\(_2\) (carbon dioxide), O\(_2\) (oxygen), X\(_2\) (divalent cation) or X\(_{-2}\) (divalent anion) and press the \( \text{f2 (accept)} \) key.
5. Press the measure key to return to the measurement mode.

pH Calibration with Two Buffers
1. Prepare and condition the pH electrode according to the electrode user guide. Select two pH buffers that bracket the standard and press the \( \text{f2 (accept)} \) key to begin the calibration.
2. Rinse the pH electrode with distilled water and place into the first buffer.
3. When the electrode and buffer are ready, press the \( \text{f3 (start)} \) key to begin the calibration.
4. Wait for the pH value to stop flashing. If the pH value is incorrect, use the numeric keypad and decimal key to manually enter the pH of the first buffer and press the \( \text{f2 (accept)} \) key.
5. Rinse the \( \text{f2 (next)} \) key to proceed to the next buffer.
6. Rinse the pH electrode with distilled water and place into the second buffer.
7. When the electrode and buffer are ready, press the \( \text{f3 (start)} \) key.
8. Wait for the pH value to stop flashing. If the pH value is incorrect, press the \( \text{f2 (accept)} \) key. If the pH value is incorrect, use the numeric keypad and decimal key to manually enter the pH of the second buffer and press the \( \text{f2 (accept)} \) key.
9. Rinse the electrode with distilled water and place into the higher concentration standard.
10. When the electrode and standard are ready, press the \( \text{f3 (start)} \) key.
11. Wait for the concentration value to stop flashing and use the numeric keypad and decimal key to enter the concentration of the second standard and press the \( \text{f2 (accept)} \) key.
12. Press the \( \text{f3 (done)} \) key. The meter will display a summary of the calibration.
13. Press the \( \text{f2 (log/print)} \) key to save and end the calibration, export the calibration data to the calibration log and printer or computer, if one is connected to the meter and enabled in the setup menu.

Important Note: The \( \text{f2 (log/print)} \) key must be pressed to save the calibration. Only pressing the \( \text{f3 (cal done)} \) key without pressing the \( \text{f2 (log/print)} \) key will not save the calibration.

ISE Calibration with Two Standards
1. Prepare and condition the ion selective electrode (ISE) according to the electrode user guide. Prepare the calibration standards that bracket the sample concentration and differ in concentration by a factor of ten.
2. Connect the ion selective electrode and reference electrode (if applicable) to the channel 1 or channel 2 meter inputs and note which channel was selected. If the stirrer probe will be used, connect the stirrer probe to the meter input.
3. Prepare the \( \text{f2 (cal done)} \) key to proceed to the next calibration standard.
4. Rinse the electrode with distilled water and place into the higher concentration standard.
5. When the electrode and standard are ready, press the \( \text{f3 (start)} \) key to begin the calibration.
6. Wait for the concentration value to stop flashing and use the numeric keypad and decimal key to enter the concentration of the standard and press the \( \text{f2 (accept)} \) key.
7. Rinse the \( \text{f2 (next)} \) key to proceed to the next calibration standard.
8. Rinse the electrode with distilled water and place into the higher concentration standard.
9. When the electrode and standard are ready, press the \( \text{f3 (start)} \) key.
10. Wait for the concentration value to stop flashing and use the numeric keypad and decimal key to enter the concentration of the second standard and press the \( \text{f2 (accept)} \) key.
11. Press the \( \text{f3 (done)} \) key. The meter will display a summary of the calibration.
12. Press the \( \text{f2 (log/print)} \) key to save and end the calibration, export the calibration data to the calibration log and printer or computer, if one is connected to the meter and enabled in the setup menu.

Important Note: The \( \text{f2 (log/print)} \) key must be pressed to save the calibration. Only pressing the \( \text{f3 (cal done)} \) key without pressing the \( \text{f2 (log/print)} \) key will not save the calibration.

Setting the Read Type
1. In the measurement mode, press the setup key.
2. Press the \( \Delta \) and \( \nabla \) keys to highlight Channel 1 or Channel 2 and press the \( \text{f2 (select)} \) key.
3. Press the \( \Delta \) and \( \nabla \) keys to highlight Read Type and press the \( \text{f2 (select)} \) key.
4. Press the \( \Delta \) and \( \nabla \) keys to select the read type and press the \( \text{f2 (accept)} \) key.
   • Auto Read – The meter will display the measurement as it stabilizes and lock and hold the measurement when it is stable. Press the measure key to take a new reading.
   • On Ready – The meter will display stabilizing when the measurement is unstable and ready when the measurement is stable. The display will automatically update if the measurement changes.
   • At Time Intervals – The meter will display measurements at set time intervals (operator programmed).
   • Continuous – The meter will continuously measure and update the display.
   • Value Change In Measurement – The meter will display a measurement when the measurement changes or exceeds a set high or low value (operator programmed).
   • Timing Read – The meter will display a measurement after a set time delay (operator programmed) and lock and hold the measurement after the time delay is reached.
5. Press the \( \text{f3 (start)} \) key to begin the time delay cycle.
6. Press the \( \text{f3 (done)} \) key to return to the measurement mode.

pH and ISE Measurements
1. Rinse the electrode (ATC probe, stirrer probe and reference electrode, if applicable) with distilled water, blot dry and place into the sample.