**EC/TDS/SALT**

**Pocket Meter**

Large Screen Waterproof Multi Range Conductivity/TDS/Salt with Temperature Display

**Instruction Manual**

**Introduction**

Thank you for selecting microprocessor-based waterproof EC/TDS/SALT meter with large dual line display. You have one of the following models: PT 157 • PT 153 T

These instruments come with the user-replaceable cup type sensor and have additional features such as Multi-range measurement, up to 3-point calibration and higher resolution measurement.

**Before You Begin**

Remove the electrode’s protective cap. Soak the electrode for a few minutes in alcohol to remove any oil stains on the electrodes which will affect the accuracy of the meter. Rinse thoroughly with de-ionised water and shake off dry.

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**Key Functions**

<table>
<thead>
<tr>
<th>Key</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON/OFF</td>
<td>Power on and off the meter. (The meter automatically switches off if no button is pressed for 8.5 seconds).</td>
</tr>
<tr>
<td>INC/DEC</td>
<td>In measurement mode, temperature reading switches between Celsius &amp; Fahrenheit.</td>
</tr>
<tr>
<td>AUTO</td>
<td>In calibration mode, switches the meter to temperature calibration mode.</td>
</tr>
<tr>
<td>PU/LO/Hi</td>
<td>In temperature calibration mode, exits calibration mode without confirming calibrated values.</td>
</tr>
<tr>
<td>Hold</td>
<td>In measurement mode, switches to hold mode freezing the display.</td>
</tr>
<tr>
<td>Hold</td>
<td>In hold mode, switches back to measurement mode.</td>
</tr>
<tr>
<td>Hold</td>
<td>In manual calibration and temperature modes, exits calibration mode without confirming calibrated values.</td>
</tr>
<tr>
<td>Hold</td>
<td>In range selection mode, selects a range.</td>
</tr>
<tr>
<td>Hold</td>
<td>In calibration mode, enters calibration mode.</td>
</tr>
<tr>
<td>Hold</td>
<td>In calibration mode, adjusts the calibration values.</td>
</tr>
<tr>
<td>Hold</td>
<td>In hold mode, enters TDS factor setting mode.</td>
</tr>
<tr>
<td>Hold</td>
<td>In TDS factor setting mode, adjusts TDS factor.</td>
</tr>
</tbody>
</table>

**Switching On**

Press ON/OFF key to switch on the meter. The LCD shows the power-up sequence as illustrated in Figure 2. When the meter is on, if you do not press a key for 8.5 minutes, the meter automatically switches off to conserve batteries.

**Measurement**

1. Press the ON/OFF key to switch on the meter. The ‘MEAS’ indicators appear when the meter is in measurement mode.
2. Dip the electrode into the test solution making sure that it is fully immersed. Stir to clear any trapped air bubbles from the electrode and let the reading stabilise. For plus models, you can opt for the cup style measurement by filling the electrode cup with sample of test solution.
3. The upper display shows the main reading (conductivity/TDS/Salt) of the solution, automatically temperature compensated (ATC) to normalised temperature of 25°C. The lower display shows the temperature of the solution.

**HOLD Function**

This feature lets you freeze the display for a delayed observation.

1. Press the HOLD key to freeze the measurement. The meter goes to hold mode and the ‘HOLD’ indicator is displayed in LCD. The measurements are frozen and the ‘MEAS’ indicator disappears.
2. Press HOLD key again to release the measurement. The ‘HOLD’ indicator is no longer displayed. The meter goes back to measurement mode.

**Temperature Unit of Measurement Selection**

This feature lets you set the unit of measurement of temperature to either Celsius (°C) or Fahrenheit (°F). When the meter is in the measurement mode, press “°C/F” button. The temperature display toggles between the Celsius and Fahrenheit reading.

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**Range Selection**

Depending on the selected mode, you can set the meter to limit its reading to a particular measuring range (PU, LO or HI) or full scale (AUTO). The default setting is AUTO. When you select a range other than AUTO, the meter can be calibrated only for that particular range. If you try to measure a sample which has a higher conductivity/TDS value than that of the selected measuring range, the LCD shows ‘OK’ error message. Refer Specifications section for available ranges of the selected model.

To select a range:

1. Switch off the meter. Press and hold the ‘°C/F’ key and then switch on the meter using ON/OFF key. Release °C/F key.
2. The meter goes to range selection mode. The LCD shows the currently selected range (the default is AUTO) in the lower display. The upper display shows the maximum possible reading for the selected range. Press HOLD key repeatedly until you see the required range (PU, LO or HI).

**Note:** If no key is pressed within 5 seconds, LCD shows power-up sequence and the meter goes to measurement mode.

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**Figure 1: Battery Compartment**

**Figure 2: Power Up Sequence**

**Figure 3: Range selection sequence from AUTO to HI**

**Figure 4: HOLD Function**

**Figure 5: Temperature unit of measurement selection**
About Calibration
To ensure higher accuracy, the meter must be calibrated on a regular basis. Calibration can be manual or automatic; calibration can be 1-point or multi-point. You can choose any combination of the above options for calibration. If you calibrate the meter for 1-point calibration, the calibration is applied for all the measuring ranges. In applications where you need higher accuracy, and when you intend to measure values in more than one range, it is recommended to select multi-point calibration.

Selection of Automatic or Manual Calibration
These instruments have both automatic & manual calibration while all other models have to be calibrated manually. In automatic calibration, the meter automatically detects and verifies known conductivity standard solutions (84uS, 1413uS & 12.88mS). In manual calibration, you can use non-standard solutions which may be specific for your application. The factory default is Automatic calibration (Auto). You can enable or disable automatic calibration as described below.

Selection of 1-point or Multi-point Calibration
The factory default is 1-point Calibration. For higher accuracy, it is recommended that you calibrate the meter for multiple ranges if you intend to measure values in multiple ranges. You can enable or disable multi-point calibration as described below.

To enable/disable auto calibration and multi-point calibration:
1. Switch off the meter. Press and hold INC key and then switch on the meter using ON/OFF key. The meter goes to auto calibration selection mode. The lower display shows ‘A.CAL’ and the upper display blinks the current choice (‘Yes’ or ‘No’). Press INC or DEC key to select ‘Yes’ (to enable auto calibration) or ‘No’ (to disable auto calibration).
Note: Press ‘°C/°F°’ key if you wish to skip this setting without confirming.
2. The meter goes to 1-point calibration selection mode. The lower display shows ‘1.Pnt’ and the upper display shows the current choice (‘PU’ or ‘LO’). Press INC or DEC key to select ‘PU’ (for 1-point calibration) or ‘LO’ (for 1-point calibration, i.e. to enable multi-point calibration).
Note: Press ‘°C/°F°’ key if you wish to skip this setting without confirming.
3. Press HOLD/ENT key to confirm the selection. The display shows ‘CO’. The display briefly shows ‘CAL’ and the number of points the meter will be calibrated.
4. The upper display shows the conductivity reading and the lower display shows the corresponding calibration standard value that closely matches. The tolerance range is ± 50%.
Note: If you have selected a specific measuring range for the meter, the lower display shows the corresponding calibration standard value that matches the selected measuring range.
5. Rinse the electrode with the calibration standard that you intend to calibrate and then dip the electrode in the other beaker with same calibration standard. Swirl gently to create a homogenous sample and allow time for the reading to stabilise.
6. The two calibration stds. values displayed sequentially until meter finds a matching solution within ± 50% tolerance.
7. Confirmation of all the calibration points displayed for 2 seconds.

To begin automatic calibration:
1. Switch on the meter. Make sure the meter is in measuring mode. Press INC or DEC key to enter conductivity calibration mode.
2. ‘CAL’ indicator appears in LCD. The display briefly shows ‘CAL’ and the number of points the meter will be calibrated.
3. The upper display shows the conductivity reading and the lower display shows the corresponding calibration standard values 1413 uS & 12.88 mS.
4. If the measuring range of the meter is set to AUTO, the display shows calibration standard values 1413 uS & 12.88 mS.
5. Press HOLD/ENT key if you wish to exit from auto calibration, during any of the above steps.

To prepare calibration standards:
Use fresh calibration standard solutions listed in the above table. Prepare each solution in two beakers - one for rinsing and the other for calibration. Rinse the electrode in de-ionised water before calibration.

To begin automatic calibration:
1. Switch on the meter. Make sure the meter is in measuring mode. Press INC or DEC key to enter conductivity calibration mode.
2. ‘CAL’ indicator appears in LCD. The display briefly shows ‘CAL’ and the number of points the meter will be calibrated.
3. The upper display shows the conductivity reading and the lower display shows the corresponding calibration standard values 1413 uS & 12.88 mS.
4. If the measuring range of the meter is set to AUTO, the display shows calibration standard values 1413 uS & 12.88 mS.
5. Press HOLD/ENT key if you wish to exit from auto calibration, during any of the above steps.

To prepare calibration standards:
Use fresh calibration standard solutions. Measure conductivity/TDS values of the solution with a meter known to be accurate. Prepare each solution in two beakers - one for rinsing and the other for calibration. Rinse the electrode in de-ionised water before calibration.

To begin automatic calibration:
1. Switch on the meter. Make sure the meter is in measuring mode. Rinse the electrode with the calibration standard that you intend to calibrate and then dip the electrode in the other beaker with same calibration standard. Swirl gently to create a homogenous sample and allow time for the reading to stabilise.
2. Press INC or DEC key to enter calibration mode. The display briefly shows ‘CAL’.
3. The upper display shows the measured conductivity/TDS reading of the solution based on previous calibration (if any) and the lower display shows the default (uncalibrated) conductivity/TDS reading.
To change TDS factor:

1. Press "INC" or "DEC" key to enter the TDS factor setting mode.
2. Use "INC" or "DEC" key to select the desired value, and press "HOLD/ENT" key to confirm the new setting.
3. Wait for 5 seconds for the meter to automatically confirm the new setting by displaying 'CO' and return to the measurement mode.

Note: The factory default TDS factor is 0.71. You can adjust the TDS factor to suit different applications.

TDS Factor Setting

The factory default TDS factor is 0.71. You can adjust the TDS factor to suit different samples of your applications.

To change TDS factor:

1. Switch on the meter. Make sure the meter is in measuring mode. Use "INC" and "DEC" keys to adjust the upper display to the correct conductivity/TDS value of the calibration solution.
2. Press "INC" or "DEC" key to enter the TDS factor setting mode. Use "INC" or "DEC" key to adjust the TDS factor. The adjustable range is 0.4 to 1.0.
3. Note: If you do not press "INC" or "DEC" key within 5 seconds, the meter shows the confirmation 'CO' and returns to the measurement mode.
4. Wait for 5 seconds for the meter to automatically confirm the new setting by displaying 'CO' and return to the measurement mode.

Temperature Calibration

Temperature calibration need not be performed every time, unless the temperature reading differs from that of an accurate thermometer. If temperature calibration is performed, Conductivity/TDS/Salt calibration is mandatory.

1. Switch on the meter. Make sure the meter is in measuring mode. If required, press "C°/F" key to select the desired unit of measurement for temperature (Celsius or Fahrenheit). Dip the meter into a solution of known temperature and allow time for the temperature reading to stabilise.
2. Press "INC" or "DEC" key to bring the meter to the calibration mode. CAL indicator appears in LCD. Immediately press "C°/F" key to switch to the temperature calibration mode.
3. Note: When you enter calibration mode, if the conductivity/TDS/salt reading is outside the specified range (Or), the meter shows 'Er.1' error message. You can still proceed to the temperature calibration mode by pressing "C°/F" key immediately. If the 'C°/F' key is not pressed within 2 seconds, the meter exits the calibration mode and returns to the measurement mode.
4. Wait for 5 seconds for the meter to automatically confirm the temperature calibration by displaying 'CO' and return to the measurement mode.

Temperature Unit of Measurement

Temperature unit of measurement is adjustable. Use "INC" and "DEC" keys to adjust the upper temperature display to the known temperature value of the solution.

Notes: The temperature adjustment window is ± 5°C (± 9°F) from the default reading.

For multi-point calibration rinse the electrode in de-ionised water and repeat step 5 for each new standard solution.

Changing Batteries

Replace the batteries when the low battery indicator starts blinking.

1. Open the battery compartment lid (with attached lanyard loop).
2. Remove old batteries by pulling plastic ribbon. Replace with fresh ones.

Electrode Maintenance

1. Always keep the sensor electrodes clean. Rinse the electrodes with de-ionised water and wipe them dry with clean cloth before storing with its protective cap. For cup type electrodes, remove the white plastic cup and insert to thoroughly clean viscous solutions. Never scratch electrodes with a hard substance.
2. For better performance, soak the electrode in alcohol for 10 to 15 minutes and rinse with de-ionised water before starting any measurement process. This is to remove dirt and oil stains on the electrode which may affect the accuracy of the measurements.
Electrode Replacement

When the meter fails to calibrate or gives fluctuating readings in calibration standards, you need to change the electrode module. You can replace the electrode module at a fraction of the cost of a new meter.

1. With dry hands, grip the ribbed meter collar with electrode facing you. Twist the collar clockwise (see Figure 13-A). Save the ribbed meter collar and O-ring for later use.
2. Pull the old electrode module away from the meter.
3. Align the four tabs of the new electrode module so that they match the four slots on the meter (see Figure 13-B).
4. Gently push the module into the slots to sit it in position. Push the smaller O-ring fully onto the new electrode module. Push the collar over the module and thread it into place by firmly twisting clockwise.

Note: It is necessary that you recalibrate the meter prior to measurement after an electrode replacement.

Self-Diagnostic Messages

<table>
<thead>
<tr>
<th>Error Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex.0</td>
<td>Calibration error due to temperature value not within the specified range</td>
</tr>
<tr>
<td>Ex.1</td>
<td>Calibration error due to Conductivity/TDS/Salt value not within the specified calibration standard range</td>
</tr>
</tbody>
</table>

Replacement Parts

- Conductivity Sensor: HI 2.00 - 20.00 mS/cm, 1.00 - 10.00 ppt
- TDS Sensor: HI 0 to 20.00 mS/cm, 0 to 10.00 ppt
- Conductivity Meter Complete: HI 2.00 - 20.00 mS/cm, 1.00 - 10.00 ppt
- TDS Meter Complete: HI 2.00 - 200.0 mS/cm, 1000 - 5000 ppt

Warranty

The waterproof meters are warranted to be free from manufacturing defects for 1 year and electrode module for 6 months, unless otherwise specified. If repair, adjustment or replacement is necessary and has not been the result of abuse or misuse within the time period specified, please return the meter - freight prepaid - and correction will be made without charge. Out of warranty products will be repaired on a charge basis.

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>EC Meter</th>
<th>TDS Meter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>PU</td>
<td>0 to 20.00 µS/cm</td>
</tr>
<tr>
<td></td>
<td>LO</td>
<td>0 to 200.0 µS/cm</td>
</tr>
<tr>
<td></td>
<td>HI</td>
<td>0 to 20,000 µS/cm</td>
</tr>
<tr>
<td>Resolution</td>
<td>PU</td>
<td>0.1 µS/cm</td>
</tr>
<tr>
<td></td>
<td>LO</td>
<td>1 µS/cm</td>
</tr>
<tr>
<td></td>
<td>HI</td>
<td>2.0 µS/cm</td>
</tr>
<tr>
<td>Accuracy</td>
<td></td>
<td>± 0.5% Full Scale</td>
</tr>
<tr>
<td>Calibration Type</td>
<td>Auto or Manual</td>
<td>Manual</td>
</tr>
<tr>
<td>Calibration Points</td>
<td>1 or 2 points</td>
<td>1 or 2 points</td>
</tr>
<tr>
<td>Calibration Window</td>
<td>± 10% from each point</td>
<td>± 10% from each point</td>
</tr>
<tr>
<td>Calibration Temperature</td>
<td>0 to 50°C</td>
<td>0 to 50°C</td>
</tr>
<tr>
<td>Temperature Coefficient</td>
<td>2% per °C</td>
<td>2% per °C</td>
</tr>
<tr>
<td>Normalisation Temperature</td>
<td>25°C</td>
<td>25°C</td>
</tr>
<tr>
<td>Auto Off</td>
<td>8.5 minutes after last key press</td>
<td></td>
</tr>
<tr>
<td>Power Battery</td>
<td>4 x 1.5V “A76” micro alkaline battery</td>
<td></td>
</tr>
<tr>
<td>Battery Life</td>
<td>&gt;150 hrs</td>
<td></td>
</tr>
<tr>
<td>LCD Display</td>
<td>Custom Dual Display 29mm x 35mm</td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td>Meter: 22cm x 6cm x 5cm; 170g</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TDS Meter: 22cm x 6cm x 5cm; 170g</td>
<td></td>
</tr>
</tbody>
</table>

Customer Support:

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