

# Instruction Manual

# CON 6/TDS 6

Hand-held Conductivity/TDS Meter



# ENGLISH

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# 1 INTRODUCTION

This manual contains the operating features of this meter. At some points this manual will refer to our website [www.eutechinst.com](http://www.eutechinst.com), for further explanation and background information, it will be indicated with this symbol: 

On this website you can also find additional information regarding applications, measuring theories and hints & tips.

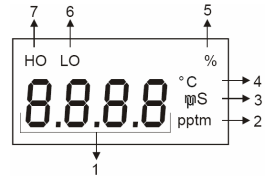
At the final page of this manual you can find information about the specifications of this meter, warranty issues and how to return your product to us.

# 2 DISPLAY AND KEYPAD FUNCTIONS

## 2.1 Display

The meter has a large custom LCD consisting of 4-digit segments.

1. Primary display
2. Parts Per Million (ppm) - or Thousand (ppt) indicator.
3. milli-Siemens/cm (mS) or micro- Siemens/cm ( $\mu$ S).
4. Temperature indicator
5. Percentage indicator for Temperature Coefficient.
6. Low battery indicator.
7. Hold (frozen) reading indicator.



LCD and Customized Annunciators for CON 6/TDS 6 meter

## 2.2 Keypad

The meter has a splash-proof keypad. Some buttons have several functions.

<b>ON / OFF</b>	Powers on and shuts off the meter. Goes directly into measurement mode when the meter is switched on.
<b>CAL</b>	<ul style="list-style-type: none"><li>• Enters into calibration mode.</li><li>• To abort without confirming any set value.</li></ul>
<b>HOLD / ENTER</b>	HOLD: Freezes the measured reading ENTER: Press to confirm values or selections
<b>▲ ▼</b>	<ul style="list-style-type: none"><li>• In Calibration Mode: to scroll through calibration values.</li><li>• In Setup Mode: to scroll through the setup sub-group programs.</li><li>• Press ▲ during conductivity measurement to for manual ranging.</li></ul>
<b>MODE</b>	<ul style="list-style-type: none"><li>• Selects measurement mode for conductivity/TDS and Temperature.</li><li>• When pressed together with ON/OFF key, it will take you into the SETUP mode. This allows you to customize meter preferences.</li></ul>

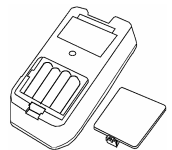
## 2.3 Inserting & Removing the Rubber Boot

1. To remove meter from rubber boot, push out from the bottom edges of meter until it is completely out of boot. Ensure that cables of electrode or temperature probe are not connected.
2. To insert meter into rubber boot, slide in from the top of meter before pushing the bottom edges of meter down to set it into position. Lift up the stand at the back of meter for bench top applications if necessary.



## 2.4 Inserting New Batteries

The battery compartment is found at the back of instrument. To open the battery compartment, push in the direction of arrow and lift up the cover. Note the polarity of battery before inserting into position. After replacement, place cover back and press down until it locks tight.



## 2.5 Battery Replacement

A "LO" annunciator in the LCD alerts you when battery power is running low.

**Caution:** Power off the meter when changing battery.

## 2.6 Connecting the Electrode and Temperature Sensor

### Connecting the electrode to the meter

1. Connecting electrode: Rotate the locking ring clockwise until it locks.
2. Removing electrode: Rotate the connector counterclockwise and slide the connector off the socket.
3. Insert the mini phono jack of temperature sensor into the meter as shown. Unplug the phono jack for measuring Conductivity or TDS without temperature compensation.

**CAUTION:** Do not pull on the electrode cord to avoid internal wire breakages.

### 2.7 Conductivity Electrode Information

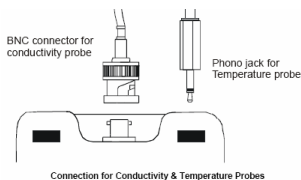
Your meter includes a conductivity electrode (Part No: ECCONSEN91B/ 35606-55) Ultem / Stainless Steel electrodes with an electrode constant of  $K = 1.0$ . This conductivity / TDS electrode features a built-in temperature sensor for Automatic Temperature Compensation (ATC). Wetted parts include:

1. Polyetherimide PEI (Ultem®)
2. Polybutylene Terephthalate PBT (Valox®)
3. Stainless Steel (SS 304)

The removable protective plastic electrode guard is meant for simple periodic maintenance and it must be kept in tact during measurement and calibration. Always immerse the electrode beyond upper steel band.

**Note:** DO NOT remove the protective electrode guard during measurement and calibration as it may affect your readings.

**Note:** We recommend that you do not submerge the electrode above the protective yellow cap. You can submerge the cable for brief periods of time, not continuously.



**Immerse probe beyond upper steel band**



## 3 ENTERING SETUP MODE

The setup mode lets you customize your meter's preferences and defaults. It will be referred to a couple of times later in this manual. To enter setup the mode:

1. Switch the meter off.
2. Press ON and MODE simultaneously, holding both keys for 2 seconds until you view parameter P9.0 (ASC).
3. First release **ON** key before releasing the MODE key. First "StUP" indicator will appear followed by "CELC".

## 4 CALIBRATION

### 4.1 Important Information on Meter Calibration

Your meter has five measuring ranges. You have an option of calibrating your meter in a single point calibration for all the five ranges or for better accuracy; you can calibrate one point in each of the measuring ranges (up to five points). When you perform a single point recalibration, the old calibration will be replaced by the new one even if the new calibration is done in a different range from the old calibration. For example, if you have previously calibrated at 1413  $\mu\text{S}$  in 0 to 2000  $\mu\text{S}$  range, and you recalibrate at 12.88 mS in 0 to 20.00 mS range, the new calibration will override the previous calibration in 0 to 2000  $\mu\text{S}$  range.

In the case of multi point calibration, when you perform a multi point recalibration, old calibrations are replaced only on a range basis. For example, if you previously calibrated at 1413  $\mu\text{S}$  in 0 to 2000  $\mu\text{S}$  range and you recalibrate at 1500  $\mu\text{S}$  (also in 0 to 2000  $\mu\text{S}$  range), the meter will replace only the old calibration data (1413 $\mu\text{S}$ ) in that range. The meter will retain all calibration data in other ranges. To completely recalibrate your meter, or when you use a replacement electrode, it is best to clear all calibration data.

Note that CON 6/ TDS 6 will not accept calibration values less than 40  $\mu\text{S}/\text{cm}$  (20 ppm).

## 4.2 Preparing the Meter for Calibration

Before starting calibration, make sure you are in the correct measurement mode. For best results, select a standard value close to the sample value you are measuring.

## 4.3 Temperature Calibration

Your electrode features a built-in temperature sensor which is factory calibrated. Calibrate your sensor only if you suspect temperature errors may have occurred over a long period of time or if you have a replacement electrode.

1. Connect the phono jack.
2. Switch the meter on.
3. Press MODE to select temperature measurement mode
4. Press CAL.
5. Dip the electrode into a solution of known temperature (i.e. a temperature bath). Allow time for the built-in temperature sensor to stabilize.
6. Scroll with ▲ or ▼ to set the correct temperature value (i.e. the temperature of the temperature bath).
7. Press ENTER to confirm. The meter returns to measurement mode.

**Note:** To exit without confirming the temperature calibration value, press CAL.

**Note:** Since temperature affect the accuracy of conductivity / TDS, it is recommended to carry out a conductivity / TDS calibration after a temperature calibration is done.

## 4.4 Automatic or Manual, Single or Multi point Calibration

You can either choose automatic conductivity calibration (CON6 only) or manual conductivity / TDS calibration. In the automatic calibration mode, the meter automatically detects and verifies the appropriate *known calibration standards solutions* before accepting these particular calibration standards as one of its calibration values in a specific measurement range. The *known calibration standards* used for automatic calibration are:

At 25.0°C : 84µS , 1413µS , 12.88mS , 111.8mS

At 20.0°C : 76µS , 1278µS , 11.67mS , 102.1mS

In the manual calibration, non-standard calibration values can be used. You can manually input the appropriate values as your desired calibration standards in each specific range.

### 4.4.1 Selection of Automatic or Manual Calibration (CON6 only)

1. Enter the setup menu as described in chapter 3.
2. Press ▲ or ▼ until [ACAL] appears on the LCD.
3. Press ENTER
4. Press ▲ or ▼ to select either [Yes] or [no].
5. Press ENTER to select. The meter will take you back to the menu, [ACAL].
6. Press ▲ or ▼ to move to the next menu or press CAL to exit to measurement mode.

### 4.4.2 Selection of Single or Multi Point Calibration

Single point calibration lets you have a single calibration for four ranges by calibrating one point in either one of the five, this factor is applied to all the five ranges.

Multi point calibration gives better calibration accuracy by letting you calibrate in each of the five ranges, this calibration factor would only be applicable in the particular range where the calibration is done. Default value is MULTI Point

1. Enter the setup menu as described in chapter 3.
2. Press ▲ or ▼ until [S.P.CA] appears on the LCD.
3. Press ENTER.
4. Press ▲ or ▼ to select either "Yes" or "no".
5. Press ENTER to select. The meter will take you back to the menu, "S.P.CA".
6. Press ▲ or ▼ to move to the next menu or press CAL to exit to measurement mode.

## 4.5 Automatic Calibration (CON6 only)

**Note:** select automatic or manual calibration as described in p 4.4.1

**Note:** select single -or multi point calibration as described in p 4.4.2

**Note:** Press CAL to exit without confirmation.

1. If necessary, press the MODE to select the correct mode.
2. Rinse the electrode with de-ionized water or a rinse solution, then rinse with a small amount of calibration standard.
3. Dip the electrode into the calibration standard. Immerse the electrode tip beyond the upper steel band. Stir the electrode gently to create a homogeneous sample. Allow time for the reading to stabilize.
4. Press CAL. The CA indicator will appear briefly, a value will appear flashing. Wait for the value to stabilize.
5. Press **ENTER**. The calibration standard value will appear briefly. If the calibration is successful, [done] will be displayed, and the meter returns to measurement mode.

**Multi point calibration:** repeat step 1 to 5 for every calibration point in each measuring range using the known calibration solutions until all points have been calibrated.

#### **4.6 Manual Calibration (For Conductivity & TDS Calibration)**

**Note:** select automatic or manual calibration as described in p 4.4.1

**Note:** select single -or multi point calibration as described in p 4.4.2

**Note:** To exit without confirmation, press CAL to go back to measurement mode.

1. Repeat step 1 to 4 from p 4.5
2. Wait for the value to stabilize, press ▲ or ▼ to adjust the value to the standard used.
3. Press **ENTER**. The “CO” indicator will appear briefly and the calibration is successful. The meter returns to measurement mode.

**Multi point calibration:** repeat step 1 to 7 for every calibration point in each measuring range using the calibration solutions until all points have been calibrated.

#### **4.7 Advanced TDS Calibration (TDS 6 only)**

##### **4.7.1 Calibrating TDS with conductivity standards & adjusting TDS factor**

Instead of calibrating for TDS directly using TDS calibration standard solutions, you can calibrate by using the conductivity calibration method and enter the appropriate TDS conversion factor into the meter. For more information regarding TDS Conversion Factor determination, please refer to our website: [www.eutechinst.com](http://www.eutechinst.com)

##### **4.7.2 Setting the TDS Conversion Factor**

1. Enter the setup menu as described in chapter 3.
2. Press ▲ or ▼ until [tdS] appears on the LCD.
3. Press **ENTER**.
4. Press ▲ or ▼ to select a value between 0.4 to 1.0.
5. Press **ENTER** to select. The meter will take you back to the menu, [tdS].
6. Press ▲ or ▼ for the next menu or **CAL** to exit to measurement mode.

## **5 MEASUREMENT**

### **5.1 Temperature Compensation**

This meter can take measurements with automatic (ATC) or manual (MTC) temperature compensation.

#### **5.1.1 With Automatic Temperature Compensation (ATC)**

Make sure the phono jack of the probe is inserted. The conductivity/TDS reading displayed will be compensated according to the normalization temperature (20 °C or 25 °C) selected.

#### **5.1.2 Setting manual temperature compensation value**

Unplug the probe's phono jack from the meter. You need to enter the temperature value into the meter at which the reading will manually temperature compensate. You can select any temperature between 0 and 50 °C (32 to 122 °F). Default value is 25 °C.

1. Disconnect the phone jack.
2. Switch on the meter
3. press **MODE** to select temperature measurement mode.
4. Press **CAL**. “CA” will appear briefly and a temperature value will start flashing.

5. Check the sample temperature with a thermometer. Wait for the value to stabilize.
6. Press ▲ or ▼ and adjust the value to the reference thermometer used.
7. Press **ENTER**. “CO” will appear briefly and the reading will stop flashing. The calibration is successfully performed, the meter returns to measurement mode.

## 5.2 Taking Measurements

1. Rinse the electrode with de-ionized or distilled water before use. Shake or air dry. To avoid contamination or dilution of your sample, rinse electrode with a small volume of your sample liquid.
2. Switch the meter on.
3. Dip the electrode into the sample. Ensure that the liquid level is above its upper steel band. Stir the electrode gently to create a homogenous sample.
4. Allow time for the reading to stabilize.

## 5.3 HOLD Function

Lets you freeze the display and hold the measured value.

1. Press HOLD to hold a measurement. “HO” will appear on the display.
2. Press HOLD again to release the held value.

**Note:** If the meter is shut off the HOLD value will be lost.

## 5.4 Ranging settings and options

The meter automatically selects the range for your readings. Select the range manually by pressing ▲ successively for each range. The five ranges are:

Range	Conductivity range	TDS range
Range 1	0 – 20.00 $\mu\text{S}/\text{cm}$	0 – 10.00 ppm
Range 2	0 – 200.0 $\mu\text{S}/\text{cm}$	0 – 100.0 ppm
Range 3	0 – 2000 $\mu\text{S}/\text{cm}$	0 – 1000 ppm
Range 4	0 – 20.00 $\text{mS}/\text{cm}$	0 – 10.00 ppt
Range 5	0 – 200.0 $\text{mS}/\text{cm}$	0 – 100 ppt

**Note:** If the measured value is higher than the range selected, “Or” will appear on the display. Press ▲ until the correct range is selected.

**Note:** The meter resets to the Auto-ranging once it is turned off. Manual ranging needs to be reset each time you turn the meter on.

# 6 OTHER FUNCTIONS

## 6.1 Reset to factory defaults

This function resets the meter to factory default settings. This clears all calibration data and any changes to other setup functions.

1. Enter the setup menu as described in chapter 3.
2. Press ▲ or ▼ until [UrSt] appears on the LCD.
3. Press **ENTER**.
4. Press ▲ or ▼ to select either [Yes] or [no].
5. Press **ENTER**.
6. The meter goes back to measurement mode.

## 6.2 Setting the temperature coefficient

The temperature coefficient is the amount of change in conductivity per degree of temperature; it is expressed in percent per °C. Entering the exact temperature coefficient of your solution lets you accurately compensate temperature for almost any solution. You can adjust 0.0 to 10.0 % per °C. Meter default is 2.1% per °C.

1. Enter the setup menu as described in chapter 3.
2. Press ▲ or ▼ until [t.Co %] appears on the LCD.
3. Press **ENTER**.
4. Press ▲ or ▼ to select a value between 0.0 to 3.0.
5. Press **ENTER** to select. The meter will take you back to the menu, [t.Co %].
6. Press ▲ or ▼ for the next menu or **CAL** to exit to measurement mode.

### 6.3 Setting the normalization temperature

The meter will normalize its measurements to a selectable temperature. The normalization temperature can be 20.0°C or 25.0°C. Meter default is 25.0°C.

1. Enter the setup menu as described in chapter 3.
2. Press **▲** or **▼** until [**t.nr °C**] appears on the LCD.
3. Press **ENTER**.
4. Press **▲** or **▼** to select either [**25.0 °C**] or [**20.0 °C**].
5. Press **ENTER**. The meter will take you back to the menu, [**t.nr °C**].
6. Press **▲** or **▼** for the next menu or **CAL** to exit to measurement mode.

### 6.4 Selection of cell constant

The meter lets you select a cell constant of K = 1.0, 10, or 0.1. The cell included with has a cell constant of K=1.0.

1. Enter the setup menu as described in chapter 3.
2. Press **▲** or **▼** until [**CELC**] appears on the LCD.
3. Press **ENTER**.
4. Press **▲** or **▼** to select either “1.0”, “0.1” or “10.0”. Ensure the cell constant selected correspond with the conductivity electrode you are using.
5. Press **ENTER** to select. The meter will take you back to the menu, [**CELC**].
6. Press **▲** or **▼** for the next menu or **CAL** to exit to measurement mode.

## 7 ERROR MESSAGES

Error	Indicates	Possible cause	Corrective action
LO	Low battery	Faulty / empty battery	Replace batteries
Err 1	Conductivity calibration error	Calibration point is outside the $\pm 40\%$ window in the autocalibration	Check the conductivity calibration solution. Switch to manual calibration mode and calibrate again.
Err 2	Temperature calibration error	Auto calibration is performed outside the range (0 – 50 °C).	Check the temperature and make sure that it is within the range
Err 3	Conductivity calibration error	Calibration point is within 10% of the measurement range in the manual calibration mode.	Check the value of the conductivity calibration solution.

## 8 TROUBLESHOOTING

Problem	Cause	Solution
Power on, but no display	a) Batteries not in place b) Batteries not in correct polarity (+ and – position). c) Weak batteries	a) Check the batteries are in place and making contact. b) Re-insert with correct polarity. c) Replace batteries.
Unstable readings	a) Air bubbles in probe. b) Dirty probe. c) Probe not deep enough in sample. d) External noise pickup or induction caused by nearby electric motor. e) Broken probe.	a) Tap probe to remove bubbles. b) Clean the probe and re-calibrate. c) Make sure sample entirely covers the probe sensors. d) Move or switch off interfering motor. e) Replace probe.
Slow response	a) Dirty / Oily probe.	a) Clean probe.