

EcoScan CON 5
Conductivity Handheld Meter
EcoScan TDS 5
TDS Handheld Meter
Instruction Manual

68X243602 ver 2.0 08/99

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1. INTRODUCTION

1.1 *Introducing the EcoScan Series*

Thank you for purchasing Eutech Instruments' EcoScan Conductivity and Total Dissolved Solids (TDS) meter series. These economy microprocessor-based handheld meters deliver up to $\pm 1\%$ full-scale accuracy. It has a large custom LCD (Liquid Crystal Display) for clear and easy reading.

EcoScan CON 5 measures Conductivity ($\mu\text{S}/\text{mS}$) and Temperature ($^{\circ}\text{C}$) while the EcoScan TDS 5 measures Total Dissolved Solids (TDS) and Temperature ($^{\circ}\text{C}$). These sturdy meters measure up to 3 different ranges with auto-ranging capability that switches to appropriate measuring range automatically.

The instruction manual is organised for quick reference with step-by-step procedures that give you thorough review of the various features and meter operations.

Included with your meter are a 2 stainless steel pin Conductivity electrode with built-in temperature sensor (for ATC), a rubber boot, 4 alkaline "AAA" batteries, instruction manual and warranty card. To order other accessories and buffer standard solutions, please refer to the Section on Accessories for more information.

2. GETTING STARTED

2.1 Description of Keypad Functions

The EcoScan CON 5/TDS 5 meter has 6 keys on its splash-proof keypad. These comprise ON/OFF, HOLD/ENTER, CAL, MODE, Δ and ∇ keys.

ON/OFF: Powers the meter on and turns it off. Meter directly enters measurement mode when you switch it on.

MODE: Selects measurement mode for Conductivity/TDS or Temperature,

CAL: Allows calibration mode for Conductivity/TDS and Temperature, or to abort calibration without confirming any set value.

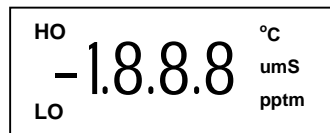
HOLD: Freezes the measured reading for easy viewing.

ENTER: Confirms calibration value.

Δ (UP) / ∇ (DOWN): Scrolls up and down to the values during calibration.

2.2 Description of LCD Annunciators

The meter has a large custom LCD that consists of 3½-digit segments and operation annunciators for uS/mS or ppm/ppt and °C (Temperature). Other annunciators include "HO" (when the HOLD function is activated) and "LO" (low battery condition).



2.3 Inserting & Removing the Rubber Boot

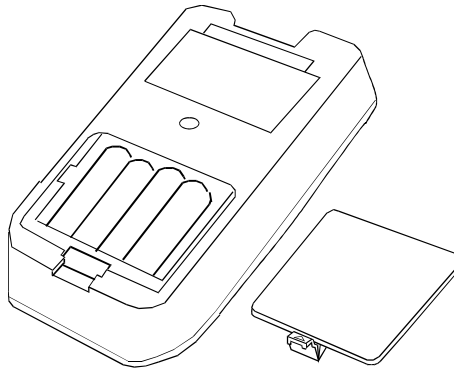
1. To remove meter from rubber boot, push out from the bottom edges of meter until it is completely out of boot. Ensure that the cables of Conductivity electrode or temperature probe are not connected.

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.



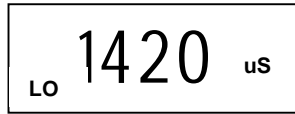
2.4 Inserting New Batteries

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

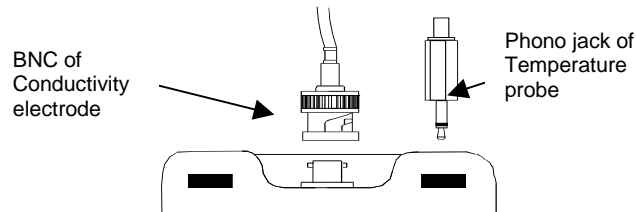
A "LO" annunciator in the LCD alerts you when battery power is running low. Replace with the same type as recommended by the manufacturer.



Caution: Power off the meter when changing battery.

2.6 Connecting the Electrode and Temperature Sensor

To connect electrode into meter, align the connector slots with the posts of meter's socket and rotate connector clockwise until it locks. Do not force when connecting. To remove, simply rotate the connector in anti-clockwise direction until it unlocks, and slide the connector off the socket.



Insert the mini phono jack of temperature sensor into the socket on the meter. Unplug the phono jack when not in use or you measure Conductivity or TDS without any temperature compensation.

2.7 Switching the Meter On

1. Press **ON/OFF** key to power up your meter. All LCD segments display momentarily as the meter performs a self-diagnostic test, per shown in section 2.2. The LCD switches into Conductivity or TDS measurement mode.
2. Press **MODE** key to choose your desired mode of measurement with its corresponding annunciator displays in the LCD. For temperature mode, the measured reading can be 25.0°C (factory default) or the last calibrated temperature value if there is no temperature probe, or the current measured value if a temperature probe is connected.
3. The LCD displays "Ur" if the meter reading exceeds the maximum or "Or" if under minimum possible measurement range (refer to section on Specifications).



Ur

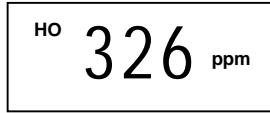


Or

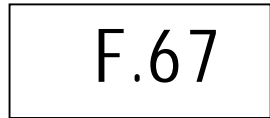
2.8 Setting the Conductivity-to-TDS Conversion Factor (EcoScan TDS 5 Only)

The EcoScan TDS5 is set to a default conversion factor of 0.67. This should give good results for most applications (including natural waters and other applications that calibrate to 442 standard solutions). You can adjust the factor for different salts, chemicals, or nutrient solutions using the following procedure. Note the meter allows adjustment of 0.50 to 0.85.

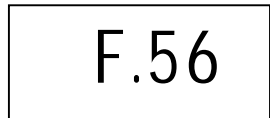
1. Turn meter on and press **HOLD** key. The "HO" annunciator appears on the upper left corner of the LCD and the reading freezes.

A rectangular box representing the LCD display. In the top-left corner, the letters "HO" are displayed. To the right of "HO", the number "326" is displayed in a large font, followed by "ppm" in a smaller font.

2. Press **CAL** key and the LCD will display "F.67" indicating the current factor.

A rectangular box representing the LCD display. The text "F.67" is centered on the screen.

3. Adjust the TDS factor using Δ (up) or ∇ (down) key.

A rectangular box representing the LCD display. The text "F.56" is centered on the screen.

4. Press **ENTER** key to confirm and the meter reverts to its measurement mode.

3. CALIBRATION

3.1 Conductivity Calibration (EcoScan CON5)

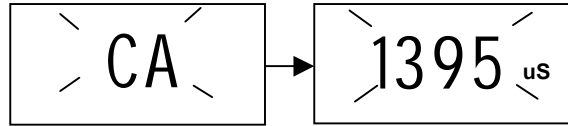
The meter is capable of calibrating 1 point per range (3 points across entire measurement range). If a range is not calibrated, the meter automatically detects the closest range calibrated and uses the calibration information. Calibrate to all measurement ranges to ensure the highest accuracy throughout all measurement range. Note that EcoScan will not accept calibration values less than 40 $\mu\text{S}/\text{cm}$ (20 ppm). All new calibration values will automatically override existing data.

If you are measuring in solutions with Conductivity lower than 100 $\mu\text{S}/\text{cm}$ or TDS lower than 50 ppm, calibrate the meter at least once a week to get good accuracy. If you are measuring in the mid ranges and you wash the probe in deionised water and store it dry, calibrate the meter once a month. If you take measurements at extreme temperatures, calibrate at least once a week.

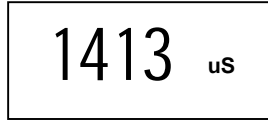
Ensure that you use new Conductivity standard solutions or sachets during calibration. Do not reuse standard solutions as it may be contaminated and affect the calibration and accuracy of measurements. Store solutions in a dry, cool environment if possible.

Always rinse the probe with either tap water or rinse solution before and after each calibration/sample measurement to avoid cross-contamination. For details please refer to section on Probe care and maintenance.

1. Pour a known standard solution e.g. 1413 $\mu\text{S}/\text{cm}$ into a clean container. Power on the meter, and the meter will automatically enter Conductivity measurement mode.
2. Immerse the electrode sufficiently into one of the containers of your standard solution. Stir gently and wait for reading to stabilise (approx. 30 seconds). Tap the electrode lightly on the bottom of the container to remove any air bubbles trapped.
3. Press **CAL** key to enter calibration mode. The LCD shows "CA" momentarily, and display shows the factory calibrated value flashing.



4. Press Δ (up) or ∇ (down) key to scroll the reading until the displayed value matches your standard solution i.e. 1413 $\mu\text{S}/\text{cm}$.
5. Press **ENTER** key to confirm calibration and the LCD displays the new set reading and revert to measurement mode.



6. Alternatively you can abort the new calibrated value by pressing **CAL** key to exit from calibration mode.

Important: Meter allows a tolerance range of 30% of its measured reading. You will not be able to scroll through to the desired value if reading is out of its tolerance.

3.2 TDS Calibration (EcoScan TDS 5)

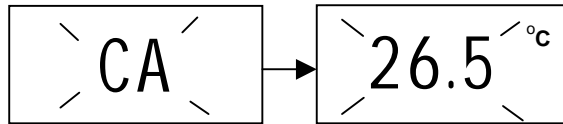
The calibration procedure for the EcoScan TDS 5 is the same as EcoScan CON 5 (refer to section 3.1 for details).

3.3 Temperature Calibration

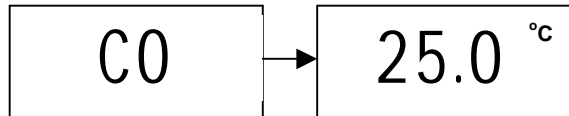
3.3.1 With Temperature probe For Preselected Curve

The temperature sensor included with your meter is factory-calibrated. Over time, the temperature calibration may drift and require recalibration. If you replace the probe you should calibrate temperature probe prior to Conductivity or TDS calibration.

1. Connect your temperature probe to the meter. Press **MODE** key to enter Temperature mode until "°C" annunciator appears in the LCD.
2. Compare the displayed value to a NIST certified thermometer or other thermometer known to be accurate. For best accuracy, place probe and thermometer in a constant temperature bath.
3. Press **CAL** key to enter temperature calibration mode. The LCD shows "CA" momentarily and the displayed reading flashes.



4. Press **Δ** (up) or **∇** (down) key until the display shows the correct temperature. The arrow keys will scroll to the maximum allowable value of ± 5 °C.
5. Press **ENTER** key to confirm calibration. The LCD displays "CO" momentarily, and the meter reverts to measurement mode.



3.3.1.1 With Temperature probe (with Curve Selection)

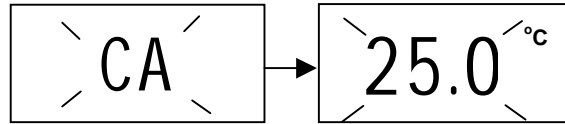
In the event the temperature probe has drifted too far from its original characteristic – due to age and use or if the probe is being replaced, it may be a good idea to match the probe to the best curve. There are 3 curves programmed in the unit. To choose the curve, proceed as follows:

1. Connect your temperature probe to the meter. Press **MODE** key to enter Temperature mode until “°C” annunciator appears in the LCD.
2. Compare the displayed value to a NIST certified thermometer or other thermometer known to be accurate. For best accuracy, place probe and thermometer in a constant temperature bath.
3. Press **CAL** key to enter temperature calibration mode. The LCD shows “CA” momentarily and the displayed reading flashes.
4. Press **MODE** key once. Note the reading. This is with respect to the curve 1.
5. Press **Δ** (up) key once. The display will change to a different value which is with respect to curve 2. Note the reading. Press **Δ** (up) key again, the reading now will be with respect to curve 3. Choose the curve which gives its reading closest to the actual value.
6. Press **ENTER** key and the display blinks once. The curve selection has now been made. To match the value exactly with the standard value, press **Δ** (up) or **∇** (down) key, the display can be set to the exact value. Press **ENTER** to confirm.

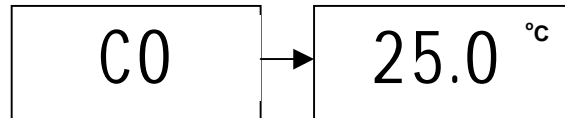
3.3.2 Without Temperature probe (no ATC)

If no temperature probe is used, the meter compensates for Conductivity or TDS response based on a new calibrated temperature value manually set by you or at 25 °C (factory default).

1. Press **MODE** key to enter into Temperature mode until "°C" shows in the LCD.
2. Compare displayed value to a NIST certified thermometer or other thermometer known to be accurate.
3. Press **CAL** key to enter temperature calibration mode. The LCD shows "CA" momentarily and the displayed reading flashes. Note that this displayed value should either be 25.0 °C or last set temperature value.



4. Press **Δ** (up) or **∇** (down) key until the display shows the correct temperature. The arrow keys will scroll to the maximum allowable value of ± 5 °C.
5. Press **ENTER** key to confirm calibration. The LCD displays "CO" momentarily, and the meter reverts to measurement mode.



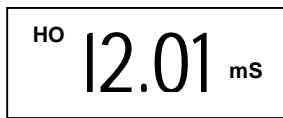
4. MEASUREMENT

4.1 Taking Measurement

1. To begin measurement, rinse probe thoroughly with deionised water to remove any impurities.
2. Power on meter and the meter will automatically go into Conductivity/ TDS measurement mode. Press **MODE** key to select your desired mode of operation between Conductivity/TDS and Temperature.
3. Dip probe sufficiently, with the tip of probe completely immersed, into sample. Stir and tap it gently to remove any air bubbles trapped. Wait for the reading to stabilise. Note reading.

4.2 Holding a Reading

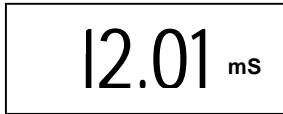
To freeze or hold your reading, press **HOLD** key once. The LCD displays "HO" annunciator to indicate the HOLD function is activated.



HO 12.01 mS

4.3 Releasing a Held Reading

Press **HOLD** key again to deactivate the HOLD function or to release your frozen reading. The meter returns to measurement mode, and the "HO" annunciator disappears from the LCD.



12.01 mS

5. PROBE CARE AND MAINTENANCE

Keep your Conductivity probe clean. Do not strike the probe against any hard surface, and never scratch the stainless steel pins with hard material.

Wash the probe thoroughly with tap or deionised water after each use.

Do not immerse the probe in oily solutions. To remove oil films or oxidation, clean electrode with alcohol.

Clean it with a mild detergent solution. Blot it dry. Wash thoroughly in tap water and then in deionised water. Recalibrate the meter after cleaning it.

6. TROUBLESHOOTING

Problem	Cause	Solution
No display	a) Batteries not in place.	a) Insert batteries. b) Re-insert batteries in correct polarity.
Unstable reading	a) Dirty electrode. b) Broken electrode.	a) Clean electrode and recalibrate. b) Replace electrode.
"E2" display	a) Error in calibration.	a) Recalibrate the instrument.
"E3" display	a) Failed initialization.	a) Turn off meter and turn it on. Return if necessary.
Not able to calibrate	b) Display freezes. c) Faulty electrode.	b) Release reading by pressing HOLD key. c) Replace electrode.

7. SPECIFICATIONS

Model		EcoScan CON 5	EcoScan TDS 5
Conductivity Range	0 to 199.9 uS, 0 to 1999 uS; 0 to 19.99 mS	•	
Resolution	0.1, 1 uS; 0.01 mS	•	
Accuracy	+/- 1% full scale	•	
TDS Range	0 to 99.9, 0 to 999 ppm; 0 to 9.99 ppt		•
Resolution	0.1, 1 ppm; 0.01 ppt		•
Accuracy	+/- 1% full scale		•
TDS Factor	0.50 to 0.85 (user selectable – 0.67 default)		•
No. of Calibration Points	1 to 3 points (1 per range)	•	•
Temperature Range	0.0 to 100.0 °C	•	•
Resolution/Accuracy	0.1 °C; +/- 0.5 °C	•	•
Temp. Coefficient	2% / °C	•	•
Temperature Compensation	Automatic or manual (from 0 to 80 °C)	•	•
Features			
Auto Ranging	Yes	•	•
Hold Function	"HO"	•	•
Auto Shut Off	After 17 minutes	•	•
Low Battery Indication	"LO"	•	•
Error Message Display	"E2", "E3"	•	•
Display	Single Custom LCD	•	•
Operating Temperature	0 to 50 °C	•	•
Power Requirements	4 x "AAA" Alkaline Batteries	•	•
Battery Life	> 100 hours	•	•
Meter Dimensions	14 x 7 x 3.5 cm	•	•
Meter Weight	200g	•	•

8. ACCESSORIES

Accessories available:

EC-CONSEN45B: Epoxy-body 2-stainless steel pins Conductivity Electrode with built-in ATC sensor, 12 x 110 mm

EC-CON-100BT: 100 uS Conductivity Standard Solution (480 ml per bottle)

EC-CON-500BT: 500 uS Conductivity Standard Solution (480 ml per bottle)

EC-CON-1413BT: 1413 uS Conductivity Standard Solution (480 ml per bottle)

EC-CON-2764BT: 2764 uS Conductivity Standard Solution (480 ml per bottle)

EC-CON-1288BT: 12.88 mS Conductivity Standard Solution (480 ml per bottle)

EC-442-50BT: 50 ppm Standard Solution (480 ml per bottle)

EC-442-300BT: 300 ppm Standard Solution (480 ml per bottle)

EC-442-1000BT: 1000 ppm (1 ppt) Standard Solution (480 ml per bottle)

EC-442-3000BT: 3000 ppm (3 ppt) Standard Solution (480 ml per bottle)

EC-CON-447BS: 447 uS Conductivity Standard Sachets (20 ml x 20 per box)

EC-CON-1413BS: 1413 uS Conductivity Standard Sachets (20 ml x 20 per box)

EC-CON-2764BS: 2764 uS Conductivity Standard Sachets (20 ml x 20 per box)

EC-CON-15000BS: 15'000 uS (15 mS) Conductivity Standard Sachets (20 ml x 20 per box)

NOTES

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