Operations Manual
EcoSense® EC300

Portable Conductivity, Salinity and Temperature Instrument

- English
- Français
- Español
- Deutsch
- Italiano

WARRANTY

The EcoSense® EC300 Instrument is warranted for one year from date of purchase by the end user against defects in materials and workmanship. EC300 probes and cables are warranted for one year from date of purchase by the end user against defects in material and workmanship. Within the warranty period, YSI will repair or replace, at its sole discretion, free of charge, any product that YSI determines to be covered by this warranty.

To exercise this warranty, write or call your local YSI representative, or contact YSI Customer Service in Yellow Springs, Ohio. Send the product and proof of purchase, transportation prepaid, to the Authorized Service Center selected by YSI. Repair or replacement will be made and the product returned, transportation prepaid. Repaired or replaced products are warranted for the balance of the original warranty period, or at least 90 days from date of repair or replacement.

Limitation of Warranty

This Warranty does not apply to any YSI product damage or failure caused by: (i) failure to install, operate or use the product in accordance with YSI's written instructions; (ii) abuse or misuse of the product; (iii) failure to maintain the product in accordance with YSI's written instructions or standard industry procedure; (iv) any improper repairs to the product; (v) use by you of defective or improper components or parts in servicing or repairing the product; or (vi) modification of the product in any way not expressly authorized by YSI.

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GENERAL INTRODUCTION

The EC300 is one of three instruments in the EcoSense product line from YSI. The EC300 is a precision tool that measures conductivity, salinity and temperature. A built-in microprocessor calculates and compensates for all parameters related to conductivity and temperature determinations.

This unit has a splash-resistant IP65 case. The mechanical touch keys are highly reliable with tactile and audio feedback. This instrument uses one 9V battery. Re-calibration is not required when power is restored.

The front of the instrument has a large LCD that displays temperature and either temperature compensated or non-temperature compensated conductivity, salinity or TDS simultaneously along with user prompts and mode indicators. The unit prompts users through calibration and measurement procedures.

The model EC300 is available with a single four-electrode cell. Other features include automatic conductivity ranging, automatic temperature compensation, long battery life, and 50/60 Hz AC noise rejection. This meter is universal and user-friendly for field, industrial and laboratory applications.

INITIAL INSPECTION

Carefully unpack the unit and accessories, and inspect for shipping damages. Compare received parts with materials listed on the packing list. Notify YSI immediately of any damage or missing parts. Save all packing materials until satisfactory operation is confirmed.

SPLASH RESISTANCE

Though the EC300 instrument is housed in a splash proof case, DO NOT use it underwater; the connector is not waterproof. The splash-resistant case prevents permanent damage to the unit if accidentally dropped into non-corrosive solutions. In case of submersion, follow these steps immediately:

1. Dry the connector if necessary, and replace the conductivity probe. Rinse unit carefully with distilled water. After rinsing and drying, inspect and clean connectors to remove all contaminants that may affect probe connections.
2. Wait for the unit and probe to dry completely before resuming operation.
3. If the unit does not function correctly after steps 1 and 2, call YSI for possible repair or replacement (see Warranty).

BATTERY INSTALLATION

An initial display of “BAT” on the LCD indicates approximately one hour of battery life for unit operation within specifications. Replace battery when “BAT” appears on the LCD. (See Figure 1.)

To replace battery, remove the two battery cover screws, battery cover and o-ring. Replace the 9V battery. Replace battery cover and o-ring (align the o-ring properly to insure a good seal) and fasten the two battery cover screws for the splash-resistant feature.

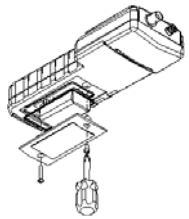


Figure 1.
Battery Installation

KEY FUNCTIONS OF THE MODEL EC300

1. **⏻:** Turns the unit ON or OFF. Calibration values are not erased when the unit is turned off. When the unit is not in use, turn it off to save battery life. For long-term storage, remove the battery.
2. **MODE:** Selects display mode. In Normal operation, press **MODE** to sequentially display uncompensated conductivity, temperature compensated conductivity, salinity and total dissolved solids (TDS). In calibration mode, this key exits the current calibration and displays the next calibration parameter.
3. **CAL:** In normal operation, changes the mode from Normal to Calibration.
4. ↵ (Enter) **:** In Calibration Set-up, press this key to save the current parameter to memory.
5. **Δ** and **∇ Keys:** Increases or decreases the display value as desired.

THE LCD DISPLAY

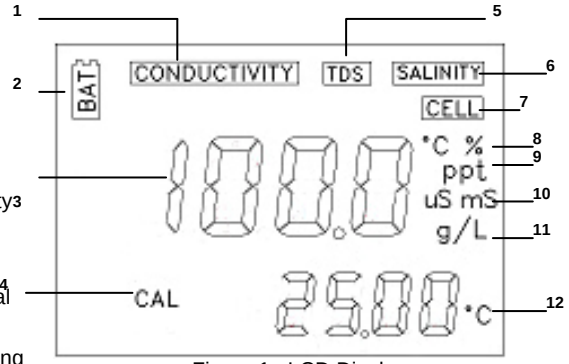


Figure 1. LCD Display

1. **CONDUCTIVITY:** Displays when measuring conductivity.
2. **BAT:** Low battery indicator.
3. Main display for compensated and uncompensated conductivity, salinity and TDS values.
4. **CAL:** Calibration mode indicator.
5. **TDS:** Displays when measuring total dissolved solids.
6. **SALINITY:** Displays when measuring salinity.
7. **CELL:** Indicates conductivity cell constant value.
8. **°C:** Flashes during temperature compensated conductivity measurement. During calibration, indicates temperature reference unit.

   %: Displays during calibration; indicates temperature coefficient unit.
9. **ppt:** Parts per thousand; indicates salinity measurement.
10. **uS, mS:** micro Siemens, milli Siemens; Indicates conductivity measurement.
11. **g/L:** grams/Liter; indicates TDS measurement.
12. **°C:** Temperature display.

MEASUREMENT MODES

1. **Temperature** - Current solution temperature continually displays.
2. **Temperature Compensated Conductivity** - Measurement of conductivity, compensated to 25°C or another specified value between 15 and 25°C. Expressed as uS/cm or mS/cm with a flashing "°C".
3. **Uncompensated Conductivity** – Direct measurement of conductivity, not compensated to a specific temperature. Expressed as uS/cm or mS/cm.
4. **Salinity** – Measurement of salinity; expressed in parts per thousand (ppt).
5. **TDS** – Measurement of total dissolved solids (TDS); expressed in grams per liter (g/L)

Carefully observe the units displayed at the far side of the LCD to determine the desired mode.

CALIBRATION

Calibration setup contains five sections: TDS, Cell, Temperature Coefficient, Temperature reference, and Conductivity Calibration. To access these sections:

1. Connect the conductivity probe and cable assembly to the unit and turn the unit on. The screen will display **CELL** and the cell constant of the conductivity probe.
2. Allow temperature readings to stabilize, then press **CAL** to enter the calibration mode; **CAL** appears on the LCD. Press **MODE** to sequentially display the following sections:

Note: Press Enter (↵) to accept any values changes in each section and automatically advance to the next section. If there are no changes, the unit accepts the current value and proceeds to the next section.

TDS

TDS is determined by multiplying conductivity (mS) by a TDS factor. The default factor value is 0.65. To change the TDS factor, use the Δ and ∇ keys to adjust the value between 0.30 and 1.00. Press Enter (↵) to save the new value, or press **MODE** to cancel the change and display the **CELL** screen.

CELL

The second screen will display **CELL** and the current cell value. The default cell value is 5.00 and is displayed in the lower right of the screen. The unit allows a variance of ±0.50 before displaying an error message. The cell value cannot be adjusted at this screen; calibrating conductivity is the only way to adjust the cell constant. Press Enter (↵) to reset the cell constant to 5.00 and display the **Temperature Coefficient** screen.

Note: Be certain to press Enter (↵) to reset the cell constant to 5.00. If **MODE** is pressed, the unit retains the previous cell constant and calibrates from a value that is already offset.

Temperature Coefficient

The unit uses the temperature coefficient to calculate temperature compensated conductivity. The default value is 1.91%. To change the temperature coefficient, use the Δ and ∇ keys to adjust the value between 0 and 4.00%. Press Enter (↵) to save the new value, or press **MODE** to cancel the change and display the **Temperature Reference** screen.

Temperature Reference

The unit uses the temperature reference value to calculate temperature compensated conductivity. The default value is 25°C. To change the temperature coefficient, use the Δ and ∇ keys to adjust the value between 15 and 25°C. Press Enter (↵) to save the new value, or press **MODE** to cancel the change and display the **Conductivity Calibration** screen.

Conductivity Calibration

1. Immerse the probe in a standard of known conductivity, preferably a standard in the middle range of the solutions to be measured. Completely submerge the probe without touching the sides of the calibration container. Shake the probe lightly to remove any air bubbles trapped in the conductivity cell.
2. Allow temperature to stabilize. The message ‘rAng’ (range) may display briefly to indicate unit auto-ranging; this is normal. After temperature stabilization, use the Δ and ∇ keys to adjust the conductivity value to that of the conductivity standard at 25°C. Press Enter (↵) to calibrate. The unit beeps twice to indicate a successful calibration, then automatically switches to normal operation mode.

CONDUCTIVITY MEASUREMENTS

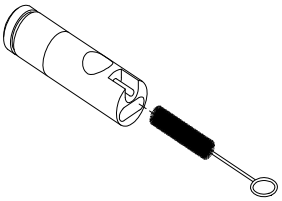
1. Turn the unit on. Place the probe in the solution to be measured. Completely submerge the probe. Shake the probe lightly to remove any trapped air bubbles in the conductivity cell.

2. Press **MODE** to enter the desired measurement mode. The message 'rAng' (range) may appear briefly on the display indicate auto-ranging; this is normal. Allow temperature to stabilize before taking measurements.

PROBE MAINTENANCE

The most important requirement for accurate and reproducible conductivity measurements is a clean cell. A dirty cell changes the conductivity of a solution through contamination. Clean the cell thoroughly before storing it. To clean the conductivity cell:

1. Dip the cell in cleaning solution and agitate for two to three minutes. Any foaming acid tile cleaner, such as Dow Chemical Bathroom Cleaner, should clean adequately. For a stronger cleaner, use a solution of 1:1 isopropyl alcohol and 1 N HCl. Remove the cell from the cleaning solution.



2. Use the nylon brush (supplied) to dislodge any contaminants from inside the electrode chamber.

3. Repeat steps one and two until the cell is completely clean. Rinse the cell thoroughly in deionized, or clean tap water.

TROUBLESHOOTING

MAIN DISPLAY		PROBLEM	POSSIBLE SOLUTION
OvEr		• Conductivity is >200.0 mS • Salinity is > 70.00 ppt	• Completely submerge the probe. • Allow sufficient time for the electrode and Temp probe stabilization.
OvEr/Undr during calibration		Cell Constant Calibration is out of range	• Recalibrate with correct value for the conductivity standard. • Replace conductivity standard. • Clean cell. • Return for service.
MAIN DISPLAY	**SECONDARY DISPLAY**		
OvEr/Undr	**OvEr**	Temperature >90.0 °C	• Decrease/Increase the sample temperature.
	Undr	Temperature < -10.0 °C	• Return for service.

SPECIFICATIONS

Display	Range	Accuracy	Resolution
Conductivity, Auto-ranging	0.0 to 499.9 uS/cm 500 to 4999 uS/cm 5.00 to 49.99 mS/cm 50.0 to 200.0 mS/cm	±1% of reading plus 2 uS/cm ±1% of reading plus 5 uS/cm ±1% of reading plus 0.05 uS/cm ±2.5% of reading plus 0.5 mS/cm	0.01 uS/cm 1 mS/cm 0.01 mS/cm 0.1 mS/cm
Salinity	0.0 to 70.0 ppt	0.2% Full Scale	0.1 ppt
Temperature °C	-10.0 to 90 °C	±0.2 °C or ±0.4% Full Scale, whichever is greater	0.1 °C

Reference Temperature	15.0 to 25.0 °C
Temperature Coefficient	0.0% to 4.0%
Cell Constant	5.00 ± 0.50
TDS Constant Range	0.30 to 1.00
Power	One 9V battery
Calibration Back-up	Yes
Audio Feedback	Yes, on all touch keys
Water Resistance	Splash-resistant, IP 65
Operating Temp. Range	0 to 50 °C
Operating Relative Humidity Range	up to 95%
Temperature Probe	Thermistor, 10kΩ / 25 °C
Dimensions (L x W x D)	186 mm x 70 mm x 37 mm (7.3 in x 2.8 in x 1.5 in)
Weight (batteries included)	430 grams (1 lb)

RECOMMENDED SPARE PARTS LIST

PART #	DESCRIPTION
300-4	4-meter probe and cable assembly.
300-10	10-meter probe and cable assembly.
380	Carrying case, hard sided.
480	Instrument carrying case with shoulder strap, soft sided.

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