

Model L20C
Instruction Manual



Microprocessor based
Conductivity TDS Temperature
Bench Top Meter

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General Introduction

Thank you for selecting the Model L20C meter. The Model L20C is a precision tool that measures Conductivity, TDS and Temperature. A built-in microprocessor stores, calculates and compensate for all parameters related to Conductivity, TDS and Temperature determinations.

This meter has a waterproof IP54 case. The mechanical keys are highly reliable with tactile and audio feedback. This meter is powered by six AAA-size alkaline batteries or with a UL approved AC adaptor (OUTPUT: DC9V). The meter also displays a “BAT” message when the batteries are in need of replacement. Re-calibration is not required when power is restored. The front of the meter has a large LCD that displays Conductivity or TDS and Temperature simultaneously along with user prompts and mode indicators. The unit prompts the user through calibration and measurement procedures. The Model L20C micro-processor allows the user to easily recalibrate the parameters for the probe. A few keystrokes will adjust all the parameters for conductivity and will also give the user the option to select four types (0.01, 0.1, 1.0, 10.0) of probe cell constant for a better selection of available probes and applications. And the user can input K value of the cell by keypad directly. The system simultaneously displays temperature in °C along with either Conductivity or TDS. The user can switch back and forth from all these displays by just pushing a single “MODE” key. Other features include automatic conductivity ranging, automatic temperature compensation, long battery life, and 50/60 Hz AC noise rejection. This meter is user-friendly for laboratory application.

Initial Inspection

Carefully unpack the unit and accessories. Inspect for damages made in shipment. If any damage is found, notify your **ECD** representative immediately. All packing materials should be saved until satisfactory operation is confirmed.

Power

The model EC3175 can be powered by an 115V or 230VAC adaptor as well as 6 “AAA” alkaline batteries. Check the label on the AC adaptor supplied with the instrument to make sure that the AC line

voltage is correct. If the wrong AC adaptor is supplied, notify your **ECD** representative immediately.

Installing the Batteries

To insert the batteries into the meter, follow the procedure outlined below.

1. Use two hands to flip the two buckles and battery cover to expose the battery compartment. (Figure 1)
2. Note the polarity and insert the six AAA batteries into the battery compartment correctly.
3. Replace the battery cover.

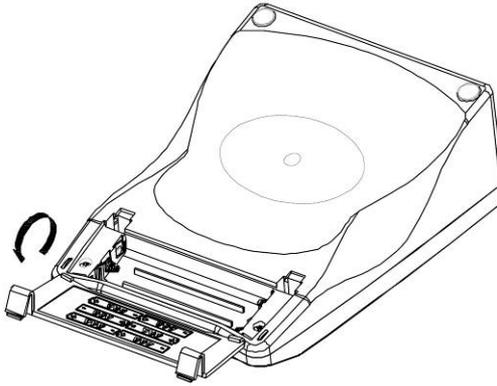


Figure 1

Display and Key Functions

A. Display

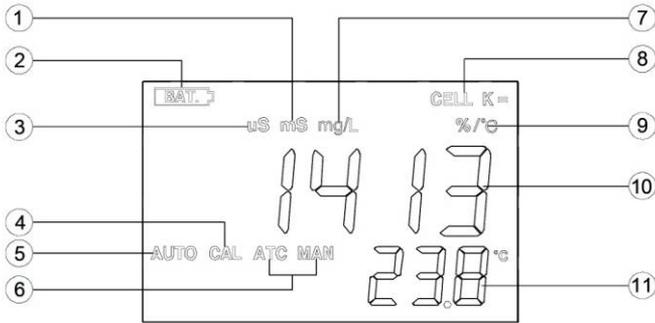
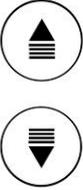


Figure 2

1. mS- millisiemens, indicates Conductivity measurement	7. mg/L- Milligrams/Liter indicates a TDS measurement
2. BAT- Low Battery Indicator	8. CELL K= Indicates conductivity Cell Constant value
3. uS- Microsiemens, indicates Conductivity measurement	9. %/°C- Indicates the temperature compensation coefficient
4. CAL- Displayed when the Instrument enters into the calibration mode	10. Main Display Numeric values for TDS or Conductivity
5. AUTO- Auto ranging indicator	11. Secondary Display Numeric values for temperature
6. ATC/MAN- ATC, indicates Automatic Temperature Compensation MAN, indicates Uncompensated Conductivity reading	

B. Keys

	<p>On/Off- Press and hold this key for 5 seconds to power on and shut off the meter. Once the unit is powered up, press the same key to turn on or off the backlight.</p>
	<p>Cal- During normal operation, this key will change the mode from “Measure” mode to “Calibration” mode.</p>
	<p>Mode- Selects display mode. In normal operation, press this key to sequentially display Compensated Conductivity/Uncompensated Conductivity and TDS.</p> <p>Clear- When this key is pressed, it clears all calibration values stored in the internal memory. Under normal use the key will not be activated unless pressed and held for 5 seconds to prevent accidental erasing stored memory.</p>
	<p>Up/Down- Increases or decreases the displayed value as desired</p>
	<p>Enter- In Calibration mode, Press this key to save the current parameter to memory.</p>

Operational Procedures

A. Preparing Standard Solutions

Suitable conductivity standards are available commercially or the user can prepare them using research grade reagents. Here are some standard solutions the user can prepare to calibrate the probe of the Model L20C.

1. Standard solution of 1413 μ S at 25°C: Accurately weight out 0.746 grams of research grade dried Potassium Chloride (KCL). Dissolve in 1000ml of distilled water.
2. Standard solution of 12.90mS at 25°C: Accurately weight out 7.4365 grams of research grade dried Potassium Chloride (KCL). Dissolve in 1000ml of distilled water.
3. Standard solution of 111.9mS at 25°C: Accurately weight out 74.264 grams of research grade dried Potassium Chloride (KCL). Dissolve in 1000ml of distilled water.

Note: You can store the remaining solution in a plastic container for one week but the air space between the cap and the solution must be kept to an absolute minimum. Storing the excess solution below 4°C can increase the storage life. If you have any doubt of the accuracy of the stored solution, a fresh batch should be prepared.

B. Calibration

Calibration setup contains six sections: TDS Constant, Temperature Coefficient, Temperature Reference, Probe Basic Cell Constant, Cell Constant Calibration and K Value Input. To access these sections:

1. Connect the conductivity probe to the unit and turn the unit on.
2. Allow temperature reading to stabilize, press “Cal” key to enter the calibration mode. **CAL** appears on the LCD.

[Note: Press “Enter” key 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 Constant

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 “up” and “down” keys to adjust the value between 0.30 and 1.00.

Press “Enter” key to save the new value and go to the next calibration parameter.

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 “up” and “down” keys to adjust the value between 0 and 4.00%. Press “Enter” key to save the new value and go to the next calibration parameter.

Temperature Reference

The unit uses the temperature reference value to calculate temperature compensated conductivity. The default value is 25°C. To change the Temperature Reference, use the “up” and “down” keys to adjust the value between 15 and 25°C. Press “Enter” key to save the new value and go to the next calibration parameter.

Probe Basic Cell Constant

The main display shows the deviation of the conductivity probe (calibrated previously or default, the deviation range is 70%~130%, 100% without error). The secondary display shows the current selected cell constant. Using the “up” and “down” keys to adjust the probe basic cell constant to that you use from the 4 available cell constants (0.01, 0.1, 1.0 and 10.0). Press “Enter” key to save the new value and go to the next calibration parameter.

Cell Constant Calibration

1. Immerse the probe in a standard of known conductivity solution (See section **Preparing Standard Solutions**), preferably a standard in the middle range of the solutions to be measured. Immerse the probe (at least 2” to 3” or 5~7cm from the tip) without touching the sides of the calibration container. Shake the probe lightly to remove any air bubbles trapped in the conductivity cell. The unit will display the conductivity value of the standard solution. During cell constant calibration, the following parameters are over-ridden: temperature reference (fixed to 25.0°C) and temperature coefficient (fixed to 1.91%). **[Note:** If you

want input **K value** directly, please press the “**Enter**” key to go to the **K Value Input**.]

2. Wait for the values of temperature and conductivity to stabilize for a few seconds. Using the “**up**” and “**down**” keys to adjust the reading of the display until it matches the value of the known standard conductivity solution at 25°C.
3. Press “**Enter**” key to calculate and save the new value of **Cell Constant** or press the “**Enter**” key to the next calibration parameter.

K Value Input

1. The unit will display the conductivity value of the standard solution with the **CELL K=** staying on. [**Note:** If the **Cell Constant** has been calibrated, please press the “**Enter**” key to exit calibration and return to normal operation.]
2. Press and hold the “**up**” or “**down**” key, the main display will show the deviation of the conductivity probe. You can now input the K value (from 70%~130% of the probe basic cell constant). After releasing the up or down key, the unit will display the conductivity value with the **CELL K=** staying on.
3. Adjust the K value until the conductivity value displayed on the LCD matches the value of the known standard conductivity solution at 25°C.
4. Press “**Enter**” key to save the new **K value** of the cell to exit calibration and return to normal operation mode.

C. Conductivity Measurements

1. Turn the unit on. Place the probe in the solution to be measured. Immerse the probe (at least 2” to 3” or 5~7cm from the tip). Shake the probe lightly to remove any trapped air bubbles in the conductivity cell.
2. Press “**Mode**” key to enter the desired measurement mode (Conductivity or TDS). The message “over” or “under” may appear briefly on the display indicate auto-ranging; this is normal. Allow temperature to stabilize before taking measurements.

Error Displays and troubleshooting

Main Display	Secondary Display	Possible Causes	Corrective Actions
"over" During measurement	0.0 - 100°C	<ul style="list-style-type: none"> ● Sample conductivity too high, >200 mS or 200 g/L ● Conductivity cell contaminated or defective ● Incorrect cell constant value input 	<ul style="list-style-type: none"> ● Sample cannot be tested ● Clean or replace cell ● Input correct cell constant value
"over" During calibration	0.0 - 100°C	<ul style="list-style-type: none"> ● Standard solution conductivity too high, >200 mS or 200 g/L ● Conductivity cell contaminated or defective ● Incorrect cell constant value input 	<ul style="list-style-type: none"> ● Sample cannot be tested ● Clean or replace cell
"over" During calibration	0.0 - 100°C	<ul style="list-style-type: none"> ● Incorrect cell constant value input 	<ul style="list-style-type: none"> ● Input correct cell constant value
"over" During measurement	over	Sample temp. too high > 100°C	Reduce sample temperature
		Defective conductivity cell	Replace conductivity cell
	under	Sample temp. too Low < 0.0°C	Increase sample temperature
		Defective conductivity cell	Replace conductivity cell

Specifications

Display	Range	Resolution	Accuracy
Conductivity K=0.01	0.000 to 1.999uS/cm 2.00 to 19.99uS/cm	0.001uS/cm 0.01uS/cm	±0.5% FS
Conductivity K=0.01	0.00 to 19.99uS/cm 2.00 to 199.9uS/cm	0.01uS/cm 0.1uS/cm	±0.5% FS
Conductivity K=0.01	0.0 to 199.9uS/cm 200 to 1999uS/cm 2.00 to 19.99mS/cm	0.1uS/cm 1uS/cm 0.01mS/cm	±0.5% FS
Conductivity K=0.01	0 to 1999uS/cm 2.00 to 19.99mS/cm 20.0 to 199.9mS/cm	1uS/cm 0.01mS/cm 0.1mS/cm	±0.5% FS
Temperature	0.0 to 100.0 ° C	0.1 ° C	±0.2° C

Reference Temperature	15.0 to 25.0 ° C
Temperature Coefficient	0.0% to 4.0%
Cell Constant	0.01; 0.10; 1.00; 10.0
TDS Constant Range	0.30 to 1.00, default at 0.65
Power	Six “AAA” Batteries
Calibration Back-up	EEPROM
Audio Feedback	All Touch Keys
Display	22mm : 14.5mm high LCD
Ambient Temperature	0 to 50 ° C
Relative Humidity	up to 90%
Case	IP54
Dimensions	150mm x 203mm x 72mm
Weight	504 grams(Batteries included)

Warranty

Electro-Chemical Devices, Inc. (ECD) warrants all products it manufactures to be free from defect in materials and factory workmanship, and agrees to repair or replace any product that fails to perform, as specified, within one (1) year after date of shipment.

This warranty shall not apply to any product that has been:

1. Subjected to misuse, negligence or accident;
2. Connected, installed, adjusted or otherwise used not in accordance with the instructions furnished by ECD;
3. Repaired, modified or altered by persons not authorized by ECD, resulting in injury to the performance, stability or reliability of the product.

This warranty is in lieu of any other warranty, expressed or implied. ECD reserves the right to make changes in the design or construction of its products at any time, without prior notification, and without incurring any obligation to make any changes in previously delivered products.

Seller's sole liabilities and the buyer's sole remedies under this agreement shall be limited to a refund in the purchase price, or at ECD's discretion, to the repair or replacement of any product that proves, upon ECD's examination, to be defective, when returned to the factory, transportation prepaid by the buyer, within one (1) year of the product's original shipment date. Seller shall not be liable for damages consequential or incidental to defects in any product, for failure of delivery in whole or in part, for injuries resulting from its use, or for any other cause.

This warranty and the writing attached constitute the full understanding of seller and the buyer, and no terms, conditions, understanding, or agreement purporting to modify or vary the terms hereof shall be binding unless hereafter made in writing and signed by an authorized official of Electro-Chemical Devices, Inc.

This warranty does not cover pH, ORP or Specific Ion measurement, reference or combination electrodes or electrode cartridges that have been commissioned in service.

If service or repair is required, please obtain the serial number(s) or sales order number of the product(s) in question and contact ECD's Service Department at: +1-800-729-1333 (USA/Canada) or +1-949-336-6060