JENCO®

VisionPlus

Operation Manual

MODEL 3177

Microcomputer Based Conductivity/TDS/ Salinity/ Temperature Benchtop Meter

3177

CONTENTS

GENERAL INTRODUCTION

Thank you for selecting the 3177 meter. The 3177 is a precision tool that measures Conductivity, TDS, Salinity and Temperature. A built-in microprocessor stores, calculates and compensates for all parameters related to Conductivity, TDS, Salinity and Temperature determinations.

This meter has a waterproof IP54 case. The mechanical keys are highly reliable with tactile and audio feedback. It is powered by six AAA-size alkaline batteries or with a UL / CE approved AC adapter (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, TDS, Salinity and Temperature simultaneously along with user prompts and mode indicators. The unit prompts the user through calibration and measurement procedures.

The model 3177 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 ℃ along with either Conductivity, TDS or Salinity. 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 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 **JENCO** representative immediately. All packing materials should be saved until satisfactory operation is confirmed.

POWER INPUT

The model 3177 can be powered by an UL / CE approved 100 ~ 240 VAC 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 **JENCO** representative immediately.

INSTALLING THE BATTERIES

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

1. Use a Philip screw driver and unlock the battery cover by turning the screw driver in the counter clockwise direction. After unlocking the screw, take off the battery cover (Fig.1)

2. Replace the old batteries with new ones and install them on the correct polarity position.

3. Put the battery cover back on the instrument. Use a Philip screw driver and turn the screw in the clockwise direction to lock the battery cover.

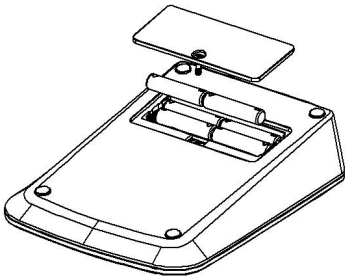


Figure 1: Battery compartment

DISPLAY & KEYS FUNCTIONS

A. Display

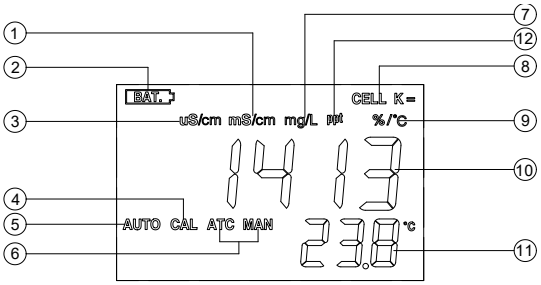
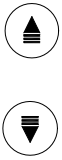


Figure2: Active LCD screen

1. **mS/cm-** Millisiemens , indicates Conductivity measurement.	7. **mg/L-** Milligrams/Liter indicates TDS measurement.
2. **BAT-** Low battery indicator.	8. **CELL K=** Indicates conductivity cell constant value.
3. **uS/cm-** Microsiemens, indicates Conductivity measurement.	9. **%/ ℃-** Indicates Temperature Coefficient
4. **CAL-** This will be displayed when the unit enters into the calibration mode.	10. **MAIN DISPLAY-** For Conductivity, TDS and Salinity values.
5. **AUTO-** Auto ranging indicator	11. **SECONDARY DISPLAY-** For temperature in ℃.
6. **ATC/MAN-** ATC indicator will be displayed if a temperature probe is connected otherwise the MAN indicator will be displayed.	12. **ppt-** Parts per thousand, indicates Salinity measurement.

B. Keys

	**On/Off-** Press and hold this key for 2 seconds to power on and shut off the meter.
	**Cal-** During normal operation, this key will change the mode from “Measure” mode to “Calibration” mode.
	**Mode / Clear-** In measure mode, press this key for 0 second to sequentially display Conductivity, TDS and Salinity. Under Conductivity, TDS and Salinity measure mode. When the **“Mode/Clear”** key is pressed for 5 seconds, all segments of the LCD will be lit up, it clears all calibration values stored in the internal memory. The unit now requires new conductivity calibration before use.
	**Up/Down-** In the conductivity/TDS/salinity measure mode, these two keys are used to manually enter the temperature values. They have no effect on the unit when operating in ATC mode. In the conductivity calibration mode, these two keys are used to adjust values in conductivity.
	**Enter-** In Calibration mode, press this key to save the current parameter to memory.

OPERATIONAL PROCEDURES

A. Calibration

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

1. Connect the conductivity probe to the unit and turn the unit on.

2. In conductivity, TDS or salinity mode, allow temperature reading to stabilize, press **"Cal"** key to enter the calibration mode. "CAL" icon 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/cm) 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 ~ 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 0.00 ~ 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 ℃. To change the temperature reference, press the **"Up"** and **"Down"** keys to adjust the value between 15 ~ 25 ℃. Press **"Enter"** key to save the new value and go to the next calibration parameter.

Probe Basic Cell Constant

The main display shows the Cell Constant of the conductivity probe (calibrated previously or default, the deviation range is 70% ~ 130%). The secondary display shows the current selected cell constant which is either 0.01, 0.10, 1.00 or 10.0. Press the **"Up"** and **"Down"** keys to select the one you want to use. Press **"Enter"** key to save the new value and go to the next calibration parameter.

Standard Solutions Calibration

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. Wait for the values of temperature and conductivity to stabilize for a few seconds. Press 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 ℃. Press the **"Enter"** key to save and go to the next calibration parameter.

K Value Input

(a) 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.**]**

(b) 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.

(c) Adjust the K value until the conductivity value displayed on the LCD matches the value of the known standard conductivity solution at 25℃.

(d) Press **"Enter"** key to save the new **K value** of the cell to exit calibration and return to normal operation mode.

B. 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, TDS or Salinity). The message "over" or "undr" may appear briefly on the display indicate auto-ranging; this is normal. Allow temperature to stabilize before taking measurements.

C. 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 3177.

1. Standard solution of 1413 uS/cm at 25 ℃: Accurately weight out 0.746 grams of research grade dried Potassium Chloride (KCL). Dissolve in 1000 ml of distilled water.

2. Standard solution of 12.90 mS/cm at 25 ℃: Accurately weight out 7.4365 grams of research grade dried Potassium Chloride (KCL). Dissolve in 1000 ml of distilled water.

3. Standard solution of 111.9 mS/cm at 25 ℃: Accurately weight out 74.264 grams of research grade dried Potassium Chloride (KCL). Dissolve in 1000 ml of distilled water.

[Note: You can store the unused portion of the standard solution in a plastic container for six months but the air space between the cap and the solution must be kept to an absolute minimum. Storing the excess solution below 4 ℃ can increase the storage life. If you have any doubt of the accuracy of the stored solution, a fresh batch should be prepared.**]**

ERROR DISPLAYS AND TROUBLESHOOTING

Main Display	Secondary Display	Possible cause(s)	Corrective Action(s)
"over" during measurements	0.0 ~ 100.0 ℃	1. Sample Conductivity value > 200.0mS; Sample TDS > 200 g/L. Sample Salinity > 70.0 ppt 2. Conductivity cell contaminated or defective. 3. Incorrect K constant value input.	1. Sample cannot be tested 2. Decontaminate / clean cell or replace cell. 3. Input correct K value.
"over" during calibration	0.0 ~ 100.0 ℃	1. Incorrect standard solution. 2. Conductivity cell contaminated or defective. 3. Incorrect K constant value input.	1. Replace standard solution. 2. Decontaminate / clean cell or replace cell. 3. Input correct K value.
"over " during measurements	over	1. Sample temperature > 100 ℃. 2. Defective conductivity cell.	1. Reduce sample temperature. 2. Replace cell.
	undr	1. Sample temperature < 0.0 ℃ 2. Defective conductivity cell.	1. Increase sample temperature. 2. Replace cell.

[Note: If the meter still does not perform normally after the above measures are taken, call **JENCO** representative.**]**

SPECIFICATIONS

Display	Range	Resolution	Accuracy
Conductivity /TDS K=0.01	0.000 ~ 1.999 uS/cm / 0.000 ~ 1.999 mg/L 2.00 ~ 19.99 uS/cm/ 2.00 ~ 19.99 mg/L 20.0 ~ 199.9 uS/cm/ 20.0 ~199.9 mg/L	0.001 uS/cm/ 0.001 mg/L 0.01 uS/cm/ 0.01 mg/L 0.1 uS/cm/ 0.1 mg/L	±0.5% F.S.
Conductivity /TDS K=0.1	0.00 ~ 19.99 uS/cm/ 0.00 ~ 19.99 mg/L 20.0 ~ 199.9 uS/cm/ 20.0 ~199.9 mg/L 200 ~ 1999 uS/cm/ 200 ~ 1999 mg/L	0.01 uS/cm/ 0.01 mg/L 0.1 uS/cm /0.1 mg/L 1 uS/cm/ 1 mg/L	±0.5% F.S.
Conductivity /TDS K=1.0	0.0 ~ 199.9 uS/cm/ 0.0 ~ 199.9 mg/L 200 ~ 1999 uS/cm/ 200 ~ 1999 mg/L 2.00 ~ 19.99 mS/cm/ 2.00 ~ 19.99 g/L	0.1 uS/cm/ 0.1 mg/L 1 uS/cm/ 1 mg/L 0.01 mS/cm/ 0.01 g/L	±0.5% F.S.
Conductivity /TDS K=10.0	0 ~ 1999 uS/cm/ 0 ~ 1999 mg/L 2.00 ~ 19.99 mS/cm/ 2.00 ~ 19.99 g/L 20.0 ~ 199.9 mS/cm/ 20.0 ~ 199.9 g/L	1 uS/cm/ 1 mg/L 0.01 mS/cm/ 0.01 g/L 0.1 mS/cm/ 0.1 g/L	±0.5% F.S.
Salinity	0.0 ~ 70.0 ppt	0.1 ppt	±0.5% F.S.
Temperature	0.0 ~ 100.0 °C	0.1 °C	±0.3 °C

Reference Temperature	15.0 ~ 25.0 °C, default at 25.0 °C
Temperature Coefficient	0.0% ~ 4.0%, default at 1.91%
Cell Constant	0.01; 0.10; 1.00; 10.0
TDS Constant Range	0.30 ~ 1.00, default at 0.65
Power	6 X 1.5 V AAA Batteries or 100 ~ 240 VAC adapter
Calibration Back-up	EEPROM
Audio Feedback	All Touch Keys
Screen	Segment LCD backlight
Ambient Temperature Range	0 ~ 50 °C
Relative Humidity	up to 90%
Case	IP54
Dimensions (W x D x H) / Weight	150 x 210 x 45 mm / 430 grams

WARRANTY

JENCO warrants this product to be free from significant deviations in material and workmanship for a period of 1 year from date of purchase. If repair or adjustment is necessary and has not been the result of abuse or misuse, within the year period, please return-freight-prepaid and the correction of the defect will be made free of charge. If you purchased the item from our **JENCO** distributors and it is under warranty, please contact them to notify us of the situation. **JENCO** Service Department alone will determine if the product problem is due to deviations or customer misuse.

Out-of-warranty products will be repaired on a charge basis.

RETURN OF ITEMS

Authorization must be obtained from one of our representatives before returning items for any reason. When applying for authorization, have the model and serial number handy, including data regarding the reason for return. For your protection, items must be carefully packed to prevent damage in shipment and insured against possible damage or loss. **JENCO** will not be responsible for damage resulting from careless or insufficient packing. A fee will be charged on all authorized returns.

NOTE: JENCO reserves the right to make improvements in design, construction and appearance of our products without notice.

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