

JENCO®

QUALITY INSTRUMENTS

Operation Manual

MODEL 3011M

Basis Portable

Cond/TDS/Salt/Temperature Meter

3011M

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GENERAL INTRODUCTION

Thank you for selecting the 3011M meter. The 3011M is a precision tool that measure Conductivity, Salinity, TDS and temperature. A built-in microprocessor stores, calculates and compensates for all parameters related to Conductivity.

This unit has a waterproof IP67 case. The touch mode keys are highly reliable with tactile and audio feedback. This meter can operate with one 9 V battery. Re-calibration is not required when power is turned on again.

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 unit is also equipped with a non-volatile memory allowing the user to store 50 different sets of readings. This unit will assign a site number for each set of reading so the user can review the data easily.

The model 3011M comes with a conductivity probe. Other features include 1 point calibration for Conductivity, automatic temperature compensation. This meter is user-friendly for field, industrial and laboratory applications.

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.

INSTALLING THE BATTERIES

The 3011M meter is packaged with one 9 V battery required for operation. To insert the batteries into the meter, follow the procedure outlined below.

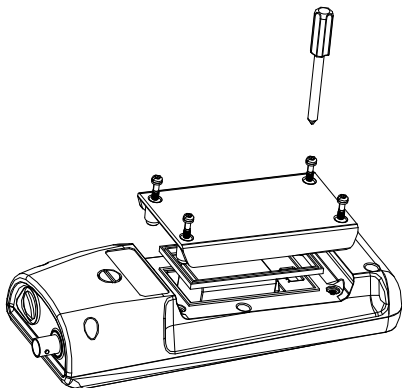


Figure 1: Battery compartment

1. Use a screw driver to remove the four screws and battery cover to expose the battery compartment. (Figure 1.)
2. Replace the 9 V battery.
3. Replace the battery cover and make sure to secure the four screws for the water-tight feature.

CONNECTORS

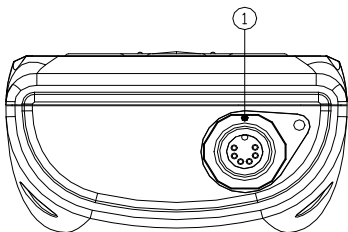


Figure 2: Connector

1. Conductivity/ATC connector

DISPLAY & KEYS FUNCTIONS

A. Display

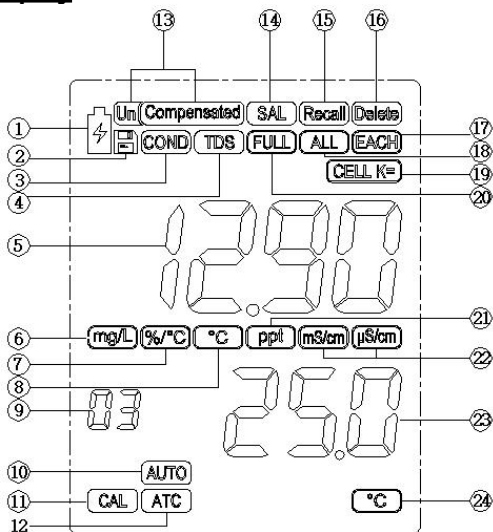


Figure 3: Active LCD screen

1. Battery Low battery indicator.	2. Save- To save a reading into the data storage.
3. COND- Conductivity measure mode.	4. TDS- TDS measure mode.
5. Main display for Conductivity, Salinity or TDS values.	6. mg/L- Milligrams/Liter indicates TDS measurement.
7. %/°C- Indicates Temperature Coefficient.	8. °C- Reference temperature unit.
9. Data storage site number.	10. AUTO- Auto ranging indicator.
11. CAL- This will be displayed when the meter enters into the calibration mode.	12. ATC- ATC indicator will be displayed if a temperature probe is connected.

13. Un(Compensated)- Uncompensated or Compensated conductivity measure mode.	14. SAL- Salinity measure mode.
15. Recall- To recall data from the data storage.	16. Delete- To delete stored data.
17. EACH- To delete a single set of data from the data storage.	18. ALL- To delete all the data in the data storage.
19. CELL K= Conductivity cell constant value.	20. FULL- This will indicate that all 50 data storage sites are used up.
21. ppt- Parts per thousand, indicates Salinity measurement.	22. mS/cm & uS/cm- Millisiemens and Microsiemens indicates Conductivity measurements.
23. Temperature value.	24. °C- Temperature unit.

B. Operational Keys Description

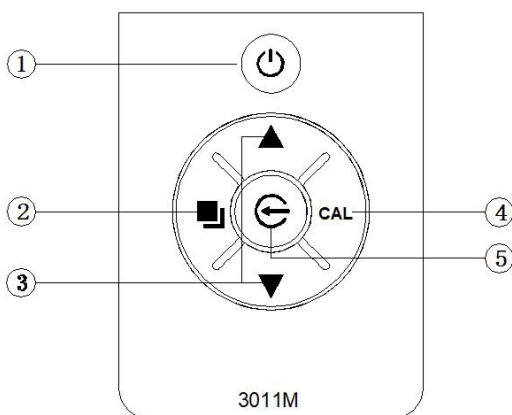








Figure 4

NO.	Key	Description
1		On/Off- Powers on and shuts off the meter.
2		Mode- Selects display mode. Pressing this key changes the display sequentially to display uncompensated conductivity, compensated conductivity, Salinity, TDS, Recall and Delete interface. In the calibration mode, press “Mode” key to exit calibration mode. In the “Recall” and “Delete” modes, press this key to exit “Recall” and “Delete” modes respectively.
3	 	Up & Down- In the calibration mode, these two keys are used to adjust the conductivity display value or K value. In the “Recall” mode, view saved data and data storage site number by pressing these keys. In the “Delete” mode, press these keys to select between the “Delete Each” and “Delete All” mode. In the “Delete Each” mode, view the to-be-deleted data and data site numbers by pressing these keys.
4		In measure mode, press this key to go to the “Calibration” mode.
5		In the measure mode, press “Enter” key to save reading into the data storage site. In the calibration mode, press “Enter” key to save the current parameter to memory. In the “Recall” mode, view saved data and data storage site number by pressing these keys. In the “Delete” mode, press these keys to select between the “Delete Each” and “Delete All” mode. In the “Delete Each” mode, view to be deleted data and data site numbers by pressing these keys.

OPERATIONAL PROCEDURES

A. Calibration

Calibration setup contains five sections: TDS Constant, Temperature Coefficient, Temperature Reference, Probe Basic Cell Constant and Standard Solutions Calibration. To

access these sections:

1. Power up the unit. Connect the conductivity probe to the unit.
2. Press "**Mode**" key to go to conductivity mode. "ATC" icon, "uS/cm" icon and "AUTO" icon will lit up.
3. Rinse the conductivity probe in distilled water and immerse them in the standard solution. Allow temperature reading to stabilize, then press "**Cal**" key to enter the calibration mode. "CAL" and "TDS" icons 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**" or "**Down**" keys to adjust the value between 0.30 to 1.00. 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% to 130%). The secondary display shows the current selected cell constant which is either 0.1, 1.0, 10.0 or 475. Press the "**Up**" or "**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.

Temperature Coefficient

The unit uses the temperature coefficient to calculate temperature compensated conductivity. The default value is 1.91 %/°C. To change the Temperature Coefficient, use the "**Up**" or "**Down**" keys to adjust the value between 0.00 to 4.00 %/°C. 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, press the "**Up**"

or “**Down**” keys to adjust the value between 15 to 25 °C. Press “**Slope/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 to 7 cm 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**” or “**Down**” key to adjust the reading of the display until it matches the value of the known standard conductivity solution at 25 °C. Press the “**Enter**” key to save and exit the calibration.

B. Conductivity, Salinity, TDS Measurements

1. Power up the unit. Connect the conductivity probe to the unit.
2. Press “**Mode**” key to go to Uncompensated conductivity/Compensated conductivity/salinity/TDS mode. “ATC” icon, “uS/cm (mS/cm/ppt/mg/L)” icon and “AUTO” icon will lit up. Place the probe in the solution to be measured. Immerse the probe (at least 2” to 3” or 5 to 7 cm from the tip). Shake the probe lightly to remove any trapped air bubbles in the conductivity cell.
3. Allow sufficient time for the display to stabilize. The meter will display the conductivity/salinity/TDS value of the sample at the displayed sample temperature.

[Note: Press “**Mode**” key to enter the desired measurement mode (Conductivity, Salinity or TDS). The message “rAn6” may appear briefly on the display indicating auto-ranging. This is normal. Allow temperature to stabilize before taking measurements.]

C. Save, Recall and Delete Data

1. **Saving readings to memory.**
 - a. In the measure modes, press the “**Enter**” key to save data.

The “Save” icon with the corresponding site number will lit up for a brief moment to indicate a successful data save. Saving is now complete.

- b. If the “Full” icon is displayed, this means that all 50 data saving sites are used up. No new data can be saved until existing saved data are deleted.

2. **Recalling readings from memory.**

- a. To recall saved data, press “**Mode**” key until the “Recall” icon lit up. Press “**Enter**” key to go into “Recall” mode.
- b. To view data, press “**Up**” or “**Down**” key to select the storage site number and displays the corresponding record.
- c. Press “**Mode**” key to exit “Recall” mode.

3. **Deleting data.**

- a. Press “**Mode**” key until the “Delete” icon lit up. Press “**Enter**” key to go into the “Delete” mode.
- b. Select “Delete All” or “Delete Each” mode by pressing the “**Up**” or “**Down**” key.
- c. In the “Delete All” mode, press “**Enter**” key to clear all stored data. Deletion is now complete.
- d. In the “Delete Each” mode, use “**Up**” or “**Down**” key to select data to be deleted. Then press “**Enter**” key to delete. Deletion is now complete. The next set of saved data will automatically move up a slot in the storage site.
- e. Press “**Mode**” key to exit “Delete” mode.

D. **Preparing Conductivity 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 3011M.

1. Standard solution of 1413 $\mu\text{S}/\text{cm}$ at 25 °C : 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 °C : 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 °C : 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 °C 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	-10.0 to 120.0 °C	<ol style="list-style-type: none"> 1. Sample Conductivity/ TDS/Salinity value out of range 2. Conductivity cell contaminated or defective. 3. Incorrect K constant value input. 	<ol style="list-style-type: none"> 1. Sample cannot be tested. 2. Decontaminate/ clean cell or replace cell. 3. Input correct K value.
"over" during calibration	-10.0 to 120.0 °C	<ol style="list-style-type: none"> 1. Incorrect standard solution. 2. Conductivity cell contaminated or defective. 3. Incorrect K constant value input. 	<ol style="list-style-type: none"> 1. Replace standard solution. 2. Decontaminate/ clean cell or replace cell. 3. Input correct K value.
"over " during measurements	"OvEr"	<ol style="list-style-type: none"> 1. Sample temperature > 120 °C. 2. Defective conductivity cell. 	<ol style="list-style-type: none"> 1. Reduce sample temperature. 2. Replace cell.
	"udr"	<ol style="list-style-type: none"> 1. Sample temperature < -10.0 °C 2. Defective conductivity cell. 	<ol style="list-style-type: none"> 1. Increase sample temperature. 2. Replace cell.

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

SPECIFICATIONS

Display	Range	Resolution	Accuracy
Conductivity K=0.475	0.0 ~ 474.9 uS/cm	0.1 uS/cm	±0.5% F.S.
	475 ~ 4749 uS/cm	1 uS/cm	
	4.75 ~ 47.49 mS/cm	0.01 mS/cm	
	47.5 ~ 200.0 mS/cm	0.1 mS/cm	
Conductivity K=0.1	0.000 ~ 9.999 uS/cm	0.001 uS/cm	
	10.00 ~ 99.99 uS/cm	0.01 uS/cm	
	100.0 ~ 400.0 uS/cm	0.1 uS/cm	
Conductivity K=1.0	0.0 ~ 999.9 uS/cm	0.1 uS/cm	
	1000 ~ 9999 uS/cm	1 uS/cm	
	10.00 ~ 40.00 mS/cm	0.01 mS/cm	
Conductivity K=10.0	0 ~ 9999 uS/cm	1 uS/cm	
	10.00 ~ 99.99 mS/cm	0.01 mS/cm	
	100.0 ~ 400.0 mS/cm	0.1 mS/cm	
TDS K=0.475	0.0 ~ 474.9 mg/L	0.1 mg/L	±0.5% F.S.
	475 ~ 4749 mg/L	1 mg/L	
	4.75 ~ 47.49 g/L	0.01 g/L	
	47.5 ~ 200.0 g/L	0.1 g/L	
TDS K=0.1	0.000 ~ 9.999 mg/L	0.001mg/L	
	10.00 ~ 99.99 mg/L	0.01mg/L	
	100.0 ~ 400.0 mg/L	0.1 mg/L	
TDS K=1.0	0.0 ~ 999.9 mg/L	0.1 mg/L	
	1000 ~ 9999 mg/L	1 mg/L	
	10.00 ~ 40.00 g/L	0.01 g/L	
TDS K=10.0	0 ~ 9999 mg/L	1 mg/L	
	10.00 ~ 99.99 g/L	0.01 g/L	
	100.0 ~ 400.0 g/L	0.1 g/L	
Salinity	0.0 ~ 80.0 ppt	0.1 ppt	±0.5% F.S.
Temperature	-10.0 ~ 120.0 °C	0.1 °C	±0.3 °C

Conductivity calibration	1 point
Reference Temperature	15.0 to 25.0 °C, default at 25.0 °C
Temperature Coefficient	0.00% to 4.00 %/°C default at 1.91 %/°C
TDS Factor	0.30 to 1.00, default at 0.65
Cell Constant	0.1, 1.0, 10.0 (2 Wire), 0.475 (4 Wire)
Temperature sensor	Thermistor, 10 kΩ at 25 °C
Power	9 V Battery
Calibration Back-up	EEPROM

Memory	50 sets
Audio Feedback	All Touch Keys
Screen	Segmented LCD
Ambient Temperature Range	0 to 50 °C
Relative Humidity	up to 90%
Case	IP 67
Dimensions (W x D x H)	214 X 74 X 42 mm 216 X 80 X 50 mm (Have jacket)
Weight	290 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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