Operation Manual

Hand-held Conductivity/Salinity/TDS/

Temperature Meter

3020M

CONTENTS

GENERAL INTRODUCTION

Thank you for selecting the 3020M meter. The 3020M 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 and temperature determinations.

This unit has a waterproof IP65 case. The touch mode keys are highly reliable with tactile and audio feedback. This meter can operate with one 9V battery. Re-calibration is not required when power is restored.

The front of the meter 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 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 3020M is available with a four-wire conductivity cell (K=0.475) and a two-wire conductivity cell (K=0.1). Other features include automatic conductivity ranging, automatic temperature compensation, long battery life, and 50/60 Hz AC noise rejection. This unit is universal and 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.

WATER PROOF

Though the 3020M meter is housed in a watertight case, **DO NOT** use it underwater. The watertight case prevents permanent damage to the unit if accidentally dropped into non-corrosive solutions. Follow these steps immediately if the unit is immersed in any solution:

1. 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 steps1 and 2, call JENCO for possible repair or replacement (see Warranty).

INSTALLING THE BATTERIES

The 3020M meter is packaged with one 9V battery required for operation. To insert the batteries into the meter, follow the procedure outlined below.

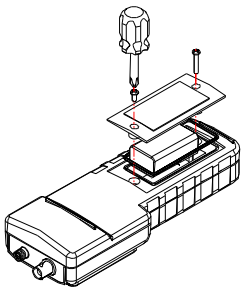


Figure 1: Battery compartment

1. Use a screw driver to remove the two screws and battery cover to expose the battery compartment. (Figure 1.)

2. Note the polarity and insert the batteries into the battery compartment correctly.

3. Replace the battery cover and make sure to secure the two screws for the water-tight feature.

[**Note:** Press the “ON/OFF” key to turn the unit on. If the unit is running then you can press the “ON/OFF” key to turn the unit off. The unit will automatically turn off after 30 minutes of no key activity.]

DISPLAY & KEYS FUNCTIONS

A. Display

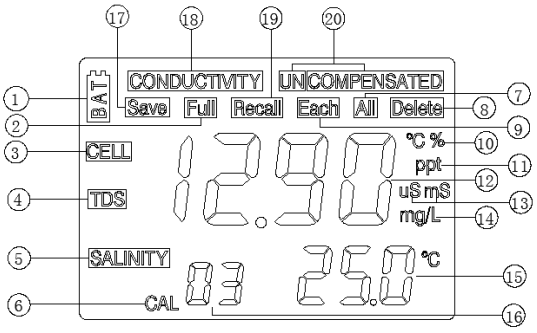


Figure 2: Active LCD screen

1. **BAT-** Low battery indicator.	8. **Delete-** To delete stored data.
2. **Full-** This will indicate that all 50 data storage sites are used up.	9. **Each-** To delete a single set of data from the data storage.
3. **CELL-** Indicates conductivity cell constant value.	10. **℃/%-** Displays during calibration: **"℃":** Indicates temperature reference unit. **"%":** Indicates temperature coefficient unit.
4. **TDS-** Displays when measuring total dissolved solids.	11. **ppt-** Parts per thousand for salinity measurement.
5. **SALINITY-** Displays when measuring salinity.	12. **MAIN DISPLAY-** For compensated and uncompensated conductivity, salinity and TDS values.
6. **CAL-** Calibration mode indicator	13. **uS/mS-** microsiemens or millisiemens for conductivity measurement.
7. **All-** To delete all the data in the data storage.	14. **mg/L-** Grams/Liter for TDS measurement.

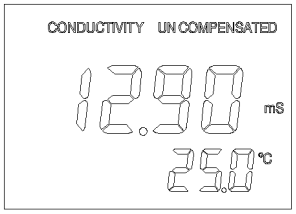
15. Temperature and unit display	18. **CONDUCTIVITY-** Displays when measuring conductivity.
16. Data storage site number.	19. **Recall-** To recall data from the data storage.
17. **Save-** To save a reading into the data storage.	20. **UNCOMPENSATED-** Distinguish between temperature compensated and non-temperature compensated reading.

B. Keys

ON/OFF	**ON/OFF-** Powers on and shuts off the meter.
MODE	**MODE-** Selects display mode. In normal operation, press this key to sequentially display compensated conductivity, salinity, total dissolved solids (TDS), uncompensated conductivity, Recall and Delete interface. In calibration mode, press this key to exit the current calibration parameter and enter into the next one. In “Recall” and “Delete” modes, press this key to exit “Recall” and “Delete” modes respectively.
^ v	**UP/DOWN-** Increases or decreases the display value as desired. In “Recall” mode, view saved data and data storage site number by pressing these keys. In “Delete” mode, press these keys to select between the “Delete Each” and “Delete All” mode. In “Delete Each” mode, view to be deleted data and data site numbers by pressing these keys.
CAL	**CAL-** In “Measurement” mode, press this key to enter into “Calibration” mode.

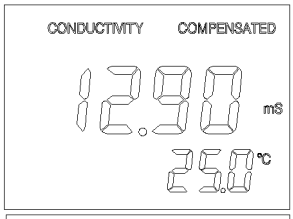
ENTER	**ENTER-** In “Calibration” mode, press this key to save the current parameter to memory. In “Measurement” mode, press this key to save reading into the next available data storage site. At the Recall interface, press this key to display the last set of saved data. At the Delete interface, press this key to go into “Delete” mode. In the “Delete All” mode, press this key to delete all saved data. In the “Delete Each” mode, press this key to delete a single set of data.

MODES OF THE METER



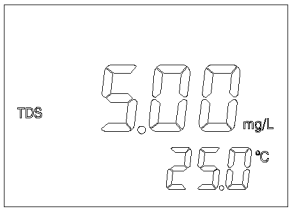
1. **UNCOMPENSATED mode:**

The unit will display non-temperature compensated conductivity reading.



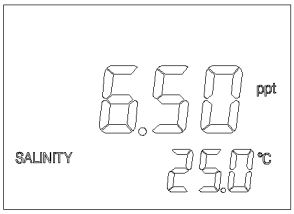
2. **COMPENSATED mode:**

The unit will display temperature compensated conductivity reading.



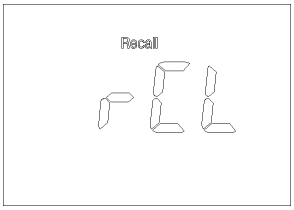
3. **TDS mode:**

The unit will display TDS reading.



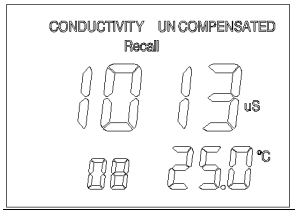
4. **SALINITY** mode:

The unit will display SALINITY reading.



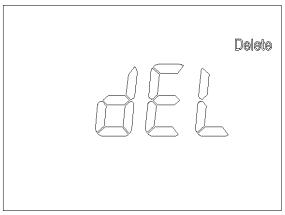
5. **Recall interface:**

Press “ENTER” key to go into recall mode.



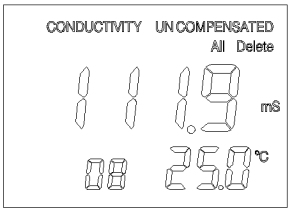
6. **Recall mode:**

In this mode, user can recall data saved in memory.



7. **Delete interface:**

Press “ENTER” key to go into delete mode.



8. **Delete mode:**

In this mode, user can erase each data or all data saved in memory.

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 3020M.

1. Standard solution of 147uS at 25℃: Accurately measure out 100ml of the 1413uS standard solution as in point 1. Dilute it with 900ml of distilled water.

2. Standard solution of 14.94uS at 25℃: Accurately measure out 100ml of the 147uS standard solution as in point 4. Dilute it with 900ml of distilled water.

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

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

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

[Note: The user 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℃ 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 five parameters: TDS, Cell, Temperature Coefficient, Temperature reference and Conductivity Calibration. To access these sections:

1. Connect the conductivity probe either the 3020P (K=0.475) or the 109P (K=0.1) to the unit and turn the unit on. The screen will display the “CELL” icon and the cell constant of the previous calibration. (Factory default is set at K=0.475).

2. Allow temperature reading to stabilize, press “CAL” key to enter the calibration mode. The “CAL” icon appears on the LCD. Press “MODE” key to sequentially view previous calibration settings.

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 “UP” and “DOWN” keys to adjust the value between 0.30 and 1.00. Press “ENTER” key to save the new value and the unit will automatically go into the next calibration parameter. If “MODE” key is pressed instead of the “ENTER” key, any changes made will be cancelled and the previous calibration settings will be retained.

CELL

Use “UP” and “DOWN” keys to select cell constant between “C0.5” or “C0.1” on the secondary display. Press “ENTER” key to confirm selection and the unit will then automatically go into the next calibration parameter. If “MODE” key is pressed instead of the “ENTER” key, any changes made will be cancelled and the previous calibration settings will be retained.

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 the unit will automatically go into the next calibration parameter. If “MODE” key is pressed instead of the “ENTER” key, any changes made will be cancelled and the previous calibration settings will be retained.

Temperature Reference

The unit uses the temperature reference value to calculate temperature compensated conductivity. The default value is 25℃. To change the temperature coefficient , use the “UP” and “DOWN” keys to adjust the value between 15℃ and 25 ℃. Press “ENTER” key to save the new value and the unit will automatically go into the next calibration parameter. If “MODE” key is pressed instead of the “ENTER” key, any

changes made will be cancelled and the previous calibration settings will be retained.

Conductivity Calibration

(a) Immerse the probe in a standard of known conductivity, 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) into standard solution without touching the sides of the calibration container. Shake the probe lightly to remove any air bubbles trapped in the conductivity cell.

(b) Allow temperature to stabilize. The message "rAGE" (range) may appear briefly on the display indicating auto-ranging; this is normal. After temperature stabilization, use the "UP" and "DOWN" keys to adjust the conductivity value to that of the conductivity standard at 25℃. Press "ENTER" key to calibrate. The unit beeps to indicate a successful calibration. Calibration is now complete and the unit will automatically switch to "Measurement" 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) in the sample solution. Shake the probe lightly to remove any trapped air bubbles in the conductivity cell.

2. Press "MODE" key to enter into the desired measurement mode. The message "rAGE" (range) may appear briefly on the display indicating auto-ranging; this is normal. Allow temperature to stabilize.

D. Save, Recall and Delete Data

a. Saving readings to memory.

1. In compensated conductivity, salinity, total dissolved solids (TDS) and uncompensated conductivity 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.

2. 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.

b. Recalling readings from memory.

1. To recall saved data, press “ENTER” key at the Recall interface to go into “Recall” mode.

2. Press the “UP” or “DOWN” keys to select the storage site number.

3. Press “MODE” key to exit “Recall” mode.

c. Deleting data.

1. Press the “ENTER” key at the Delete interface to go into “Delete” mode.

2. Select “Delete All” or “Delete Each” mode by pressing the “UP” or “DOWN” key.

3. In the “Delete all” mode, press “ENTER” key to clear all stored data. Deletion is now complete.

4. In the “Delete Each” mode, use “UP” and “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.

5. Press “MODE” key to exit “Delete” mode.

ERROR DISPLAYS AND TROUBLESHOOTING

<table>
<tr><th>Main Display</th><th>Secondary Display</th><th>Possible Cause(s)</th><th>Corrective Action(s)</th></tr>
<tr><td>"OvEr" during measurements</td><td>/</td><td>• Conductivity is > 200.0mS (K=0.475).
• Conductivity is > 200.0uS (K=0.1)
• Salinity is > 70.0ppt.</td><td rowspan="2">•Ensure the probe is immersed at least 2”~3” or 5~7cm from the tip, below the surface of the sample/standard solution.
•Allow sufficient time for the electrode and Temp probe to stabilize.
• Recalibrate with correct value for the conductivity standard.
•Replace conductivity standard.
•Clean cell.</td></tr>
<tr><td>"OvEr " during calibration</td><td>/</td><td>Cell Constant Calibration is out of range.</td></tr>
<tr><td rowspan="2">"OvEr " during measurements</td><td>ovr</td><td>Temperature > 90.0℃</td><td rowspan="2">Decrease/Increase the sample temperature.</td></tr>
<tr><td>udr</td><td>Temperature < -10.0℃</td></tr>
</table>

[Note: If the unit 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 to 475.0uS/cm 475 to 4750uS/cm 4.75 to 47.50mS/cm 47.5 to 200.0mS/cm	0.1uS/cm 1uS/cm 0.01mS/cm 0.1mS/cm	±0.5% Full Scale
Conductivity K=0.1	0.00 to 99.99uS/cm 100.0 to 200.0uS/cm	0.01uS/cm 0.1uS/cm	±0.5% Full Scale
Salinity	0.0 to 70.0ppt	0.1ppt	±0.2% Full Scale
Temperature	-10.0 to 90.0 °C	0.1 °C	±0.2°C or ±0.4% Full Scale, whichever is greater.

Reference Temperature	15.0 to 25.0 °C
Temperature Coefficient	0.0% to 4.0%
Cell Constant	Four-wire cell: K=0.475 and two-wire cell: K=0.1
TDS Constant Range	0.30 to 1.00
Power	9Volt battery
Calibration Back-up	EEPROM
Datalogging capabilities	50 data sets
Automatic shut off function	30 minutes of non-use
Audio Feedback	All Touch Keys
Display(Conductivity/ Salinity /TDS/mV : Temp)	12mm : 8mm high LCD
Ambient Temperature Range	0 to 50 °C
Relative Humidity	At 90% RH
Case	IP65 waterproof
Dimensions (W x D x H)	70mm x 198mm x 37mm
Weight	260 grams (Batteries included)

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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