

JENCO®

QUALITY INSTRUMENTS

Operation Manual

MODEL 6179M

**Microcomputer Based
pH/ORP/ION/Temperature
Benchtop Meter**

6179M

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GENERAL INTRODUCTION

Thank you for selecting the 6179M meter. The 6179M is a precision tool that measures pH, mV, ion concentration and temperature. A built-in microprocessor stores, calculates and compensates for all parameters related to pH determinations including pH electrode temperature characteristics, electrode slope deviations, offset and buffer solutions.

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:DC 9 V). 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 pH, mV, Rmv, ion and temperature measurements along with user prompts and mode indicators. The unit prompts the user through calibration and measurement procedures.

An AUTOLOCK feature for pH, mV (RmV) and ion measurements enables the unit to automatically sense the end point and "LOCK" the display to indicate the end point value of a measurement. AUTOLOCK and user prompts help eliminate most errors in determining pH, mV (Rmv), ion values, resulting in precise, repeatable and error-free measurements. The 6179M can also be used in non-AUTOLOCK mode.

The unit is also equipped with a non-volatile memory allowing the user to store 750 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 6179M is available with pH, ORP, ion and ATC (Automatic Temperature Compensation) probes. Other features include up to 5 point calibration for pH, 2 to 5 point calibration for ion, 1 point calibration for ORP, electrode offset recognition, electrode slope recognition, electrode efficiency display, built-in buffer coefficients, automatic or manual 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 6179M can be powered by an UL/CE approved 100 to 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 in 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.

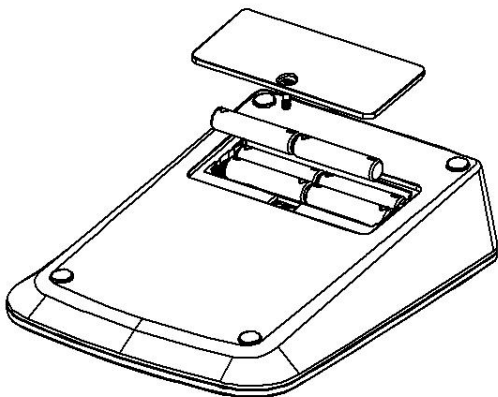


Figure 1: Battery compartment

CONNECTORS

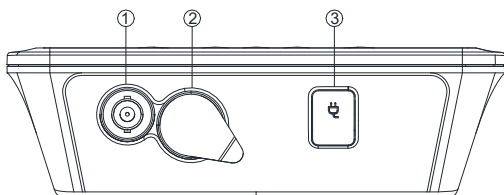


Figure 2: Connector

1. pH/ORP/ISE connector (BNC connector)
2. ATC connector (8 PIN connector)
3. AC adaptor input connector

DISPLAY & KEYS FUNCTIONS

A. Display

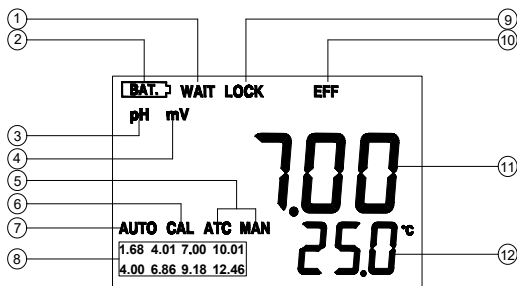


Figure 3: Active LCD screen

<p>1. WAIT- This will be displayed when the unit is still waiting for a stable reading or end point sensing.</p>	<p>7. AUTO- AUTOLOCK mode indicator.</p>
<p>2. BAT- Low battery indicator.</p>	<p>8. Buffer selection- This indicator will flash if the unit is not yet calibrated. This indicator will remain lit-up if the unit has been calibrated.</p>

3. pH- Unit and mode indicators.	9. LOCK- This will indicate that the reading is frozen during AUTOLOCK mode.
4. mV (RmV)- Unit and mode indicators.	10. EFF- This will be displayed if the user is viewing the efficiency of the electrode.
5. ATC/MAN- ATC indicator will be displayed if a temperature probe is connected otherwise the MAN indicator will be displayed.	11. MAIN DISPLAY- For pH, mV (RmV), ion and probe efficiency values
6. CAL- This will be displayed when the unit enters into the calibration mode.	12. SECONDARY DISPLAY- For temperature in °C.

B. Operational keys description

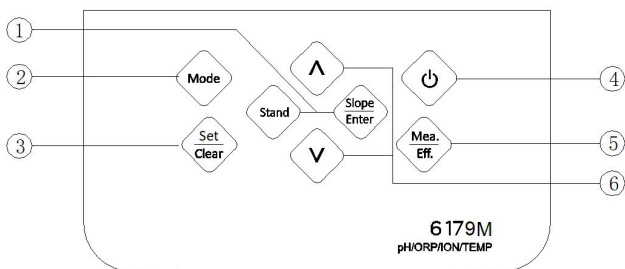









Figure 4

NO.	Key	Description
1	 	<p>Stand & Slope/Enter- These two keys are used for pH, ORP and ion calibration. For their specific functions, please see the "calibration" section in each parameter. In the measure mode, press "Slope/Enter" key for 2 seconds to save reading into the data storage site. At the Recall interface, press "Slope/Enter" key to display the last set of saved data. In the "Delete All" mode, press "Slope/Enter" and enters the selection screen. In the "Delete One" mode, press "Slope/Enter" key to delete a single set of data.</p>

2		<p>Mode- Selects display mode. Pressing this key changes the display sequentially to display pH-AUTOLOCK, mV (RmV)-AUTOLOCK, ION-AUTOLOCK, pH , mV (RmV), ion, Recall, Delete One and Delete ALL. The calibration values will not be affected by changing the display modes. In the calibration mode, press “Mode” key to exit calibration mode. In “Recall” and “Delete” modes, press “Mode” key to exit “Recall” and “Delete” modes respectively.</p>
3		<p>Set/Clear- In the measure mode, when the “Set/Clear” key is pressed for 5 seconds, all segments of the LCD will be on. The meter clears all calibration values stored in internal memory. In the pH mode, press the “Set/Clear” key to enter the buffer set selection screen. In the ion mode, press the “Set/Clear” key to enter the calibration point selection mode.</p>
4		<p>On/Off- Press and hold this key for 2 seconds to power on and shut off the meter.</p>
5		<p>Mea./Eff.- This key is used to bring the unit out of the AUTOLOCK condition when operating in the pH-AUTOLOCK, mV (RmV) - AUTOLOCK or ion-AUTOLOCK mode. In the pH or ion measure mode, press and hold this key for 5 seconds, the LCD will display the efficiency of the electrode and the offset value. In the ORP measure mode, press and hold this key for 5 seconds, the LCD will display the offset value of the electrode.</p>
6		<p>Up & Down- In the pH/ORP/ION 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 ORP calibration mode, these two keys are used to adjust the RmV display value. In the “Set” mode, these two keys are used to choose the corresponding settings. In the “Recall” mode, view saved data and data storage site number by pressing these keys. In the “Delete One” mode, view to be deleted data and data site numbers by pressing these keys.</p>

OPERATIONAL PROCEDURES

A. pH Buffer Set Selection

The 6179M meter has two buffer sets: 1.68, 7.00, 4.01, 10.01, 12.46 pH and 1.68, 6.86, 4.00, 9.18, 12.46 pH.

In pH mode, press “**Set/Clear**” key to enter the buffer set selection mode. Use “**Up**” or “**Down**” key to select the preferred buffer set. Press “**Slope/Enter**” key to save the selected buffer set.

[**Note:** There is no need to repeat this procedure every time the unit is power up unless one decides to change the buffer settings.]

B. pH Calibration

The 6179M uses up to 5 point calibration.

[**Note:** If the device is required to perform more than one calibration points, the first calibration point must be 6.86/7.00 pH.]

1. Calibration with an ATC/Temp probe in the pH-AUTOLOCK mode.

- a. Turn the unit on. In the pH mode, press “**Set/Clear**” key for 5 seconds, all LCD elements will lit up. The meter clears all calibration values stored in internal memory.
- b. Connect the pH electrode to the BNC connector and the ATC/Temp probe to the ATC/Temp connector of the unit.
- c. Press “**Mode**” key to go to pH-AUTOLOCK mode. “ATC” icon, “pH” icon and “AUTO” icon will lit up. The “CAL” icon begins to flash.
- d. Rinse the pH and ATC/Temp probes in distilled water and immerse them in the first buffer solution. Allow temperature reading to stabilize, then press and hold “**Stand**” key for 2 seconds to calibrate. The “**WAIT**” icon will flash until the unit detects a stable reading. Once the unit calibrates the first point, the selected buffer will lit up while two other selectable buffers start to flash. The unit is ready to be sloped at the second buffer if the first buffer solution is 6.86 or 7.00 pH.

[**Note:** At this moment, press the “**Mode**” key, the unit will exit the calibration mode. Single point calibration is complete.

To continue with two or more point calibration, the first buffer solution has to be either 7.00 or 6.86 pH.]

- e. Rinse the pH and ATC/Temp probe in distilled water and immerse them in the second buffer solution (either 4.00 / 4.01 pH or 9.18 / 10.01 pH corresponding to the flashing number on display). Allow temperature reading to stabilize, then press **“Slope/Enter”** key to calibrate. The **“WAIT”** icon will flash until the unit detects a stable reading. Once the unit calibrates the second point, the selected two buffers lit up and the remaining buffer starts to flash. The unit is ready to be sloped at the third buffer.

[Note: At this moment, press the **“Mode”** key, the unit will exit the calibration mode. Dual point calibration is complete.]

- f. The third point, the fourth point and the fifth point are the same as the second calibration point. When the unit completed the fifth point calibration, press the **“Mode”** key and exit calibration mode.
- g. The unit calculates and compensates for the pH electrode slope deviation corresponding to the values of the calibrated buffers. After calibration, press and hold **“Mea./Eff.”** key for about 5 seconds to display the new electrode efficiency and offset value.

2. Calibration with manual temperature compensation in the pH-AUTO LOCK mode.

- a. Turn the unit on. In the pH mode, press **“Slope/Enter”** key to save the selected buffer set. Press **“Set/Clear”** key for 5 seconds, all LCD elements will lit up. The meter clears all calibration values stored in internal memory.
- b. Connect the pH electrode to the BNC connector of the unit.
- c. Press **“Mode”** key to go to pH-AUTOLOCK mode. **“MAN”** icon, **“pH”** icon and **“AUTO”** icon will lit up. The **“CAL”** icon begins to flash.
- d. Rinse the pH probes in distilled water and immerse it in the first buffer solution. Adjust the temperature reading to that of the first buffer using the **“Up”** or **“Down”** key (0.0 to 60.0 °C). Then press and hold **“Stand”** key for 2 seconds to calibrate. The **“WAIT”** icon will flash until the unit detects a stable reading. Once the unit calibrates the first point, the selected buffer remains lit up while two other selectable buffers start to flash. The unit is ready to be

sloped at the second buffer if the first buffer solution is 6.86 or 7.00 pH.

[Note: At this moment, press the “**Mode**” key, the unit will exit the calibration mode. Single point calibration is complete.

To continue with two or more point calibration, the first buffer solution has to be either 7.00 or 6.86 pH.]

- e. Repeat steps “e” of “**Calibration with an ATC/Temp probe in the pH-AUTOLOCK mode**” for 2 to 5 point calibration.
- f. The unit calculates and compensates for the pH electrode slope deviation corresponding to the values of the calibrated buffers. After calibration, press and hold “**Mea./Eff.**” key for about 5 seconds to display the new electrode efficiency and offset value.

3. **Calibration with an ATC/Temp probe in the pH NON-AUTOLOCK mode.**

- a. Turn the unit on. In pH mode, press “**Set/Clear**” key for 5 seconds, all LCD elements will lit up. The meter clears all calibration values stored in internal memory.
- b. Connect the pH electrode to the BNC connector and the ATC/Temp probe to the ATC/Temp connector of the unit.
- c. Press “**Mode**” key for the LCD to display pH and the AUTOLOCK annunciator is off. “ATC” icon will lit up, “pH” icon is on. The “CAL” icon will begin to flash.
- d. Rinse the pH and ATC/Temp probes in distilled water and immerse them in the first buffer solution. Allow temperature reading to stabilize. Then press and hold “**Stand**” key for 2 seconds to calibrate, the unit immediately calibrates the first point, the selected buffer remains lit up while two other selectable buffers start to flash. The unit is ready to be sloped at the second buffer if the first buffer solution is 6.86 or 7.00 pH.

[Note: At this moment, press the “**Mode**” key, the unit will exit the calibration mode. Single point calibration is complete.

To continue with two or more point calibration, the first buffer solution has to be either 7.00 or 6.86 pH.]

- e. Rinse the pH and ATC/Temp probe in distilled water and immerse them in the second buffer solution (either 4.00/4.01 pH or 9.18/10.01 pH corresponding to the

flashing number on display). Allow temperature reading to stabilize, then press "**Slope/Enter**" key to calibrate. The unit immediately calibrates the second point, the selected two buffers lit up and the remaining buffer starts to flash. The unit is ready to be sloped at the third buffer.

[**Note:** At this moment, press the "**Mode**" key, the unit will exit the calibration mode. Dual point calibration is complete.]

- f. The third point, the fourth point and the fifth point are the same as the second point calibration. When the unit completed the fifth calibration point, press the "**Mode**" key and exit calibration mode.
- g. The unit calculates and compensates for the pH electrode slope deviation corresponding to the values of the calibrated buffers. After calibration, press and hold "**Mea./Eff.**" key for about 5 seconds to display the new electrode efficiency and offset value.

4. Calibration with manual temperature compensation in the pH NON-AUTOLOCK mode.

- a. Turn the unit on. In pH-NON-AUTOLOCK mode, press "**Set/Clear**" key for 5 seconds, all LCD elements will lit up. The meter clears all calibration values stored in internal memory.
- b. Connect the pH electrode to the BNC connector of the unit.
- c. Press "**Mode**" key for the LCD to display pH and the AUTOLOCK annunciator is off. "MAN" icon will lit up, "pH" icon is on. The "CAL" icon will begin to flash.
- d. Rinse the pH electrode in distilled water and immerse it in the first buffer solution. Adjust the temperature reading to that of the first buffer using the "**Up**" or "**Down**" key (0.0 to 60.0 °C) before pressing "**Stand**" key. Then press and hold "**Stand**" key for 2 seconds to calibrate. The unit immediately calibrates the first point. The selected buffer remains lit up while the remaining buffers start to flash. The unit is ready to be sloped at the second buffer if the first buffer solution is 6.86 or 7.00 pH.

[**Note:** At this moment, press the "**Mode**" key, the unit will exit the calibration mode. Single point calibration is complete.

To continue with two or more point calibration, the first buffer solution has to be either 7.00 or 6.86 pH.]

- e. Repeat steps “e” of “**Calibration with an ATC/Temp probe in the pH NON- AUTOLOCK mode**” for 2 to 5 point calibration.
- f. The unit calculates and compensates for the pH electrode slope deviation corresponding to the values of the calibrated buffers. After calibration, press and hold “**Mea./Eff.**” key for about 5 seconds to display the new electrode efficiency and offset value.

C. pH Measurements

To take pH measurements, 6179M must be calibrated before first use.

1. Measurement with an ATC/Temp probe in the pH-AUTOLOCK mode.

- a. Connect the pH electrode to the BNC connector and the ATC/Temp probe to the ATC/Temp connector of the meter. The “ATC” icon will lit up.
- b. Press “**Mode**” key until “pH”, “AUTO”, “ATC”, “buffer” icons lit up. The “WAIT” icon will begin to flash.
- c. Rinse the pH electrode and ATC/Temp probe with distilled water and immerse in the sample to be measured. Remove any air bubbles trapped around the probe by shaking or stirring the probe.
- d. Press the “**Mea./Eff.**” key. The “WAIT” icon will start flashing. The unit is waiting for a stable reading. The display will track the pH value as sensed by the pH electrode and the ATC/Temp probe.
- e. When the “WAIT” icon disappears, the reading is then “LOCK” and will not respond to further changes from the sample. The pH value shown is the pH value of the sample at the displayed sample temperature.

[**Note:** For samples that are inherently unstable, the unit will not AUTOLOCK. In this case, use the pH NON-AUTOLOCK mode for measurements.]

2. Measurement with manual temperature compensation in the pH-AUTOLOCK mode.

- a. Connect the pH electrode to the BNC connector of the meter. The “MAN” icon will lit up. Set unit to display the sample temperature by pressing “**Up**” or “**Down**” key (0.0

to 100.0 °C).

- b. Press the **“Mode”** key until “pH”, “AUTO”, “MAN”, “buffer”, icons lit up. The “WAIT” icon will begin to flash.
- c. Repeat steps **“c”** to **“e”** of **“Measurement with an ATC/Temp probe in the pH- AUTOLOCK mode”**.

3. Measurement with an ATC/Temp probe in the pH NON-AUTOLOCK mode.

- a. Connect the pH electrode to the BNC connector and the ATC/Temp probe to the ATC/Temp connector of the meter. The “ATC” icon will lit up.
- b. Press the **“Mode”** key until “pH”, “ATC”, “buffer” icons lit up.
- c. Rinse the pH electrode and ATC/Temp probe with distilled water and immerse in the sample to be measured. Remove any air bubbles trapped around the probe by shaking or stirring the probe.
- d. Allow sufficient time for the display to stabilize. The meter will display the pH value of the sample at the displayed sample temperature.

4. Measurement with manual temperature compensation in the pH NON-AUTOLOCK mode.

- a. Connect the pH electrode to the BNC connector of the unit. The “MAN” icon will lit up. Set unit to display the sample temperature by pressing the **“Up”** or **“Down”** key (0.0 to 100.0 °C).
- b. Press **“Mode”** key until “pH”, “MAN”, “buffer” icons lit up.
- c. Repeat steps **“c”** and **“d”** of **“Measurement with an ATC/Temp probe in the pH NON- AUTOLOCK mode”**.

D. Temperature Measure

The 6179M can measure temperature independently with the ATC/Temp probe without using the pH electrode. Place the ATC/Temp probe in the sample. The unit will display the measured temperature.

E. mV Offset

1. Turn the unit on. In mV mode, press **“Set/Clear”** key for 5 seconds, all LCD elements will lit up. The meter clears all

calibration values stored in internal memory.

2. Connect the ORP electrode to the BNC connector of the unit.
3. Press "**Mode**" key for the LCD to display "MAN", "mV" and "AUTO" icons will lit up. The "WAIT" icon begins to flash.
4. Rinse the ORP probe in distilled water and immerse it in the standard solution. Then press and hold "**Stand**" key for 2 seconds to calibrate. The "CAL" , "RmV" and "MAN" icons will lit up. According to the mV (RmV) value displayed, press the "**Up**" or "**Down**" key to adjust the display value to the same value as the standard solution. Press the "**Slope/Enter**" key to save and complete the calibration.
5. Press and hold "**Mea./Eff.**" key for about 5 seconds to display the new electrode offset value.

F. mV (RmV) Measurements

1. Measurement in the mV (RmV)-AUTOLOCK mode.

- a. Connect the optional combination ORP electrode to the BNC connector of the unit.
- b. Press "**Mode**" key until "mV" or "RmV" icon, "MAN", "AUTO" icons lit up. The "WAIT" icon begins to flash.
- c. Rinse the ORP electrode with distilled water and immerse it in sample to be measured. Remove any air bubbles trapped around the electrode by shaking or stirring the electrode.
- d. Press the "**Mea./Eff.**" key. The "WAIT" icon will start flashing. The unit is waiting for a stable reading. The display will track the mV (RmV) value as sensed by the ORP electrode.
- e. When the "WAIT" icon disappears and the "LOCK" icon appears, the meter will not respond to further changes from the sample. The mV (RmV) value is the sample reading

[Note: For samples that are inherently unstable, the unit will not AUTOLOCK. In this case, use the mV (RmV) NON- AUTOLOCK mode for measurements.]

2. Measurement in the mV (RmV) NON-AUTOLOCK mode.

- a. Connect the optional combination ORP electrode to the BNC connector of the unit.

- b. Press the **“Mode”** key until **“mV”** or **“RmV”** and **“MAN”** icons lit up.
- c. Rinse the ORP electrode with distilled water and immerse it in sample to be measured. Remove any air bubbles trapped around the electrode by shaking or stirring the electrode.
- d. Allow sufficient time for the display to stabilize. The meter will display the mV (RmV) value of the sample.

G. ION Calibration

The 6179M can measure ion concentration when using an ion selective electrode (ISE) for the specific ion of interest. The available ion calibration values are 0.10, 1.0, 10.0, 100.0, and 1000. Choose a minimum of 2 consecutive values for calibration and prepare the corresponding ion calibration solutions. For best results always begin with the lowest standard value, followed by the next lowest standard. The 6179M uses 2 to 5 point calibration.

1. Calibration in the ION-AUTOLOCK mode.

- a. Turn the unit on. In ION-AUTOLOCK mode, press **“Set/Clear”** key for 5 seconds, all LCD elements will lit up. The meter clears all calibration values stored in internal memory.
- b. Press the **“Set/Clear”** key to enter the calibration point selection screen. Using the **“Up”** or **“Down”** key to select 2 to 5 point calibration.
- c. Press **“Slope/Enter”** key to enter the monovalent ion/divalent ion selection screen. Using the **“Up”** or **“Down”** key to select. Press **“Slope/Enter”** key to save.
- d. Connect the ISE to the BNC connector of the unit.
- e. Press the **“Mode”** key for the LCD to display **“MAN”** and **“AUTO”** icons will lit up. The **“CAL”** icon will begin to flash.
- f. Rinse the ISE in distilled water and immerse it in the first standard solution. Press and hold **“Stand”** key for 2 seconds to calibrate. The **“CAL”** & **“AUTO”** icons will lit up. The main display will show **“- - -”**, the secondary display will show corresponding ion calibration value (0.10, 1.0, 10, 100). Using the **“Up”** or **“Down”** key to select the first point calibration value. Press **“Slope/Enter”** key to save.

- g. Press "**Slope/Enter**" key. The mV value of the standard solution will appear on the main display. The "Wait" icon will flash until the meter detects a stable value. When the "Wait" icon disappears and the ion calibration value on the secondary screen moves up to the next value, the first point calibration is complete and the meter is ready for the second point calibration.
- h. Rinse the ISE in distilled water and immerse it in the second standard solution. Press "**Slope/Enter**" key. The "Wait" icon will flash until the meter detects a stable reading. When the "Wait" icon disappears and the ion calibration value on the secondary screen moves up to the next value, the second point calibration is complete and the meter is ready for the third point calibration.
- i. To continue with the third, the fourth and the fifth point calibration, repeat step "g". Press "**Mode**" key to exit calibration mode when the desired calibration points are completed.

[**Note:** The slope (mV difference between two consecutive points) is 15 to 90 mV.]

2. Calibration in the ION-NON-AUTOLOCK mode.

- a. Turn the unit on. In ION-NON-AUTOLOCK mode, press "**Set/Clear**" key for 5 seconds, all LCD elements will lit up. The meter clears all calibration values stored in internal memory.
- b. Press the "**Set/Clear**" key to enter the calibration point selection screen. Use "**Up**" or "**Down**" key to select 2 to 5 point calibration.
- c. Press "**Slope/Enter**" key to enter the monovalent ion/divalent ion selection screen. Using the "**Up**" or "**Down**" key to select. Press "**Slope/Enter**" key to save.
- d. Connect the ISE to the BNC connector of the unit.
- e. Press "**Mode**" key for the LCD to display "MAN" icon will lit up. The "CAL" icon will begin to flash.
- f. Rinse the ISE in distilled water and immerse it in the first standard solution. Press and hold "**Stand**" key for 2 seconds to calibrate. The "CAL" icon will lit up. The main display will show "- - -", the secondary display will show corresponding ion calibration value (0.10, 1.0, 10, 100). Using the "**Up**" or "**Down**" key to select the first point calibration value. Press "**Slope/Enter**" key to save.

- g. Press **“Slope/Enter”** key. The mV value of the standard solution. When the mV value of the standard solution is stable, press **“Slope/Enter”** key to save. The ion calibration value on the secondary screen moves up to the next value. The first point calibration is complete and the meter is ready for the second point calibration.
- h. Rinse the ISE in distilled water and immerse it in the second standard solution. When the mV value of the standard solution is stable, press **“Slope/Enter”** key to save. The ion calibration value on the secondary screen moves up to the next value. The second point calibration is complete and the meter is ready for the third point calibration.

[Note: At this moment, press the **“Mode”** key, the unit will exit the calibration mode. Double point calibration is complete.]

- i. To continue with the third, the fourth and the fifth point calibration, repeat step **“h”**. Press **“Mode”** key to exit calibration mode when the desired calibration points are completed.

[Note: The slope (mV difference between two consecutive points) is 15 to 90 mV.]

H. ION Measurements

1. Measurement in the ION-AUTOLOCK mode.

- a. Connect the ISE to the BNC connector of the meter.
- b. Press **“Mode”** key until **“AUTO”** and **“MAN”** icons lit up.
- c. Rinse the ISE with distilled water and immerse it in sample to be measured.
- d. Press the **“Mea./Eff.”** key. The **“WAIT”** icon will start to flash. The unit is waiting for a stable reading. The display will track the ion value as sensed by the ion selective electrode.
- e. When the **“WAIT”** icon disappears, the reading is then **“LOCK”** and will not respond to further changes from the sample. The ion value is the sample reading.

[Note: For samples that are inherently unstable, the unit will not AUTOLOCK. In this case, use the ION NON-AUTOLOCK mode for measurements.]

2. Measurement in the ION NON-AUTOLOCK mode.

- Connect the optional combination ion selective electrode to the BNC connector of the unit.
- Press **“Mode”** key until the **“MAN”** icon lit up.
- Rinse the ISE with distilled water and immerse it in sample to be measured.
- Allow sufficient time for the display to stabilize. The meter will display the ion value of the sample.

I. Ion Selective Electrodes

The table below lists the most common electrodes available.

Ammonia (NH ₃)	Iodide (I ⁻)
Ammonium (NH ₄ ⁺)	Lead (Pb ⁺²)
Bromide (Br ⁻)	Lithium (Li ⁺)
Cadmium (Cd ⁺²)	Nitrate (NO ₃ ⁻)
Calcium (Ca ⁺²)	Nitrogen Oxide (NO _x)
Carbon Dioxide (CO ₂)	Perchlorate (ClO ₄ ⁻)
Chloride (Cl ⁻)	Potassium (K ⁺)
Copper (Cu ⁺²)	Silver / Sulfide (Ag ⁺ / S ⁻²)
Cyanide (CN ⁻)	Sodium (Na ⁺)
Fluoride (F ⁻)	Surfactant (X ⁺ , X ⁻)
Fluoroborate (BF ₄ ⁻)	Water Hardness

J. Save, Recall and Delete Data

1. Saving readings to memory.

- In the measure modes, press and hold **“Slope/Enter”** key for 2 seconds to save data. The **“ID”** icon and number with the corresponding site number will lit up for a brief moment to indicate a successful data save. Saving is now complete.
- If the **“Full”** is displayed, this means that all 750 data saving sites are used up. No new data can be saved until existing saved data are deleted.

2. Recalling readings from memory.

- Press **“Mode”** key until the **“dAtA rCL”** will show. Press **“Slope/Enter”** key to go into **“Recall”** mode.
- 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 "dEL onE" or "dEL ALL" will be displayed. Then press the "**Slope/Enter**" key to go into the corresponding "Delete one" or "Delete ALL" mode.
- b. In the "Delete ALL" mode, press the "**Slope/Enter**" and enters the selection screen. Using the "**Up**" or "**Down**" key to select "YES" or "no" for clearing all stored data. To clear all data, must select "YES" and press the "Slope/Enter" key. "nonE" will be displayed after data is completely deleted.
- c. In the "Delete one" mode, press the "**Slope/Enter**" and enters the selection screen. Using the "**Up**" or "**Down**" key to select data to be deleted. Then press "**Slope/Enter**" key to delete. Deletion is now complete. The next set of saved data will automatically move up a slot in the storage site.
- d. Press "**Mode**" key to exit "Delete" mode.

K. pH Buffers

The temperature coefficient of pH calibration buffers 1.68, 4.00, 4.01, 6.86, 7.00, 9.18 , 10.01 and 12.46 pH are stored inside the meter. The buffers used to calibrate the meter must exhibit the same temperature characteristics as the stored values.

Temperature coefficient of the pH buffers

°C	1.68	4.00	6.86	9.18	4.01	7.00	10.01	12.46
0	1.67	4.01	6.98	9.46	4.01	7.11	10.32	13.42
5	1.67	4.00	6.95	9.39	4.01	7.08	10.25	13.21
10	1.67	4.00	6.92	9.33	4.00	7.06	10.18	13.01
15	1.67	4.00	6.90	9.28	4.00	7.03	10.12	12.80
20	1.68	4.00	6.88	9.23	4.00	7.01	10.06	12.64
25	1.68	4.00	6.86	9.18	4.01	7.00	10.01	12.46
30	1.68	4.01	6.85	9.14	4.01	6.98	9.97	12.30
35	1.69	4.02	6.84	9.10	4.02	6.98	9.93	12.13
40	1.69	4.03	6.84	9.07	4.03	6.97	9.89	11.99
45	1.70	4.04	6.83	9.04	4.04	6.97	9.86	11.84
50	1.71	4.06	6.83	9.02	4.06	6.97	9.83	11.71
55	1.72	4.07	6.83	8.99	4.08	6.97	9.80	11.57
60	1.72	4.09	6.84	8.97	4.10	6.98	9.78	11.45

[Note: The actual reading of the instrument can differ from the values shown by ± 0.01 pH]

ERROR DISPLAYS AND TROUBLESHOOTING

Main Display	Possible cause(s)	Corrective Action(s)
"Er1"	<ol style="list-style-type: none"> 1. "Stand" was pressed before the electrode and ATC/Temp probe settled to within +/-1.00 pH of the buffer value. 2. pH electrode offset is greater/less than +/-1.00 pH. 3. pH electrode is faulty. 	<ol style="list-style-type: none"> 1. Press "Set/Clear" key. Allow sufficient time for the electrode and ATC/Temp probe to stabilize. Re-press "Stand" key to start the calibration procedure. 2. Replace the buffer and/or the pH electrode. Press "Set/Clear" key to recalibrate meter. 3. Replace electrode.
"Er2"	<ol style="list-style-type: none"> 1. "Slope/Enter" was pressed before the electrode and ATC/Temp probe settled to within 30% of the buffer value. 2. Buffer 1.68, 4.00, 4.01, 9.18, 10.01 and 12.46 pH is not correct. 3. pH electrode slope is off by more than 30% of ideal slope. 	<ol style="list-style-type: none"> 1. Allow sufficient time for the electrode and ATC/Temp probe to stabilize. Re-press "Slope/Enter" key to continue the calibration procedure. 2. Check if the correct buffer is used. 3. Replace the buffer and/or the pH electrode. Press "Set/Clear" key to recalibrate meter.
"Er3"	In pH calibration mode, temperature is out of the 0.0 to 60.0 °C range.	Bring the pH buffer temperature within range.
"Er4"	In ion calibration mode, the slope (mV difference between two consecutive points) is out of the 15 to 90 mV range.	<ol style="list-style-type: none"> 1. Replace the standard solution and/or the ISE. 2. Recalibrate meter.
"Er5"	In ion calibration mode, the end user exited the calibration mode before completing the number of pre-selected calibration points.	Recalibrate meter.
"over"/ "undr"	<ol style="list-style-type: none"> 1. Measured pH is out of the -2.00 to 16.00 pH range. 2. Measured mV (RmV) is out of the -1999.9 to 1999.9 mV range. 3. Measured ion is out of the 0 to 2000 range. 4. Measured temperature is out of the 0.0 to 100.0 °C range. 	<ol style="list-style-type: none"> 1. Bring sample pH into the correct measuring range. 2. Bring sample ORP into the correct measuring range. 3. Bring sample ion into the correct measuring range. 4. Bring sample temperature into the correct measuring range.

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

SPECIFICATIONS

Display	Range	Resolution	Accuracy
pH	-2.00 to 16.00 pH	0.01 pH	±0.01 pH
mV (RmV)	-1999.9 to 1999.9 mV	0.1 mV	±0.05% F.S.
Ion	0.01 to 2000	0.01, 0.1, 1	±0.5% F.S. (mono-valent) ±1.0% F.S. (di-valent)
Temperature	0.0 to 100.0 °C	0.1 °C	±0.2 °C

pH buffer recognition	1.68, 7.00, 4.01, 10.01, 12.46 pH or 1.68, 6.86, 4.00, 9.18, 12.46 pH
pH Temperature compensation	AUTO/MAN 0.0 to 100.0 °C
pH Buffer Temperature range	0 to 60.0 °C
pH calibration	Up to 5 point
mV calibration	1 point. Offset ±150 mV
Ion calibration	2 to 5 consecutive points, 0.1, 1.0, 10.0, 100.0 or 1000
Input impedance	>3 x 10 ¹² Ω
Temperature sensor	Thermistor, 10 kΩ at 25 °C
Power	6 X 1.5 V AAA Batteries or 100 to 240 V AC adapter
Calibration Back-up	EEPROM
Memory	750 sets
Audio Feedback	All Touch Keys
End Point Sensing & Hold	Yes
Screen	Segment LCD backlight
Ambient Temperature Range	0 to 50 °C
Relative Humidity	Up to 90%
Case	IP54
Dimensions (W x D x H)	150 x 210 x 45 mm
Weight	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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