



Operation Manual

Hand-held pH/mV/Temperature Meter



pH6810



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GENERAL INTRODUCTION

Thank you for selecting the pH6810 meter. The pH6810 is a precision tool that measure pH, mV 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 and buffer solutions.

This unit has a waterproof IP67 case. The touch mode keys are highly reliable with tactile and audio feedback. This meter uses four "AAA" batteries. Re-calibration is not required when power is restored.

The front of the meter has a large LCD that displays pH or mV and temperature simultaneously along with user prompts and mode indicators. The unit prompts the user through calibration and measurement procedures.

An AUTOLOCK feature for both pH and mV measurements enables the unit to automatically sense the end point and "HOLD" the display to indicate the end point value of a measurement. AUTOLOCK and user prompts help eliminate most errors in determining pH and mV values, resulting in precise, repeatable and error-free measurements. The pH6810 can also be used in non-AUTOLOCK mode.

The model pH6810 is available with pH, ORP and ATC (Automatic Temperature Compensation) probes. Other features include electrode offset recognition, electrode slope recognition, electrode efficiency display, built-in buffer coefficients, automatic or manual temperature compensation, long battery life, and 50/60Hz AC noise rejection. 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.

WATER PROOF

Though the pH6810 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 steps 1 and 2, call JENCO for possible repair or replacement (see Warranty).

INSTALLING THE BATTERIES

The pH6810 meter is packaged with 4 "AAA" alkaline batteries required for operation. To insert the batteries into the meter, follow the procedure outlined below.

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 20 minutes of no key activity.]

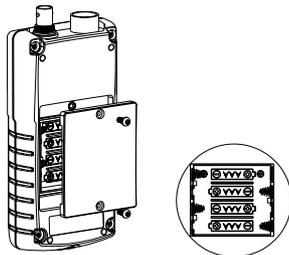


Figure 1: Battery compartment

DISPLAY & KEYS FUNCTIONS

A. Display

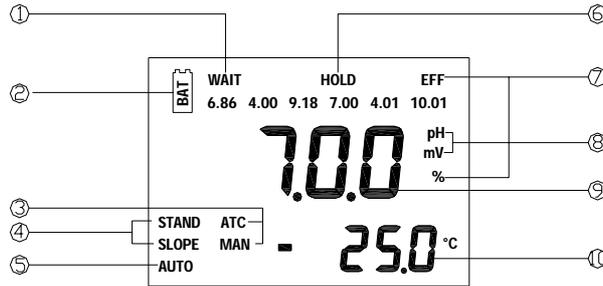


Figure 2: Active LCD screen

<p>1. WAIT- This will be displayed when the unit is still waiting for a stable reading or end point sensing.</p>	<p>6. HOLD- This will indicate that the reading is frozen during AUTOLOCK mode.</p>
<p>2. BAT- Low battery indicator.</p>	<p>7. EFF(%)- This will be displayed if the user is viewing the efficiency of the electrode. It is recommended to use a new electrode when the efficiency value is over than 75%.</p>
<p>3. ATC/MAN- ATC indicator will be displayed if a temperature probe is connected otherwise the MAN indicator will be displayed.</p>	<p>8. pH/mV- Unit and mode indicators.</p>
<p>4. STAND/SLOPE- This indicator will flash if the STAND or SLOPE is not yet calibrated. This indicator will remain lit-up if the STAND or SLOPE has been calibrated respectively.</p>	<p>9. Main display for pH, mV and probe efficiency values</p>
<p>5. AUTO- AUTOLOCK mode indicator.</p>	<p>10. Temperature and unit display</p>

B. Keys

	On/Off- Powers on and shuts off the meter.
	Mode- Selects display mode. Pressing this key changes the display sequentially to display pH-AUTOLOCK, mV-AUTOLOCK, pH and mV. The calibration values will not be affected by changing the display modes. In " pH calibration ", press "Mode" key to exit the two point calibration mode.
	Clear- It is used to clear the unit when error signal appears. It clears all calibration values stored in the internal memory. Under normal use the key will not be activated unless pressed and held for 2 seconds to prevent accidental erasing stored memory. When the Clear key is pressed, all segments of the LCD will be on. After about 2 seconds the unit will enter the pH-AUTOLOCK mode. The "AUTO" will be on and "STAND" will start to flash. This means that the unit must be calibrated.
	Up/Down- The two keys are used to manually enter the temperature values. They have no effect on the unit when operating in ATC mode.
 	Stand/Slope- The Stand and Slope keys are used for dual or three point pH calibration of the unit. Pressing and holding the Stand key while turning on the power, will change the buffer set to the other available buffer set.
	Mea. / Eff.- The key is used to bring the unit out of the AUTOLOCK condition when operating in the pH-AUTOLOCK or mV-AUTOLOCK mode. Press and hold this key for 5 seconds, the LCD will display the efficiency of the electrode.

OPERATIONAL PROCEDURES

A. Buffer Set Selection

The pH6810 meter has two buffer sets: 7.00, 4.01, 10.01pH and 6.86, 4.00, 9.18pH. The meter is factory pre-set at 7.00, 4.01 and 10.01pH.

To change the buffer set, turn off the unit, then press and hold the "Stand" key while turning on the unit again.

[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 pH6810 uses 2-point or 3-point calibration. The first point must be 6.86/7.00, and the second point can either be 4.00/4.01 or 9.18 / 10.01 .

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

1. Turn the unit on. Press "Clear" key for 2 seconds, all LCD elements will lit up. The meter clears all calibration values stored in internal memory.
2. Connect the pH electrode to the BNC connector and the ATC/Temp probe to the ATC/Temp connector of the unit: "ATC" icon will lit up. "pH" icon and "AUTO" icon lit up. The "STAND" icon will flash.
3. Rinse the pH and ATC/Temp probes in distilled water and immerse them in the first buffer solution (either 7.00 or 6.86). Allow temperature reading to stabilize, then press and hold "Stand" key for 5 seconds to calibrate. The "WAIT" icon will flash until the unit detects a stable reading. Once the unit calibrates the first point, the "SLOPE" icon will flash. The unit is ready to be sloped at the second buffer. .
4. Rinse the pH and ATC/Temp probe in distilled water and immerse them in the second buffer solution (either 4.00/4.01 or 9.18/10.01). Allow temperature reading to stabilize, then press "Slope" key to calibrate. The "WAIT" icon will flash until the unit detects a stable reading. Once the unit calibrates the second point, the "SLOPE" icon will 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.]

5. Rinse the pH and ATC/Temp probe in distilled water and immerse them in the third buffer solution (either 9.18/10.01 or 4.00/4.01). Allow temperature reading to stabilize, then press "Slope" key to calibrate. The "WAIT" icon will flash until the unit detects a stable reading. Once the unit calibrates the third point and the unit will automatically exit the calibration mode. Three points calibration is complete.
6. The unit calculates and compensates for the pH electrode slope deviation corresponding to the values of the three calibration buffers. After calibration, press and hold "Mea./Eff." key for about 5 seconds to display the new electrode efficiency.

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

1. Turn the unit on. Press "Clear" key for 2 seconds, all LCD elements will lit up. The meter clears all calibration values stored in internal memory.
2. Connect the pH electrode to the BNC connector of the unit, "MAN" icon will lit up. "pH" icon and "AUTO" icon lit up. The "STAND" icon will flash.
3. Rinse the pH probes in distilled water and immerse it in the first buffer solution (either 7.00 or 6.86). Adjust the temperature reading to that of the first buffer using the **up** or **down** keys (0.0 to 60.0) before pressing "Stand" key. Then press and hold "Stand" key for 5 seconds to calibrate. The "WAIT" icon will flash until the unit detects a stable reading. Once the unit calibrates the first point, the "SLOPE" icon will flash. The unit is ready to be sloped at the second buffer. .
4. Rinse the pH probe in distilled water and immerse it in the second buffer solution (either 4.00/4.01 or 9.18/10.01), then press "Slope" key to calibrate. The "WAIT" icon will flash until the unit detects a stable reading. Once the unit calibrates the second point, the "SLOPE" icon will 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.]

5. Rinse the pH probe in distilled water and immerse it in the third buffer solution (either 9.18/10.01 or 4.00/4.01), then press "Slope" key to calibrate. The "WAIT" icon will flash until the unit detects a stable reading. Once the unit calibrates the third point and the unit will automatically exit the calibration

mode. Three points calibration is complete.

6. The unit calculates and compensates for the pH electrode slope deviation corresponding to the values of the three calibration buffers. After calibration, press and hold "Mea./Eff." key for about 5 seconds to display the new electrode efficiency.

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

1. Turn the unit on. Press "Clear" key for 2 seconds, all LCD elements will lit up. The meter clears all calibration values stored in internal memory.
2. Connect the pH electrode to the BNC connector and the ATC/Temp probe to the ATC/Temp connector of the unit: "ATC" icon will lit up. "pH" icon is on. The "STAND" icon will flash.
3. Rinse the pH and ATC/Temp probes in distilled water and immerse them in the first buffer solution (either 7.00 or 6.86). Allow temperature reading to stabilize, then press and hold "Stand" key for 5 seconds to calibrate. Once the unit calibrates the first point, the "SLOPE" icon will flash. The unit is ready to be sloped at the second buffer. .
4. Rinse the pH and ATC/Temp probe in distilled water and immerse them in the second buffer solution (either 4.00/4.01 or 9.18/10.01). Allow temperature reading to stabilize, then press "Slope" key to calibrate. Once the unit calibrates the second point, the "SLOPE" icon will 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.]

5. Rinse the pH and ATC/Temp probe in distilled water and immerse them in the third buffer solution (either 9.18/10.01 or 4.00/4.01). Allow temperature reading to stabilize, then press "Slope" key to calibrate. Once the unit calibrates the third point and the unit will automatically exit the calibration mode. Three points calibration is complete.
6. The unit calculates and compensates for the pH electrode slope deviation corresponding to the values of the three calibration buffers. After calibration, press and hold "Mea./Eff." key for about 5 seconds to display the new electrode efficiency.

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

1. Turn the unit on. Press “Clear” key for 2 seconds, all LCD elements will lit up. The meter clears all calibration values stored in internal memory.
2. Connect the pH electrode to the BNC connector of the unit, “MAN” icon will lit up. Press “Mode” key until “pH” icon is on. The “STAND” icon will flash.
3. Rinse the pH probes in distilled water and immerse it in the first buffer solution (either 7.00 or 6.86). Adjust the temperature reading to that of the first buffer using the **up** or **down** keys (0.0 to 60.0) before pressing “Stand” key. Then press and hold “Stand” key for 5 seconds to calibrate. Once the unit calibrates the first point, the “SLOPE” icon will flash. The unit is ready to be sloped at the second buffer. .
4. Rinse the pH probe in distilled water and immerse it in the second buffer solution (either 4.00/4.01 or 9.18/10.01), then press “Slope” key to calibrate. Once the unit calibrates the second point, the “SLOPE” icon will 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.]

5. Rinse the pH probe in distilled water and immerse it in the third buffer solution (either 9.18/10.01 or 4.00/4.01), then press “Slope” key to calibrate. Once the unit calibrates the third point and the unit will automatically exit the calibration mode. Three points calibration is complete.
6. The unit calculates and compensates for the pH electrode slope deviation corresponding to the values of the three calibration buffers. After calibration, press and hold “Mea./Eff.” key for about 5 seconds to display the new electrode efficiency.

[Note: For accurate measurements, it is recommended that pH calibration is performed once a week and after replacing the electrode.]

C. pH Measurements

To take pH measurements, "STAND" and "SLOPE" icon must be on, indicating the unit is either dual-point or three-point calibrated and ready for measurements. If "STAND" and "SLOPE" flash, perform a pH calibration before taking measurements.

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

1. Connect the pH electrode to the BNC connector and the ATC/Temp probe to the ATC/Temp connector of the unit. The "ATC" icon will lit up.
2. Press "Mode" key until "pH" icon and "AUTO" icon lit up.
3. 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.
4. Press the "Mea." 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.
5. When the "WAIT" icon disappears, the reading is then "HOLD" 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.]

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

1. 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 and down keys(-10.0 to 120.0).
2. Press "Mode" key until "pH" icon and "AUTO" icon lit up.
3. Rinse the pH electrode 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.

4. Press the "Mea." 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 probe.
5. When the "WAIT" icon disappears, the reading is then "HOLD" and will not respond to further changes from sample. The pH value shown is the pH value of the sample at the set sample temperature.

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

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

1. Connect the pH electrode to the BNC connector and the ATC/Temp probe to the ATC/Temp connector of the unit. The "ATC" icon will lit up.
2. Press "Mode" key until "pH" icon lit up.
3. Rinse the pH electrode and ATC/temp probe with distilled water and immerse in the sample to be measured.
4. Allow sufficient time for the display to stabilize. The instrument will display the pH value of the sample at the displayed sample temperature.

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

1. Connect the pH electrode to the BNC connector of the unit. The "MAN" icon will lit up.
2. Press "Mode" key until "pH" icon lit up.
3. Rinse the pH electrode probe with distilled water and immerse in the sample to be measured.
4. Allow sufficient time for the display to stabilize. The instrument will display the pH value of the sample at the set sample temperature.

D. Temperature Measure

The pH6810 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 Measurements

a. Measurement in the mV-AUTOLOCK mode.

1. Connect the optional combination ORP electrode to the BNC connector of the unit.
2. Press "Mode" key until "mV" icon and "AUTO" icon lit up.
3. Rinse electrode with distilled water and immerse it in sample to be measured.
4. Press the "Mea." key. The "WAIT" icon will start flashing. The unit is waiting for a stable reading. The display will track the mV value as sensed by the ORP electrode
5. When the "WAIT" icon disappears, the reading is then "HOLD" and will not respond to further changes from the sample. The mV value is the sample reading.

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

b. Measurement in the mV NON-AUTOLOCK mode.

1. Connect the optional combination ORP electrode to the BNC connector of the unit.
2. Press "Mode" key until "mV" icon lit up.
3. Rinse electrode with distilled water and immerse it in sample to be measured.
4. Allow sufficient time for the display to stabilize. The instrument will display the mV value of the sample.

pH BUFFERS

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

Temperature coefficient of the pH buffers

	4.00	6.86	9.18	4.01	7.00	10.01
0	4.01	6.98	9.46	4.01	7.11	10.32
5	4.00	6.95	9.39	4.01	7.08	10.25
10	4.00	6.92	9.33	4.00	7.06	10.18
15	4.00	6.90	9.28	4.00	7.03	10.12
20	4.00	6.88	9.23	4.00	7.01	10.06
25	4.00	6.86	9.18	4.01	7.00	10.01
30	4.01	6.85	9.14	4.01	6.98	9.97
35	4.02	6.84	9.10	4.02	6.98	9.93
40	4.03	6.84	9.07	4.03	6.97	9.89
45	4.04	6.83	9.04	4.04	6.97	9.86
50	4.06	6.83	9.02	4.06	6.97	9.83
55	4.07	6.83	8.99	4.08	6.97	9.80
60	4.09	6.84	8.97	4.10	6.98	9.78

[Note: The actual reading of the instrument can differ from the values shown by $\pm 0.01\text{pH}$.]

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 +/-1.5 pH of the buffer value. 2. pH electrode offset is greater / less than +/-1.5 pH. 3. pH electrode is faulty. 	<ol style="list-style-type: none"> 1. Press "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 "Clear" key to recalibrate meter. 3. Replace electrode.
"Er2"	<ol style="list-style-type: none"> 1. "Slope" was pressed before the electrode and ATC/Temp probe settled to within 30% of the buffer value. 2. Buffer 4.00, 4.01, 9.18 and 10.01 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" key to continue the calibration procedure. 2. Check if the correct buffer is used. 3. Replace the buffer and /or the pH electrode. Press "Clear" key to recalibrate meter.
"Er3"	<ol style="list-style-type: none"> 1. Temperature is out of the 0.0 to 60.0°C range. 	<ol style="list-style-type: none"> 1. Bring the buffer temperature within range.
"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 is out of the -1999 to 1999 mV range. 3. Measured temperature is out of the -10.0 to 120.0°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 temperature into the correct measuring range.

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

SPECIFICATIONS

Display	Range	Resolution	Accuracy
pH	-2.00 to 16.00 pH	0.01 pH	±0.1%FS ± 2 digits
mV	-1999 to 1999 mV	1 mV	±0.1%FS ± 2 digits
Temperature	-10.0 to 120.0 °C	0.1 °C	±0.5°C

pH buffer recognition	pH 7.00, 4.01, 10.01 or pH 6.86, 4.00, 9.18
pH Temperature compensation	AUTO/MAN -10.0°C to 120.0 °C
pH Buffer Temperature range	0°C to 60.0°C
pH Electrode Offset recognition	±90 mV at pH 7.00 or 6.86
pH Electrode Slope recognition	±30% at pH 4.00, 4.01, 9.18 and 10.01
Input impedance	>10 ¹² Ω
Temperature sensor	Thermistor, 10 kΩ at 25°C
Power	Four "AAA" Batteries
Battery Life	~1000 Hours
Calibration Back-up	EEPROM
Audio Feedback	All Touch Keys
End Point Sensing & Hold	Yes
Display (pH /mV : Temp)	11mm : 7mm high LCD
Ambient Temperature Range	0 to 50 °C
Relative Humidity	up to 90%
Case	IP67 water-tight case
Dimensions (W x D x H)	75mm x 157mm x 35mm
Weight	230 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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