

# **OPERATION MANUAL**

---

---

**THE JENCO MODEL 6230  
MICROCOMPUTER BASED  
pH/mV/TEMP  
PORTABLE METER**

**JENCO** ELECTRONICS, LTD.  
MANUFACTURER OF PRECISION INSTRUMENTS

## GENERAL INTRODUCTION

The model 6230 is a precise instrument for the measurement of pH, mV, and temperature. A built-in microcomputer is used to store, calculate, and compensate for all the relevant parameters relating to pH determinations. These include temperature characteristics of the pH electrode, buffer solutions and electrode slope deviations.

This instrument is made with a watertight case, which makes it splash resistant. The mechanical touch keys are highly reliable with tactile and audio feedback. This meter can be operated either with 6 AAA batteries or with an AC adaptor. The batteries provide backup power for the internal memory to retain its calibration values, after the power is turned off. Re-calibration is not required when power is turned on again. The battery operation also allows the 6230 to withstand power line transients, when using the AC adaptor, without altering its internal memory.

The front of the meter has a large LCD that displays the pH(mV) and temperature values simultaneously along with the user prompting and mode indication annunciators. The instrument prompts the user through the calibration and measurement procedures.

An **AUTOLOCK** feature is provided for both pH and mV measurements. This enables the instrument to automatically sense the end point and “lock” the display to indicate the end point value of a measurement. The 6230 can also be used in the non-**AUTOLOCK** mode.

The **AUTOLOCK** and the user prompting features help eliminate virtually all human factors in the determination of pH and mV values, thus resulting in precise, repeatable and error free measurements.

The model 6230 uses pH and ORP electrodes with BNC connectors and interchangeable temperature sensor, built into the bulb of the pH electrode, ensures close temperature tracking to the pH sensing membrane.

Optional RS-232C can track all displayed values and interface the meter with recorders, printers, computers, etc.

Other features include power down memories, electrode offset recognition, electrode slope recognition, built-in buffer to coefficients, automatic or manual temperature compensation, CE approval, and high 50/60 Hz AC noise rejection. This meter is an universal “USER FRIENDLY” instrument for field, industrial and laboratory applications.

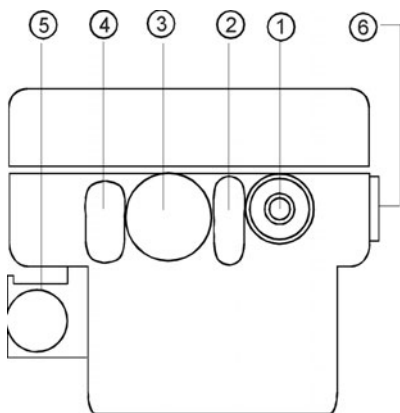
## INITIAL INSPECTION

Carefully unpack the instrument 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.

## SPLASH PROOF

The 6230 meter is splash resistant with a watertight case. The instrument should not be operated under water since the pH electrode is not waterproof. The splash proof feature is to prevent permanent damage to the instrument when accidentally splashed with non-corrosive solutions. Take the following measures immediately in the event that the instrument is dampened in any kind of solution:

1. Rinse the instrument thoroughly with distilled water. The connectors should be sprayed with a jet stream of water to remove all contamination that might create electrical leakage potential paths. This leakage path may reduce the impedance of the instrument and create polarization current between the pH and reference cells of the electrode.
2. Rinse the electrode and spray its connector in the same manner.
3. Wait for the instrument to be completely dry before resumption of operation.
4. Replace the pH electrode if satisfactory operation is not resumed.

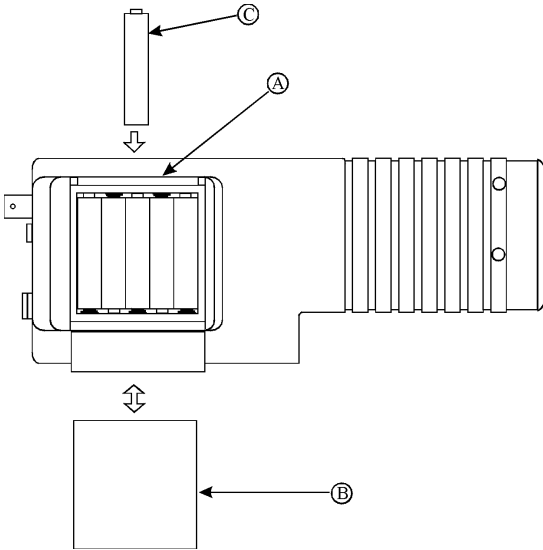


1. pH BNC CONNECTOR
2. REF ELECTRODE INPUT CONNECTOR
3. ATC INPUT CONNECTOR
4. AC ADAPTOR INPUT CONNECTOR
5. ELECTRODE HOLDER
6. RS-232C CONNECTOR

**FIGURE 1 TOP VIEW**

## CHANGING THE BATTERIES

1. Position the meter so that the left side of the meter is facing up. (**Refer to Figure 2**)  
With a coin, inset it in the closure slot on the side labeled **A**. With the coin tilted, thrust it upward to open the battery compartment and lift the closure up.
2. Insert the batteries and ensure polarities are correct.



- A. SIDE CLOSURE SLOT
- B. CLOSURE
- C. 6 AAA BATTERIES

**FIGURE 2 REAR VIEW (BATTERY COMPARTMENT)**

## TURN OFF INSTRUMENT

When the instrument is not in use, press the **ON/OFF** key to turn off the instrument. Unplugging the AC adaptor from the instrument or from the AC line does not turn off the instrument. It would automatically switch to the internal batteries. The instrument will continue to operate on the internal batteries.

## TOUCH KEYS FOR THE MODEL 6230

1. **ON/OFF** key:

The **ON/OFF** key turns the instrument ON and OFF. *The pH calibration values will not be erased when the instrument is turned off.*

2. **MODE** key:

The **MODE** key selects the parameters to be displayed. Pressing the **MODE** key changes the display sequentially to display **pH**, **mV**, **pH/AUTOLOCK**, and **mV/AUTOLOCK**. The calibration values will not be affected by changing the display modes.

3. **STAND** and **SLOPE** keys:

The **STAND** and **SLOPE** keys are used for dual point pH calibration of the instrument.

4. **UP** ( $\Delta$ ) and **DOWN** ( $\nabla$ ) keys:

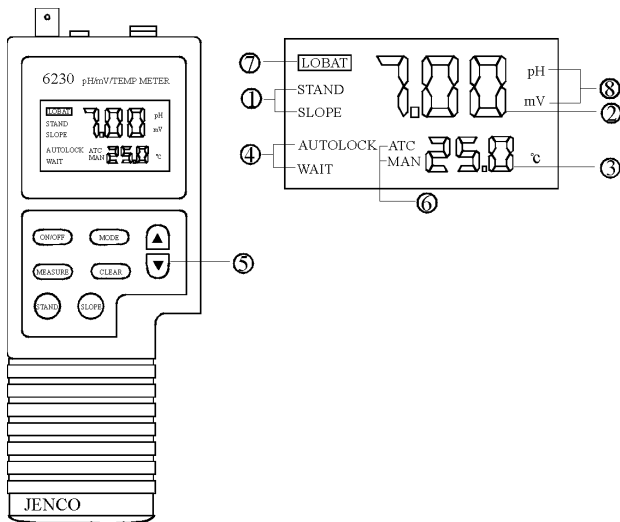
The  $\Delta$  and  $\nabla$  keys are used to manually enter temperature values. They have no effect on the instrument when operating in the Automatic Temperature Compensation (ATC) mode.

5. **MEASURE** key:

The **MEASURE** key is used to bring the instrument out of the **AUTOLOCK** condition when operating in the **pH/AUTOLOCK** or **mV/AUTOLOCK** mode.

6. **CLEAR** key:

The **CLEAR** key is used to clear the memory of the internal microcomputer. When the **CLEAR** key is pressed, all segments of the LCD display will be on. After approximately 2 seconds, the instrument enters into the **pH/AUTOLOCK** mode. The **AUTOLOCK** annunciator will be on and the **STAND** annunciator will start to flash. This means that the instrument is to be calibrated. The **CLEAR** key is to be used only when errors are made that require the instrument to be re-calibrated.



1. STAND & SLOPE INDICATORS
2. pH/mV/Temp VALUE DISPLAY
3. TEMPERATURE DISPLAY
4. AUTOLOCK & WAIT INDICATORS
5. ALL EIGHT CONTROL KEYPADS
6. ATC & MANUAL INDICATORS
7. LOW BATTERY INDICATOR
8. pH/mV MODE DISPLAY

**FIGURE 3 FRONT VIEW**

## MEASUREMENT ERROR INDICATIONS

Two groups of buffers can be used with this meter: (4.01, 7.00, & 10.01 for model 6230) or (4.01 6.86, & 9.18 for model 6230C).

- Er1 pH electrode offset is greater than  $\pm 1.5$  pH range.  
Buffer 7.00 (6.86) is not correct or electrode is bad.
- Er2 pH electrode slope is off by more than 30% of the ideal slope.  
Buffer 4.01, 9.18, or 10.01 is not correct.
- Er3 Temperature is out of the  $-5.0$  to  $125.0$  °C range.
- Er4 Buffer temperature is out of the  $0$  to  $60$  °C range.
- Er5 pH value is out of the  $-2.00$  to  $16.00$  pH range.  
mV value is out of the  $-1999$  to  $+1999$  mV range.
- Er6 Illegal operation procedures.

# OPERATIONAL PROCEDURES

## pH CALIBRATION

Connect the AC adaptor to the AC power line. Make sure that the correct AC adaptor is used. It is recommended to conserve the internal batteries by pressing the **ON/OFF** key. The instrument will be in the state of when it was last turned off. It is not necessary to press the **CLEAR** key.

### 1. Calibration with ATC/TEMP probe in the pH/AUTOLOCK mode.

- 1.1 Connect the combination pH electrode to the BNC connector and ATC/Temp probe to the top of the instrument. (**Refer to Figure 1**) The ATC annunciator on the LCD display will be on. Press the **MODE** key for the LCD display to indicate **pH** and for the **AUTOLOCK** annunciator to be on. (**Refer to Figure 3**)
- 1.2 Rinse the pH electrode and ATC/Temp probe in distilled water and immerse in pH buffer 7.00 (6.86). The instrument will display the buffer temperature.
- 1.3 Press the **STAND** key. The **STAND** annunciator will be on and **WAIT** annunciator will flash. At this time, the instrument is hunting for a stable reading. The display will be locked to the buffer value corresponding to the temperature of buffer 7.00 (6.86), as measured in step 1.2 (**Refer to Table 1**). When a stable reading is reached, the **WAIT** annunciator will stop flashing and stay off. The **SLOPE** annunciator will start to flash. This means that standardization at buffer 7.00 (6.86) has been completed and the instrument is now ready to be sloped at a second buffer.

If **Er1** is displayed, check to make sure that the correct buffer is used and that the electrode offset is less than  $\pm 1.5$  pH. Replace the buffer and/or the pH electrode. Press the **CLEAR** key and repeat from 1.1. **Er1** may appear if the **STAND** key is pressed before the electrode and ATC/Temp probe settle to within  $\pm 1.5$  pH of the buffer value. Allow sufficient time for the electrode and ATC/Temp probe to stabilize before taking any action.

If **Er4** is displayed, the buffer temperature is out of the 0 to 60 °C range. Bring the buffer temperature within range and repeat 1.2. It is not necessary to press the **CLEAR** key.

- 1.4 Remove the pH electrode and ATC/Temp probe from buffer 7.00(6.86) and rinse them in distilled water. After rinsing, immerse them in buffer 4.01, 9.18, or 10.01.
- 1.5 Press the **SLOPE** key. The **SLOPE** annunciator will stop flashing and stay on. The **WAIT** annunciator will start to flash, indicating that the instrument is hunting for a stable reading. The display will be locked to the second buffer value corresponding to the temperature of the second buffer (**Refer to Table 1**). When a stable reading is reached, the **WAIT** annunciator will stop flashing and

stay off. The microcomputer inside the instrument will calculate and compensate for the pH electrode slope deviation corresponding to the values of the two calibration buffers. The instrument is dual point calibrated and is now ready for measurements.

If **Er2** is displayed, check to make sure that the correct buffer is used and that the slope of the electrode is not off by more than 30% from the theoretical slope. Replace the buffer and/or the pH electrode. Press the **CLEAR** key and repeat from **1.1**. Only buffer 4.01, 9.18, or 10.01 may be used to slope the instrument. **Er2** may appear if the **SLOPE** key is pressed before the electrode and ATC/Temp probe settle to within 30% of the buffer value. Allow sufficient time for the electrode and ATC/Temp probe to stabilize before taking any action.

If **Er4** is displayed, the buffer temperature is out of the 0 to 60°C range. Bring the buffer temperature within range and repeat **1.2**. It is not necessary to press the **CLEAR** key.

If **Er6** is displayed, **CLEAR** the instrument and repeat from **1.1**.

## **2. Calibration with manual temperature compensation in the pH/AUTOLOCK mode.**

- 2.1 Connect the pH electrode to the top of the instrument (**Refer to Figure 1**). The **MANUAL** annunciator will be on. Press the **MODE** key for the LCD display to indicate **pH** and for the **AUTOLOCK** annunciator to be on (**Refer to Figure 1**).
- 2.2 Rinse the pH electrode in distilled water and immerse in buffer 7.00(6.86). Set the instrument to display the temperature of the buffer 7.00(6.86) by pressing the  $\Delta$  and  $\nabla$  keys. The displayed temperature must be less than 60 °C.
- 2.3 Press the **STAND** key. The **STAND** annunciator will be on and the **WAIT** annunciator will flash. This means that the meter is hunting for a stable reading. The display will be locked to the buffer value corresponding to the temperature of buffer 7.00(6.86) as set in **2.2 (Refer to Table 1)**. When a stable reading is reached, the **WAIT** annunciator will stop flashing and stay off. The **SLOPE** annunciator will start to flash, indicating that standardization at buffer 7.00(6.86) is completed and the instrument is ready to be sloped at a second buffer.

If **Er1** is display, check to make sure that the electrode offset is less than  $\pm 1.5$  pH and that the correct buffer is used. Replace the buffer and/or the pH electrode. Press the **CLEAR** key and repeat from **2.1**. **Er1** may appear if the **STAND** key is pressed before the electrode settles to within  $\pm 1.5$  pH of the buffer value. Allow sufficient time for the electrode to stabilize before taking any action. Remove the pH electrode from buffer 7.00(6.86), rinse with distilled water and immerse in buffer 4.01, 9.18, or 10.01. Set the instrument to display the



temperature if the second buffer, as in 2.2. The displayed temperature must not be greater than 60 °C.

- 2.4 Press the **SLOPE** key. The **SLOPE** annunciator will stop flashing and stay on. The **WAIT** annunciator will start to flash, indicating that the instrument is hunting for a stable reading. The display will be locked to the value of the second buffer corresponding to the temperature of the second buffer as set in **2.3 (Refer to Table 1)**. When a stable reading is reached, the **WAIT** annunciator will stop flashing and stay off. The microcomputer inside the instrument will calculate and compensate for the pH electrode slope deviation corresponding to the values of the two calibration buffers. The instrument is dual point calibrated and is now ready for measurements.

If **Er2** is displayed, check to make sure that the correct buffer is used and that the slope of the electrode is not off by more than 30% from the theoretical slope. Replace the buffer and/or the pH electrode. Press the **CLEAR** key and repeat from **2.1**. Only buffer 4.01, 9.18, or 10.01 may be used to slope the instrument. **Er2** may appear if the **SLOPE** key is pressed before the electrode settles to within 30% of the buffer value. Allow sufficient time for the electrode to stabilize before taking any action.

If **Er6** is displayed, **CLEAR** the instrument and repeat from 2.1.

### 3. Calibration with ATC/Temp probe in the pH mode.

- 3.1 Connect the pH electrode and ATC/Temp probe to the top of the instrument (**Refer to Figure 1**). The **ATC** annunciator will be on. Press the **MODE** key for the LCD to display **pH** and for the **AUTOLOCK** annunciator to be off.
- 3.2 Rinse the pH electrode and ATC/Temp probe in distilled water and immerse in pH buffer 7.00(6.86). The instrument will display the buffer temperature.
- 3.3 Allow sufficient time for the electrode and ATC/Temp probe to stabilize. Press the **STAND** key. The **STAND** annunciator will be on and the **SLOPE** annunciator will flash, indicating that standardization at buffer 7.00(6.86) is completed and the instrument is ready to be sloped at a second buffer. The instrument will display the buffer value corresponding to the temperature of the buffer 7.00(6.86) as measured in **3.2 (Refer to Table 1)**. If the reading still drifts, repeat **3.3** until a stable reading is obtained.

If **Er1** is displayed, check to make sure that the correct buffer is used and that the electrode offset is less than  $\pm 1.5$  pH. Replace the buffer and/or the pH electrode. Press the **CLEAR** key and repeat from **3.1**. **Er1** may appear if the **STAND** key is pressed before the electrode and ATC/Temp probe settle to within  $\pm 1.5$  pH of the buffer value. Allow sufficient time for the electrode and ATC/Temp probe to stabilize before taking any action.

If **Er4** is displayed, the buffer temperature is out of the 0 to 60°C range. Bring the buffer temperature within range and repeat **3.2**. It is not necessary to press the **CLEAR** key.

- 3.4 Remove the pH electrode and ATC/Temp probe from buffer 7.00(6.86). Rinse them in distilled water and immerse in buffer 4.01, 9.18, or 10.01. The instrument will display the temperature of the second buffer.
- 3.5 Allow sufficient time for the pH electrode and ATC/Temp probe to stabilize. Press the **SLOPE** key. The **SLOPE** annunciator will stop flashing and stay on. The instrument will display the second buffer value corresponding to the temperature of the second buffer, as measured in **3.4 (Refer to Table 1)**. If the reading still drifts, repeat **3.5** until a stable reading is obtained. The microcomputer inside the instrument will calculate and compensate for the pH electrode slope deviation corresponding to the values of the two calibration buffers. The instrument is dual point calibrated and is now ready for measurements.

If **Er2** is displayed, check to make sure that the correct buffer is used and that the slope of the electrode is not off by more than 30% from the theoretical slope. Replace the buffer and/or the pH electrode. Press the **CLEAR** key and repeat from **3.1**. Only buffers 4.01, 9.18, or 10.01 may be used to slope the instrument. **Er2** may appear if the **SLOPE** key is pressed before the electrode and ATC/Temp probe settle to within 30% of the buffer value. Allow sufficient time for the electrode and ATC/Temp probe to stabilize before taking any action.

If **Er4** is displayed, the buffer temperature is out of the 0 to 60°C range. Bring the buffer temperature within range and repeat **3.2**. It is not necessary to press the **CLEAR** key.

If **Er6** is displayed, CLEAR the instrument and repeat from **3.1**.

#### **4. Calibration with manual temperature compensation in the pH mode.**

- 4.1 Connect the pH electrode to the top of the instrument (**Refer to Figure 1**). The **MANUAL** annunciator will be on. Press the **MODE** key for the LCD display to indicate **pH** and for the **AUTOLOCK** annunciator to be off.
- 4.2 Rinse the pH electrode in distilled water and immerse in buffer 7.00(6.86). Set the instrument to display the temperature of the buffer 7.00(6.86) by pressing the  $\Delta$  and  $\nabla$  keys. The displayed temperature must be less than 60°C.
- 4.3 Allow sufficient time for the electrode to stabilize. Press the **STAND** key. The **STAND** annunciator will be on and the **SLOPE** annunciator will flash. This means that standardization at buffer 7.00(6.86) is completed and the instrument is ready to be sloped at a second buffer. The instrument will display the buffer

7.00(6.86) set in **4.2 (Refer to Table 1)**. If the reading still drifts, repeat **4.3** until a stable reading is obtained.

If **Er1** is displayed, check to make sure that the correct buffer is used and that the electrode offset is less than  $\pm 1.5$  pH. Replace the buffer and/or the pH electrode. Press the **CLEAR** key and repeat from **4.1**. **Er1** may appear if the **STAND** key is pressed before the electrode settles to within  $\pm 1.5$  pH of the buffer value. Allow sufficient time for the electrode to stabilize before taking any action.

4.4 Remove the pH electrode from buffer 7.00(6.86) and rinse with distilled water. After rinsing, immerse it in buffer 4.01, 9.18, or 10.01. Set the instrument to display the temperature of the second buffer, as in **4.2**. The displayed temperature must be less than 60°C.

4.5 Allow sufficient time for the pH electrode to stabilize. Press the **SLOPE** key. The **SLOPE** annunciator will stop flashing and stay on. The instrument will display the second buffer value corresponding to the temperature of the second buffer as set in **4.4**. (**Refer to Table 1**) If the reading still drifts, repeat **4.5** until a stable reading is obtained. The microcomputer inside the instrument will calculate and compensate for the pH electrode slope deviation corresponding to the values of the two calibration buffers. The instrument is dual point calibrated and is now ready for measurements.

If **Er2** is displayed, check to make sure that the correct buffer is used and that the slope of the electrode is not off by more than 30% from the theoretical slope. Replace the buffer and/or the pH electrode. Press the **CLEAR** key and repeat from **4.1**. Only buffer 4.01, 9.18, or 10.01 may be used to slope the instrument. **Er2** may appear if the **SLOPE** key is pressed before the electrode settles to within 30% of the buffer value. Allow sufficient time for the electrode to stabilize before taking any action.

If **Er6** is displayed, **CLEAR** the instrument and repeat from **4.1**.

## pH MEASUREMENTS

The **STAND** and **SLOPE** annunciators must be on. This means the instrument is dual point calibrated and is ready for measurements.

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

- 1.1 Connect the pH electrode and ATC/Temp probe to the top of the instrument (**Refer to Figure 1**). The **ATC** annunciator will be on.
- 1.2 Press the **MODE** key for the LCD display to indicate **pH** and for the **AUTOLOCK** annunciator to be on.
- 1.3 Rinse the pH electrode and ATC/Temp probe with distilled water and immerse them in the sample to be measured.

1.4 Press the **MEASURE** key. The **WAIT** annunciator will start flashing. This means the instrument is hunting for a stable reading. The display will track the pH value as sensed by the pH electrode and the ATC/Temp probe. When the display changes less than 0.01 pH within approximately 10 seconds, the **AUTOLOCK** function will be activated. The **WAIT** annunciator will stop flashing and stay off. The reading is then “locked” and will not respond to further changes from the pH electrode and ATC/Temp probe. The “locked” display is the pH value of the sample at the displayed sample temperature.

If **Er5** is displayed, the pH value measured is out of the  $-2.00$  to  $+16.00$  range.

1.5 For samples that are inherently unstable, the instrument will not **AUTOLOCK**. In this case, use the **pH** (non-**AUTOLOCK** pH) mode for measurements.

## 2. Measurement with ATC/Temp probe in the pH mode.

2.1 Connect the pH electrode and the ATC/Temp probe to the top of the instrument (**Refer to Figure 1**). The **ATC** annunciator will be on.

2.2 Press the **MODE** key for the LCD display to indicate **pH** and for the **AUTOLOCK** annunciator to be off.

2.3 Rinse the pH electrode and ATC/Temp probe with distilled water and immerse them in the sample to be measured.

2.4 Allow sufficient time for the display to stabilize. The instrument will display the pH value of the sample at the displayed sample temperature.

If **Er5** is displayed, the pH value measured is out of the  $-2.00$  to  $+16.00$  range.

## 3. Measurement with manual temperature compensation in the pH/AUTOLOCK mode.

3.1 Connect the pH electrode to the top of the instrument (**Refer to Figure 1**). The **MANUAL** annunciator will be on.

3.2 Press the **MODE** key for the LCD display to indicate **pH** and for the **AUTOLOCK** annunciator to be on.

3.3 Rinse the pH electrode with distilled water and immerse it in the sample to be measured. Set the instrument to the temperature of the sample as in **2.2** of **pH CALIBRATION** section.

3.4 Press the **MEASURE** key. The **WAIT** annunciator will start to flash. This means that the instrument is hunting for a stable reading. The display will track the pH value as sensed by the pH electrode. When the display changes less than 0.01 pH within approximately 10 seconds, the **AUTOLOCK** function will be activated. The **WAIT** annunciator will stop flashing and stay off. The reading is then “locked” and will not respond to further changes from the pH electrode. The “locked” display is the pH value of the sample at the set sample temperature.

If **Er5** is displayed, the pH value measured is out of the –2.00 to +16.00 range.

3.5 For samples that are inherently unstable, the instrument will not **AUTOLOCK**. Use the **pH** (non-AUTOLOCK pH) mode for measurements.

#### 4. **Measurement with manual temperature compensation in the pH mode.**

4.1 Connect the pH electrode to the top of the instrument (**Refer to Figure 1**). The **MANUAL** annunciator will be on.

4.2 Press the **MODE** key for the LCD to display **pH** and for the **AUTOLOCK** annunciator to be off.

4.3 Rinse the pH electrode with distilled water and immerse it in the sample to be measured.

4.4 Set the instrument to the temperature of the sample as in **2.2** of **pH CALIBRATION** section.

4.5 Allow sufficient time for the display to stabilize. The instrument will display the pH value of the sample at the set sample temperature.

If **Er5** is displayed, the pH value measured is out of the –2.00 to + 16.00 range.

## **TEMPERATURE MEASUREMENTS**

The model 6230 can be used to measure temperature independently with the ATC/Temp probe without using the pH electrode.

1. Place the ATC/Temp probe in the media to be measured. The measured temperature is displayed.
2. **Er3** will be displayed if the temperature is out of the temperature measurement range of –5.0 to 125.0°C. Once the temperature is brought within range, **Er3** will disappear and the correct temperature reading will be displayed. It is not necessary to press the **CLEAR** key.

## **mV MEASUREMENTS**

The **MANUAL** annunciator will be on if the ATC/Temp probe is not connected to the instrument.

### **1. Measurement in the mV /AUTOLOCK mode.**

1.1 Connect an optional combination ORP electrode to the instrument in the BNC connector (**Refer to Figure 1**).

1.2 Press the **MODE** key for the LCD to display mV and for the **AUTOLOCK** annunciator to be on.

1.3 Rinse the electrode with distilled water and immerse it in the sample to be measured.

1.4 Press the **MEASURE** key. The **WAIT** annunciator will start to flash. This

means the instrument is hunting for a stable reading. The display will track the mV value as sensed by the electrode. When the display changes less than 1mV within approximately 10 seconds, the **AUTOLOCK** function will be activated. The **WAIT** annunciator will stop flashing and stay off. The reading is then “locked “ and will not respond to further changes from the electrode. The “locked” display is the mV value of the sample.

If **Er5** is displayed, the mV value measured is out of the  $\pm 1999$  mV range. The instrument will display the correct value once the input mV is brought within range. It is not necessary to **CLEAR** the instrument.

- 1.5 The ATC/Temp probe can be used to measure the sample temperature as required.
- 1.6 For samples that are inherently unstable, the instrument will not **AUTOLOCK**. In this case, use the **mV** (non-AUTOLOCK mV) mode for measurements.

## 2. Measurement in the mV mode.

- 2.1 Connect an optional combination ORP electrode to the instrument in the BNC connector (**Refer to Figure 1**).
- 2.2 Press the **MODE** key for the LCD display to indicate **mV** and for the **AUTOLOCK** annunciator to be off.
- 2.3 Rinse the electrode with distilled water and immerse it in the sample to be measured.
- 2.4 Allow sufficient time for the fore the display to stabilize. The instrument will display the mV value of the sample.

If **Er5** is displayed, the mV value measured is out of the  $\pm 1999$  mV range. The instrument will display the correct value once the input mV is brought within range. It is not necessary to **CLEAR** the instrument.

- 2.5 The ATC/Temp probe can be used to measure the sample temperature as required.

## pH BUFFERS

The temperature coefficient of pH calibration buffers 4.01, 7.00 and 10.01 are stored inside the memory of the microcomputer. The buffers used to calibrate the instrument must exhibit the same temperature characteristics as the stored values. The buffer temperature values are listed in **Table 1**.

**TEMPERATURE COEFFICIENT OF THE pH BUFFERS  
BUFFERS**

°C	<b>4.01</b>	<b>7.00</b>	<b>10.01</b>
0	4.00	7.11	10.32
5	4.00	7.08	10.25
10	4.00	7.06	10.18
15	4.00	7.03	10.12
20	4.00	7.01	10.06
25	4.01	7.00	10.01
30	4.02	6.98	9.97
35	4.02	6.98	9.93
40	4.03	6.97	9.89
45	4.04	6.97	9.86
50	4.06	6.97	9.83
55	4.07	6.97	9.80
60	4.10	6.98	9.78

The actual reading of the instrument can differ from the values shown by  $\pm 1.5$  digit.

**Table 1**

**RS-232C INTERFACE OPERATION**

**Before operating with the RS-232C interface, you must get out of the AUTOLOCK mode.**

This section assumes you are familiar with the basics of data communication, the RS-232C interface, rudimentary knowledge and a copy of any of the following computer languages: Turbo BASIC<sup>®</sup>, Quick Basic<sup>®</sup>, Turbo PASCAL<sup>®</sup>, and Turbo C<sup>®</sup>. This meter can only be operated using the RS-232C interface by using a special software driver included with this meter. A simple program must be written in order to send your command and receive data from the meter by using any of the above mentioned computer languages.

An annotated sample program for each computer language and a more detailed explanation of the software drive are included in the accompanying disk.

## PREPARATION OF THE METER FOR OPERATION

The meter comes equipped with an RS-232C (serial) interface. The meter communicates with a PC computer (100% IBM PC/AT compatibles) through a DB-9 interface connector. A standard RS-232C cable can be used for interconnecting two IBM PC/Ats.

After you have connected the cable and turned on both the meter and the computer, you are now ready for the software part of the operation.

## SOFTWARE PREPARATION

The accompanying disk includes a special software driver to let you easily write a simple program to read data from the meter. By incorporating the driver to your software, you can then use the special commands without worrying about the protocol between the meter and your computer.

For the model 6230, reading “**MAN6230.TXT**” in the accompanying disk will jumpstart you into using the meter with its RS-232C interface. “**MANUAL.TXT**” is the general explanation of the various serial commands available in the driver.

## MODEL 6230 RS-232C PARAMETERS

BAUD RATE	2400 (fixed)
PARITY	Software Driver Controlled
DATA BITS	8
STOP BITS	1
PROTOCOL	Software Driver Controlled

## SPECIFICATIONS

	RANGE	ACCURACY	RESOLUTION
<b>pH</b>	-2.00 to 16.00 pH	±0.1%, ±1 digit	0.01 pH
<b>mV</b>	-1999 to +1999 mV	±0.1%, ±1 digit	1.0 mV
<b>TEMP</b>	-0.5 to 125.0°C	±0.5°C	0.1°C
pH TEMP. COMPENSATION		AUTOMANual -5.0 to 125.0 °C	
pH BUFFER RECOGNITION		(4.01, 7.00, &10.01) or (4.01, 6.86, &9.18)	
pH BUFFER TEMP. RANGE		0 to 60 °C	
pH ELECTRODE OFFSET RECOGNITION		±90 mV at pH 7.00 or 6.86	



pH ELECTRODE SLOPE RECOGNITION	±30% at pH 4.01, 9.18, or 10.01
INPUT IMPEDANCE	>10 <sup>12</sup> Ω
COMMUNICATION	RS-232C Output
POWER SUPPLY: Batteries / Adaptor	6 AAA batteries/9V AC adaptor
POWER BACKUP	Yes
AUDIO FEEDBACK	All Touch Keys
END POINT SENSING & HOLD	Yes
DISPLAY: pH/mV: Temp.	12.5 mm: 7.5 mm HIGH LCD
AMBIENT TEMP. RANGE	0 to 50 °C
RELATIVE HUMIDITY	Up to 95%
ATC PROBE	Thermistor 10K Ω
BATTERY LIFE (Alkaline)	~25 Hours
DIMENSIONS (W×L×H)	86mm×241mm×72mm
WEIGHT	430gm (Batteries Included)

## WARRANTY

Jenco Instruments, Ltd. 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 without 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, please 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 unauthorized returns.

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

### **JENCO INSTRUMENTS, INC.**

7968 Arjons Drive, Suite C  
San Diego, CA 92126 USA  
TEL: 858-578-2828 FAX: 858-578-2886  
E-MAIL: [jencoi@ix.netcom.com](mailto:jencoi@ix.netcom.com)

### **JENCO ELECTRONICS, LTD.**

PO. BOX LINKOU 117  
TAIPEI, TAIWAN  
TEL: 02 601-6191 FAX: 02 601-7206  
E-MAIL: [jencoe@ms2.hinet.net](mailto:jencoe@ms2.hinet.net)

### **SHANGHAI JENCO ELECTRONICS, LTD.**

18 Wang Dong Zhong Road  
Sijing Town, Songjiang  
SHANGHAI, CHINA  
TEL: (86-021)5761-9599 FAX: (86-021)5761-9598  
E-MAIL: [jenco@public.sta.net.cn](mailto:jenco@public.sta.net.cn)  
Homepage: <http://www.jenco.com.cn>