

INSTRUCTION MANUAL

pHTutor

Bench meter

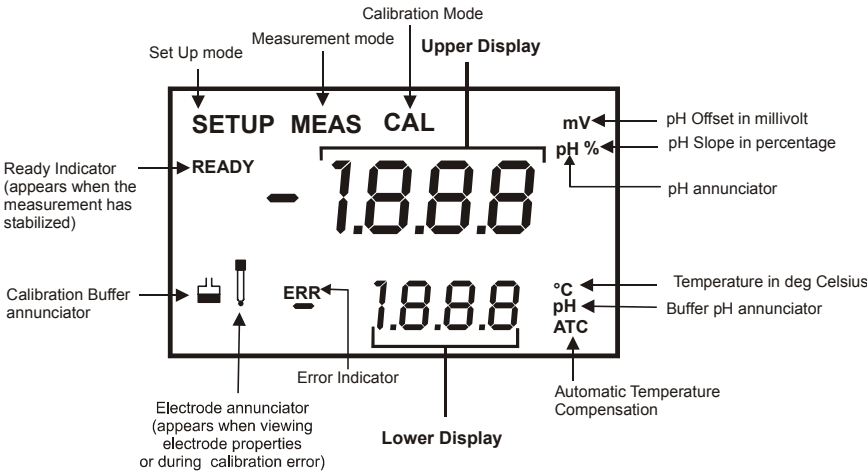
Introduction

Thank you for purchasing pHTutor pH/Temperature bench meter.
This manual provides a step-by-step guide to operate the pHTutor bench meter.

Display And Keypad Functions

Display

The LCD (Liquid Crystal Display) has an upper and lower display which shows the measured pH and the measured temperature. The display also shows keypad functions, program functions and annunciators.



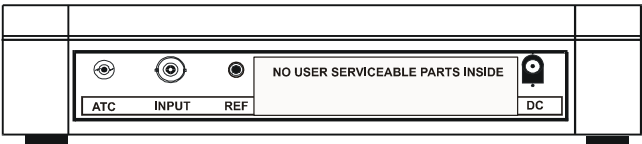
Keypad

A large splash proof membrane keypad with tactile feedback makes meter easy to use.

	Powers on and shuts off the meter
	Toggles between the measurement and calibration modes of the meter. In SETUP mode, pressing CAL/MEAS key returns meter to the measurement mode
	Confirms the calibration values in calibration mode and the selections in the SETUP menu.
	Sets the calibration values during the calibration mode. Scrolls through each SETUP menu and the configuration settings.

Rear Instrument Panel

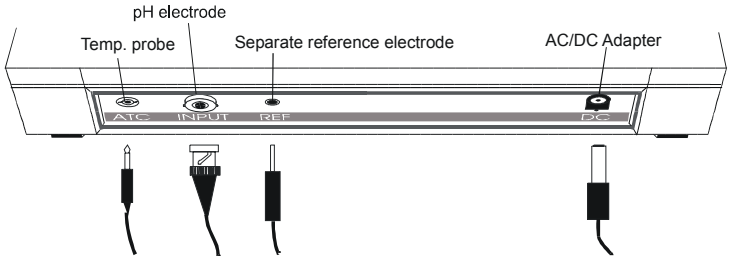
The pHTutor bench meter provides a complete set of connectors for the various accessories commonly used.



Connection	Function
ATC	For phono jack connection from the temperature probe for Automatic Temperature compensation. The probe should be a 30KΩ thermistor type.
INPUT	For connection to pH electrodes with BNC type connectors. Always ensure that the connector is clean and dry.
REF	For connection to pin type reference electrode normally used with half cell (mono) type pH electrodes.
DC	For connection for the AC/DC power adapter

Starting Up

Connect the accessory connectors at the rear of the instrument panel. During operation, it is important that water does not get onto the BNC connector. Also avoid touching the connector with soiled or wet hands.

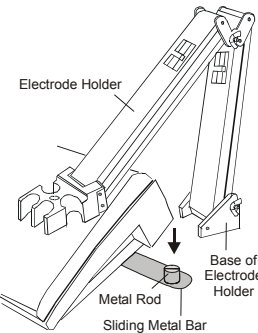


Connecting the Electrode Holder (Optional Purchase)

The base plate of the meter has a sliding metal bar to which you can attach the integral swivel electrode holder. You can mount the electrode holder either on right or left side of the meter.

To position the sliding metal bar:

Use a Phillips screwdriver to remove the screw holding the sliding metal bar. Slide the metal bar until the second screw slot lines up with the original screw hole. Use the screw removed earlier to secure the sliding bar into position.



To install the electrode holder to the meter:

To mount the swivel electrode holder into the metal rod on the side bar, align the slot of the base of the electrode holder with the metal rod. Push it downwards until it fully sits into position.

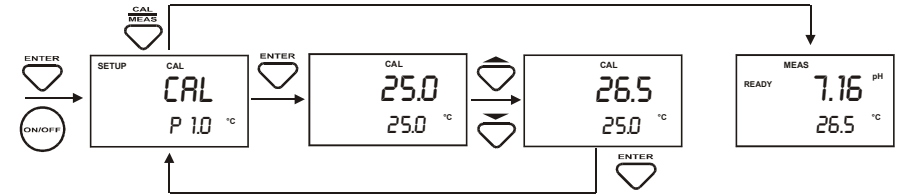
NOTE: Move the base of the electrode holder if you wish to swing the electrode holder about. To prevent the meter from toppling over causing accidental spills, **DO NOT** swing the body of the electrode holder.

Temperature Calibration (Optional Purchase)

For ATC, you must connect a temperature probe (optional purchase).

- While pressing **ENTER** key, switch on the meter by pressing **ON/OFF** key.
- Release the **ENTER** key. The meter enters the first page (Temperature Calibration) of Setup mode with the display showing "CAL", "P1.0" & "°C".
- Press **ENTER** key to enter the Temperature Calibration mode. The upper display can be adjusted to the required temperature value while the lower display shows the currently measured temperature value.
- Dip the temperature probe into a solution of known temperature, such as a temperature bath for a few minutes until the temperature probe stabilizes.
- Press **▲** or **▼** key to adjust the upper display to the known temperature value of the temperature bath used in step 4.
- Press **ENTER** key to confirm the setting. The display then reverts to the first page of Setup mode. Press **CAL/MEAS** key to enter the Measurement mode.

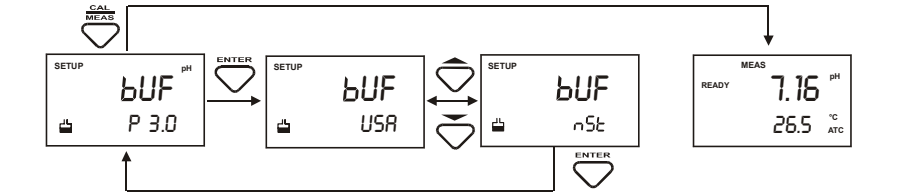
NOTE: To abort Temperature Calibration, do not press **ENTER** key in step 6. Press **CAL / MEAS** key instead.



pH Standard Buffer Selection

The pHTutor features **USA** (pH 4.01, pH 7.00 and pH 0.01) or **NIST** (pH 4.01, 6.86, and 9.18) standards. Before calibration, you must set the meter to accept either one to suit your requirements.

- While pressing **ENTER** key, switch on the meter by pressing **ON/OFF** key.
- Release the **ENTER** key. The meter enters the first page of Setup mode with the display showing "CAL", "P1.0" & "°C".
- Press **▲** or **▼** key to scroll through the Setup pages until the display shows "bUF" & "P3.0".
- Press **ENTER** key to enter the buffer standard selection mode.
- Press **▲** and **▼** key to toggle between the pH buffer standards (USA or bUF).
- Press **ENTER** key to confirm your choice of buffer standard. The display then reverts to the buffer selection mode page ("bUF" - "P3.0"). Press **CAL/MEAS** key to enter the Measurement mode.



pH Calibration

Calibration should be done regularly. You can calibrate up to three points using either the USA or the NIST buffer standards. One point calibration (Offset calibration) should only be carried out with pH 7.00 or pH 6.86; otherwise calibration will not be accepted. For Slope to Slope calibration (two points calibration), the first calibration point will only be successfully registered in the meter after the second point calibration has been completed.

- Press **ON/OFF** key to switch on the meter.
- Dip pH electrode about 2 to 3 cm into the pH standard buffer solution.
- Press **CAL/MEAS** key to enter pH calibration mode. The 'CAL' annunciator appears in the LCD. The upper display shows the default (uncalibrated) pH measurement of the pH electrode while the lower display indicates the pH standard buffer solution which is automatically recognized by the meter.

NOTE: To abort pH calibration, press 'CAL / MEAS' key. The meter then enters measurement mode.



- Swirl gently and allow the meter reading to stabilize. Wait till the display shows "READY". Press **ENTER** key to confirm the first calibration point. The upper display value is calibrated to the pH standard buffer solution. The lower display toggles between next two standard calibration points.

NOTE: If the upper measured display is not within the buffer acceptable window, an error message "ERR" and the electrode icon will flash upon pressing the **ENTER** key. Press **CAL/MEAS** key to exit calibration and resume to the measurement mode. Check electrode condition and recalibrate.

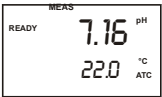
- Repeat with other two standard buffers for better accuracy of the calibration. Rinse electrode in tap water before dipping into next standard buffer.

NOTE: The calibration mode allows you to perform up to three calibration points before returning to the measurement mode automatically. However, if you wish to have only one or two calibration points, simply skip the remaining calibration points by exiting to the measurement mode by pressing **CAL / MEAS** key.

pH Measurement

Automatic Temperature Compensation (ATC) (Optional Probe Purchase)

For ATC measurements, simply attach an appropriate temperature probe into the meter. The “ATC” annunciator lights up on the LCD. Submerge the probe in the liquid you are measuring so that the sample temperature can be recorded and compensated for.

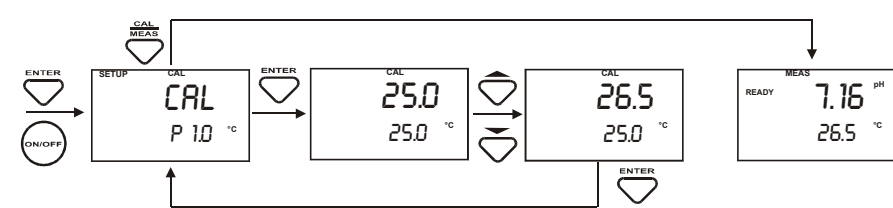


Manual Temperature Compensation (MTC)

For MTC, you must disconnect the temperature probe.

- While pressing **ENTER** key, switch on the meter by pressing the **ON/OFF** key.
- Release **ENTER** key. The meter enters the first page (Temperature Calibration) of Setup mode with the display showing “CAL”, “P1.0” & “°C”. Note no “ATC” shown.
- Press **ENTER** key to enter the Temperature Calibration mode. The upper display can be adjusted to the required temperature value while the lower display shows the default temperature value (25°C) or indicates the last set temperature value.
- Check the temperature of your sample using an accurate thermometer.
- Press **▲** or **▼** key to adjust the upper display to the measured temperature value in step 4.
- Press **ENTER** key to confirm the setting. The display then reverts to the first page of Setup mode. Press **CAL/MEAS** key to enter the Measurement mode. The meter will compensate pH reading for the manually set temperature.

NOTE: To abort MTC calibration, do not press the **ENTER** key in step 6. Press the ‘**CAL / MEAS**’ key instead.



Taking Measurements

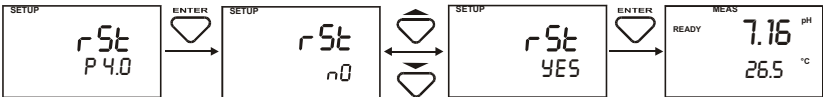
Be sure to remove any electrode soaker bottle or protective rubber cap from the electrode before measurement.

- Press **ON/OFF** key to switch on meter. The “MEAS” annunciator appears on the top of the LCD. When a temperature probe is connected, “ATC” annunciator appears in the lower right-hand corner of LCD to indicate Automatic Temperature Compensation.
- Dip the electrode about 2 to 3 cm into the test solution. Stir and let the reading stabilize.
- “READY” annunciator appears once the reading stabilizes. Note the reading on the display.

User Reset

You can reset the pH calibration to the factory default by using the user reset function. Buffer standard selection and temperature calibration are not affected by the user reset function.

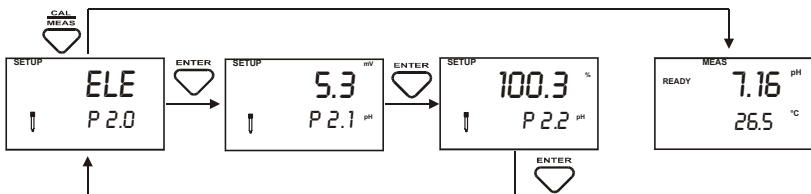
- Switch off the meter.
- While pressing **ENTER** key, switch on the meter by pressing the **ON/OFF** key.
- Release **ENTER** key. The meter enters the first page (Temperature Calibration) of Setup mode with the display showing “CAL”, “P1.0”.
- Press **▲** or **▼** key to scroll through the Setup pages until the display shows “rST” & “P4.0”.
- Press the **ENTER** key to enter the user reset option page.
- Press **▲** or **▼** key to select your option on the user reset function.
 - “nO” deactivates reset function
 - “YES” activates the reset function
- Press **ENTER** key to confirm your selection.
- If you select “YES”, the display flashes momentarily and proceeds to the measurement mode. The pH calibration resets back to factory default value.
- If you select “nO”, the display reverts to “rST” & “P4.0” page without resetting user calibration.



Viewing Electrode Properties

The pHtutor lets you check the electrode parameters for diagnostic purposes. You can view the offset and slope of the electrode to determine its effectiveness.

- While pressing **ENTER** key, switch on the meter by pressing the ON/OFF key.
- Release **ENTER** key. The meter enters the first page of setup mode with the display showing “CAL”, “P1.0”.
- Press **▲** or **▼** key to scroll through the setup pages until the display shows “ELE” & “P2.0”.
- Press **ENTER** key to enter the electrode properties viewing page. The display shows the mV offset value of the electrode.
- Press **ENTER** key again to view the slope in % of the electrode.
- Press **ENTER** key. The display reverts to “ELE” & “P2.0” page.
- Press **CAL/MEAS** key to return to the measurement mode.



Self-Diagnostic Messages

Over range / Under range signal	Or / Ur	Electrode is not in contact with solution or electrode is failing.
		Measured pH value or temperature value exceeds its specified maximum or minimum value
Error Message	Err	Wrong key selected
	Err	pH calibration error of attempting to confirm a calibration value which is not within the specified calibration window

Accessories

Replacement meter and accessories

Item Description	Eutech Instruments Order Code No.	Oakton Instruments Order Code No.
CyberScan pHtutor Bench pH/ Temp Meter	EC-PHTUTOR	35619-30
Temperature Probe for pHtutor bench meter, 1m cable length	EC-PH5-TEMB01P	35613-05
Electrode Stand with Swivel Arm & Base Plate	EC-PH-ELSTDC	35617-50
110/120VAC power adapter, 50/60 Hz	EC-120-ADA	35615-07
220/230VAC power adapter, 50/60 Hz	EC-220-ADA	35615-08

Replacement Electrodes

Item Description	Eutech Instruments Order Code No.	Oakton Instruments Order Code No.
General purpose, Epoxy-body double junction pH Combination Electrode, 12 X 110 mm, 1m cable length	EC-FC72522-01B	35641-51
General purpose, Epoxy-body “3-in-1” pH/Temp. Combination Electrode, 12 X 110 mm, 1m cable length	EC-FC73529-01B	35811-71
Glass body Refillable pH Combination Electrode: Annular ceramic reference junction with protective sensor guard, 1 m cable length	EC-FG73504-01B	05997-10

pH Buffers/Sachets, Reference Electrolyte & Others

Item Description	Eutech Instruments Order Code No.	Oakton Instruments Order Code No.
pH 4.01 Buffer Solution (480 ml bottle)	EC-BU-4BT	00654-00
pH 7.00 Buffer Solution (480 ml bottle)	EC-BU-7BT	00654-04
pH 10.01 Buffer Solution (480 ml bottle)	EC-BU-10BT	00654-08
pH 4.01 Buffer Sachets (20 ml x 20 pcs. per box)	EC-BU-4BS	35653-01
pH 7.00 Buffer Sachets (20 ml x 20 pcs. per box)	EC-BU-7BS	35653-02
pH 10.01 Buffer Sachets (20 ml x 20 pcs. per box)	EC-BU-10BS	35653-03
Reference Electrolyte (KCl with Ag/AgCl) (480 ml bottle)	EC-RE001	05992-47 (125 ml)
Reference Electrolyte (4MKCl) for Calomel (Hg/ Hg2Cl2) electrodes & double-junction electrodes	EC-RE002	05992-48 (125 ml)
Storage Solution for pH Electrode (480 ml bottle)	EC-RE005	00653-04
Protein Cleaning Solution (480 ml bottle)	EC-DPC-BT	00653-06

Specifications

pHtutor	Specifications
pH Range	0.00 to 14.00 pH
Resolution	0.01 pH
Relative Accuracy	0.01 pH
Calibration Points	Up to 3 points with Auto-buffer recognition
Buffer Set Standard Selection	USA- 4.01/7.00/10.01NIST- 4.01/6.86/9.18
Calibration Window (USA Buffer Set Standard)	+/-1.00 pH (pH 4.01 & pH 10.01),+/-1.50 pH (pH 7.0)
Calibration Window (NIST Buffer Set Standard)	+/-1.00 pH (pH 4.01 & pH 9.18),+/-1.25 pH (pH 6.86)
Temperature Compensation	Automatic / Manual (0 to 100 °C)
Temperature Range	0 to 100 °C
Temp Resolution	0.1 °C
Temp Accuracy	+/- 0.3 °C
Temp Calibration Window	+/- 5 °C
pH Slope and Offset Display	Yes
User reset	Yes
Non Volatile Memory Backup	Yes
LCD Display	Custom Dual LCD (1 x 4.5 digits, 1 x 3.5 digits, annunciators)
Power Requirement	AC/DC 9V Adapter (110 VAC/220 VAC, 50-60Hz)
Dimensions / Weight	Meter : 18 x 23 x 6 cm / 1250 g Boxed : 40 x 26 x 9 cm / 1950 g

Return of Items

Authorization must be obtained from your distributor before returning items for any reason. When applying for authorization, please include information regarding the reason the item(s) are to be returned.

Note: We reserve the right to make improvements in design, construction and appearance of products without notice. Prices are subject to change without notice.