

# How to Calibrate and Use the pH Meter

In this laboratory, you will have access to the Mettler Toledo Seven Easy pH meter. This meter is designed for easy measurement of pH, conductivity and ion measurement. You will determine pH using a combination measurement and reference electrode with automatic temperature compensation (ATC). Older pH meters required separate electrodes for measurement and reference. If the sample temperature differs from the calibration temperature, there can be a measuring error of 0.15 pH units or more between pH 3 and 11 (Mettler Toledo, n.d.). Your automatic temperature compensation probe takes this difference into consideration automatically.



## Unpack The Meter and Electrode

To facilitate storage and to protect the equipment, your pH meter and electrode are stored in the original factory packaging. Unpack the meter, power adapter, electrode, electrode arm and any other accessories.

## Install the Electrode Stand

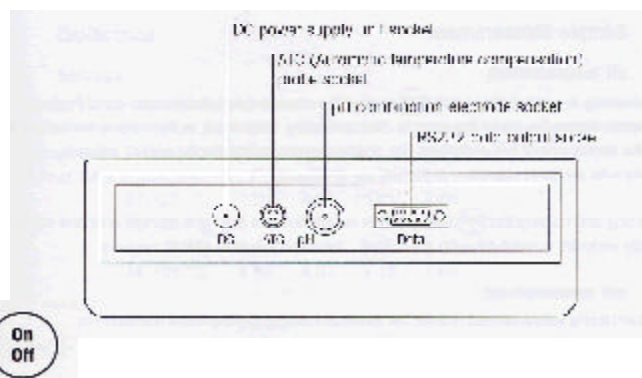
Your meter comes with an electrode stand which allows you to safely hold the electrode in the solution or hold the probe out of the way when not in immediate use. Look for the flat, weighted base of the stand. Pop out the centrally placed cap in the base of the stand and set aside. You'll need it later when you repackage the meter after use.

Place the base of the arm in the hole revealed when the cap is removed. Look for the plastic coated screw. Turn the base upside down and screw the base to the arm with the screw. Don't over tighten the screw or you'll strip the threads.



## Attaching the Electrode

Carefully lay the electrode on the table in front of you. Look to the rear of the pH meter. Disconnect the shorting clip from the pH socket and connect the electrode to that socket. Attach the temperature probe wire to the ATC (automatic temperature compensation) probe socket. (It's the second wire leading from the electrode.) Connect the power supply to the power supply socket and plug the power supply adapter into the electrical plug. Turn on the meter by the on/off button at the upper left of the meter.



## Sample Measurement

Remove the plastic cap from the tip of the electrode and set aside in an upright position. **Caution! This cap has a liquid in it and it must be saved. Don't pour out the liquid or allow it to spill out the cap.** Place the electrode in the electrode stand in one of the solid ring holders. Lower the electrode into a small beaker of distilled (deionized) water.

Press the Read button. You should see the pH decimal point begin to flash. Once the sensor has stabilized, the display will freeze and the screen should register an unblinking  $\sqrt{A}$ .



Read key.

## Calibrate the Meter

This meter allows for 1, 2, or 3 point calibrations. You will perform a two point calibration. Choose two of the three buffer packets included with your kit *e.g.* 7.00, 4.01, 10.01, etc.



Buffer key.

Select a fixed buffer group by pressing the buffer key. You will get an immediate flashing display of the buffer groups at which the meter is currently set. Note the temperature reading on your meter and select the fixed buffer group accordingly (matched to the provided buffers in your pH meter box). Usually, you will stick with B1. You can toggle between B1 and B4 by using either the read key or the buffer key. When the desired buffer is chosen, press the read key to confirm your selection. You may also change the temperature with the temperature key.

B1	25C	7.00	4.00	10.01	1.68	
B2	25C	7.00	4.01	9.21	2.00	11.00
B3	20C	7.00	4.00	9.00	2.00	12.00
B4	25C	6.86	4.01	9.18.	1.68	



Calibrate key.

Choose one of the buffer packs, *e.g.* 7.00 and open the pack. Place in the paper holder provided. Remove the probe from the distilled water and insert the probe into the buffer pack. Press the calibrate key. The display automatically stabilizes and will indicate a  $\sqrt{A}$  in the right side of the meter display.

Raise the arm to remove the probe and rinse thoroughly with distilled water. Open a second buffer pack, *e.g.* 10.01 and place in the paper holder. Insert the probe and repeat the process of calibration and reading.



Temperature key.

Raise the arm and remove the probe and rinse thoroughly with distilled water.

## Read the pH

You are now ready to test for the pH of your solution. Lower the arm so the probe enters the solution to which you wish to know the pH. Press the read key and allow to stabilize. You may toggle between pH and millivolt using the pH/mv key. Once you finish, remove the probe and rinse thoroughly with distilled water.



pH/millivolt key.

## Storing Your pH Meter

Turn off the meter. **Cap the tip of the probe and make sure the solution in the cap comes in contact with the probe sensor.** Remove the probe from the meter. Repackage the probe in the original box. Also repackage the meter, disassemble the arm and close up the box.