



Orion Model 330 pH Meter Instructions



PURPOSE OF THIS DOCUMENT: To assist you in using the pH meter for preparing buffers.

DESCRIPTION - A pH meter measures the pH of a solution utilizing a glass reference electrode. The electrode is made of a very thin glass that allows H^+ ions to pass through it. The meter measures electrical potential and converts this data into a pH reading for a sample.

You will conduct a two point buffer calibration each time you measure the pH of a solution.

Never use the probe as a stir stick! Suspend the probe with a holder. Do not let the stir bar ever hit the probe.



ASSEMBLY AND LOCATION - There is a pH meter in the Northwest corner of the biochem lab. There are standards and strong acids and bases for you to use. It is job to clean up when you are done.

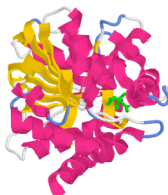
PREPARATION - Inspect the probe. Make sure the reference electrode is in electrode storage solution. The glass electrode has very thin walls that allow H^+ to pass through. However, small alkali metal cations, such as Na^+ , may also enter the glass. The small cations will affect the electrical potential measured by the pH meter, causing inaccurate readings. While the electrode soaks in storage solution, the alkali metal cations are replaced by H^+ .

Look to see that the glass bulb is intact and that the fluid above is filled with solution. Do not fill yourself. Ask your instructor to use the saturated $AgCl$ or KCl solution.

USE - The meter should be in STANDBY mode, indicated by the digital display. Press the MODE key to wake up the meter and put it in MEASURE mode. The digital display will now display pH of the electrode storage solution.

Autocalibration with Two Buffers:

1. Choose either pH 4.00 and pH 7.00, or pH 7.00 and pH 10.00 buffers; whichever will bracket your expected sample range.
2. Remove reference electrode from electrode storage solution, place an empty beaker underneath it, and rinse it off using a squirt bottle filled with distilled water.
3. Press CAL key to initiate calibration sequence. CAL is displayed for two seconds.
4. Press the YES key to accept the last calibration range (7-4 or 7-10) or select one of these calibration ranges using the SCROLL (\blacktriangle , \blacktriangledown) keys. Press the YES key to accept. The 7 buffer annunciator will light up.
5. Place electrode in pH 7.00 buffer. Reading will be displayed and updated as calibration continues. When the READY light comes on, indicating electrode stability, press YES key to accept.



Orion Model 330 pH Meter Instructions



6. The pH 4 (or pH 10) annunciator will light up. Remove electrode from pH 7.00 buffer. Rinse with distilled water and place electrode in either pH 4.01 or 10.01 buffer (depending on calibration range that was selected).
7. When READY light comes on, press the YES key to accept buffer value. SLP will be displayed while the calculated slope is displayed.
8. The annunciators for the type of calibration performed will remain lit until another calibration is performed.
9. Meter will automatically go into the MEASURE mode. The READY light will come on to indicate electrode stability.

Taking pH Measurements:

1. If measuring immediately following calibration, the meter should already be in MEASURE mode. If measuring some time after calibration, the meter may be in STANDBY mode. Press the MODE key to enter the MEASURE mode.
2. Rinse the reference electrode, and place into sample.
3. Record pH directly from main meter display when the READY light is displayed or when electrode signal is stable.

Factors affecting the function of the meter:

1. A pH meter is often inaccurate if the pH of the sample is greater than 12.
2. Solutions that have high sodium ion concentrations generally give erroneous results because Na⁺ ions pass through the electrode walls. These Na⁺ ions affect the electrical potential measured by the electrode, which causes inaccurate pH readings.
3. The electrode bulb should be completely submerged in sample in order to obtain a stable and accurate reading.
4. Problems with the electrode may prevent accurate pH readings. Refer to the Orion 91 Series pH Electrodes Instruction Manual for proper maintenance and care.

TROUBLESHOOTING - If the instrument does not calibrate.

- Double check the probe. It may be broken or not connected.
- Throw out the stds, wash the containers well and refill with fresh pH standards. Re-calibrate.
- Use a one point calibration to get the instrument in range if the probe was not in good condition prior to cleaning or if the initial calibration was well off standard.

CLEANING AND STORAGE - Rinse the tube and place in storage buffer. Do NOT let the tube sit dry. Clean the area when finished. Put away droppers and beakers. Empty wash containers.