

pH Sensor

PS-2102



Included Parts

1. pH amplifier
2. pH electrode
3. Storage bottle containing storage solution

Additional Part Required

- PASPORT-compatible interface
- PASCO data collection software

Related Parts

- Replacement electrode (PASCO PS-2573)
- pH Buffer Capsule Kit (SC-2321)

Quick Start

1. Connect the amplifier to your PASPORT-compatible interface.
2. Connect the pH electrode to the amplifier.
3. If you are using a computer, connect the PASPORT interface to it and start the PASCO data collection software.
4. Remove the storage bottle from the electrode.
5. Rinse the electrode with distilled water.
6. Immerse the end of the electrode in the solution to be measured.

7. Begin recording data.

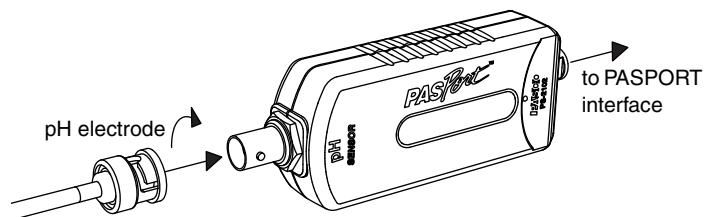
Introduction

The pH Sensor measures the pH of a solution. The measurement is recorded and displayed by the connected computer or datalogger. The pH Sensor is well-suited for continuous recording and discrete measurements.

Set-up

Connecting the Parts

1. Plug the sensor's PASPORT connector into any port of a PASPORT-compatible interface.
2. Push the connector at the end of the electrode cable onto the sensor's electrode connector. Twist the connector to lock it in place.

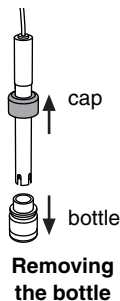


Connecting the electrode and interface

3. If you are using a computer, connect the PASPORT interface to it and start the PASCO data collection software.

Removing the Storage Bottle

1. Hold the electrode vertically so that the solution will not spill out of the bottle.
2. Unscrew and remove bottle. Keep the storage solution for later use.
3. Push the bottle cap up the electrode shaft to keep it out of the way.



Collecting Data

1. Rinse the electrode with distilled water.
2. Immerse the end of the electrode in the solution to be measured. The bulb-shaped glass membrane should be entirely immersed.
3. Use the data collection software to begin recording data.
4. Wait for the reading to stabilize.
5. Rinse the electrode again before placing it in another solution.

Calibration

Calibration is not always necessary, especially if you are interested in measuring a change in pH rather than absolute pH values. For accurate measurements, first calibrate the sensor.

The calibration procedure varies depending on which software or datalogger you are using. For more specific instructions, see the documentation and online User Guide or Help System for your software or datalogger.

Prepare for Calibration

Calibration will need distilled water, two different pH buffer solutions, and containers for the water and buffer solutions. The data collection software (for example, PASCO Capstone) should be running.

- The **pH Buffer Capsule Kit (SC-2321)** from PASCO includes three vials, each with ten capsules of pH 4.0, pH 7.0, and pH 10.0, and a bottle of preservative solution which contains a pH indicator and will color each buffer solution for easy identification.
- Each capsule can make 100 milliliters (ml) of buffer solution.
- Containers such as 100 ml and 1000 ml beakers are available from PASCO. See the Web site at www.pasco.com for information.
- Make two buffer solutions with pH values that “bracket” the pH values to be measured. For this example, make one with

pH 4 and the other with pH 7. The calibration buffer solutions should be at the same temperature as the solutions that will be measured.

Using SPARKvue Software for Calibration

REMINDER: Check the online User Guide and Help System in SPARKvue for the most up-to-date information.

1. Click (or press) the Experiment Tools button (⌘).
 - The Experiment Tools screen opens.
2. Click Calibrate Sensor.
 - The Calibrate Sensor: Select Measurement screen opens.
3. Click the Sensor box and click the sensor to be calibrated.
4. Click the Calibration Type box and click a calibration type. (For this example, click “2-point”.)
5. Click Next.
 - The Calibrate Sensor Enter Values screen opens.
6. Rinse the end of the pH electrode in distilled water and then put the pH electrode into a pH 4 buffer solution.
7. Under Calibration Point 1, click the Standard Value box and enter the known value (4.00 in this example).
8. Under Calibration Point 1, click Read From Sensor.
 - The value measured by the sensor is transferred to the Sensor Value box.
9. Take the electrode out of the first buffer solution and rinse the end of the electrode with distilled water. Dry the electrode and then put the pH electrode into the pH 7 buffer solution.
10. Under Calibration Point 2, click the Standard Value box and enter the pH buffer’s known value (7.00 in this example).
11. Under Calibration Point 2, click the Read From Sensor box.
 - The second value measured by the sensor is transferred to the Sensor Value box.
12. Click OK.

Using PASCO Capstone for Calibration

REMINDER: Check the online User Guide and Help System in PASCO Capstone for the most up-to-date information.

1. Click Calibration (🔧) in the Tools Palette.
2. Choose the electrode you would like to calibrate now: pH Measurement.
3. Click Next.
4. Choose the type of calibration you would like to perform: Two Standards (2 point).
5. Click Next.
6. Enter the first known pH buffer value (4.00 in this example) in the Standard Value text box.
7. Rinse and dry the pH electrode
8. Place the pH electrode in the pH 4 buffer solution.
9. Stir the electrode until the Current Value stabilizes.
10. Click Set Current Value to Standard Value.
11. Click Next.
12. Enter the second known pH buffer value (7.00 in this example) in the Standard Value text box.
13. Remove the electrode from the first buffer solution and rinse and dry the end of the electrode
14. Place the electrode in the second buffer solution.
15. Stir the electrode until the Current Value stabilizes.
16. Click Set Current Value to Standard Value.
17. Click Next.
18. Click Finish. Rinse and dry the electrode before using it for data measurement.

Electrode Maintenance

Electrode Storage

For a storage period of a few weeks or less, rinse the electrode with distilled water and place it in the storage bottle filled with storage solution. To make storage solution, combine equal parts 4 M potassium chloride (KCl) and pH 4 buffer solution, with a few drops of pH buffer preservative (buffer preservative is optional).

You may keep the electrode in the storage solution indefinitely, but for long term storage, PASCO recommends storing the electrode dry. After dry storage, the electrode must be restored (see below) to rehydrate the glass membrane.

Restoring the Electrode

Follow this procedure to improve the response of a slow electrode or to rehydrate the membrane after dry storage.

1. Clean the membrane using one or more of these methods:
 - If the electrode is contaminated with proteins, soak the electrode in a solution of 1% pepsin in 0.1 Molar hydrochloric acid (HCl).
 - If the electrode is contaminated with inorganic deposits, rinse the electrode with 0.1 M Ethylenediaminetetraacetic acid (EDTA) solution.
 - If the electrode is contaminated with oil or grease, wash the electrode in a mild detergent or solvent known to be effective for the particular film.
 - If the electrode is not responding quickly, soak the electrode alternately in 0.1 M NaOH (sodium hydroxide) and 1 M HCl (hydrogen chloride). Leave it in each solution for one minute. Rinse completely between soakings and end with HCl.
2. Soak the electrode in 0.1 M hydrochloric acid (HCl) for 15 minutes.
3. Soak the electrode in a pH 7 buffer solution for 30 minutes.

If the restoring procedure fails to improve the response of the electrode, replace the electrode.

Replacement and Alternative Electrodes

- For a replacement pH electrode, purchase PS-2573. (Check the PASCO Web site at www.pasco.com for more information about pH electrodes.)
- The pH Sensor is compatible with other combination pH electrodes that have BNC connectors, such as the PASCO Ion Selective Electrodes and the Oxidation Reduction Potential electrode. Please see the PASCO Web site for more information.

Specifications

pH Amplifier	
pH Range	0 to 14 (probe dependent)
Accuracy	±0.1 after calibration
Resolution	0.005
Repeatability	0.02
pH Electrode	
Type	Gel-filled Ag-AgCl combination electrode
Connector	BNC

Technical Support

For assistance with any PASCO product, contact PASCO at:

Address: PASCO scientific
10101 Foothills Blvd.
Roseville, CA 95747-7100

Phone: +1 916 462 8384 (worldwide)
800-772-8700 (U.S.)

Web: www.pasco.com

Email: support@pasco.com

For more information about the pH Sensor and the latest revision of this instruction sheet, visit the PASCO Web site at www.pasco.com and enter “PS-2102” in the Search window.

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The European Union WEEE (Waste Electronic and Electrical Equipment) symbol (to the right) and on the product or its packaging indicates that this product **must not** be disposed of in a standard waste container.

