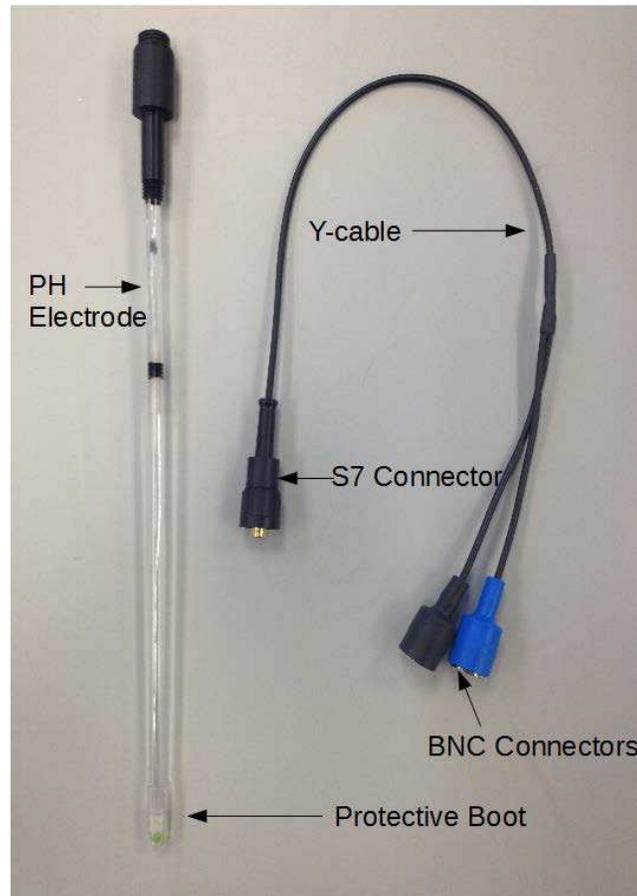


## Phenometrics pH Combination Electrode June 2015

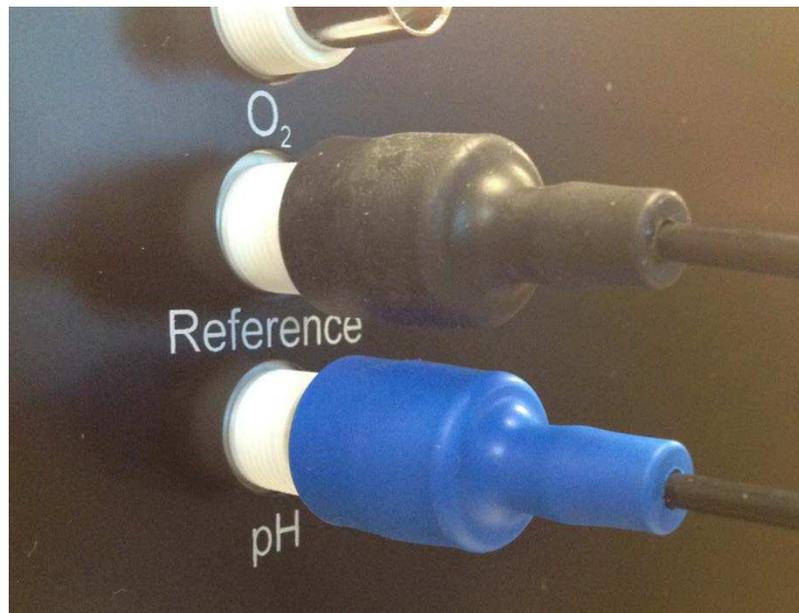


### Preparation and Connection

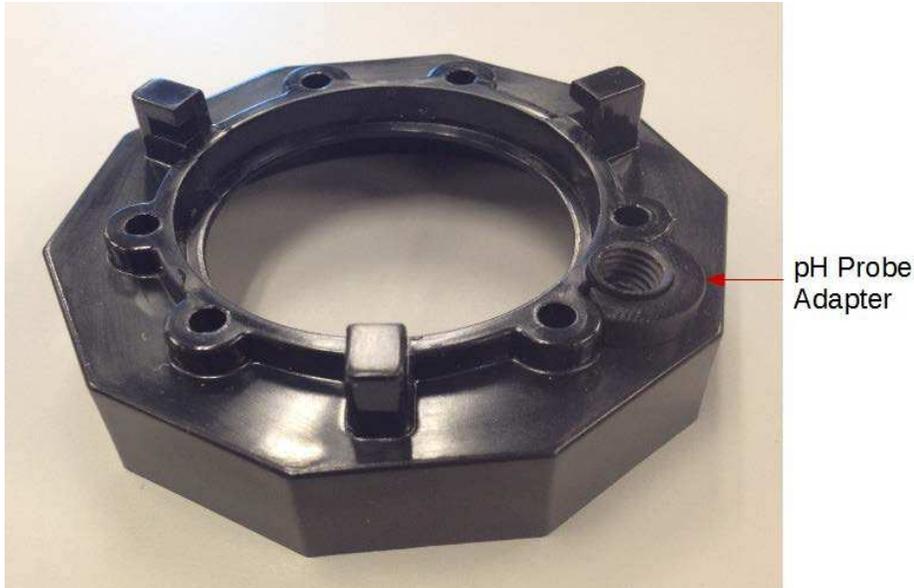
1. Remove the pH electrode from the packaging. Carefully, remove the bulb protector. Hold the electrode close to the boot, then gently wiggle the boot to break suction and remove it. **Do not hold the electrode by the plastic connector and twist the boot! Doing so may result in breaking the electrode.** Do not discard the boot. It can be replaced when storing the electrode for extended periods in the future. Support the electrode and immerse the bulb in 4.01 pH buffer for approximately 30 minutes. This will hydrate the pH bulb for optimum performance.



2. Connect the Y-cable to the electrode by screwing together the S7 connector of the Y-cable and the top of the electrode, as shown above. Hold the probe only by the plastic connector when doing this, not by the glass barrel.



3. Connect the Y-cable to the PBR101 by connecting the black BNC connector of the Y-cable to the Reference connector of the PBR101. Then connect the blue BNC connector of the Y-cable to the pH connector of the PBR101, as shown above.



4. Insert the pH electrode into the adapter in the vessel cap, and tighten by screwing the probe into the adapter. Hold the electrode by the plastic connector when screwing it into the cap. **Finger-tighten only, do not over tighten the probe into the adapter.**
5. The electrode body is autoclavable and may be left mounted in the cap during autoclaving. However, the Y-cable is **not** autoclavable. The cable can be conveniently removed and reconnected after autoclaving.

## Calibration

1. Before using the electrode to measure or control pH in the PBR101, it must first be calibrated. Refer to section 7.2 of the Algal Command 2.0 Manual. You will be using only the combination electrode instead of the separate pH and reference half-cell electrodes.

## Electrode Cleaning and Maintenance

The combination pH electrode is very robust and should perform well in many applications. However, as with all pH electrodes, performance will degrade over time due to microscopic buildup of protein, lipid, and cellular or other biological debris, salt precipitation, etc. Typically, electrodes can often be restored to factory-new performance by one of the following procedures:

1. **General Cleaning:** Soak the electrode in 1:10 dilution of household laundry bleach in a 0.1-0.5% liquid detergent solution in hot water with vigorous stirring for 15 minutes. Place bulb under warm, running tap water for 15 seconds. Soak the bulb in storage solution for at least 10 minutes.
2. **Salt Deposits:** Dissolve salt deposits by immersing the electrode in 0.1 M HCl for five minutes, followed by immersion in 0.1M NaOH for five minutes, and thorough rinsing with distilled water.

Some deposits may form in the electrode junction and will not be visible. If electrode response is slow or shows drift, try this procedure to correct the problem.

3. Oil/Grease Films: Wash electrode bulb in detergent and water. Rinse electrode bulb with distilled water.
4. Protein Deposits: Dissolve the deposit by immersing the electrode in a 1% pepsin solution with a background of 0.1 M HCl for five minutes, followed by thorough rinsing with distilled water.

If these steps fail to improve electrode performance, then junction may be irreversibly clogged and the electrode should be replaced.

Note: This electrode is permanently sealed. Electrolyte does not need to be added. A visible “bubble” is normal and added during manufacture to allow for electrolyte gel expansion over a wide temperature range.

## **Electrode Storage**

For best results always keep the pH bulb wet, preferably in pH 4.01 buffer with 1/100 part of saturated KCl added when not being using in the PBR101. Other pH buffers or pH storage solutions are also acceptable. **Never store in distilled water.** The protective boot filled with the appropriate buffer will provide an ideal storage chamber for long periods.

**NOTE: electrodes should not be stored for a period longer than 6 months for best results, as the bulb may begin to dry out. To avoid this, the probes should be periodically soaked in 4.01 pH buffer for roughly 30 minutes, to ensure that the bulb is properly hydrated.**