Sea-Bird Electronics, Inc.
1808 136th Place NE
Bellevue, WA 98005
USA

Phone: (425) 643-9866
Fax: (425) 643-9954
E-mail: seabird@seabird.com
Web: www.seabird.com

APPLICATION NOTE NO. 18-2

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SBE 18, 22, 27, AND 30
pH SENSOR STORAGE, MAINTENANCE, AND CALIBRATION

When the pH Sensor is Not in Use

1. Replace the *soaker* bottle over the plastic pH electrode by removing the soaker bottle cap, sliding it along the plastic pH electrode as far as it will go, and threading the bottle up into the cap. There should be enough fluid in the bottle to cover at least the glass electrode and Teflon reference junction.
2. Remove the bottle by reversing the sequence.

When removing or installing the soaker bottle, do not force the pH electrode sideways. The electrode's outer shell is plastic, but the **inner stem is glass and can break if the electrode is handled roughly.**

The *soaker* fluid is pH 4 buffer solution saturated with KCL. The pH 4 solution is acidic, and will eat away most fouling of the pH electrode. Additional solution, if required, may be made using commercially available buffer capsules, KCL crystals, and distilled water.

The sensor will tolerate the periodic absence of the soaker bottle and can be returned to initial performance by soaking for a few hours. However, **exposure of the bare sensor to temperature extremes (e.g., strong direct sunlight on a hot day) can cause a loss of internal electrolyte**. Subsequent cooling will draw air into the sensor, which will lead to pressure-related problems.

Note: The sensor contains a non-organic electrolyte and antibacterial inhibitors designed to optimize its use in marine environments.

Calibrating the pH Sensor

Sea-Bird pH sensors are calibrated with commercial buffer solutions (±0.02 pH). Make periodic corrections by comparison to buffers near the anticipated in situ pH, typically in the 7 - 8 pH range. Best calibration of the sensor is obtained by soaking the sensor in deionized water for 30 minutes prior to standardization with buffers.

To calibrate:

1. For easier access during calibration, remove the pH sensor from the mount kit holding it to the CTD, but leave the pH sensor cable connected to the CTD end cap.
2. Run SEASAVE V7, set it up to display the pH voltage (the voltage channel for the pH data is listed on the instrument configuration page in your CTD manual), and start real-time data acquisition.
3. Connect a small-gauge wire to one of the screws at the connector end of the sensor housing and put the other end into the buffer solution bottle.
4. Put the pH probe in the buffer solution and wait 1 minute for complete stabilization. Note the resulting voltage on the computer display.
5. Repeat this process for at least two other values of pH, preferably *bracketing* the range of interest. **Rinse the pH electrode in deionized water between measurements in the different pH buffer solutions.**

See Application Note 18-1 for information about use of the PHFIT program for calculation of pH calibration coefficients. Enter the new coefficients generated by PHFIT in the CTD configuration (.con) file.

Note: In our SEASOFT-Win32 suite of programs, edit the CTD configuration (.con) file using the Configure Inputs menu in SEASAVE V7 (real-time data acquisition software) or the Configure menu in SBE Data Processing (data processing software). Select pH as a voltage sensor when editing the .con file; the software prompts for slope and offset.