

Deployment Checklist for Moored Instruments

This Application Note applies to Sea-Bird Scientific instruments intended to provide time series data on a mooring or fixed site:

- SBE 16*plus*, 16*plus*-IM, 16*plus* V2, and 16*plus*-IM V2 SeaCAT Conductivity and Temperature Recorder
- SBE 19*plus* and 19*plus* V2 SeaCAT Profiler CTD (in moored mode)
- SBE 26*plus* Seagauge Wave and Tide Recorder
- SBE 37 (IM, IMP, SM, SMP, SI, SIP) MicroCAT CTD Recorder
- SBE 37 (IMP-ODO, SMP-ODO) MicroCAT CTD and Optical Dissolved Oxygen Recorder
- SBE 39, 39-IM, 39*plus*, 39*plus*-IM Temperature Recorder
- SBE 53 BPR Bottom Pressure Recorder
- SBE 56 Temperature Logger
- HydroCAT V2 CTD and Optical Dissolved Oxygen Recorder
- HydroCAT-EP V2 CTD, pH, Optical Dissolved Oxygen, chlorophyll a fluorescence, and turbidity meter

The checklist below is to assist users in deploying moored instruments. This checklist is intended as a guideline to assist you in developing a checklist specific to your operation and instrument setup. The actual procedures and procedure order may vary, depending on such factors as:

- Instrument communication interface—RS232, RS485, inductive modem, USB, or SDI12
- Deployment interface for RS232 or RS485—with I/O cable for real-time data or dummy plug for self-contained operation
- Sampling initiation—using delayed start commands to set a date and time for autonomous sampling to automatically begin, starting autonomous sampling just before deploying the instrument, or taking polled measurements
- Sensors included in your instrument—
 - Pressure is optional in the SBE 16*plus*, 16*plus*-IM, 16*plus* V2, 16*plus*-IM V2, 37 (all), 39, 39-IM, 39*plus*, 39*plus*-IM, HydroCAT, and HydroCAT-EP, and is not provided in the SBE 56.
 - Conductivity is optional in the SBE 26*plus* and 53, and is not included in the SBE 39, 39-IM, 39*plus*, 39*plus*-IM, or 56.
 - Oxygen is optional in the HydroCAT.
 - Oxygen, chlorophyll-a, and turbidity are optional in the HydroCAT-EP; pH is included.
 - Optional auxiliary sensors can be field- or factory-integrated with the SBE 16*plus*, 16*plus*-IM, 16*plus* V2, 16*plus*-IM V2, 19*plus*, and 19*plus* V2.
- Software used—most instruments use Seaterm or Seaterm V2 terminal program; HydroCATs use UCI.

Deployment Summary

Instrument serial number
Mooring number
Date of deployment
Depth of instrument
Intended date of recovery
Capture file printout(s) or setup report attached, or file name and location
Actual date of recovery
Condition of instrument at recovery
Notes

Prepare for Deployment

Task	Complete?
<p>If applicable, upload existing data from memory Perform preliminary processing/analysis of data to make sure all data is transmitted, that the data was not corrupted in transmit process, and that (if transmitting converted data) instrument EEPROM was programmed with correct calibration coefficients. If there is a problem with data, try to upload again now. Once you record over data in next deployment, opportunity to correct any upload problem is gone.</p>	
<p>Initialize memory to make entire memory available for recording If memory is not initialized, data will be stored after last recorded sample.</p>	
<p>Calculate battery endurance to ensure sufficient power for intended deployment See the user manual for example calculations (UCI does these calculations automatically for HydroCATs).</p>	
<p>Calculate memory endurance to ensure sufficient memory for intended sampling scheme See instrument manual for example calculations.</p>	
<p>Install new batteries Even if you think there is adequate battery capacity left for another deployment, the cost of fresh batteries is small price to pay to ensure successful deployment.</p>	
<p>Establish setup/operating parameters <i>With Seaterm or Seaterm V2:</i> 1. Click Capture in terminal program and enter the filename to record instrument setup, so you have complete record of communication with instrument. 2. Set current date and time. 3. Configure setup/operating parameters. 4. If desired, set date and time for sampling to automatically begin. 5. Send <i>Status</i> command to verify and provide record of setup. 6. Send <i>Calibration Coefficients</i> command to verify and provide record of calibration coefficients. <i>With UCI:</i> Set up instrument; run report to verify and provide record of setup.</p>	
<p>Get conductivity sensor ready for deployment As applicable, remove protective plugs that were placed in Anti-Fouling Device caps or remove label that was placed over inlet/outlet or remove Tygon tubing that was looped end-to-end around conductivity cell to prevent dust/dirt from entering cell. Note that deploying instrument with protective plugs, label, or looped Tygon tubing in place will prevent instrument from measuring conductivity during deployment, and may destroy cell.</p>	
<p>For instrument with external pump (16plus, 16plus-IM, 16plus V2, 16plus-IM V2, 19plus, 19plus V2), verify that system plumbing is correctly installed See instrument manual for configuration.</p>	
<p>Start sampling (if you did not set up instrument with a delayed start command), or verify that sampling has begun (if you set up instrument with a delayed start command) <i>With Seaterm or Seaterm V2:</i> 1. Select Capture in terminal program and enter file name to record instrument setup, so you have a complete record of communication with instrument. 2. If you did not set up instrument with a delayed start command, send command to start sampling. 3. If instrument can communicate in real-time while sampling: Send <i>Status</i> command to verify and provide record that instrument is sampling. Send <i>Send Last</i> command to look at most recent sample and verify that output looks reasonable (i.e., ambient temperature, zero conductivity, atmospheric pressure). <i>With UCI:</i> Set up instrument; get report to verify and provide record of setup. <i>Note:</i> For instruments with a pump (external or integral), do not operate the pump <i>dry</i> for extended period of time.</p>	
<p>If instrument has pressure sensor, record atmospheric pressure with barometer Use this during data processing to check and correct for pressure sensor drift, by comparing to instrument's pressure reading in air (from above).</p>	
<p>Install mounting hardware on instrument Verify that hardware is secure.</p>	

Recovery

Immediately upon recovery

Task	Complete?
Rinse instrument with fresh water, remove locking sleeve on dummy plug or cable, slide it up cable (if applicable), and rinse the still-mated connection	
For instrument with pump (external or integral), stop sampling Stop sampling as soon as possible upon recovery to avoid running pump <i>dry</i> for an extended period of time. Note that for some instruments, pump turns off automatically when conductivity frequency is below programmed minimum value. <i>With Seaterm or Seaterm V2 (most instruments):</i> Connect to instrument in terminal program and send command to stop sampling. <i>With UCI:</i> Connect instrument to UCI; UCI sends command to stop sampling.	
If instrument has pressure sensor, record atmospheric pressure with barometer You can use this information during data processing to check and correct for pressure sensor drift, by comparing to instrument's pressure reading in air.	
Gently rinse conductivity cell with clean de-ionized water, drain, and gently blow through cell to remove larger water droplets <ul style="list-style-type: none"> If cell is not rinsed between uses, salt crystals may form on platinized electrode surfaces. When instrument is used next, sensor accuracy may be temporarily affected until these crystals dissolve. Note that vigorous flushing is not recommended if you will be sending instrument to Sea-Bird for post-deployment calibration to establish drift during deployment. For instruments with integral pump or integral pump and dissolved oxygen sensor (37-SMP, SMP-ODO, SIP, IMP, IMP-ODO; HydroCATs): Rinse all internal plumbing in addition to conductivity cell. If not rinsed between uses, salt crystals may form on pump impeller and/or on oxygen sensor membrane or optical window. 	
For instrument with external pump (16plus, 16plus-IM, 16plus V2, 16plus-IM V2, 19plus, 19plus V2): Remove Tygon tubing from pump head's hose barbs, and rinse inside of pump head, pouring fresh water through a hose barb If pump head is not rinsed between uses, salt crystals may form on impeller. Over time, this may freeze impeller in place, preventing pump from working.	
As applicable, install protective plugs in Anti-Fouling Device caps, install label over inlet/exhaust, or loop Tygon tubing end-to-end around conductivity cell for long term storage This will prevent dust/dirt from entering conductivity cell.	
Transmit data from instrument's memory <i>With Seaterm or Seaterm V2:</i> <ol style="list-style-type: none"> Connect to instrument in terminal program. If you have not already done so, send command to stop sampling. Click Upload in terminal program to upload data in memory. Perform preliminary processing/data analysis to ensure you have uploaded all data, data was not corrupted in upload process, and (if uploading converted data) instrument EEPROM was programmed with correct calibration coefficients. If there is a problem with data, you can try to upload again now. Once you record over data in next deployment, opportunity to correct any upload problem is gone. <i>With UCI:</i> Connect to instrument and select Transfer Data.	

Later

Task	Complete?
Clean conductivity cell as needed: <ul style="list-style-type: none"> Do not clean cell if you will be sending instrument to Sea-Bird for post-deployment calibration to establish drift during deployment. Clean cell if you will not be performing a post-deployment calibration to establish drift. 	
For instrument with external pump (16plus, 16plus-IM, 16plus V2, 16plus-IM V2, 19plus, 19plus V2): Clean pump as described in <i>Application Note 75: Maintenance of SBE 5T and 5M Pumps</i>. (Annually) Inspect and (if applicable) rinse pressure port	
Send instrument to Sea-Bird Scientific for calibrations/regular inspection and maintenance. We typically recommend that instrument be recalibrated once a year, but possibly less often if used only occasionally. Return instrument to Sea-Bird for recalibration. Between lab calibrations, take field salinity samples to document conductivity cell drift.	

Notes:

- We cannot place instrument in our calibration bath if heavily covered with biological material or painted with anti-fouling paint. Remove as much material as possible before shipping to Sea-Bird; if we need to clean instrument before calibrating it, we will charge you to clean it. To remove barnacles, plug ends of conductivity cell to prevent cleaning solution from getting into cell, then soak instrument in white vinegar *for a few minutes*.
- To remove anti-fouling paint, use a heavy duty Scotch-Brite pad or similar material.
- If using lithium batteries, do not ship batteries installed in instrument.