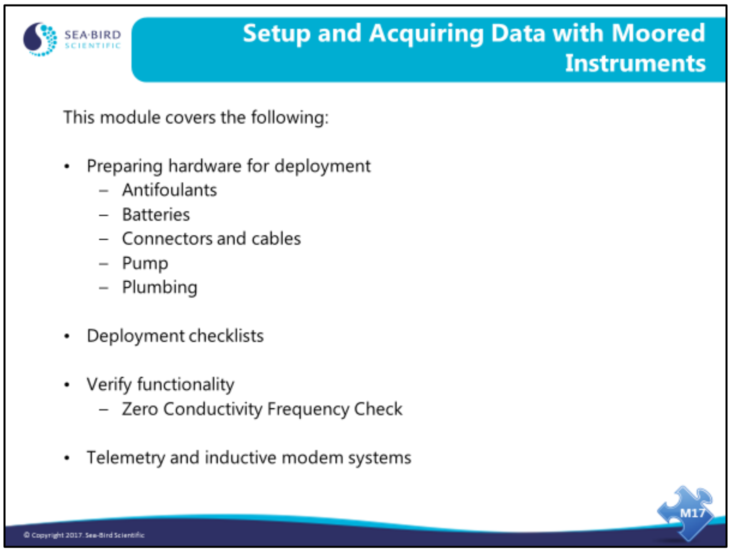
Setup and Acquiring Data with Moored Instruments: Hardware

Sea-Bird Scientific University Module 17

Overview

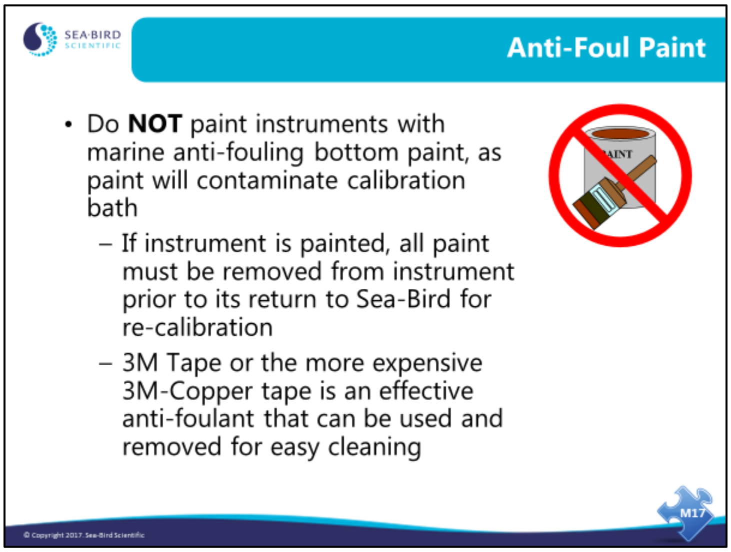


In this module we will discuss setup of moored instruments for deployment, considering instrument status reports.

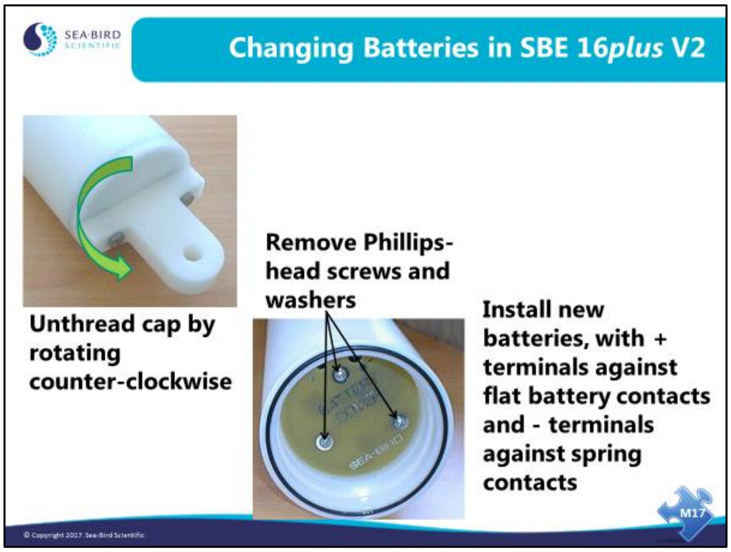
By the end of this module, you should be able to:

- Prepare your instrument for deployment

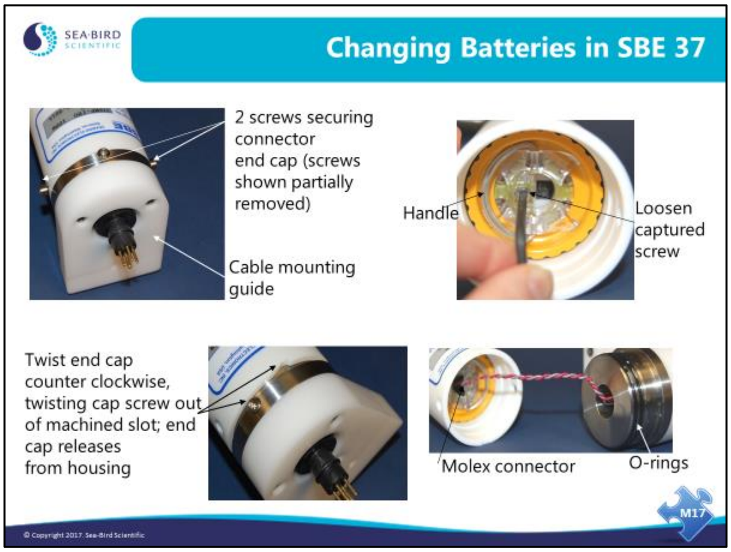
Anti-Foulant Paints



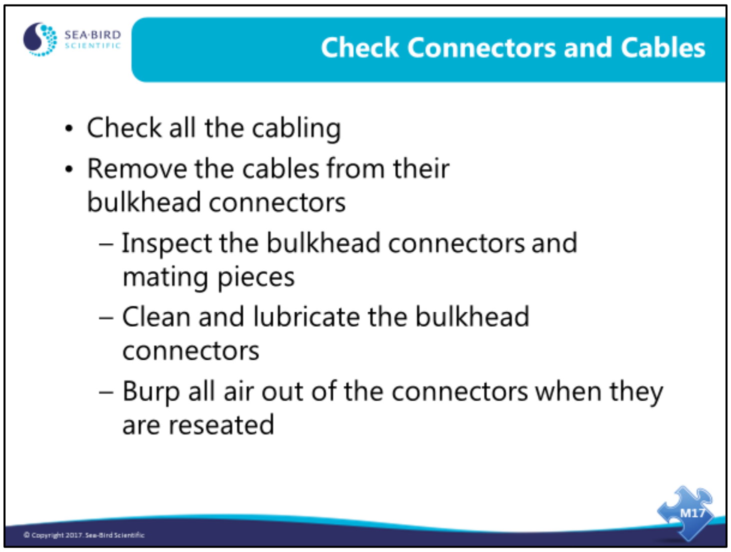
Changing Batteries



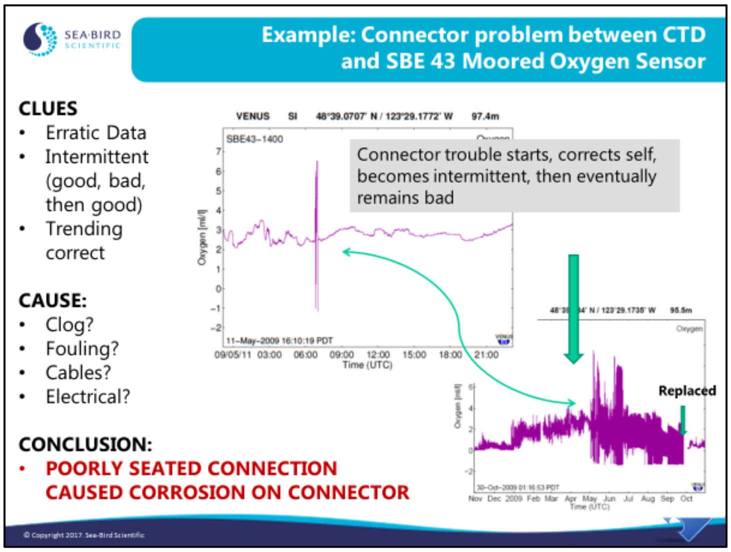
Changing Batteries (*continued*)



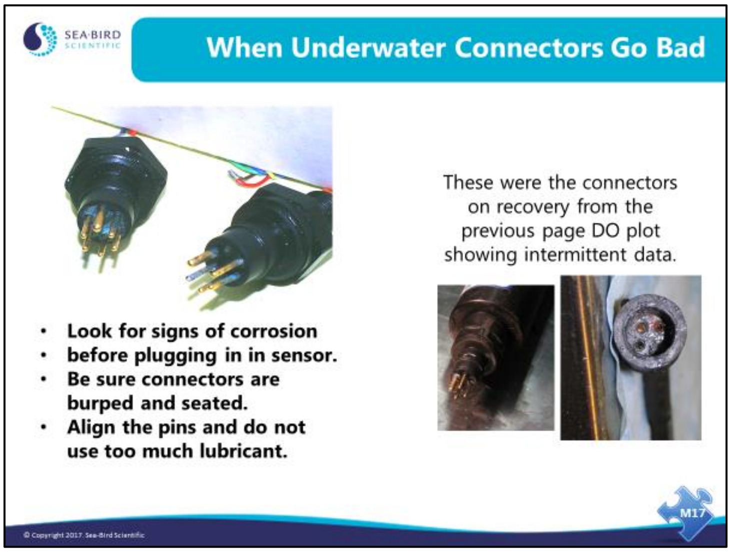
Checking Cables and Connectors



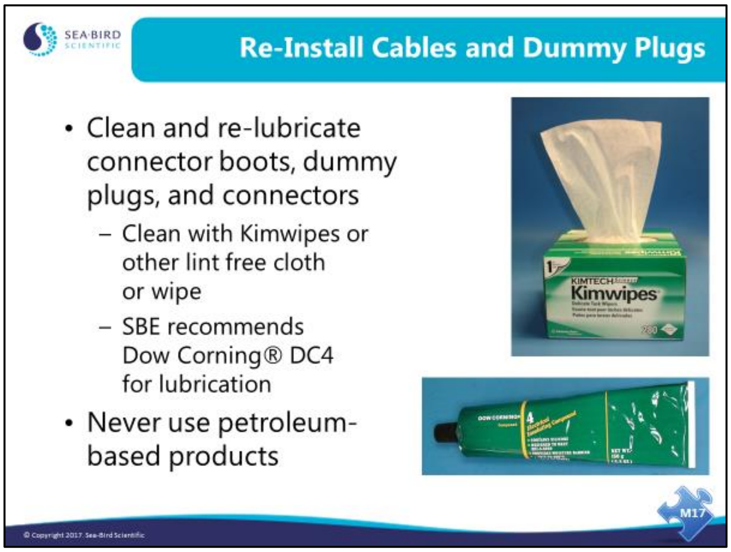
Checking Cables and Connectors (*continued*)



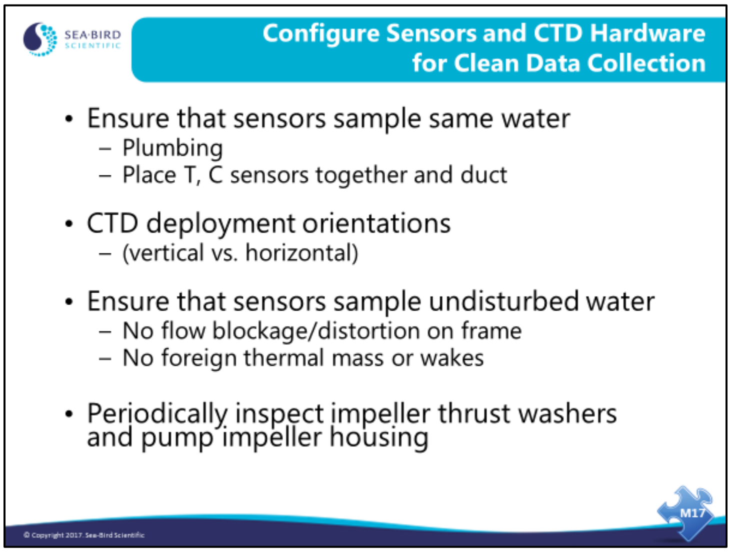
Checking Cables and Connectors (*continued*)



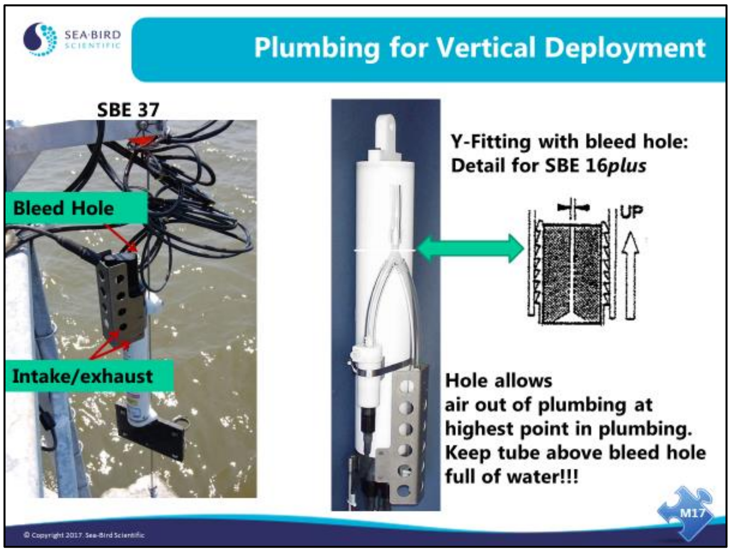
Checking Cables and Connectors (*continued*)



Clean Data Collection: Plumbing



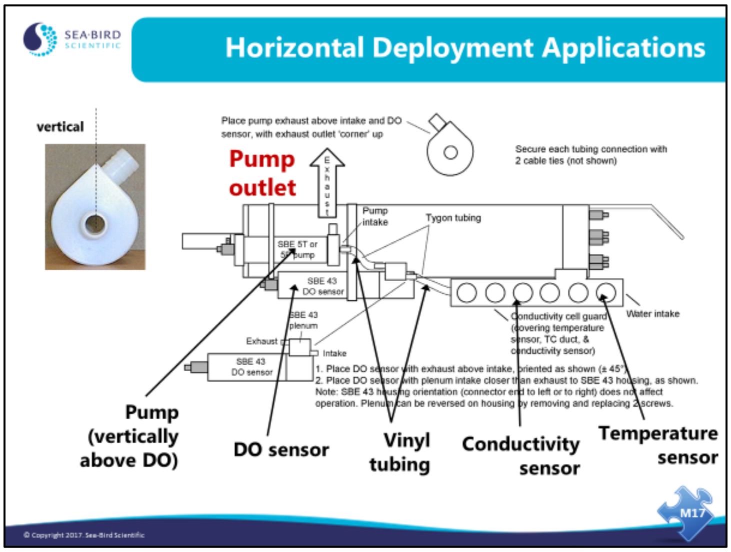
Clean Data Collection: Plumbing *(continued)*



On the right, SBE 16*plus* TC intake is lowest on package, so it is the first thing to see the water in the plumbing.

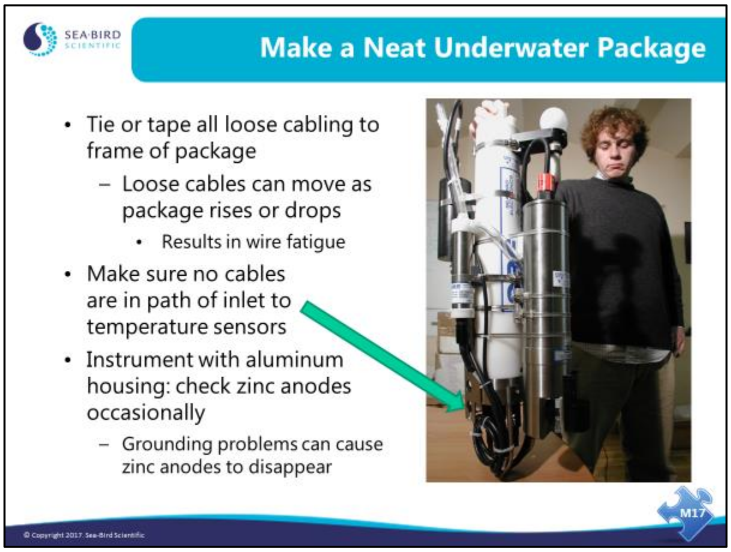
On the left, the SBE 37 MicroCAT can be deployed as shown or inverted. In the recommended orientation (shown), the air escapes through a bleed hole on the top. This orientation also helps prevent sedimentation in the plumbing. If deployed inverted, air escapes from the two openings at the intake and exhaust. But in this orientation, it is best to fill the plumbing with water before deployment, as there is no way for water to fill in fast enough through the bleed hole.

Clean Data Collection: Plumbing (*continued*)

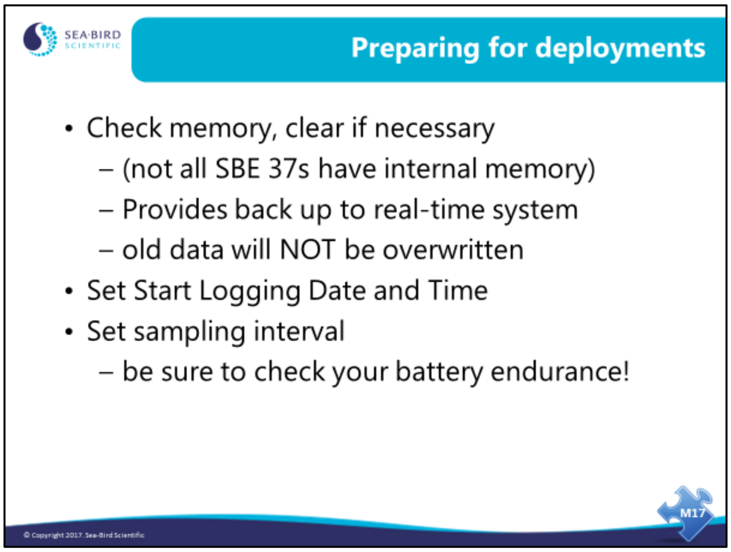


Notice here that the pump exhaust is now the highest point on the plumbing.

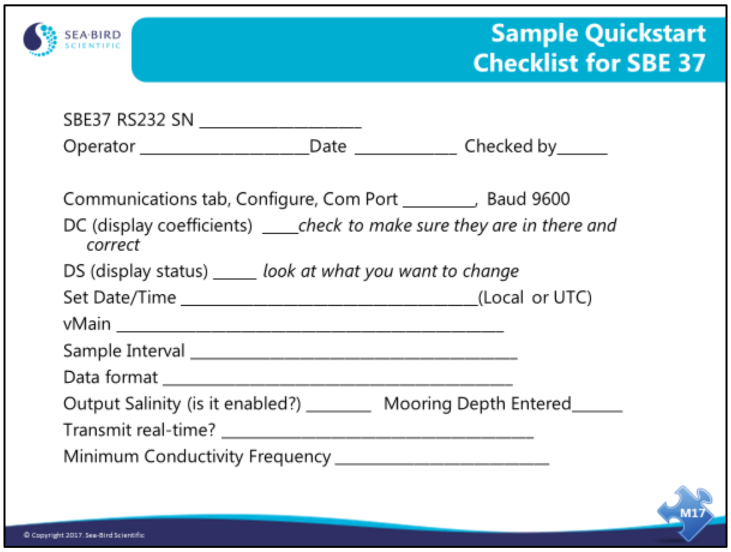
Clean Data Collection: Plumbing *(continued)*



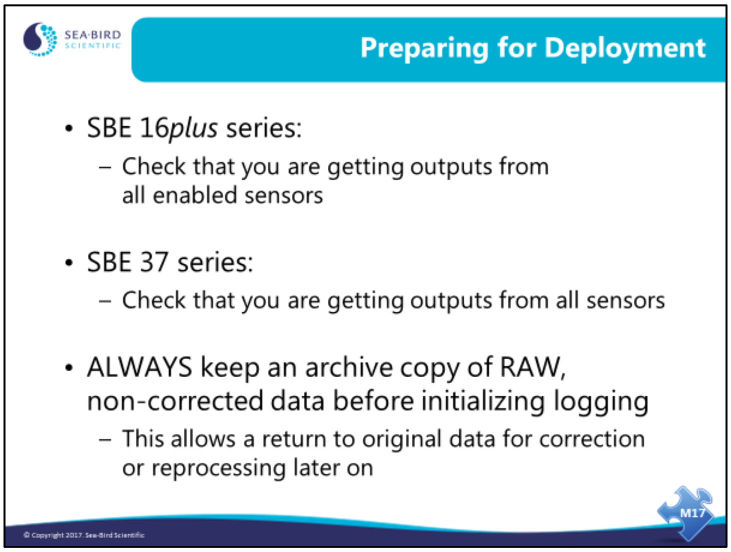
Preparing for Deployment



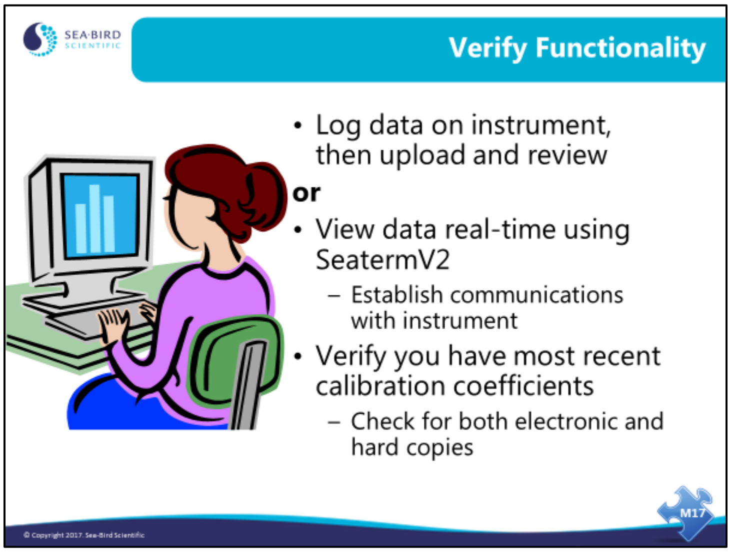
Preparing for Deployment (*continued*)



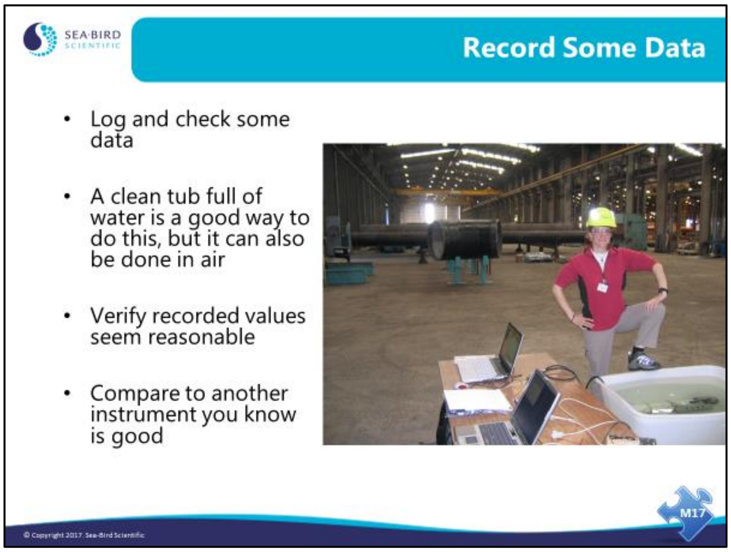
Preparing for Deployment (*continued*)



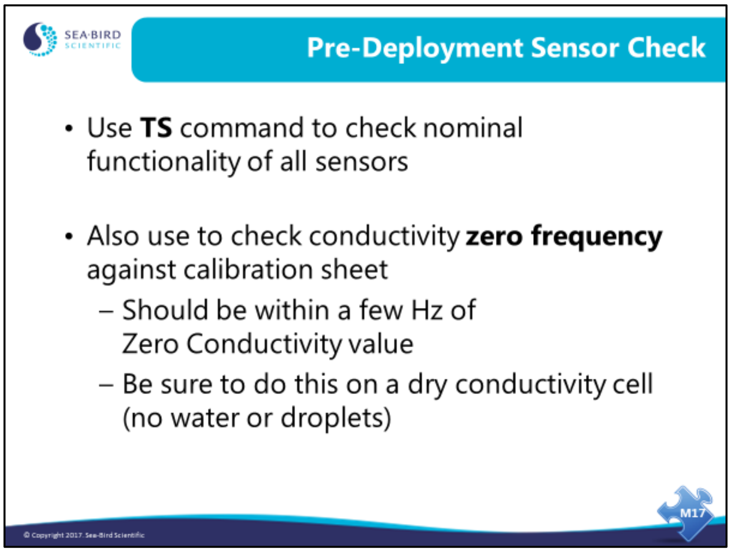
Preparing for Deployment: Sensor Check



Preparing for Deployment: Sensor Check (*continued*)



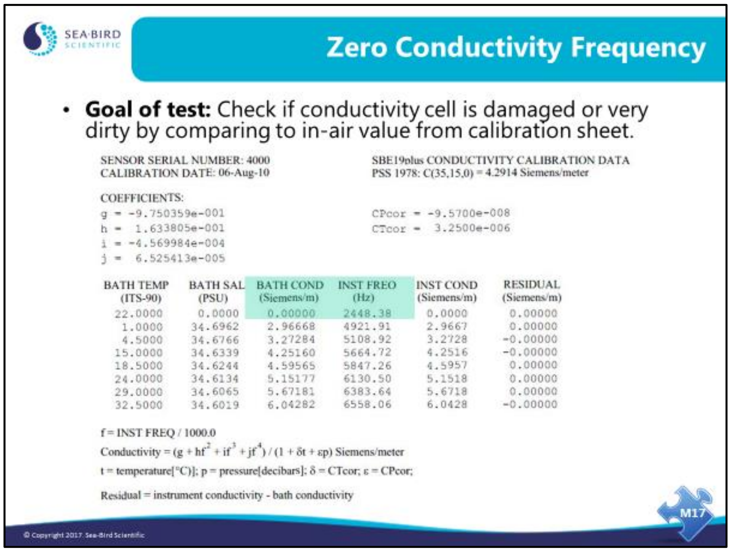
Preparing for Deployment: Sensor Check (*continued*)



Before you invest a great deal of time and effort deploying a mooring, it is a great idea to send your instrument in for calibration. It is an excellent check on its functionality, not to mention its accuracy. If you are unable to do this, check to see that all the sensors are presenting nominally correct output. Sea-Bird moored instruments, with the exception of the SBE 16, have calibration coefficients stored internally and are able to output measurements in scientific units.

The best spot check for the conductivity cell is to observe its zero conductivity frequency. The zero conductivity frequency is the uncorrected (raw) frequency output at 0 conductivity. To do this, rinse the cell in distilled or de-ionized water and shake any remaining drops out. The sensor should read very close to the zero conductivity reading on the calibration sheet (within a few tenths of a Hz). If it does not, the cell may be dirty or damaged. Try cleaning it with a non-ionic detergent such as Triton X. If still bad, send for servicing.

Preparing for Deployment: Check Zero Conductivity Frequency



BATH TEMP (ITS-90)	BATH SAL (PSU)	BATH COND (Siemens/m)	INST FREQ (Hz)	INST COND (Siemens/m)	RESIDUAL (Siemens/m)
22.0000	0.0000	0.00000	2448.38	0.0000	0.00000
1.0000	34.6962	2.96668	4921.91	2.9667	0.00000
4.5000	34.6766	3.27284	5108.92	3.2728	-0.00000
15.0000	34.6339	4.25160	5664.72	4.2516	-0.00000
18.5000	34.6244	4.59565	5847.26	4.5957	0.00000
24.0000	34.6134	5.15177	6130.50	5.1518	0.00000
29.0000	34.6065	5.67181	6383.64	5.6718	0.00000
32.5000	34.6019	6.04282	6558.06	6.0428	-0.00000

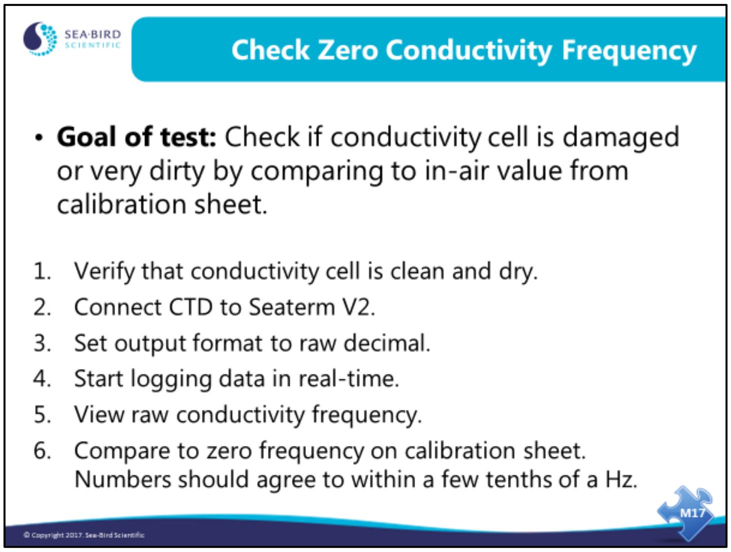
The Zero Conductivity Frequency is provided on the conductivity calibration form we send you with your CTD.

For salt water applications, the value for the *minimum conductivity frequency* is typically set at the factory to [*zero conductivity raw frequency + 500 Hz]*. A typical minimum conductivity frequency in salt water is (2448 + 500) = 2948 Hz.

For fresh water applications, the value for the *minimum conductivity frequency* is typically set at the factory to [*zero conductivity raw frequency + 1- 5 Hz*]. A typical minimum conductivity frequency in fresh water is (2448 + 5) = 2453 Hz

Reminder: The pump turns on when raw conductivity frequency exceeds the minimum conductivity frequency (MinCondFreq=). To prevent the pump from turning on when in air, set the minimum conductivity frequency for pump turn-on above the instrument's *zero conductivity raw frequency* shown in the configuration sheet. If the minimum conductivity frequency is too close to the *zero conductivity frequency*, the pump may turn on when the CTD is in air, as a result of small drifts in the electronics. Some experimentation may be required, and in some cases it may be necessary to rely only on the pump turn-on delay time to control the pump. If so, set a minimum conductivity frequency lower than the *zero conductivity frequency*.

Preparing for Deployment: Check Zero Conductivity Frequency (*continued*)



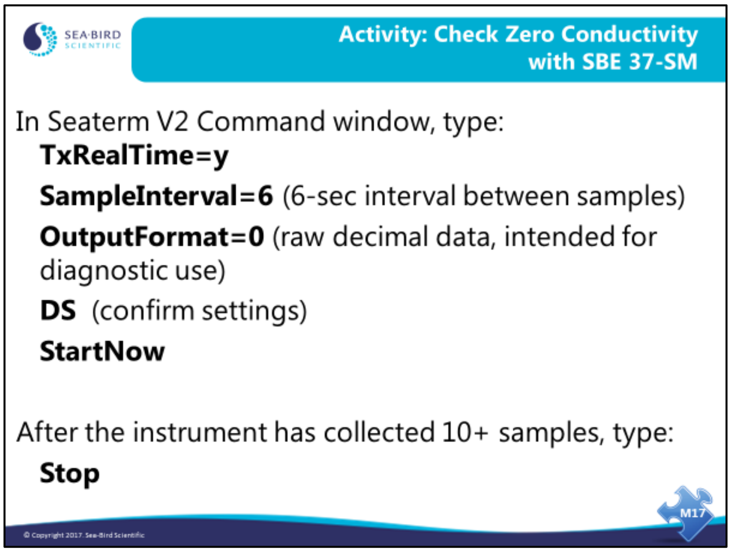
Click Capture button on menu bar in Seaterm V2 to create a file of your test data.

Clean and rinse cell thoroughly with distilled or de-ionized water and allow to dry completely prior to this test.

Note that each CTD has a unique zero frequency and calibration. Use the calibration sheet for each CTD to check the in-air zero conductivity frequency.

- If the conductivity frequency readings differ by more than 0.5 to 1 Hz different from the calibration sheet values, the conductivity cell is damaged or dirty. Try following the cleaning procedures again in Application Note 02D to see if the value improves. Make sure the cell has time to dry, and then repeat this procedure and check the raw frequency again.
- In addition, noisy readings can indicate a dirty cell.

Activity: Check Zero Conductivity for SBE 37-SM

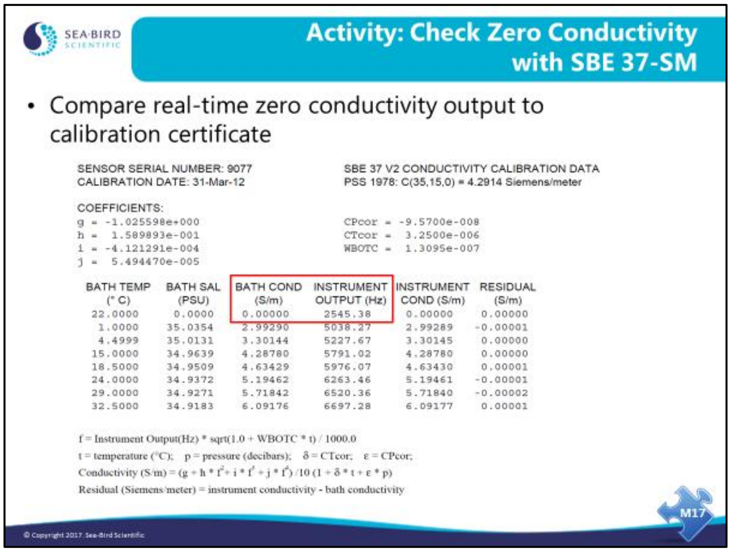


Type **StartNow** to look at data in real-time.

Type **Stop** to stop logging.

Example:
Column Headings are as follows for **OutputFormat=0**:
Temperature Counts, **Conductivity Frequency,** Pressure Counts, Pressure sensor temperature counts, Date and Time
S>StartNow
<!--start logging at = 15 May 2012 17:10:03, sample interval = 15 seconds-->
S>
#224970, **2545.383,** 534298, 1557, 15 May 2012, 17:10:04
#224952, **2545.371,** 534298, 1556, 15 May 2012, 17:10:19

Activity: Check Zero Conductivity for SBE 37-SM *(continued)*



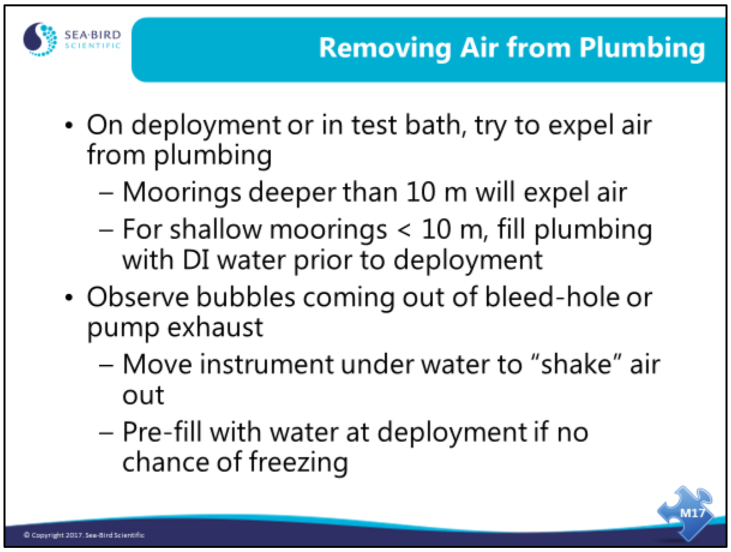
Check against the calibration sheet that goes with your instrument.
In this example, for conductivity SN 9077, we find the zero conductivity values agree.
Real-time data from instrument:
<!--start logging at = 15 May 2012 17:10:03, sample interval = 15 seconds-->
S>
#224970, **2545.383,** 534298, 1557, 15 May 2012, 17:10:04
#224952, **2545.371,** 534298, 1556, 15 May 2012, 17:10:19

Calibration sheet value:

Bath Temp (ITS-90)	Bath Sal (PSU)	Bath Cond (Siemens/m)	**Inst Freq** (Hz)	Inst Cond (Siemens/m)	Residual (Siemens/m)
22.0000	0.0000	**0.00000**	**2545.38**	0.00000	0.00000
1.0000	35.0354	2.99290	5038.27	2.99289	-0.00001
4.4999	35.0131	3.30144	5227.67	3.30145	0.00000
15.0000	34.9639	4.28780	5791.02	4.28780	0.00000
18.5000	34.9509	4.63429	5976.07	4.63430	0.00001
24.0000	34.9372	5.19462	6263.46	5.19461	-0.00001
29.0000	34.9271	5.71842	6520.36	5.71840	-0.00002
32.5000	34.9183	6.09176	6697.28	6.09177	0.00001

See how the zero air reading is within a few 10ths of a Hz of the zero conductivity value on the calibration sheet, indicating a clean, functional cell. The cell must be dry for this to work.

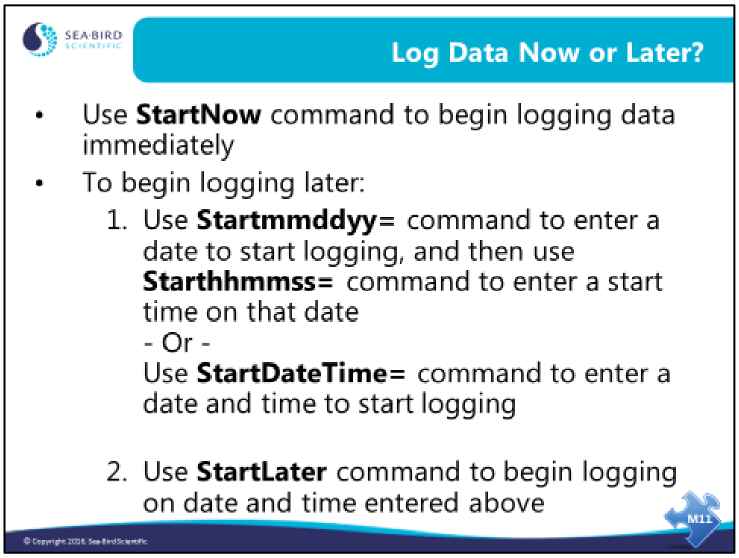
Removing Air from Plumbing



If you do not see air bubbles coming out of the bleed hole, the hole maybe clogged. Use a fine gauge wire to clear the bleed hole.

Another important note: Salt water can cause the bleed hole to clog with salt if not rinsed regularly. Sea-Bird recommends soaking instruments in freshwater after deployment to prevent this from happening.

Starting Logging



You have the option of setting a logging start time and date, allowing you to begin data collection once the mooring is in place. The risk you run is that you might not place the mooring when you planned to. There are always some risks in life. The alternative is to trim off data that is meaningless at the beginning of the file.

Refer to the instrument manual for the exact commands for your instrument and your firmware version. For example, the 16*plus* V2 uses **StartDateTime=** to set the start date and time; the 16*plus* uses **Startmmddyy=** and **Starthhmmss=** to set the start date and time.