

Appendix D: Using the Portasal

Running the Portasal

The Portasal can also be used to run salts, although at a poorer precision and accuracy. It can be set up in the salinometer room in between the two Autosal instruments. Contact the MST to set up the Portasal. Always make sure it is secured.

The process for running the Portasal is similar to running the Autosal, with a few differences:

- The Portasal has a keypad for standardizing and running salts. It will read for the conductivity ratio and for the salinity. Below is an explanation of the keys and their functions.
- The Portasal bath is smaller than the Autosal (approx. 10 liters). The error in salinity is ± 0.003 because of this, as opposed to the ± 0.001 for the Autosal.
- The Flow Rate switch controls the pumps. If the Flow Rate switch is turned to Off, then the pumps are off. The flow rate should be kept as fast as possible. However, if there is a great difference between the sample and bath temperatures (the lamp inside the bath will flash quickly and irregularly), the flow rate should be slowed to allow the sample and bath to equilibrate before taking a reading.
- Standardizing: Load the standard seawater and the samples the same way as with the Autosal. When the standard seawater sample has been flushed, turn the function switch to Read and press the STD button on the keypad. This will ask you to enter the K_{15} value (NOT twice the K_{15} value). Press **<Enter>**, and the Portasal will ask for the batch number. Key this in, and press **<Enter>** again. The Portasal will adjust itself to the K_{15} value you've entered. When the reading is steady, press **<Enter>** again. Record this number. This is the standard. To test this, flush the cell and run the standard as if it were a sample three times, filling the cell and reading to match the salinity listed on the standard. If the reading doesn't match the salinity, then standardize the instrument again.
- To read salinity instead of the conductivity ratio, turn the function switch to Read, then press the SAL button on the keypad.
- Because of the error, it is advised to take at least 5 readings per sample to ensure accuracy.
- It is imperative to have the Tank Overflow tubing attached in case of temperature flux which will necessitate evacuating the bath.

Key	Function
1/ T SET	Set the temperature
2/ HDR	Header function
3/ FLT	Filter function
4/ TEMP	Displays the temperature of the bath
5/ ZERO	Checks the zero

Key	Function
6/ REF	Provides a reference number for troubleshooting issues.
7/ SAL	Salinity. Press this after turning the function switch to Read in order to calculate salinity
8/ COND	Conductivity Ratio.
9/ STD	Standardize. Follow directions on display.
0/ I/O	
RESET	Resets the input that you've done on that function.
ARROW KEYS (↑←↓→)	Moves input within display.
ENTER	Inputs information.
SHIFT	Makes numerals available to enter.

Starting the Portasal Process

Before running salts, make sure to have all the equipment you need:

- two seawater standard vials (at room temperature) from the same batch
- samples (at room temperature)
- an ample supply of kimwipes
- rubber or laytex gloves
- file for removing glass tops of standardized seawater
- log sheets
- bucket to catch outflow
- supply of distilled water

Zero the instrument by turning the function switch to Zero. Ensure that the display reads between 0.0 0000 and 0.0 ± 0005 . The closer to zero it can get, the better.

Standardizing the Portasal

Before and after a run of salts (usually 48 samples), the Portasal should be standardized in order to obtain accurate data. This is done by running a standardized seawater sample and standardizing the reading to the K_{15} value printed on the seawater sample.

When the instrument has been stored with distilled water in the cell, the cell should be flushed with some seawater (either an open standard or an old sample bottle) before standardizing in order to

prime the cell. Flush the cell approximately 10 times before placing the standard on the instrument. See directions below for flushing the cell.

1. Open the seawater standard by filing the neck to score the glass, then break off the glass tip by striking it with the file.
2. Cut a length of tubing to fit to the bottom of the seawater sample bottle and place on the metal tube fitting protruding from the rubber stopper. Use a black adapter to fit over the lip of the sample bottle and into the rubber stopper.
3. Place sample onto the adjustable sample table. Make a secure fit into the rubber stopper.
4. Be sure to set up a tube and bucket for the cell drain. Because of electrical conductivity, make sure the tube from the Portasal doesn't touch anything including the bucket and the waste in the bucket. Flush the Portasal by placing a finger over the Flush valve. Water will exit the conductivity cell and flow out the cell drain.
5. Flush the Portasal 5 times before taking a reading.
6. Turn the function switch to Read, and press the STD key on the keypad. The display will ask for the following information:
 - the K_{15} value. Input it, and press <Enter>.
 - the batch number. Input it, and press <Enter>.Wait for a steady reading. Press <Enter> again when the reading is steady, and record the value in the appropriate place (see **Documentation** section below). This should equal the Standardized K_{15} value. Do this three times.
7. Turn function switch back to STBY.
8. Flush the cell, and take a reading of the standard as if it were a sample. When the cell is filled, turn the function dial to READ, and press SAL to get the salinity. This should equal the value printed on the label of the sample.
9. The instrument is now standardized and ready to run samples.

Analyzing Samples

1. Remove the standardized seawater bottle and the tubing. Place a shorter tubing (relative to the size of the sample bottle) onto the metal tube fitting.
2. Wipe the top of the sample bottle off, making sure not to let any salt crystals get into the sample bottle. Place the lip of the sample bottle over the rubber stopper, and adjust the sample table to ensure a snug fit.
3. Flush the conductivity cell three times. Make sure there are no bubbles in the cell. If there are, flush again.
4. While flushing, gently shake the next sample bottle.
5. After the third flush, when the cell is filled, take a reading by turning the function switch to READ and pressing the SAL key. Record the result on the log sheet.

6. Flush the cell again, and take another reading. Usually wait 5 seconds for the reading to stabilize before recording it. Do this for at least 5 readings, or until three readings are identical. Even a difference of one on the last digit (0.001) warrants another read. Stop the run if the water level gets below 1/4 of the bottle.
7. Remove the sample bottle, place an empty sample bottle snugly against the rubber stopper, and flush the cell to remove any of the sample from the tubing. This will ensure that the next sample isn't contaminated.
8. Wipe the tubing down with a kimwipe.
9. Replace bottle upside down in the case as a reminder that it has already been run.
10. Repeat steps 2-9 for each sample.

Finishing a Run

When the run is finished, it is necessary to standardize the instrument again. Use a standard seawater sample from the same batch as the one you standardized with at the beginning of the run.

1. Remove the last sample bottle and the sample-sized tubing.
2. Replace the tubing with the longer standardizing-sized tubing, pushed in the black stopper.
3. Repeat the steps in **Standardizing the Portasal**. Record what the reading is before you standardize.
4. Remove the standard bottle and the standardizing-sized tubing. Place the sample-sized tubing back on the metal fitting.
5. Place a sample bottle filled with distilled water (and clearly labeled) onto the instrument, and flush. This is the proper way to store the instrument when not in use.
6. Check and record the zero reading again. It should be the same as when the run started.

Documentation

The log sheet (an example is shown on the following pages) offer a clear and accurate way to record data while running salts. It is imperative to complete the top section of this form for the computation of salinity.

The body of the log sheet has a number of columns for sample number, CTD cast number, and the number of the bottle on the rosette from which the sample came. There are five spaces for readings per sample. Each sample should have at least three readings. Use the next line if more than five readings are needed for a sample.

When the log sheet is finished, place it in the CTD log book.

