SmarTroll specific instructions – updated 9.14.2018

The SmarTroll probe is used to measure temperature, pH, conductivity, dissolved oxygen and depth

Calibration:

Calibration sheet is supplied by UDWQ and found in the filing cabinet below microscope.

Figure 1 iSitu App

Connect multiprobe to the battery pack and turn on the battery pack and handheld device (e.g. tablet or phone). Red light on battery pack => it's not connected via blue tooth.

1) Open the iSitu app on the handheld device. (See Figure 1 to right)
2) Select a location for calibration, such as the lab or your home (You may need to select a new site on the bottom right).
3) To modify the site information, tap the site name (red light next to "Set" button comes on). **To move to calibration mode, tap "Set".**
4) It will show a screen with the current sensor readings (Figure 2)
5) Select the flask icon at the bottom of the screen to start calibration (Figure 3).

Figure 2 Live readings.

Figure 3 Calibration screen.

Conductivity

We do a 1 point standard curve with an intermediate value as the test. You should choose a range that will encompass all expected values, as values that exceed the calibration range are not as accurate.

Typically, we calibrate with the 1413 uS/cm solution (available in bulk).

Record the standard value and expiration date on the calibration sheet

1. In calibration mode, select the "Conductivity Sensor" on the handheld device then "1-Point Calibration".
2. Rinse calibration cup once with DI water and three times with the appropriate standard.
3. Add conductivity standard to the fill line.
4. Select "Start" at the bottom of the screen. The unit should detect the calibration standard being used, but if not type it in (Figure 4).
5. When reading is stable, select "Accept".
6. Dispose of the calibration solution in the sink or waste container and rinse the sensor with DI water.
7. Use a second conductivity standard as a reference solution to do a check. We use a 500 uS/cm solution. Rinse the sensor three times with this solution, and then add to the fill line.

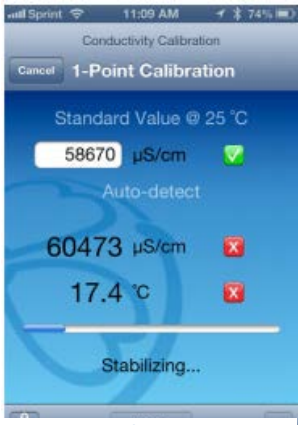

Figure 4 Conductivity calibration screen. The boxes turn green or yellow before you can "Accept".

8. Go back to the main screen and record the value. Your measured value should be within +/- 10% of the solution value.
9. Discard the calibration standard in the sink or waste container and rinse the probes and cup with DI water.
10. Go back to the main calibration page using the arrow in the top left corner.

pH

In most environments in Utah, a 2-point with pH 7 and pH 10 is sufficient. If expected value is less than pH 7, use a pH 4 and pH 7.

Record the pH solution values and expiration dates on the calibration sheet.

1. On the handheld device in calibration mode, select "pH Sensor", then "2-point-calibration". (If you are using a 3-point calibration, use all 3 standards – 4, 7 and 10 and select "3-point calibration". Follow the same steps as below.)
2. It will indicate Buffer "1 of 2"
3. Start with the lowest pH standard (usually pH 7) and rinse probe with standard three times
4. Add standard to the fill line and select "Start", it should detect the buffer value.
5. Once the meter is stable (this may take a couple of minutes), it will show green or yellow boxes, select "Accept" and record the standard value (i.e. 7.00) as the post calibration reading.
6. It will immediately proceed to Buffer 2 (or 3) or to the calibration screen at the end.
7. Rinse cup and probes with DI Water and add the next buffer.
8. Repeat steps 4-6 above with Buffer 2 (and 3 if using a 3-point)
9. Rinse probe with DI water
10. If you have an additional pH value, use it for a check. We only have a pH 4, but a pH 9 would be a good one, since it is between the 7 and 10. Rinse the probe 3 times and fill the calibration cup to the fill line.
11. Make sure you are back in the live reading mode and record the value. It should read within +/- 5% of the reference solution.
12. Dispose of the solution in the sink or waste container and rinse the probe with DI water.

Figure 5 Showing Buffer 2 of 2 as stable and ready to accept.

Dissolved Oxygen

Calibrate dissolved oxygen (DO) by selecting "RDO Sensor", then "100% Calibration"

1. Add a saturated sponge or make sure there is a half inch of water in the bottom of the calibration cup.
   Note: The calibration cup must be vented to barometric pressure. If you are using the twist-on storage cup, set the instrument in the cup, but do not twist it into place.

Figure 6 100% Saturation screen.

2. When it is finished it will read “stable” and have 3 green check marks.
3. Select “Accept”
4. Use arrow to go back to main calibration page.
5. Record the RDO % value. This should be within +/-5% of the calibration value.

Depth

Depth Calibration is only necessary if it is not reading zero out of the water

1. Select Depth, Zero in Air
2. Make sure the pressure sensor is open to the air
3. When stable, select “Accept”

Figure 7 If you are in the live reading mode, click sites in the top left to change sites.

Once finished calibrating, store the sensors in the storage cup with an inch of tap water. Turn off the battery pack and put the iPad in sleep mode by pushing the button on the top right, towards the back.

Make sure the carrying bag has the sensor guard and 4 - 2A batteries.

Store the filled out calibration form in the top left filing cabinet beneath the microscope.

Data Collection:

1. Connect multiprobe to the battery pack and turn on the battery pack and handheld device (e.g. iPad). If the light on the battery pack is red, it is not connected via the Bluetooth.
2. Open the iSitu app on the handheld.
3. The screen will open up either in the live reading mode or show a list of sites. To go to the site list from the live reading page, select Sites in the top left (Figure 7). Select your site from the list by hitting the “Set” button (Figure 8).
4. To create a new site, within the site list, tit the button at the bottom right “New Site”. You will be able to add the Site Name, Description, take a picture and use the GPS or manually enter the Lat/Long coordinates.
5. Select “save” and it will bring you back to the Site list. To take a reading, select “Set” button which will bring up the live readings. *(If you click on the name instead of the button, the circle at the right will turn red. You will do this only when you want to edit or see details about the site.)*

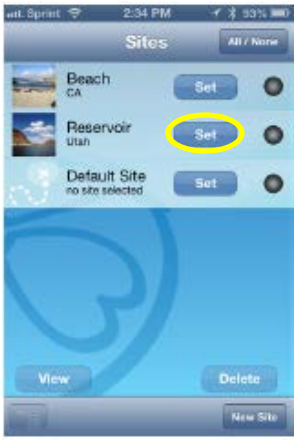

Figure 8 Site list. To open the live reading page, select "Set".

6. To change the parameters or units shown in the reading mode, touch and hold briefly one of the boxes you would like to change -this will bring up a wheel where you can select a different parameter or unit (Figure 9).
7. Position the sonde in the thalweg (main streamflow); or along a bank/edge in the flow if the waterbody is too deep or fast; or lower from a bridge. Ensure the sonde is upstream of other sampling activity, in well mixed water and allow bottom sediments to settle out if disturbed.
8. Wait 1-2 minutes for the values to settle and record them on the data sheet provided. Also select "RECORD" which will save the values on the handheld device.

When finished sampling, make sure the probe is properly stored in the cap with a damp sponge or with an inch of tap water. Also, set the iPad on the charger if it is below 90%.

Figure 9 Change parameter and/or units by touching one of the boxes in the live reading screen to bring up this wheel.