



### Temperature Sensor

1. Attach the calculator to the CBL2.
2. Open the ChemBio application and press ENTER to get to the following screen:-

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***MAIN MENU***
1:SET UP PROBES
2:COLLECT DATA
3:VIEW GRAPH
4:VIEW DATA
5:FIT CURVE
6:RETRIEVE DATA
7:QUIT
  
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3. Select SET UP PROBES and follow the on screen prompts to place the temperature sensor in channel 1.

4. Select 2: COLLECT DATA from the MAIN MENU.
5. Select 5: SINGLE POINT or MONITOR INPUT for collecting data from different sites. Select 2: TIME GRAPH for collection of data points over a timed interval, entering your sampling details.

### pH Sensor

1. Attach the calculator to the CBL2, open the ChemBio application, and place sensor in a beaker of distilled water for several minutes.
2. From the MAIN MENU select SET UP PROBES and follow the prompts to place the pH sensor in channel 1.
3. On the CALIBRATION screen, select 2: PERFORM NEW (..the sensor should be calibrated at the start of a fieldwork activity...) Take the sensor out of the distilled water and place in the pH4 buffer solution. Press [+] when the voltage is stable, and enter the pH reference 4. Repeat for the second buffer solution (e.g. pH 9.2 or pH 10).
4. Select 2: COLLECT DATA from the MAIN MENU. Again, you can use SINGLE POINT, MONITOR INPUT or TIME GRAPH.



#### Dissolved Oxygen Sensor

1. Unscrew the membrane cap from the tip of the sensor. Using a pipette, fill the cap with 1 cm<sup>3</sup> of DO Electrode Filling Solution. Carefully screw the cap back onto the sensor, and place it in a beaker containing about 100 cm<sup>3</sup> of distilled water
2. Open the ChemBio application, go to the MAIN MENU, select SET UP PROBES and follow the prompts to place the pH sensor in channel 1.
3. It is necessary to warm up the sensor for 10 minutes before taking readings. This warm-up period is known as *polarising*. With the sensor still in the distilled water, select POLARISE PROBE from the CALIBRATION menu. Wait for 10 minutes while the sensor polarises and then press ENTER to return to the CALIBRATION menu. The sensor must stay connected at all times to keep it warmed up. If disconnected for a period longer than 10 minutes, it will be necessary to repeat the polarisation.
4. You are now ready to choose the calibration method. If you wish to use the stored calibration values, select USE STORED from the CALIBRATION menu.

If you wish to perform *a new calibration* follow this procedure:-

**Zero-Oxygen Calibration Point.** Select PERFORM NEW from the CALIBRATION menu. Remove the sensor from the distilled water and place the tip into the Sodium Sulfite Calibration Solution. **Important:** No air bubbles can be trapped below the tip of the sensor or it will sense an inaccurate dissolved oxygen level. If the voltage does not rapidly decrease, tap the side of the bottle with the probe to dislodge any bubbles. The readings should be in the 0.2- to 0.5-V range. When the readings stabilize (~1 minute) push [+] on the calculator and enter '0' as the known value in mg/L.

**Saturate DO Calibration Point** Rinse the sensor with distilled water and gently blot dry. Unscrew the lid of the calibration bottle and slide the lid and the grommet about 1 cm onto the probe body. Add water to the bottle to a depth of about 0.5 cm and screw the bottle into the cap. **Important:** Do not touch the membrane or get it wet during this step. Keep the probe in this position for about a minute. The readings should be in the 2.0- to 3.0-V range. When the readings displayed stabilise, press [+] and enter the correct saturated dissolved-oxygen value (in mg/L).

5. Select COLLECT DATA from the MAIN MENU, and use either SINGLE POINT, MONITOR INPUT or TIME GRAPH as before.



### Using the Flow Rate Sensor to measure Flow Velocity

1. Attach the calculator to the CBL2, open the ChemBio application
2. From the MAIN MENU select SET UP PROBES and follow the prompts to place the FLOW RATE sensor in channel 1.
3. Select M/S from the FLOW RATE UNITS menu.
4. Select COLLECT DATA from the MAIN MENU, and SINGLE POINT from the DATA COLLECTION menu.
5. To monitor flow rate at a section, submerge the impeller of the Flow Rate Sensor to 40% of the depth measured at the section. If the section is shallow enough, use the plastic risers included with the flow rate sensor to support the sensor on the stream bed. The risers make it easier to keep the impeller of the sensor in the same spot and orientated in the same direction.
6. Point the impeller of the sensor upstream and directly into the flow. Press ENTER to begin sampling. Hold the sensor in place for 25 seconds while data are being collected. Once data collection is finished, the flow rate will be displayed on the calculator screen.
7. Press ENTER and select YES from the REPEAT MENU. Move the Flow Rate Sensor to the next water column. Repeat Step 6 for other sections.
8. MONITOR INPUT or TIME GRAPH can also be used as before.

### Multiple sensors

Multiple sensors can be used attached to the same CBL2. For example, temperature, flow rate and dissolved oxygen is a useful combination



This paper contains edited extracts from Vernier manuals.  
Caddis image from Streamscapes Advanced 'A Stakeholder's Handbook.'