Electron
Microscopy
Sciences

INSTRUCTION MANUAL

CAT. 65211-12 Bio-Pump Plus

Electron Microscopy Sciences
P.O. Box 550 ♦1560 Industry Road ♦ Hatfield PA 19440
www.emsdiasum.com
Toll Free: **1-800-523-5874**
sgkcck@aol.com
Tel: 215-412-8400 ♦ *Fax:* 215-412-8450

Introduction

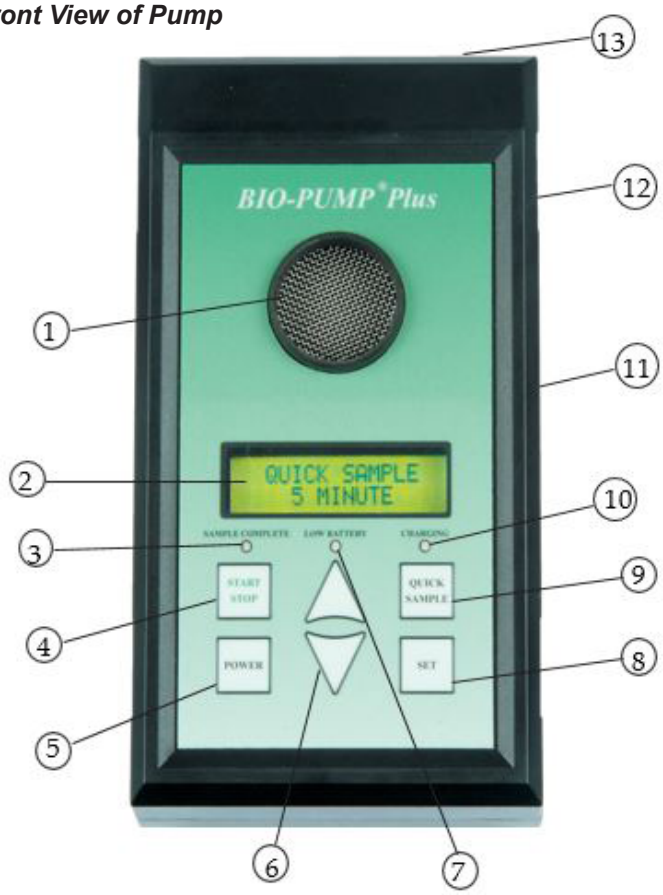
The Bio-Pump Plus is an advanced portable, battery-powered air sampling pump designed for the exclusive use with Air-O-Cell, Via-Cell and Air-O-CSI cassettes.

Specifications

Flow rate:	15lpm
Accuracy:	± 5%
Housing:	ABS plastic
Battery:	Rechargeable nickel metal hydride (NiMH)
Run time:	Minimum 8 hours continuous (100 (5)-minute samples new, fully charged battery)
Dimensions:	4.3/8" (w) x 2.75" (h) x 8" (d) inches
Weight:	1.6lbs

Pump Overview

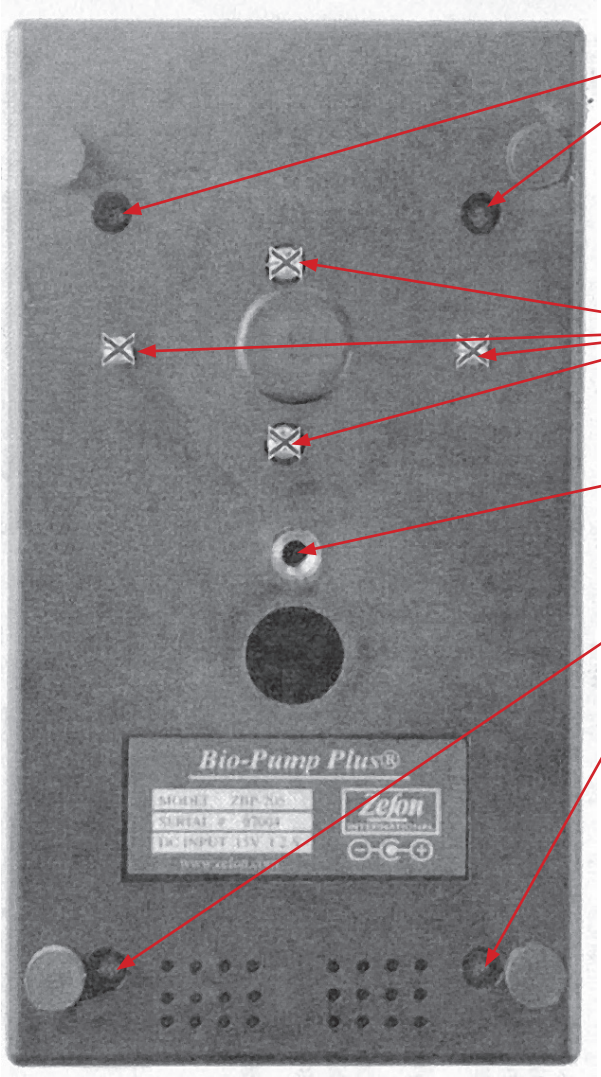
Front View of Pump



1. Rubber grommet cassette attachment
2. LCD display
3. "Sample complete" light
4. START/STOP button
5. POWER button
6. UP/DOWN arrows
7. "Low battery" light
8. SET button
9. QUICK SAMPLE button
10. "Charging" indicator light
11. Tripod mounting threads, ¼" (on bottom)
12. Battery compartment (on bottom)
13. Battery charging jack

Pump Overview, *continued*

Back View of Pump



Housing Screws (Total – 4). Remove only when changing battery.

Motor Assembly Mounting Screws (Total – 4). DO NOT Remove!

Tripod Mounting Thread, 1/4” (on bottom).

Housing Screws (Total – 4). Remove only when changing battery.

Calibration

We recommend that the Bio-Pump Plus be calibrated and verified at least once every day of use. A flow indicator for Air-O-Cell cassettes and Via-Cell/Air-O-Cell CSI cassettes is supplies with the pump for ease of calibration. You may also calibrate your pump using the optional Bio-Pump TSI primary calibrator. These are the only approved calibrators that are specially designed to work with low back pressure impeller fan type pumps.

Calibration Warning!

DO NOT calibrate the pump using any other devices. Doing so will yield inaccurate readings due to the backpressure created by the calibrators.

Adjusting Calibration

Connect flow indicator to pump as shown

Adjust flow until ball is centered on line

1. Press the POWER button to turn on the pump.
2. Using the arrows, select CALIBRATE BIO-PUMP.
3. Connect the flow indicator or bubble tube.
4. Press the SET button and the unit will start running at a low speed.
5. Use the arrows to adjust the flow rate until 15lpm is shown on the flow indicator or bubble tube. **NOTE:** When setting calibration, the flow starts out very low. Continue to press the up arrow until 15lpm is reached. This may take as many as 15 pushes of the button.
6. Press the set key to save the calibration. The pump will stop automatically.

NOTE: *To check the pump calibration you must use the "verify calibration" setting. Using the Calibrate Bio-Pump mode will erase the previous flow setting from memory and revert to a low speed setting.*

Verifying Calibration

1. Press the POWER button to turn on the pump.
2. Use the arrow buttons to select VERIFY CALIBRATION.
3. Connect the flow indicator or bubble tube.
4. Press the SET or START button to begin.
5. Measure the flow rate with the calibrator. To stop, press the stop button. To adjust the calibration, use the CALIBRATED-PUMP option as described above.

Sampling Modes

Bio-Pump Plus comes with three (3) different sampling modes to choose from:

- ***Quick sample mode***
  Allows easy sampling of the most commonly used predetermined sampling times of 1, 2, 5, or 10 minutes.
- ***Single Sampling mode***
  Designed to take one sample at a predetermined amount of time. Amount of time can be set anywhere from 1 minute to 9 hours 59 minutes,
- ***Sequential sampling mode***
  Allows the pump to be programmed to turn on and off at predetermined times. Example: It can be programmed to run for one minute every hour for 5 hours.

Taking Sampling Using The Quick Sample Mode

1. Place the pump in the desired location.
2. Place cassette on the rubber grommet on top of the pump so that the cassette fits snugly.
3. Press the POWER button to turn on the pump.
4. Press the QUICK SAMPLE button. The display should read: QUICK SAMPLE, 1 minute.
5. Continue to press the QUICK SAMPLE button to change the sample time from 1, 2, 5, and 10 minutes.
6. Once the correct number of minutes is displayed, press START to begin sampling.
7. Once completed, the unit will beep and the display will show SAMPLE COMPLETE. The yellow sample complete light will turn on. Remove the cassette from pump by gently pulling upward. Seal cassette, document the sample run time and send to laboratory for analysis.

NOTE: *To exit Quick Sample Mode at anytime, press the SET button.*

Taking Samples Using Single Sampling Mode

1. Place the pump in the desired location.
2. Place cassette on the rubber grommet on top of the pump so that the cassette fits singly.
3. Press the POWER button to turn on the pump.
4. Using the arrows, select SINGLE SAMPLING MODE.
5. Press SET.
6. Using the arrows, enter the sample run time (adjustable in 1 minute increments).
7. Press SET.
8. Press START to begin sampling. Once completed, the unit will beep and the display will show SAMPLE COMPLETE and the red sample complete light will turn on. Remove cassette from pump by gently pulling upward.
9. Seal cassette, document the sample run time and send to laboratory for analysis.

NOTE: *To exit Single Sample Mode at anytime, press the SET button. Previous Run Time will be stored in memory.*

Taking Samples Using Sequential Sampling Mode

1. Set up the pump as described in steps 1-3 for single sampling mode.
2. Using the arrows, select SEQUENTIAL SAMPLING MODE, then press SET.
3. Using the arrows, select the number of on/off cycles, then press SET.
4. Using the arrows, select the CYCLE RUN TIME (adjustable in seconds), then press SET.
5. Using the arrows, select the CYCLE OFF TIME (adjustable in seconds), then press SET.
6. Press START to being sampling. Once completed, the unit will beep, the display will show SAMPLE COMPLETE and the yellow sample complete light will turn on. Remove cassette from pump by gently pushing upward.
7. Seal cassette, document the sample run time and send to laboratory for analysis.

NOTE: *To exit Sequential Sample Mode at anytime, press the SET button after Run Time and Off Time have both been set.*

Battery

Check Remaining Battery Power

1. Press the POWER button to turn on the pump.
2. Using the arrows, select BATTERY LEVEL. The display will show “CHECKING BATTERY LEVEL”.
3. After a few seconds, the percentage of battery life remaining will be displayed.

NOTE: The percentage shown may vary up or down at times as the batteries adjust themselves. Nickel Metal Hydride (NiMH) batteries constantly work at regenerating themselves and releasing more power. It is possible for the displayed battery life to increase or decrease without being used because of this.

Low Battery Shut Down

If the battery becomes low enough that the unit will not operate at a constant speed, the unit will shut down. During shutdown, the amount of actual run time will be saved. When power is restored, simply turn on the power, press the SET button, and the time the pump ran before shutting down will be displayed.

Charging the Battery

To charge the battery, plug in the charger. The green charging light next to the LCD display will Illuminate to indicate the unit is charging. When charging is complete, the light will go out. A full battery charge takes approximately 3 hours. If the pump will not be used for an extended period of time, it will slowly lose its battery charge and will need to be recharged before use. During these extended periods the pump can be kept plugged in so the battery receives a trickle charge.

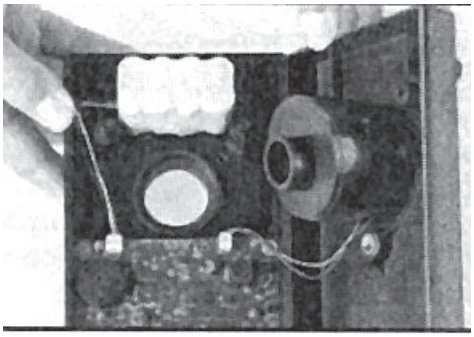
NOTE: During a trickle change, the battery charging indicator light will not illuminate.

AC Power Operation

The Bio-Pump may be run using standard AC power supplied by the charger. To do this, simply plug in the charger and run as normal.

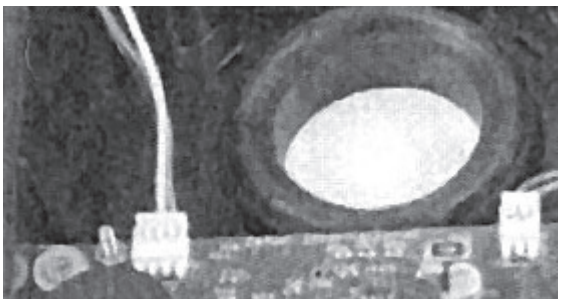
Installing a New Battery

1. Remove the four Phillips-head screws at each corner on the bottom of the case.



2. Lift bottom of case about 1 cm up and turn it over, ***to the right*** of the top case.

3. Unplug the old battery from circuit board. Remove it from the top of the case.



4. Install new battery in same orientation as the old.
5. Plug into board.
6. Replace bottom cover with the four Phillips-head screws. DO NOT over-tighten as screws may strip.

Cautions and Warnings

1. Always follow basic safety precautions when using this product to reduce risk of injury, fire, or electric shock.
2. Batteries may explode or leak and cause burn injury if disassembled.
3. ***Use only the charger and battery supplied with the bio-pump plus. Using a different battery or charger can damage the pump or cause injury from explosion.***
4. Do not submerge the pump or subject the pump to any liquids.
5. Do not open the pump case.
6. Do not block the vent holes under the unit.

Maintenance

Proper care and maintenance of your Bio-Pump Plus is essential for a long useful life. It is a delicate electronic device and should be treated accordingly. Rough and abusive use and/or accidental impacts may damage the unit.

- Keep the unit clean and free of dust and dirt.
- Clean only with a clean dry cloth.
- Keep the battery charged.
- Battery should be charged periodically when not used for a prolonged amount of time or it may be left plugged in for a continuous trickle charge.
- Do not oil the motor. (The motor is designed to be maintenance free.)
- Always store Bio-Pump® Plus in its case for proper protection.
- Do not store the unit in extreme heat for any extended period of time.
- The Bio-Pump® Plus the carrying case is not designed to be a shipping container. Damage may occur to the unit should the case be used as such.