

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. Zefon offers the following guidelines in caring for your equipment.

1. Keep the unit clean and free of dust and dirt. It may be wiped down with a clean dry cloth.
2. Keep the battery charged. Charge periodically when not used for a prolonged amount of time or leave plugged in for a continuous trickle charge.
3. Always store Bio-Pump® Plus in its case for proper protection.
4. Do not ship the Bio-Pump® Plus using the carrying case as the shipping container. The case is not designed to be a shipping container and damage may occur.
5. Do not attempt to oil the motor. The motor is designed to be maintenance free.
6. Do not store the unit in extreme heat for any extended period of time.



ZA0043 Heavy Duty Tripod Sampling Stand



ZBP-310 Remote Extension shown attached to Bio-Pump®

Optional Accessories

Heavy Duty Tripod Sampling Stand
Remote 5' Extension Tubing

ZA0043
ZBP-310

Parts & Accessories

Bioisolation Filter
AC Power Adaptor, 100v-240v
Battery
Air-O-Cell® Cassettes (10/pk)
Air-O-Cell® Cassettes (50/pk)
Via-Cell® Cassettes (10/pk)
Air-O-Cell® CSI Cassettes (2/pk)
Air-O-Cell® CSI Cassettes (10/pk)

ZA0047
ZBP-304
ZBP-315
AOC010
AOC050
VIA010
CSI002
CSI010



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Operating Instructions

Bio-Pump® Plus

with TSI Calibrator Kit

Product # ZBP-205-CKIT



Description

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-Cell*® CSI cassettes.

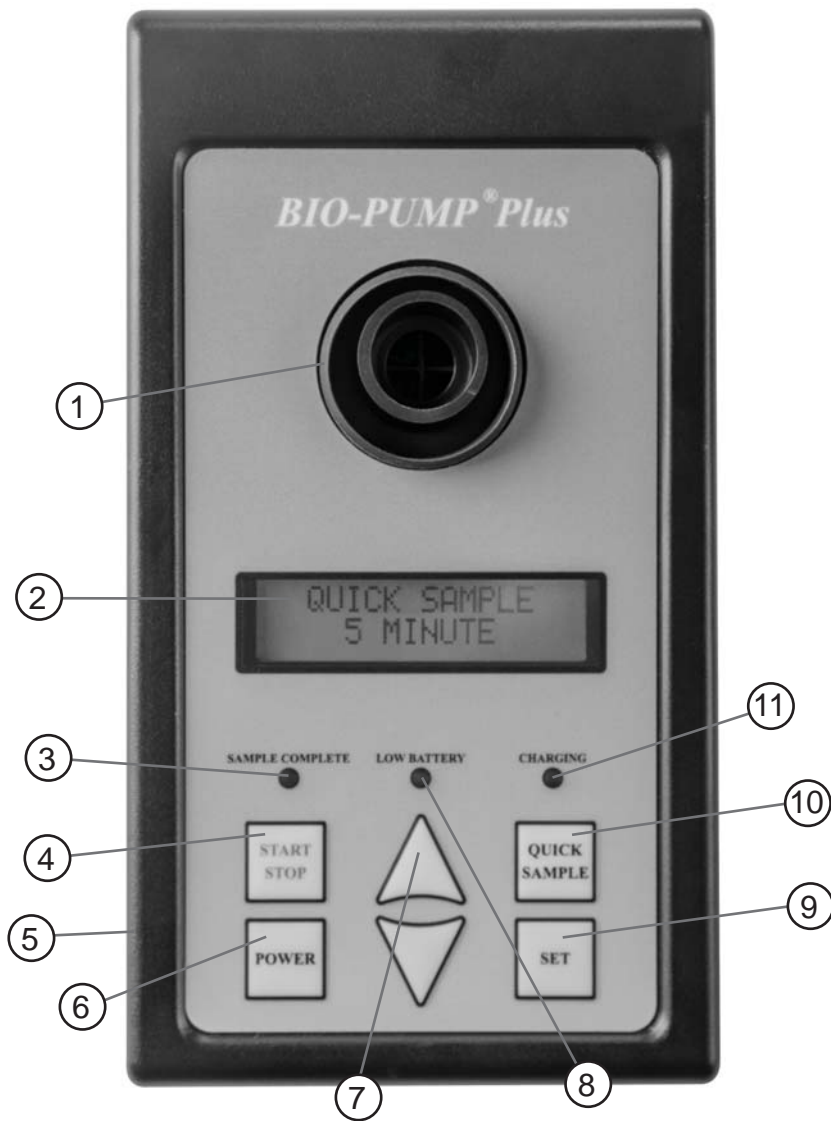
Specifications

Flow Rate: 15LPM
Accuracy: ± 5 %
Housing: PC/ABS plastic
Battery: Rechargeable Nickel Metal Hydride (NiMH)
Run Time: 100 five minute samples on new, fully charged battery
Dimensions: 4.5" (w) x 2.75" (h) x 8" (d) inches
Weight: 1.75 lbs



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Pump Overview



FRONT VIEW OF PUMP

1. Rubber Grommet Cassette Attachment
2. LCD Display
3. "Sample Complete" Light
4. START/STOP Button
5. Battery Charging Jack
6. POWER Button
7. UP/DOWN Arrows
8. "Low Battery" Light
9. SET Button
10. QUICK SAMPLE Button
11. "Charging" Indicator Light

Cautions and Warnings

1. The pump may be opened only to change the battery. Do not touch board components when changing battery and handle the board by the edges only.
2. Always follow basic safety precautions when using this product to reduce risk of injury, fire or electric shock.
3. Batteries may explode or leak and cause burn injury if disassembled.
4. **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.**
5. Do not submerge the pump or subject the pump to any liquids.
6. Do not open the pump case except to change out an old battery.
7. Do not block the vent holes under the unit.

Limited Warranty

Zefon International warrants the Bio-Pump® Plus for a period of 1 year from date of purchase. Zefon will without charge repair or replace, at its option, the defective pump or component parts upon delivery to its repair facility.

This limited warranty covers defects in workmanship and material. It does not apply to:

1. Product damage by accident or weather related circumstances.
2. Misuse or abuse of product as a result of unauthorized repairs or alterations.
3. Lack of proper care and maintenance.
4. Failure to follow instructions.
5. Any damage from attempting to use cassettes other than *Air-O-Cell®*, *Via-Cell®*, or *Air-O-Cell®* CSI.
6. Any damage resulting from sampling outside the scope of Zefon's recommendations for use.
7. Items that need to be replaced as a result of normal use (e.g. batteries).

If it should become necessary to return the pump for service, please call Zefon at 352-854-8080 for a return authorization number and return instructions. Please have the unit serial number and a description of the problem handy. All units returned must be complete with the pump, case, charger and flow indicator for a complete evaluation. Units returned without all of these items cannot be thoroughly evaluated by our service department. The sender is responsible for shipping charges, freight, insurance and proper packaging to prevent damage in transit. **A return authorization number must be issued prior to shipment and must be marked on your shipment.**

Disclaimer

Zefon shall not be liable for direct, indirect, consequential, incidental or other damages resulting from the sale or use of any goods including lack of use due to equipment failure. Zefon's total liability shall be limited to repair or replacement of the product.

Zefon assumes no responsibility whatsoever to any party whatsoever for any property damage, personal injury or death received by or resulting from, in whole or in part, the improper use or storage of this product by the user, person, firm, entity, corporation or party not adhering to the instructions and warnings in this manual.

Taking Samples Using Sequential Sampling Mode

1. Setup 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 begin 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 pulling upward.
7. Seal cassette, document the sample run time and send to laboratory for analysis.

SEQUENTIAL SAMPLING MODE

ON/OFF CYCLES
1

CYCLE RUN TIME
0:00:00

CYCLE OFF TIME
0:00:00

PRESS START TO RUN SAMPLE

Note: "Sequential Sampling Mode" mode will exit upon hitting the "SET" button after runtime and off-time have both been set.

Battery

Checking the Remaining Amount of Battery Power

1. Press the POWER button to turn the pump on.
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.

BATTERY LEVEL
100%

Note: Nickel Metal Hydride (NiMH) batteries constantly work at regenerating themselves and releasing more power. It is possible for the displayed battery level to increase or decrease without being used because of this.

Low Battery Indicator

When the battery level becomes very low, the red LED will come on. Some additional samples may still be taken, but the unit should be plugged in as soon as possible.

Low Battery Shut Down

If the battery's voltage drops low enough that the unit will not operate reliably, or if for any reason an inconsistent motor speed is detected, the unit will shut down. During shutdown, the amount of actual run time will be saved. When power is restored, "Incomplete run" will be displayed on the home screen. Previous sample may be continued, or a new sample may be started.

Charging the Battery

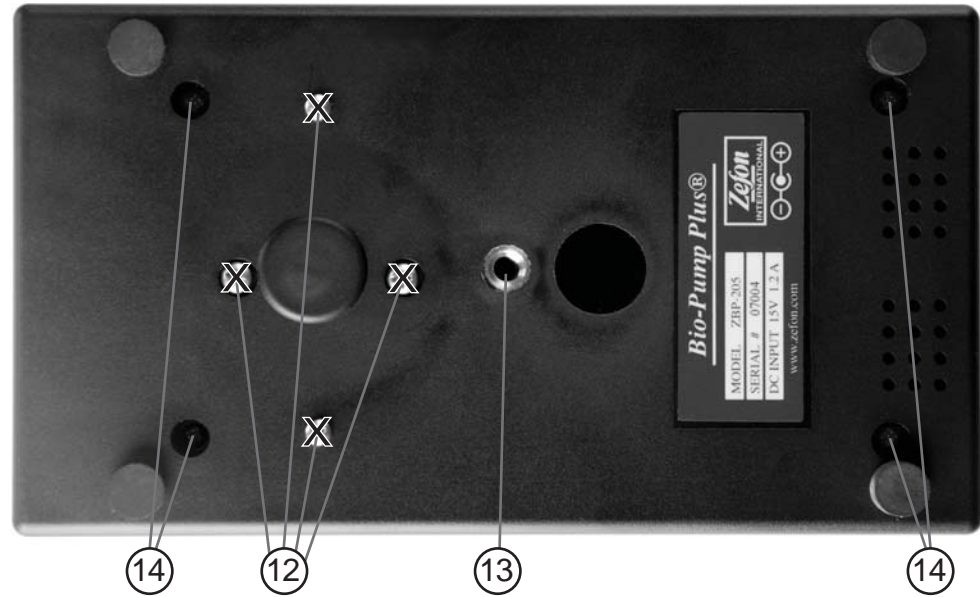
To charge the battery, plug in the charger. The green charging light next to the LCD display will illuminate to indicate the unit is charging. When charging is complete, the charging light will blink. A full battery charge takes approximately 3 hours. If the pump will not be used for an extended period 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 on AC power so the battery receives a trickle charge.

AC Power Operation

The Bio-Pump® may be operated using standard AC power supplied by the charger.

Replacing the Battery (see page 3)

Pump Overview



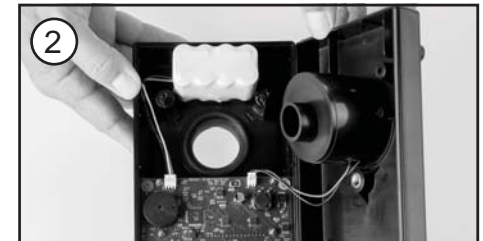
BACK VIEW OF PUMP

12. Motor Assembly Mounting Screws, Qty: 4 (DO NOT REMOVE)
13. Tripod Mounting Threads, 1/4" (on bottom)
14. Housing Screws, Qty: 4 (remove only to change battery)

Battery Installation



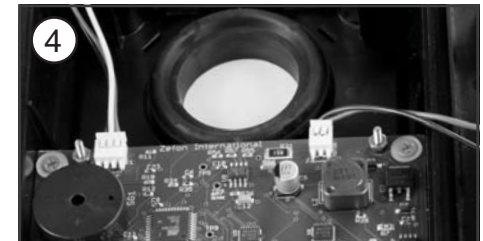
Remove the four Phillips-head screws at each far corner of the bottom case.



Lift the bottom case about one centimeter up, and turn it over TO THE RIGHT of the top case.



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



Install the new battery in the same orientation as the old, plug it into the board, and replace the bottom cover with four Phillips-head screws. **Do not overtighten as screws might strip.**

Calibration

It is recommended that the Bio-Pump® Plus be calibrated and verified at least once every day of use.

Connect the Calibrator to the Bio-Pump®



Adjusting the Calibration

1. Press the POWER button to turn the pump on.
2. Using the arrows, select CALIBRATE BIO-PUMP.
3. Connect the flow indicator or TSI Calibrator.
4. Press the SET button.
5. The pump will begin running at a default flow rate that is approximately 15 LPM. Use the arrows to adjust the flow rate until "15 LPM" registers on the flow indicator or on the TSI's LCD.

Press the SET key to save the calibration.

Note:

When you enter calibration mode, the pump will reset its flow rate to a default setting that is approximately 15 LPM. To check the pump calibration without resetting the flow rate, you may use the "Verify Calibration" function.

Verifying the Calibration

1. Press the POWER button to turn the pump on.
2. Use the arrow buttons to select VERIFY CALIBRATION.
3. Connect the flow indicator or TSI tube adapter.
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 CALIBRATE BIO-PUMP option as described above.

About Calibration

Impeller fan motors like the ones used in the Bio-Pump® Plus are sensitive to changes in backpressure. This requires specially designed low resistance calibration devices and tubing connections to calibrate the pump properly. The TSI calibrator included with this kit is specially designed for this purpose.

CALIBRATE
BIO-PUMP

ADJUST FLOW
THEN PRESS SET

VERIFY
CALIBRATION

Sampling Modes

Bio-Pump® Plus comes with 3 different sampling modes to choose from:

1. Quick Sample Mode
Quick Sample modes allows easy sampling of the most commonly used sampling times of 1, 2, 5, or 10 minutes.
2. Single Sampling Mode
Single Sampling Mode is designed to take one sample at a predetermined amount of time. The amount of sample time can be set anywhere from 1 minute to 9 hours 59 minutes.
3. Sequential Sampling Mode
Sequential sampling 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 five 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 the pump on.
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 sampling 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, the display will show "SAMPLE COMPLETE" and the yellow sample complete light will turn on. Remove cassette from pump by gently pulling upward. Seal cassette, document the sample run time and send to laboratory for analysis.

Note: "Quick sample" mode will exit upon hitting the "SET" button at any time.

QUICK SAMPLE
5 MINUTE

Select Quick Sample Time, then
press START

RUN TIME 0:00:00
SET TIME 0:00:00

Display shows set time and run time
during sampling

SAMPLE COMPLETE

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 snugly.
3. Press the POWER button to turn the pump on.
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. (optional)
8. Press START to begin 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 pulling upward.
9. Seal cassette, document the sample run time and send to laboratory for analysis.

Note: "Single Sample" mode will exit upon hitting the "SET" button after runtime has been set. Previous runtime will be stored in memory.

SINGLE
SAMPLING MODE

Use Up/Down arrows to select Single
Sampling Mode, then press SET

ENTER RUN TIME
0:00:00

Use Up/Down arrows to enter the
desired run time, then press SET

PRESS START
TO RUN SAMPLE

RUN TIME 0:00:00
SET TIME 0:00:00

Display shows set time and run time
during sampling

SAMPLE COMPLETE