FREEDOM 500 HIGH OUTPUT ELECTRIC BILGE PUMP SYSTEM

Owner's Manual

2200 mAh LITHIUM ION Battery Pack

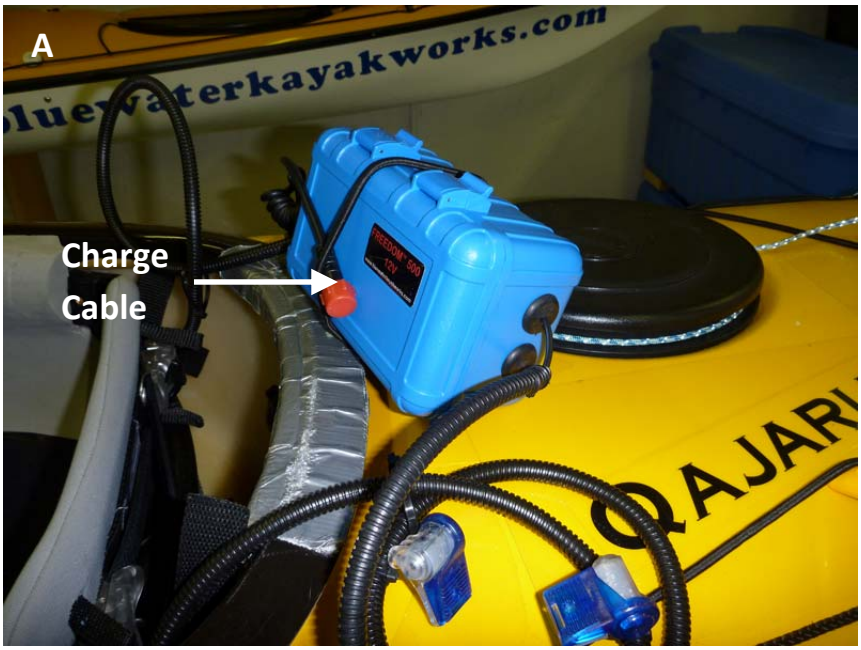
The Freedom 500 Electric Bilge Pump - a New Kayak Experience

- The Freedom 500 is the first product for sea kayakers to combine safety, fun, and skill development in a single product since the invention of the dry suit. Our relationship to the water and to our kayak changes. With the Freedom 500 pump, wet exiting actually becomes fun.
- With the addition of an electric bilge pump, rescue practice is more efficient and fun. No one learns anything while pumping water after a wet exit.
- You can play with the edges of boat stability rather than fear the drudgery of manual pumping.
- Skilled paddlers will love their new freedom as they rediscover and play with new rolls and tricks. The re-entry roll off the beach followed by a whale spout may now become the favorite method of entering the kayak at the start of a journey!
- Finally a solution is available for kayakers of all skill levels that remedies the annoying and potentially dangerous problem of how to evacuate water from your cockpit after capsizing in rough conditions. Following re-entry, when the extra stability provided by the spray skirt, two hands on the paddle, and two feet on the foot pegs is most needed, manual pumping, which accords none of this, compromises safety. With a Freedom 500, the cockpit is dry in less than a minute with no compromise to safety.
- In rough conditions, the Freedom 500 is fun! As you continue to roll your kayak the water continues to spout.
- When the water level comes down to 1 inch, rock the kayak to the left or right, which allows water to fill the sump around the pump in order to get most of the water out of the kayak.
- Always carry your manual bilge pump as a backup system.

Basics of Using Your System

Charging the Battery The Freedom 500 HIGH OUTPUT system comes equipped with a 2200 mAh hour Lithium Ion rechargeable battery pack, a Lithium Ion SMART charger (AC), and an adapter cable with a waterproof connector on one end and a Tamiya connector on the other end. Use this adapter cable to connect to the Freedom's charge cable and charge the battery pack without opening the dry box.

The charge cable comes with a waterproof sealing cap, pictured in the photo below, which should always be installed on the charge cable after you are done charging the battery. It is best to store the charge cable in a place that is accessible, such as captured between the dry box and the dry box bungee, as pictured in **Photo A**.



To charge the battery follow these steps:

1. Unscrew the sealing cap and put it on top of the AC charger.
2. Set the SMART charger to 14.8V.
3. Plug the SMART charger in, green light should light.
4. Connect the waterproof connector end of the adapter cable to the charge cable, align the connectors and push together, the green light on the SMART charger will turn red while charging and then, when charging is complete, the light will turn green.
5. When the charge cycle is complete, unplug adapter cable from charge cable, screw on RED sealing cap, unplug, and store SMART charger in a safe place.

TWO IMPORTANT WARNINGS

1. Only use the Lithium Ion SMART charger, set at 14.8 V, supplied to charge the battery in the Freedom 500 HIGH OUTPUT system.
2. ALWAYS install the sealing cap after charging the battery and before using the kayak on water. Failure to do so will induce corrosion in the charge cable connector and will void the warranty.

Opening the Dry Box You should rarely have to open the dry box. If you open the box, make sure that the outer surface of the box is dry. Slide box bungee off one end of box. Open clasps and then open box door.

Spare Parts A spare fuse and pump O-ring are in a mini-zip lock bag taped to the inside of the box lid. A spare sealing cap is in a mini-zip lock bag and is tucked next to the fuse holder.

Replacing Fuse The fuse is replaced by holding the body of the fuse holder with one hand and pulling the cap of the fuse holder off with the other hand. Once the cap is open, remove the fuse and place a new one into the fuse holder.

Emergency Charging Procedure If the waterproof charging cable becomes corroded due to water infiltration, it is best to stop using the waterproof charging cable to charge the battery because the corrosion will drain the battery prematurely. In such a case, it is best to open the dry box and unplug the connector with the RED tab from the connector with the Blue tab. The AC Lithium Ion SMART charger can be plugged directly into the connector with the Red tab in order to charge the battery pack. The instructions and WARNING below are printed on a label affixed to the inside the dry box.

WARNING!

Always keep protective cap screwed onto charge cable and lubricate threads with Silicon grease. If you lose the protective cap, use backup BLACK push on cap. If charge cable becomes corroded due to exposure to water, disconnect connector with Blue tab from connector with Red tab and connect battery charger to connector with Red tab to charge battery.

Connector #1 - Battery 1, **Connector #2** - Spare battery,
Connector (Red tab) - Battery charge input,
Connector (Blue tab) - Charge cable

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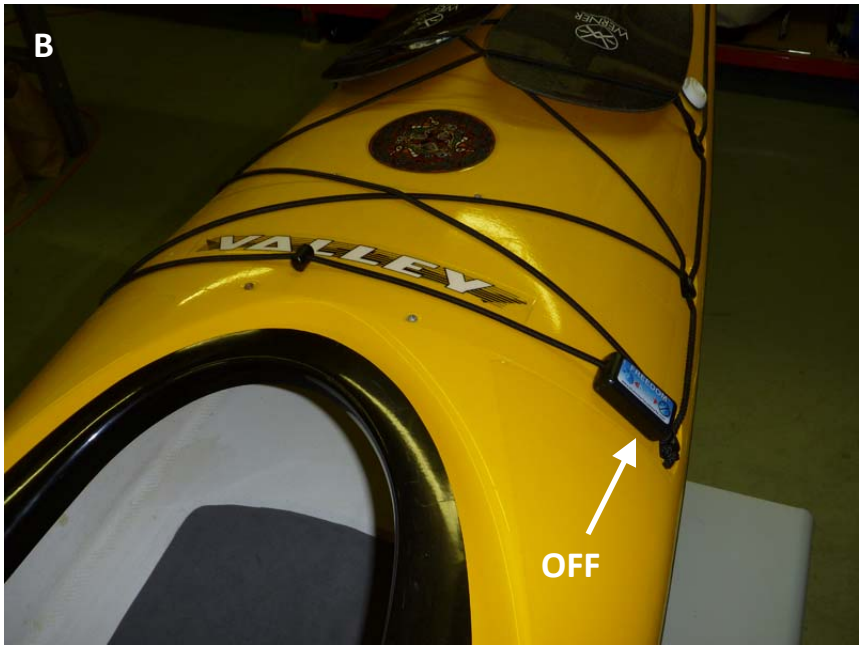
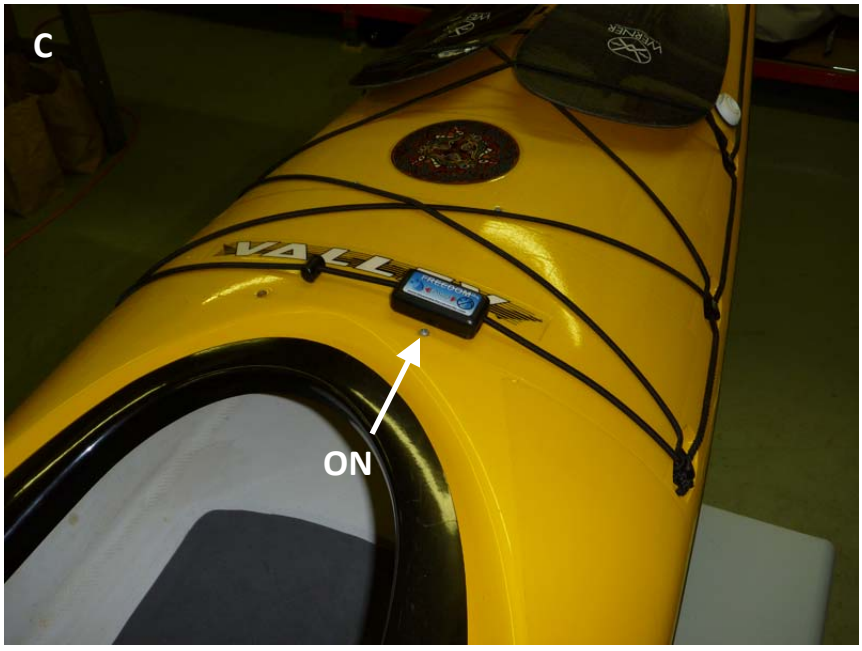
Pump OFF Position The pump is OFF when the magnet is not positioned above the switch as in **Photo B**. If you followed the installation procedure in the instructions provided, the OFF position is as shown in the photo at right. Other OFF positions exist, such as sliding the magnet to the left side of the deck. A cord lock is placed on the bungee, which can be used to prevent the magnet from moving inadvertently into the ON position. The cord lock is shown in the photos at right.



Pump ON Position Slide the switch-magnet over the switch as shown in the **Photo C**. The switch-magnet has three ON areas, a central elliptical ON area is flanked by circular ON areas to the left and right. The long axis of the elliptical ON area is coincident with the kayak's longitudinal axis. The elliptical ON area is centered on the switch. The switch-magnet with dimple on its backside produces an ellipse width, which extends to the two screw holes in the switch case (approximately 2.5 inches wide). The length of the elliptical ON area is approximately 3.5 inches long. On each side of the elliptical ON area is a smaller circular ON area, approximately 1.5 inches in diameter. There is a short OFF area (approximately ⅜ inch long) separating the elliptical ON area from the circular ON areas. We recommend that you use the ON elliptical area because it is larger and easier to find.



Pump O-Ring The pump O-ring is replaced by depressing the two black buttons, one on each side of the pump body and then lifting the pump body off its base. When you remove the pump from its base, be careful that the O-ring does not fall out of the pump body. Place a small bead of silicon grease in the O-ring groove and then install a new O-ring into the groove. A spare O-ring has been provided in a mini-zip lock bag taped on the inside cover to the dry box. If you need more O-rings, a rubber O-ring having dimensions of ⅞ inch ID, 1.0 inch OD and 1/16 inch in cross section diameter can be used.

Pump Strainer Cleaning Remove the pump from its base, following steps directly above, in order to clean debris from the pump strainer while the pump is off its base.

Lithium Ion Battery Pack Operation The Lithium Ion battery pack in your Freedom 500 HIGH OUTPUT has an internal electronic control board that turns the pack off when the voltage drops to 12V. This function prolongs the life of the battery pack by preventing unnecessarily deep discharge.

IMPORTANT TIP – Because the Li-Ion battery delivers current at approximately the same voltage throughout its discharge cycle, there is no visible difference in pump output volume as the battery runs down. This means that you will not be able to tell how much battery life is left by the height of the waterspout. The pump will turn off abruptly when the pack voltage falls to 12V. Therefore, we recommend that you charge the battery even before it is fully discharged. Li-Ion batteries will have a longer life if you do not discharge them deeply before recharging and there is no harm in charging the pack if it is only partially discharged. For example if a Li-Ion pack is discharged to a 50% level, recharge from the 50% level only counts as ½ charge cycle for pack longevity calculations. Therefore, 2 charge cycles from a 50% discharged state are equivalent to 1 full recharge cycle for a pack. It makes sense to recharge your pack often, doing so will ensure that the pack has peak power for each kayak adventure.

Maintenance Temperature when you are not using your pack for an extended period, it is best to store the pack at 25C.

Maintenance Charging Lithium Ion batteries have a natural self-discharge process that dissipates about 8% of their power per month. During periods of extended non-use of the system, you should recharge the battery for optimal battery health. Pack voltage should not fall to below 12V. To achieve maximum battery back life, it is good to recharge the pack at least once every 4 months.

System Run Time The HIGH OUTPUT system provides one hour of pump ON time as shown from the measurements contained in Figure 1.

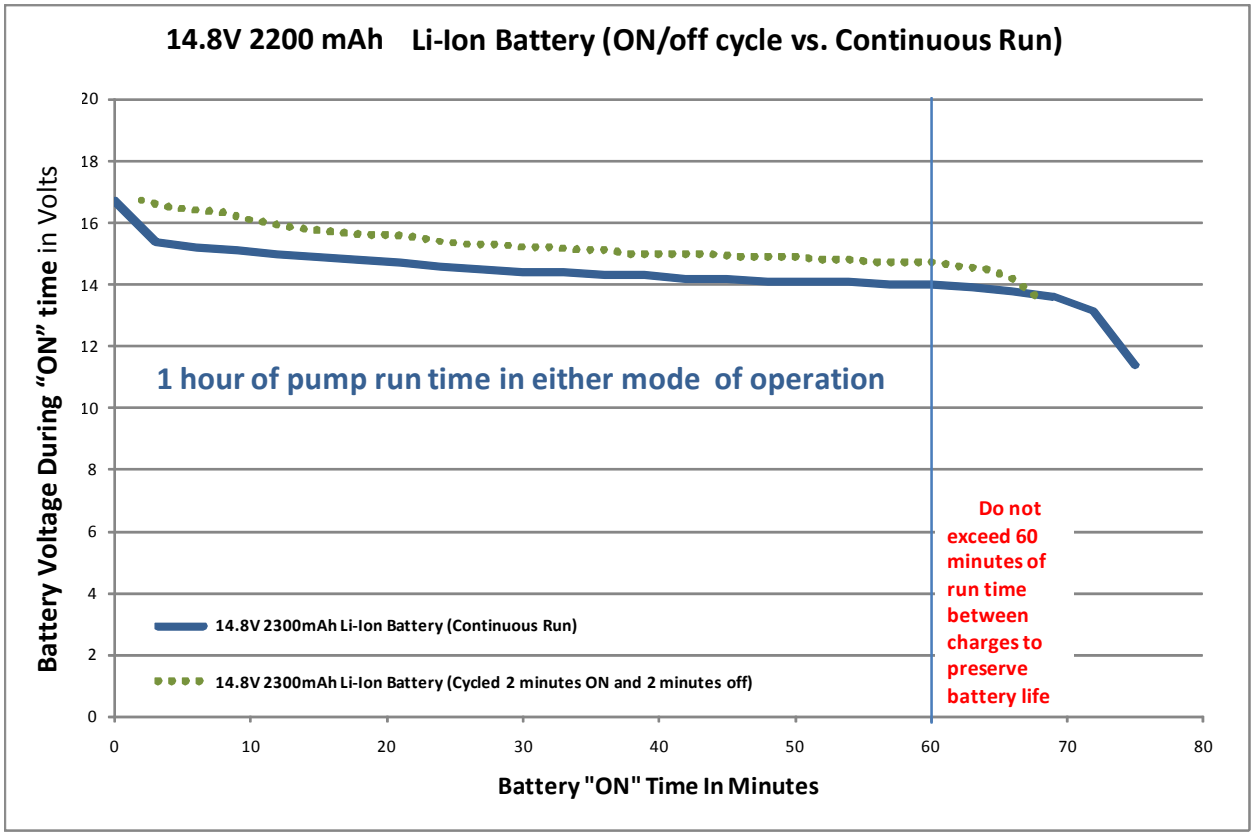


Figure 1. HIGH OUTPUT FREEDOM 500 System Measurements.

Figure 1 shows a comparison of the system performance during two modes of operation. In the first mode (upper curve) the system is cycled on for 2 minutes, then off for 2 minutes continuously until the pack turned off. The horizontal axis shows that the system pumped water for over 60 minutes during the combined run time of the cyclic test.

The lower curve represents battery voltage measurements obtained while the pump ran continuously with no off periods. The continuous run test produced over an hour of pump run time.

The conclusion from **Figure 1** is that there is essentially no difference in operation between the two modes of operation. The Li-Ion battery pack is capable of providing enough current to run the pump continuously and does not need to be cycled on and off to give the pack time to recover.

HIGH OUTPUT Freedom 500 Specifications

- **Power Plant**
  1. 14.8 volt, 2200 mAh rechargeable Lithium Ion (Li-Ion) battery pack powers the High Output system. The Li-Ion battery can deliver power sufficient to run the pump for 1 hour of continuous running.
  2. Li-Ion batteries have very low internal self-discharge, losing approximately 8% of their charge per month.
  3. Li-Ion 2200 mAh pack weighs 6 oz. Li-Ion batteries have a higher energy density than Nickel Metal Hydride (NiMH) batteries.
  4. Optional 14.8 volts, 4400 mAh Li-Ion battery pack will provide 2 full hours of continuous pump run time.
  5. Internal printed circuit board in the battery pack automatically shuts pack off when pack voltage drops to 12 volts. Over discharge is prevented, thereby providing long pack life.
  6. Li-Ion battery pack provides over 500 recharge cycles.
- **AC Charger** – A Lithium Ion SMART charger comes standard with the HIGH OUTPUT system. This charger provides a low charge current which prolongs battery life.
- **Pump**
  1. 14.8 volt Li-Ion pack supercharges the 500 gallon per hour pump evacuating the cockpit in less than 1 minute (measurements taken in a Valley Nordkapp LV).
  2. Pump is easily removed from its base for cleaning via push buttons.
- **System Performance**
  1. Low system weight, approximately 3 pounds with 1 hr 2200 mAh Li-Ion battery pack (3 pound weight is minus the bilge hose and mini-cell floor lining).
  2. Waterproof charge cable eliminates the need to open the dry box to charge the battery.
  3. Waterproof charge cable provides a connection to the optional solar charging panel (available 2011).
- **Dimensions**
  1. Dry box dimensions: 6.5” x 4.5” x 3.25” (L x W x H)
  2. Pump dimensions: 3.25” x 3.00” x 3.25” (L x W x H)
  3. Mounting plate dimensions: 21” (long plate); 10.5” (short plate)
  4. Bilge Hose Dimensions: 3/4” x 6 feet
  5. Thru-hull fitting hole diameter ⅞”
  6. Switch cable length 62”
  7. Charge cable length 24”
  8. Pump to dry box cable length 65”

BLUEWATER KAYAK WORKS WARRANTY

BLUEWATER KAYAK WORKS is pleased to accompany the finest sea kayak electric bilge pumps, the Freedom series pumps, with a one-year limited warranty to the original purchaser of the system.

In the event that you realize a problem exists, please contact the retailer where you purchased your electric bilge pump and they will be able to assist you with your claim. The BLUEWATER KAYAK WORKS Warranty covers defective materials or workmanship for a period of one year when used as intended under normal conditions. The original warranty extended to the original owner cannot be transferred to another person.

In addition, BLUEWATER KAYAK WORKS does not cover electric bilge pump systems that have been altered or modified in any way from the original state of manufacture when purchased. Every claim must be accompanied by the original bill of sale. All warranty claims will be subject to an investigation by BLUEWATER KAYAK WORKS and BLUEWATER KAYAK WORKS may repair or replace the defective product at their discretion, determining whether the problem is a result of defective materials or workmanship or the result of misuse or accident above and beyond the scope of the warranty. Photos accompanying the damaged part may be requested to ensure an accurate evaluation during the investigation.

Failure to keep the end of the charge cable covered with the sealing cap when the danger of water entry is present voids this warranty. Failure to keep the door of the dry box closed when the danger of water entry is present voids this warranty.

BLUEWATER KAYAK WORKS, LLC is not responsible for injury or damage caused by improperly charging the battery pack(s).

BLUEWATER KAYAK WORKS, LLC is not responsible for injury or accidents sustained during the use of their product. Users acknowledge all assumed risks and are solely responsible for all damages or injuries incurred, including death, which may result from the use of BLUEWATER KAYAK WORKS, LLC products and waive any and all claims against BLUEWATER KAYAK WORKS, LLC.

BLUEWATER KAYAK WORKS, LLC's electric bilge pump systems are not meant to replace the manual pump. You should always carry a manual pump when you kayak.