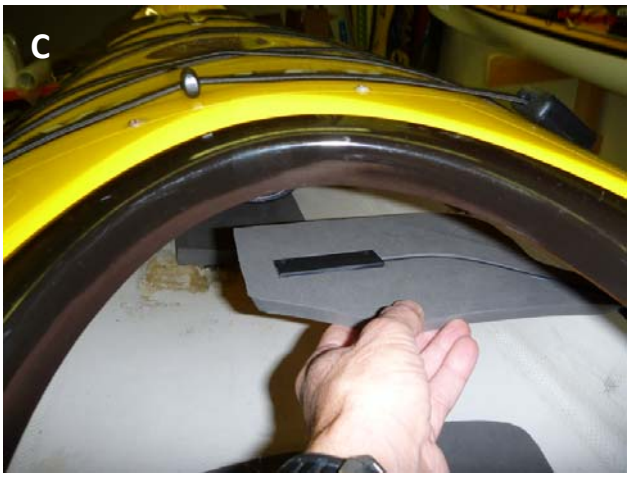
Installation Instructions

QUICK INSTALLATION INSTRUCTIONS FOR THE FREEDOM 500
SEE APPENDIX FOR DETAILED DISCUSSION

CONFIGURATION 1A - Dry Box Behind Seat, Pump In Front of Seat (Most Common Mounting)

STEP 1. Select bungee closest to cockpit coaming for switch-magnet travel path (**Photo A**). Switch-magnet with a dimple milled on back should be at least 39 inches away from center of compass deck mount. Lower strength magnet, without dimple, can be as close as 34 inches

away from center of compass mount (**Photo B**). In all cases, mount the switch-magnet on a deck bungee that runs from right to left across the width of the kayak. Place mini-cell foam block for pump switch (**parts list l**) under deck and align switch cavity with bungee directly forward of cockpit coaming (**Photo C**) . Ensure that the bungee provides a line of travel for the switch-magnet of approximately 8 to 9 inches in length, reposition and trim mini-cell foam block as needed and trace perimeter of mini-cell foam block with pencil or place small pieces of tape around perimeter for alignment.



STEP 2. Set dry box assembly on kayak deck behind coaming, then pass switch (**parts list a**) in between the right hand seat column and the kayak hull. Place switch in cavity in mini-cell foam block and tape temporarily in place under deck in position traced in **Step 1** above (**Photo C**).

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STEP 3. Depress buttons and separate pump from pump base by pulling apart (**Photo D**), then attach pump base to one of the two mounting plates (**Photo E**) with three stainless steel screws and lock nuts (**parts list b**). Long mounting plate is pictured below and was used in this installation. Re-install pump on pump base, being careful not to lose O-ring when pump and pump base are separated. Slide mounting plate under kayak seat until pump is within ½ inch of front of seat.

STEP 4. Using waterproof wire connectors (**parts list i**), connect the two brown wires together using a first connector; next connect the two black wires together using a second waterproof wire connector (**Photo F**). Refer to detailed instructions in **Installation Overview** for operation of connectors. Wipe any silicon grease that extrudes through the unused hole in each connector with a paper towel and do not get the grease on the inside of the cockpit; the grease will interfere with the Yak Snot adhesive. You have two extra waterproof connectors in your kit for possible future use.

STEP 5. Test pump operation by placing magnet over switch (**Photo G**) and then move magnet to OFF position and then back to ON position. Pump should run when magnet is over switch in ON position and stop when

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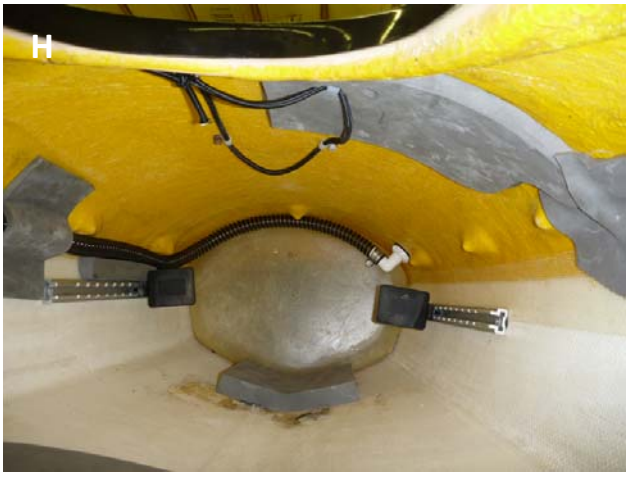
magnet is over OFF position. Untie bungee, install cord lock and switch-magnet (**parts list j**) on bungee. Clean outer surface of kayak directly under bungee, install Yak Armor strip (**parts list k**) on kayak deck between ON and OFF regions and re-tie bungee.

STEP 6. Temporarily secure switch cable against hull of cockpit with two small pieces of removable masking tape. Center mini-cell foam strip over switch cable and trace perimeter of foam strip with pencil.

STEP 7. Remove masking tape holding foam block with switch in **Step 2** and masking tape holding switch cable against interior of kayak in **Step 6** and sand surface of mini-cell foam block, surface of mini-cell foam strip, and areas traced in **Step 1** and **Step 6** above on interior of kayak. Wipe all sanded surfaces with Isopropyl alcohol. Wait 5 minutes for alcohol to



evaporate, then apply two coats of Yak Snot adhesive to all sanded surfaces. Wait 5-10 minutes for adhesive to dry then: (a) align mini-cell foam block (with pump switch placed in switch cavity) with pencil marks and/or alignment tape and push firmly in place against interior of kayak (**Photo H**); (b) center foam strip over switch cable and push foam strip firmly in place (**Photo I**).

Step 8. Locate hole for thru-hull fitting on outside of kayak deck(**Photo J**), mark location for hole using one of the rubber washers (**parts list e**), and drill ½ inch hole in kayak deck. Enlarge hole to ⅞ inch with round file or use a Dremmel style power tool with sanding drum bit. Install a stainless steel hose clamp on the end of the bilge hose and push thru-hull fitting into end of bilge hose, tighten hose clamp. Thread inner nut onto thru-hull

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fitting and place one washer on thru-hull fitting. From the inside of the cockpit, insert thru-hull fitting into hole. From the outside of the cockpit place one washer on end of thru-hull fitting extending out through hole and thread outer nut in place until tight. Refer to detailed instructions in **Installation Overview** for further discussion on the thru-hull fitting. Tighten outer nut to compress washer but do not over tighten outer nut.

Step 9. Route bilge hose through inside of cockpit from thru-hull fitting to pump and cut extra length of bilge hose away. Place stainless steel hose clamp on end of bilge hose and attach to pump. Use a small amount of silicon grease or Vaseline on the inside of the bilge hose to facilitate pushing the hose onto the pump. Refer to detailed instructions in **Installation Overview** for further discussion on routing bilge hose. Using mini-cell foam strips and Yak Snot Adhesive cut 2 pieces of foam strip 8 inches long and secure bilge hose to inside of kayak using Yak Snot adhesive (follow step as before, i.e., sanding, alcohol wipe, and coat with adhesive, press into place) (**Photo K**) .

Step 10. Tuck black and brown wires into wire loam around the waterproof wire connectors and secure with tie-wraps (**parts list g**) on each side of wire connectors. Extra length of pump wires on left side of dry box and extra length of switch cable on right side of dry box can be formed into loops and tie-wrapped. Keep enough cable length free to allow the dry box to be set on top on the kayak deck (**Photo L**) .

Step 11. One ¼-inch hole was drilled into the back of the seat pan (**Photo M**). Using the Velcro strap, bungee and hook (**parts list a and g**) secure dry box to kayak (**Photo N**). Use holes in aft end of mounting plate to receive bungee and/or drill one or two ¼-inch holes in

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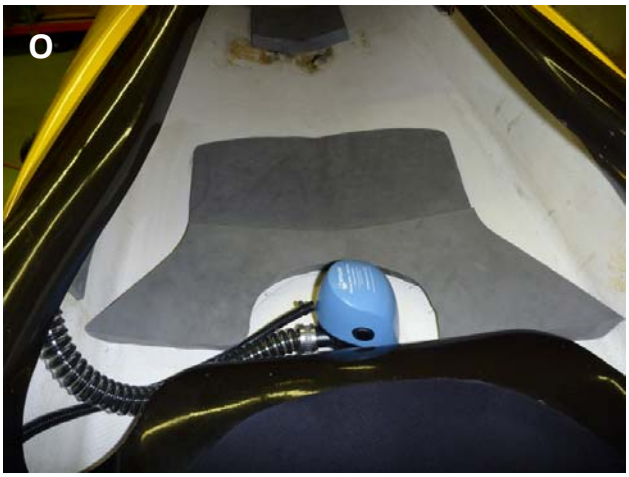
perimeter of kayak seat, seat column, etc. to route bungee (**Photo M**).

Step 12. From the inside of the cockpit, center mini-cell foam sump base (**parts list n**), directly over keel line in contact with front of seat, place connected island on kayak floor in contact with sump base and place detached island at most forward location of cockpit against forward bulkhead (**Photo O**). Trim to fit as needed. Sit in kayak, ensure the mini-cell parts do not interfere with your legs, trim as needed and secure to inside of kayak using Yak Snot adhesive (follow step as before, i.e., sanding, alcohol wipe, coat with adhesive, press into place) (**Photo O**) .



Installation is complete!

Refer to **User's manual** for instructions on charging the battery and system operation. Remember to be very careful not to lose the **WATERPROOF** sealing cap from the charging cable. This cap should always be attached when you are not charging the system. A push-on rubber sealing cap is attached to the charging cable; use this push-on cap if you lose the **WATERPROOF** sealing cap. You must not get the charging cable end wet; otherwise, you will encourage corrosion, drain the battery, and void the warranty.

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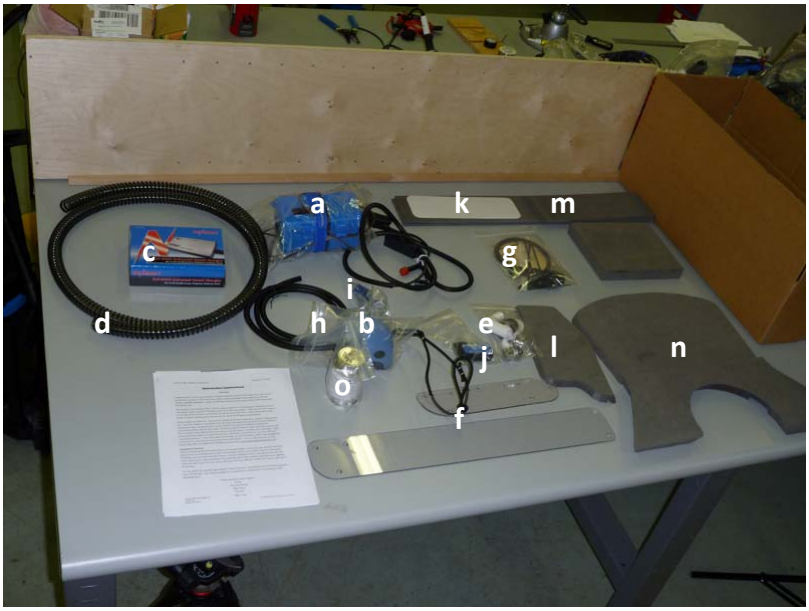
Parts List



a. **Dry Box Assembly** – includes dry box, switch with switch cable and wire loam cover, charging cable with threaded RED sealing cap and spare push-on cap, and pump power wires, battery, foam insert, fuse holder with fuse and spare fuse & spare pump O-ring taped to the inside of the dry box lid, spare RED sealing cap next to fuse holder in mini zip-lock bag, dry box bungee cord, and Velcro strap.
b. **Pump Assembly** – includes wire loam.
c. **Smart Charger** – for battery pack and waterproof cable to Tamiya connector charge adapter.
d. **Bilge Hose** – ¾ inch inside diameter 7 feet in length.
e. **Thru-hull Fitting Kit** – includes three custom rubber washers, two stainless steel hose clamps, and three plastic hose mounting brackets (in zip-lock bag).
f. **Mounting Plates** – One pair of universal polycarbonate mounting plates, one short and one long. Short plate has attached bungee cord with clasp.
g. **Attachment Kit** – 31 inch Bungee Cord With Hook, 4 white tie-wraps (8 inch length), 4 black tie-wraps (6 inch length), and 10 black tie-wraps (4 inch length).
h. **Stainless Steel Pump Screws and Nuts** – 4 stainless steel pump mounting screws 8-32 x ½" with stainless steel lock nuts (in zip-lock bag).
i. **Waterproof Wire Connectors** –4 waterproof wire connectors (in zip-lock bag).
j. **Pump Switch-magnet & cord lock** (in zip-lock bag).
k. **Yak Armor** deck protection strip (3"x 9.5")
l. **Mini-cell Foam Block** – machined for pump switch mounting.
m. **Mini-cell Foam Strips** – for pump switch cable mounting and for securing bilge hose to cockpit (2- 4" x 24", 1-4"x12"), and mini-cell foam block spacer material.

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n. **Mini-cell Foam Sump Kit** – for cockpit floor lining, three-piece kit including (1) sump base, (2) connected island, and (3) detached island.
o. **Yak Snot** mini-cell foam adhesive (4oz can in zip-lock bag).

Tools You Will Need That Are Not Provided

- ½ inch drill bit or equivalent, ¼ inch drill bit or equivalent, and electric drill
- miniature hand held power tool such as the Dremel tool with circular sanding bit or 3/8 inch round file
- straight blade screw driver, Phillips screw driver, and pliers
- wire cutters, scissors, knife, and pencil
- removable painter's masking tape (blue roll works well)
- adjustable wrench
- Isopropyl alcohol

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APPENDIX

Installation Overview & Detailed Discussion

Congratulations! You just purchased a Freedom 500 Sea Kayak Electric Bilge Pump System and joined the revolution. This is the most robust, easily adaptable electric bilge pump for sea kayaks available anywhere. Proper installation and care of the system will provide many years of carefree use.

We designed the Freedom 500 to provide easy installation in all sea kayaks; therefore, you will not always need to use all of the parts that come with your system. Open the box and inspect it to see that all of the items on the Parts List are present in the box. Contact Bluewater Kayak Works to report missing parts that are not the result of damage during shipping.

All sea kayaks are different. There are no standards for seat dimensions, cockpit configurations, etc. Even the models of sea kayaks from the same sea kayak manufacturer can have different dimensions with varying amounts of room behind the seats and different methods of attachment of the seats to the kayaks. Bulkhead position relative to the seat varies widely and the amount of room behind the seat varies across the various manufacturers' offerings. These instructions are meant as a guide and provide systematic instructions for the most common mounting scenarios. True to the spirit of kayaking, you will inevitably modify these installation instructions to suit your personal preference and situation. You can also view our on-line videos that show the different installation procedures at www.bluewaterkayakworks.com.

Installation Planning

While considering this Overview, inspect your kayak cockpit. Actual installation time is only about one hour and most of this time is spent waiting for the Yak Snot glue to set-up before pressing parts together. Pump kits that have mini-cell coated with peel and stick adhesive install much faster, typically in 30 minutes.

You can check our website page (coming soon) labeled "Kayak Fit Guide" (accessed from the Product page) for more information. During your initial installation consideration should decide on locations for the following items:

Pump switch & switch-magnet
Pump
Thru-hull fitting
Bilge Hose
Dry box

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Your selection of dry box location, pump location, and your seat pan length will determine which mounting plate configuration you will use (**parts list f**), i.e., either the long plate, short plate, or both plates.

Pump Switch

Common to all installations and central to the design of the magnetic switch is the need to position the pump switch directly beneath the deck bungee that the switch-magnet slides on. The bungee closest to the forward end of the cockpit can be used for this purpose since this bungee is easily reached while seated in the cockpit. You will need to inspect your own kayak and select the bungee that you will use to mount the switch-magnet. For clarity in these instructions, "right," and "left" are defined when you are seated in your kayak.

- For a deck bungee running across the width of the kayak (from right to left), the “OFF” position for the system is intended to exist when the magnet is positioned at the far right hand side of its range of travel along the deck bungee. The reason for this is so that if you accidentally hit the magnet while paddling you will most likely move the magnet to the right into the OFF position instead of the ON position.
- Similarly, the “ON” position is intended to be when the magnet is moved to the left, and is aligned over the top of the switch. The pump switch mini-cell foam block (**parts list l**) is sized to permit the center of the ON location to exist when the switch-magnet is just to the right of the crown of the kayak deck. By design, the switch-magnet and switch do not need to be lined up exactly. The “ON” position pattern has a primary ON contact area is in the shape of an ellipse approximately 3.5 inches long (as measured along the direction of the kayak’s longitudinal axis) by 2.5 inches wide (as measured along the width of the kayak). This means that if the center of the switch-magnet is positioned anywhere in that region, the switch will be activated and the pump will be ON. Keep these guidelines in mind as you select the location for the switch and corresponding deck bungee on which the switch-magnet will travel.
- Kayaks which have a compartment mounted in the deck directly forward of the cockpit coaming prevent the ON position for the switch from being mounted as described above. The compartment prevents the switch from being mounted close enough to the deck. The switch-magnet should not be more than 0.75 inches above the switch when the switch is in the ON position. Some examples of kayaks with front compartments are the P&H Cetus, Scorpio, and Delphin; the Tiderace Excite, and Explore; and the Point 65 Whisky, Cappuccino, and Double Shot. In this case, the ON and OFF positions are reversed in order to use the bungee closest to the front cockpit coaming for the switch-magnet. ON is at the far right and OFF is just to the right of the center of the deck. A cord lock (**parts list g**) can be added to the first deck bungee to prevent the magnet from being inadvertently moved to the ON position.

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- An alternative deck bungee or deck line can be used for these kayaks or a bungee can be added to provide a convenient line of travel for the switch-magnet.

Waterproof Wire Connectors

The waterproof wire connectors eliminate the need to remove the seat in order to install the pump on one side of the seat and the dry box on the other side. The wire ends are inserted into the connector and do not need to be stripped. The connector is very simple to use - to operate the wire connector do the following:

1. open the connector by rotating both wings of the connector apart from each other;
2. insert the brown wire from pump assembly (**parts list b**) into a first hole of connector;
3. insert the brown wire from dry box assembly (**parts list a**) into a second hole of the connector;
4. close the connector by rotating both wings of the connector together and firmly press the wings together until the wings touch each other and lock closed. When the wings contact each other they will click, locking the connector closed. The connector should not be opened after the wings lock together.
5. Wipe off any dielectric silicon grease that may extrude out of the third unused hole in the connector body. Be careful not to get this silicon grease on the surfaces of kayak or mini-cell foam as it will interfere with the bonding.

If you didn't insert the wires far enough into one of the waterproof connectors cut the connector out of the system and reinstall wires into a new connector provided. There are 4 waterproof connectors in your box (**parts list i**).

Thru-hull Fitting

Physical mounting considerations require a relatively flat area of the kayak deck on which to mount the thru-hull fitting so that the rubber washer compresses and fills most of the gap between the kayak deck and the thru-hull fitting's outer and inner nuts. One black rubber washer is placed on the underside of the deck and either one or two rubber washers (as necessary) are placed on the top side of the deck. Two washers are used when there is more curvature in the kayak deck. Most of the time only one rubber washer will be needed between the top side of the kayak deck and the thru-hull fitting's outer nut.

A common location for the thru-hull fitting is on the right hand side of the forward end of the cockpit about 2 inches above the side seam. This location permits you to see simultaneously the switch-magnet and the thru-hull fitting within your field of view as you look forward. Thus, it is easy to see whether the pump is ON or OFF and whether water has stopped flowing out of the thru-hull fitting, permitting you to turn the system OFF as soon as the cockpit is empty.

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Alternatively, the thru-hull fitting can be mounted behind the cockpit coaming on either the right or left side of the kayak. To mount the thru-hull fitting in this location, there must be at least 2 inches of relatively flat deck area accessible from the inside of the cockpit in between the cockpit coaming and the rear cockpit bulkhead. The area must be large enough for the thru-hull fitting's inner nut to rest against the underside of the kayak deck. Check to be sure that enough flat area exists by placing the thru-hull fitting's inner nut against the underside of the kayak's deck before drilling the hole.

Another alternative location for the thru-hull fitting is on the immediate left side of the kayak just below the coaming. This location minimizes the length of bilge hose needed and saves weight.

Evaluate the locations for running the bilge hose by sitting in the kayak and checking to see whether there is room between your left leg and the kayak hull to permit running the bilge hose up to a suitable location for the thru-hull fitting.

We recommend that you **AVOID** the following locations for the thru-hull fitting:

1. the very crown of the kayak deck (highest point);
2. curved areas of the deck that create more than an ⅛ inch gap between the deck and the thru-hull fitting nut;
3. the side seam;
4. any area below the side seam; and
5. any location on the deck that would aim water at a spare paddle mounted on the forward part of the deck.

If your kayak deck is composite (i.e., fiberglass, carbon, Kevlar, etc.), drill a ½ hole thru the deck. Enlarge with round file or Dremel style tool to ⅞ inch diameter. Check to see that thru-hull fitting fits into the hole. Alternatively, a ⅞ inch hole-saw can be used on Polyethylene kayaks to drill the thru-hull hole.

If your kayak construction is Kevlar, we recommend using some epoxy to seal the edge of the laminate after the hole has been drilled. Wait until the epoxy dries before proceeding.

To install the thru-hull fitting, place one washer in between thru-hull fitting inner nut and inside surface of kayak and insert thru-hull fitting, from the inside of the cockpit, into the ⅞ inch hole drilled. Place one washer in between outer surface of kayak and then thread outer nut onto thru-hull fitting. Tighten thru-hull fitting outer nut with adjustable wrench to compress washer but do not over tighten. Adjust position of inner nut on thru-hull fitting so that the thru-hull fitting is flush with its outer nut when the outer nut is tight. A small gap in between the kayak deck and the outer nut is acceptable. No water will leak in and it is best not to stress the kayak

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deck by over tightening. Depending on the curvature of the kayak deck in the location of the thru-hull hole, use one or two washers in between outside surface of kayak deck and the outer thru-hull nut to reduce gap if needed.

Bilge Hose

When the thru-hull fitting is mounted at the forward end of the cockpit, the bilge hose can be run in one of two ways depending on the position selected for the pump output port, as described and shown below.

1. Pump positioned with output port to the left (using either long (**Photo P**) or short mounting plate (**Photo Q**) see below) running hose left along forward perimeter of seat pan then up above foot peg tracks (**Photo K**) curving up against the underside of the kayak deck to connect with thru-hull fitting (**Photo H**). Thru-hull fitting can be placed on either the left or right hand side of deck.

2. Pump positioned with output port forward (**Photo R**) (using short mounting plate with bungee removed) bilge hose runs forward along center of cockpit floor (on keel) to forward bulkhead, curving up to the left side of the cockpit across the underside of the deck to connect with the thru-hull fitting on the right side of the cockpit. Note that you will need to cut all three of the mini-cell foam sump kit pieces (**parts list n**) in half to run bilge hose in this manner.

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In the cases above where the bilge hose traverses from the left to the right side of the kayak and traverses directly under the deck, the bilge hose is run so that it fits tightly up against the inside the kayak cockpit and curves up around the crown of the deck. This path places the bilge hose slightly above the elevation of the thru-hull fitting which prevents wave water from entering the thru-hull fitting when conditions are rough. This is our preferred location.

When the thru-hull fitting is mounted to the kayak deck, rear of the cockpit coaming, the bilge hose can be run in one of two ways:

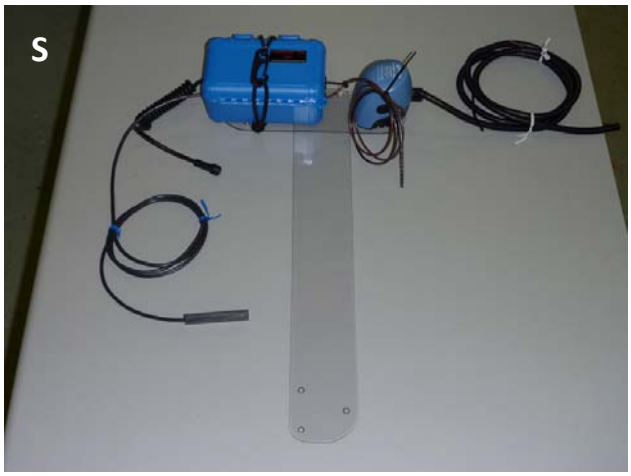
1. With the pump positioned forward of the seat pan and the pump output port positioned to the left, run the bilge hose around the perimeter of the seat pan and then back along the left side of kayak cockpit to the area behind seat, make a loop with the hose and then connect to the thru-hull fitting.
2. With the pump positioned behind the seat using the short and long mounting plates, and with pump output port positioned to the left, run the bilge hose in a loop and then connect to thru-hull fitting.

The bilge hose can be secured to the kayak deck with the mini-cell foam strips (**parts list m**) and adhesive or with the plastic hose mounting brackets (**parts list e**).

Mounting Plates

Either the long or short mounting plate can be used to mount the pump assembly immediately forward of the seat. The mounting plate slips under the kayak seat and is held in place by the seat.

Both plates can be used together to locate the pump and dry box behind the seat (**Photo S & T**). This installation begins by attaching the pump base to the short mounting plate. The pump base is attached to the end of the short plate opposite to the end that comes with the black



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bungee pre-installed; attach the pump base to the short mounting plate with screws provided by pressing black buttons and separating pump top from pump base. Align short plate perpendicular to long axis of kayak place long plate on top of short pate, align ⅜ inch holes and secure tightly with white bungees. Bend long plate and insert forward end of long plate under seat from backside of seat and push forward allowing short plate with dry box and pump to rest behind seat as shown in **Photo U**. Kayak pictured in **Photo U** is a Delta 17.

Alternatively, insert the long plate under the seat starting from the front of the seat and pushing the plate in until the plate comes out from the rear of the seat. At rear of seat, lift long plate over the short plate and push long plate back until the two holes in the long plate align with the corresponding two holes in the short plate. Insert a white tie-wrap into the first pair of aligned ⅜ inch diameter holes in the long and short plates and tighten. Insert another white tie-wrap into the second pair of two aligned holes and tighten. When attached together with tie-wraps, the two mounting plates form a "T" shape (**Photo S & T**). The dry box is attached to the short plate using the bungee and hook which come preassembled on the short plate. Final position for the dry box and pump assembly is as shown in **Photo U**.

The long plate can be cut if necessary with a hacksaw, scroll saw, etc. and new ⅜ inch holes can be drilled when the kayak seat is short.

Secure Dry Box Behind Seat

If dry box is going to be secured to the long mounting plate using holes at end of mounting plate, use the loose bungee provided with hook. Thread bungee through holes in plate as necessary and tie loop in bungee end to receive hook. Alternatively, if the seat pan is too long and/or there is not enough room to position dry box flat on floor of kayak, drill several ¼ inch diameter holes in seat pan, pass bungee through holes and make loop to secure dry box to seat pan using bungee and hook**.** Or you may find it more convenient to drill holes into the inside lip of the cockpit coaming for the bungee. Sometimes there are D-rings already mounted into the bulkhead behind the seat. Bungee can be threaded through these D-rings to facilitate securing the dry box.

Alternatively, some kayaks have mini-cell taking up space behind the seat back. In some cases, part of this mini-cell foam can be removed to make room for the dry box. Cut and refashion the mini-cell foam making room for the dry box. Be careful to remove enough mini-cell foam to permit the pump power wires to exit the dry box without being bent. The pump power wires

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should be allowed to exit the dry box through their respective grommets and remain perpendicular to the surface of the dry box that contains the grommets. Do not bend the wires as they come out of the grommets - this will preserve the waterproof integrity of the grommets. The same consideration should be afforded to the pump switch cable and the charging cable, i.e., do not bend the wires as they come out of their respective grommets.

Congratulations! We hope that you will enjoy many kayak trips ahead with new Freedom to Explore.

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