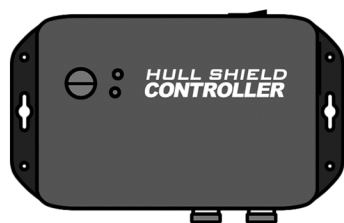
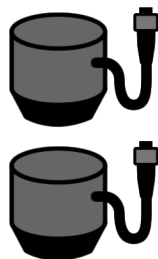


Your Hull Shield Ultrasonic System must be installed correctly. Hull Shield systems operate from a standard boat 12VDC power supply. Hull Shield systems are designed to operate 24/7 and require a constant source of power to maintain operation. Vessels which have Hull Shield installed must keep the battery system charged at all times. Power to the watercraft can be supplied through a standard battery maintainer or a dedicated shore-power hookup. Alternative power sources include solar & wind energy, however it is necessary to exercise additional precautions when using these alternative sources.

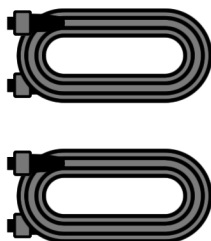
## PACKAGE CONTENTS



Controller Module



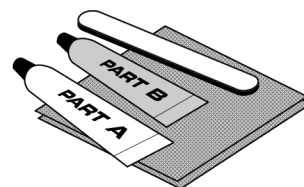
Ultrasonic Transducers



Transducer Signal Cables



Power Cable & Ring Terminals



Surface Prep Kit & 2-Part Epoxy

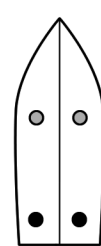
## MOUNTING LOCATIONS

● 2 Transducers

○ 4 Transducers

Transducer locations are chosen to maximize effectiveness and achieve even coverage. A properly fitted system will produce desirable results. Transducer locations are determined by hull shape and the total number of transducers to be installed. *Please ensure you have the correct system and quantity of transducers prior to installing this product.*

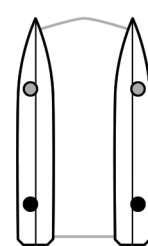
These images provide a general guide for transducer placement. The final position you choose will depend on available access to these areas.



MONOHULL



SAILING



CATAMARAN

## TRANSDUCER INSTALLATION

Transducers must attach directly to the hull. Most watercraft will have composite stringer and bulkhead systems that provide structural support for the hull and decking. Composite materials **WILL NOT CONDUCT ULTRASOUND** and must be avoided as transducer mounting positions. Ultrasonic transducers will only transmit ultrasound through solid materials. Ultrasound is not transmitted through porous materials such as wood, foam and air. ACCEPTABLE materials include solid FRP/GRP fiberglass, aluminum, & steel. **This system IS NOT COMPATIBLE with wooden, plastic, or cored hulls.**

### Transducers Step 1 - Surface Preparation

The surface of both the hull and the transducer must be flat, clean, & paint-free to achieve proper adhesion. Remove all dirt, grease, and other contaminants from the surfaces. Scuff both surfaces, the hull and the base of the transducer, with a medium-grit sandpaper to expose fresh material. Remove sanding dust and clean the surface again.

### Transducers Step 2 - Prepare and Mix Epoxy

Epoxy resin will thicken after mixing - only mix the epoxy when you are ready to attach the transducer! Apply equal parts of A & B epoxy resin onto a disposable mixing surface. Be sure to apply an adequate amount - the resin will need to completely cover the base of the transducer. Using the applicator, thoroughly mix both parts to an even consistency.

### Transducers Step 3 - Apply Epoxy Resin

Use the applicator to place the epoxy resin on the transducer base. Spread the epoxy resin outward and away from the center until you achieve a uniform coverage of the entire surface.

### Transducers Step 4 - Position the Transducer

Place the transducer, epoxy side down, into the desired position. Twist the transducer while applying downward force to ensure the base makes even contact with the hull surface. *It may be necessary to use an adhesive tape to hold the transducer firmly in place while the epoxy cures.*

### Transducers Step 5 - Wait for the Epoxy to Set

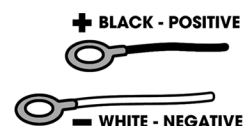
The epoxy resin must cure at least 24 hours prior to operation of the system. Do not disturb the transducer during the cure process.

## CONTROLLER INSTALLATION

The Hull Shield Controller Module supplies the power and signals required to operate the ultrasonic transducers. The controller module features convenient screw holes and slide-slots to facilitate various mounting methods. Use fasteners that are appropriate for the substrate you are attaching the module to.

### Controller Step 1 - Attach the Power Cable to the Battery

Determine whether the power cable will span the distance between the battery and location you plan to mount the controller module. The power cable can be extended with 16 gauge 2-conductor wire. We have provided convenient 5/16" eyelets for attaching the cable to the battery.



**CONNECT THE BLACK WIRE TO THE POSITIVE BATTERY TERMINAL AND THE WHITE WIRE TO THE NEGATIVE BATTERY TERMINAL.**

Signal cables may need to be routed/fished through tight areas. The signal cables can be cut and spliced back together to facilitate cable routing. The cables can also be extended with 18AWG marine-grade multistranded speaker wire. Ensure that splices are strong and encapsulated in a waterproof junction box or other sufficiently water proof insulator.

### Controller Step 2 - Connect Battery & Signal Cables



Be sure that the controller module is OFF prior to connecting any cables. The switch located at the top of the unit must be in the OFF position. **NEVER connect or disconnect a signal cable while the controller module is powered on!**

Connect the transducer cables to inputs on the bottom of the controller module. Twist the blue locking ring clockwise onto the threads to secure the connectors. **DO NOT OVER-TIGHTEN!** Connect the power cable by inserting into the socket located on the right side of the controller module. Be sure that the cable is firmly pressed into the socket.

## OPERATION

### MODE SETTINGS

The Controller Module can be set to either a MAX or ECO setting using the mode switch. An LED Indicator will denote the selected MODE with a green light.

**MAX MODE** - This is the default setting and provides the highest level of protection. MAX Mode consumes about 1.5Ah of power.

**ECO MODE** - This setting is only used when having issues with low battery voltage (normally when relying on Solar or renewable charging). This mode consumes less power, however it provides less protection. ECO Mode consumes about 1Ah of power.

### LOW BATTERY INDICATOR

When the battery voltage drops below 12.0V, the system will enter a SLEEP MODE and shutdown to conserve battery power for other essential operations. The system will automatically resume operation when the battery level rises above 12.2V. After the system has entered SLEEP MODE, the LED indicator will be red to alert you that battery levels were too low for the system to operate.

**RESETTING THE SLEEP ALERT INDICATOR** - The red LED indicator can be RESET back to green with the following procedure. 1) Switch the system off for 15 seconds. 2) Switch the system back on. 3) Toggle the mode switch at least once immediately after switching the system on.