

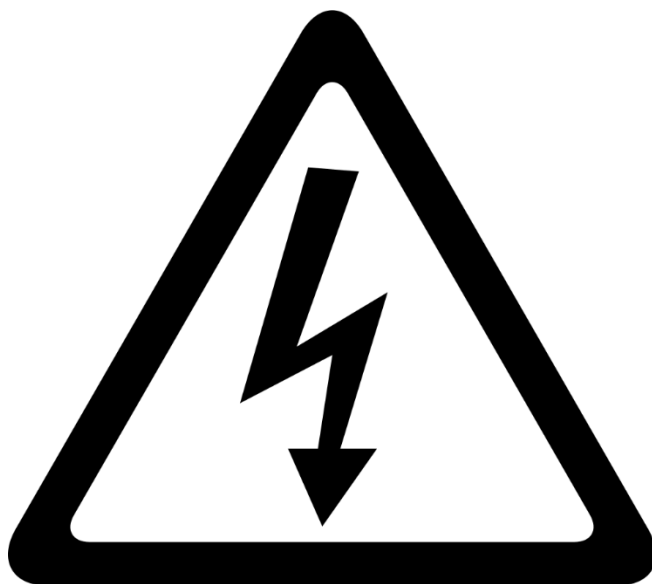


**HULLTM
SHIELD**
BY **GAT GROUP LLC**



TRANSDUCER INSTALLATION GUIDE

VERSION 19.4



WARNING

RISK OF ELECTRIC SHOCK

ELECTRIC SHOCK HAZARD

- Transducers operate at high voltages!
- Improper installation procedures can result in electric shock!
- Always perform installation with more than one person!
- Ensure all devices are isolated from power supplies during transducer installation!



WARNING

RISK OF PERSONAL INJURY

PERSONAL INJURY HAZARD

- Installation areas may pose safety hazards!
- Always perform installation with more than one person!
- Always use appropriate safety gear during installation!
- Follow instructions to reduce risk!
- Contact a professional if in doubt!

Important Safety Considerations

Electrical Installation Safety & Operational Concerns

It is recommended that installation of electrical components is conducted by a competent marine electrician.

Ultrasonic transducers operate by high voltage current.

Working with electricity poses a serious risk of injury or death.

Always have another person present during installation as a safety precaution.

Electrical components must be installed properly for the reliable and safe operation of the watercraft.

Connect all AC connections in accordance with IEC wiring regulations.

Personal Injury & Safety Concerns

It is recommended that installation of electrical components is conducted by a competent marine electrician.

Always have another person present during installation as a safety precaution.

Transducers will likely be installed in areas having limited access and little space to work. Tighter access and smaller work areas pose a higher risk of injury.

Transducers may be installed near water creating a risk of drowning and electrocution.

Using power tools without proper safety gear can lead to serious injury or death.

Improperly routed cables can become a personal trip hazard.

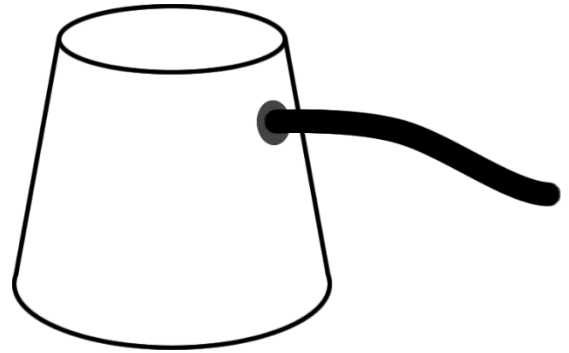
Improperly fastened cables can become loose and pose additional safety and electrical risks.

Parts & Tools Required for Installation

Ensure that you have all necessary parts and tools required to complete installation. Take precaution that you follow safety guidelines and wear proper safety gear and protection.

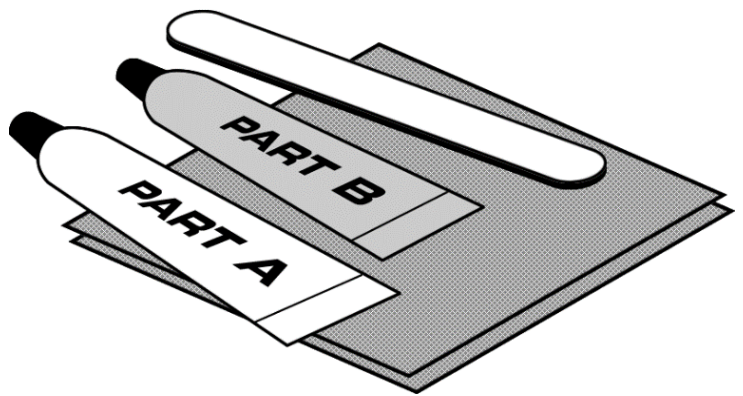
Parts Required

- HULL SHIELD Ultrasonic Transducer/s



Tools Required for Installation

- Sandpaper
- 2-Part Epoxy Adhesive
- Epoxy Mixing Applicator





IMPORTANT - READ FIRST

- Please read this manual in entirety before installing any transducers!
- It is important that transducers are positioned in the correct locations to be effective!
- Follow all guidelines to achieve effective placement and results!
- **Failure to follow these guidelines will result in uneven coverage and inconsistent results!**

Determining Transducer Placement & Required Quantity

Transducers must be placed in the correct locations to maximize effectiveness and to produce even coverage. Please read the following guidelines prior to transducer installation. Only a properly fitted system will produce desirable results.

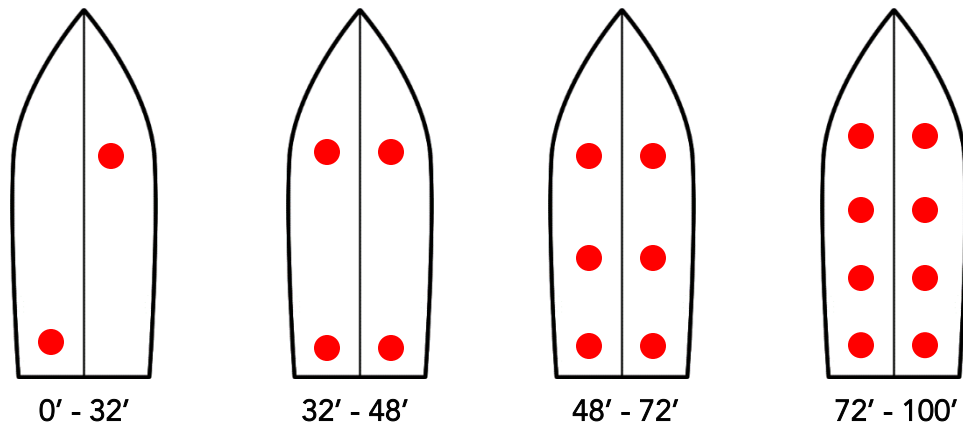
Transducer locations are determined based on hull size, material, and structure. The following pages provide a guide for determining the proper installation locations for the watercraft.

Transducer Quantity & Optimal Location

The quantity of transducers required for an effective installation is determined by the size and shape of the watercraft. Please ensure you have the correct system and quantity of transducers prior to installing this product.

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

Mono Hulls *Interior Bilge Mount*



LOA

0' - 32'

32' - 48'

48' - 72'

72' - 100'

Transducers

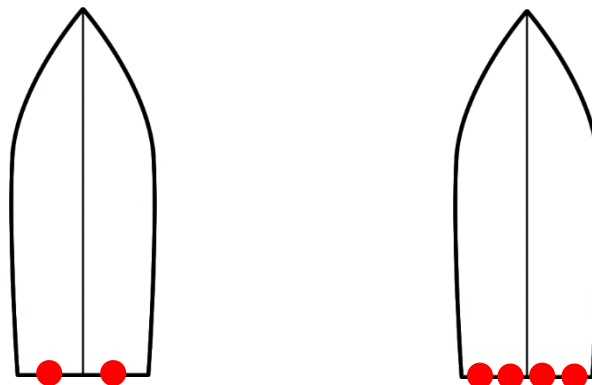
2

4

6

8

Mono Hulls *Exterior Transom Mount*



LOA

0' - 28'

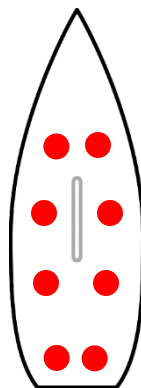
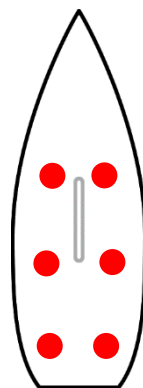
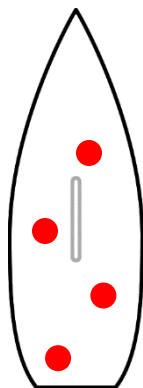
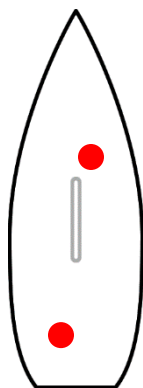
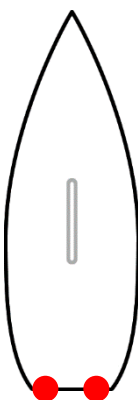
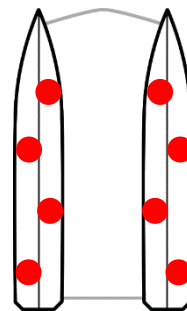
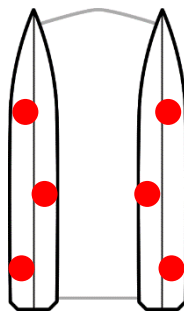
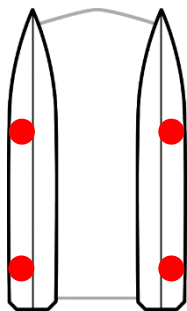
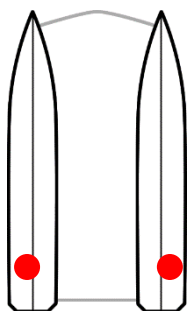
28' - 36'

Transducers

2

4

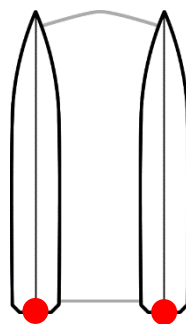
Measurements in imperial feet.

Sailing Hulls
Interior Bilge Mount

LOA
0' - 32'
32' - 48'
48' - 72'
72' - 100'
Transducers
2
4
6
8
Sailing Hulls
Exterior Transom Mount

LOA
0' - 28'
28' - 36'
Transducers
2
4
Catamaran Hulls
Interior Bilge Mount

LOA
0' - 28'
28' - 48'
48' - 78'
78' - 100'
Transducers
2
4
6
8

Measurements in imperial feet.

Catamaran Hulls

Exterior Transom Mount



0' - 28'

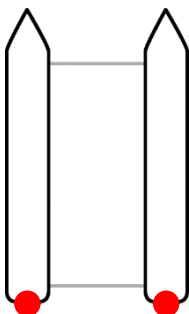
LOA

Transducers

2

Double Pontoon

Exterior Mount

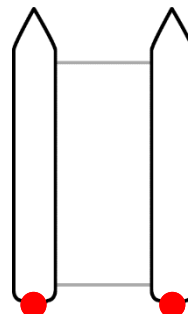


0' - 32'

LOA

Transducers

2

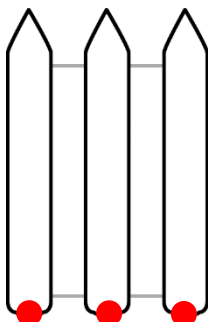


32' - 48'

4

Triple Pontoon

Exterior Mount

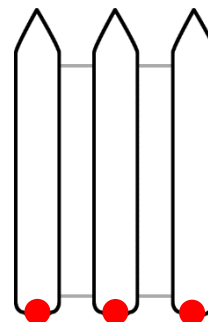


0' - 32'

LOA

Transducers

3



32' - 48'

6

Measurements in imperial feet.



ATTENTION - SANDWICH CORE HULLS

- Core materials must be removed prior to transducers installed inside the bilge!



STOP - WOODEN WATERCRAFT

- Ultrasonic anti-fouling is ineffective on hulls made from wood!

Acceptable Material Surfaces for Transducer Attachment

Ultrasonic transducers will only transmit ultrasound through solid dense surfaces. Ultrasound is not efficiently transmitted through soft or porous materials such as wood, foam, and air.

Acceptable surfaces include:

- Solid FRP & GRP Fiberglass Hulls
- Aluminum Hulls & Pontoons
- Steel Hulls
- Concrete Hulls

Unacceptable surfaces include:

- Cored Hulls (foam, balsa, honeycomb, & other composite cores)
- Wooden Hulls
- Plastic Hulls

Preparation for Installation on Sandwich Cored Hulls

Ultrasound will not transmit through the porous materials found in sandwich-core hulls. This hull type contains a core material which has been "sandwiched" between layers of fiberglass.



Contact your boat manufacturer to determine if you have a sandwich-core hull!

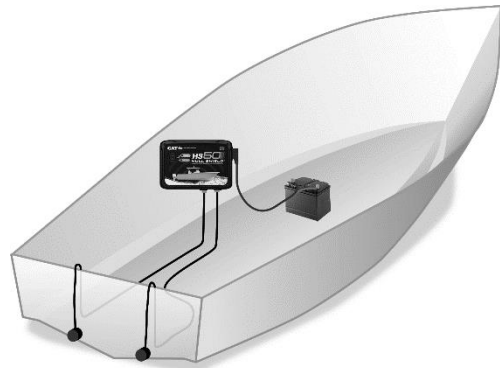
To achieve ultrasonic antifouling protection on a cored hull, the transducer must be attached to the outermost layer of fiberglass. This can be accomplished with one of three methods:

1. Position the transducer to the outside of the hull.
2. Position the transducer on a section of the hull that has no core.
3. Remove a portion of core material and replace it with solid fiberglass and resin.

1) CORED HULLS - EXTERNALLY MOUNTED TRANSDUCERS

Transducers can be conveniently mounted to the exterior surface on most vessels with a LOA of 36 feet or less.

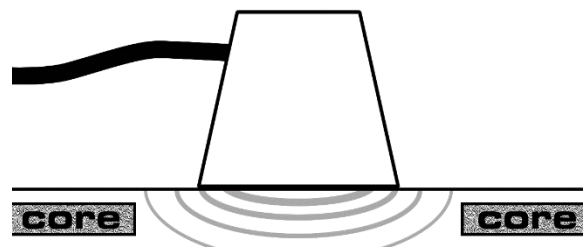
This option will provide direct contact to the outer-most layer of fiberglass.



2) CORED HULLS - FACTORY PROVIDED ATTACHMENT POINTS

Some boat manufacturers producing cored hulls will provide pre-built pads of solid fiberglass for the purpose of mounting hardware within the bilge.

These areas provide a solid cross-section required for ultrasonic transducers to operate. **Ask your boat manufacture if they have integrated mounting points and the locations of these areas.**



3) CORED HULLS - REMOVE A PORTION OF CORE MATERIAL



It is strongly advised that this procedure is done by a qualified marine technician!



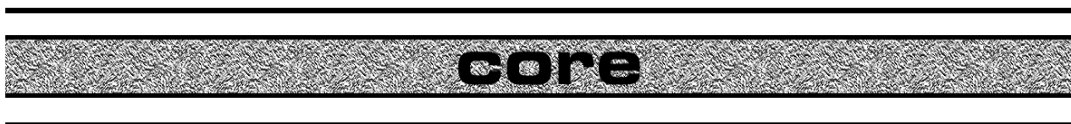
NEVER do this procedure when the watercraft is in water!



ALWAYS use safety gear when working with tools!

It is strongly recommended that this procedure is completed by a qualified marine technician. This procedure requires removing a section of core material from the hull and replacing it with fiberglass and resin - this will provide an attachment area permitting the transmission of ultrasound to the outermost layer of fiberglass on a sandwich core hull. The use of power tools and additional equipment will be required to complete this procedure.

The center of a sandwich-core hull will contain a porous material made of either foam, balsa, honeycomb, or other synthetic composite material.



A hole-saw, grinder, or other tool can be used to remove a 6" diameter section of the interior fiberglass and core material.

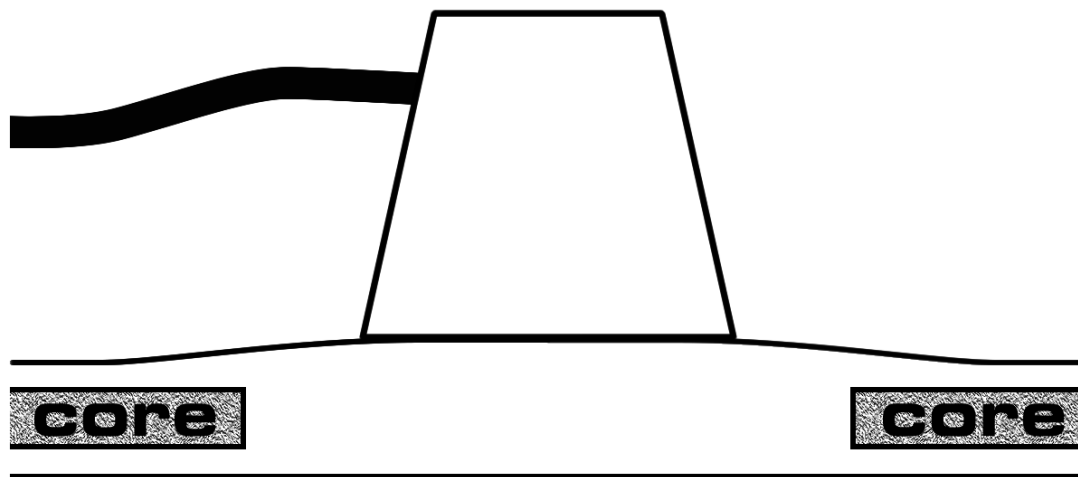


3) CORED HULLS - REMOVE A PORTION OF CORE MATERIAL (continued)

After removing the core material, the hole must be filled with fiberglass and epoxy resin. This creates a high strength area that will provide a solid connection between the inner and outer layers of fiberglass.



Epoxy resin must be permitted to cure to the manufacturer's recommended cure time. Only after the epoxy has cured, the transducer can be mounted to the area.



Stringers, Girders, & Bulk Heads



AVOID - Stringers, Girders, & Bulk Heads

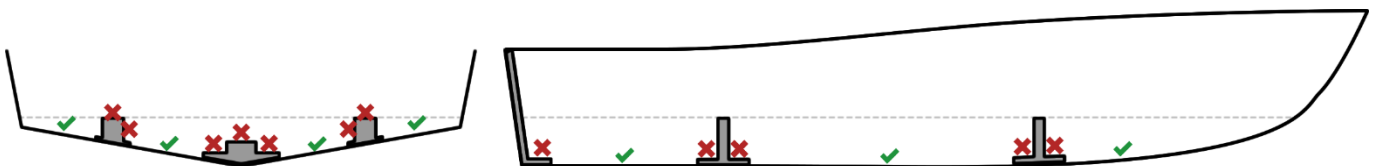
- Never position transducers onto stringers, girders, & bulkheads!

Most watercraft have stringer and bulkhead systems which provide structural support for the hull and decking. Composite building materials are used in the construction of these systems. Composite materials will not conduct ultrasound and must be avoided as transducer mounting positions.



DO NOT position on stringers!

DO NOT position on bulkheads!



Pontoons, Aluminum, & Steel Watercraft



AVOID - Stringers, Girders, & Bulk Heads

- Never position transducers onto stringers, girders, & bulkheads!



AVOID - Mounts & Brackets

- Never position transducers onto any surface other than directly to the hull or pontoon surface.

It is imperative that the transducers attach directly to the hull or pontoon surface. You must avoid attaching the transducer to any bracket or other appendage.

Pontoon Attachment Transducer Placement

Transducers must be attached directly to the rear surface of the pontoon. The transducer must be placed **BELOW** the waterline so that it remains submerged. **DO NOT** place the transducer on any other surface besides directly to the pontoon surface.

Aluminum & Steel Watercraft Placement

Transducers must be attached directly to the hull surface or to the exterior of the transom. When placing the transducer on the interior hull surface, be sure that the transducer is located below the waterline. Always seek to place the transducer in an area centered farthest away from corners, girders, & bulkheads. The transducer must be placed **BELOW** the waterline. **DO NOT** place the transducer onto any surface besides directly to the hull surface or rear exterior transom.

Transducer Fitting & Attachment

Review the checklist prior to mounting any transducers:

- ☐ I must mount the transducers directly to the hull surface.
- ☐ I have access for transducer signal cables to be routed to the controller module.
- ☐ I have all parts and tools required to complete the task.
- ☐ I have determined that my attachment positions meet the requirements in this manual.
- ☐ I have taken all necessary safety precautions.

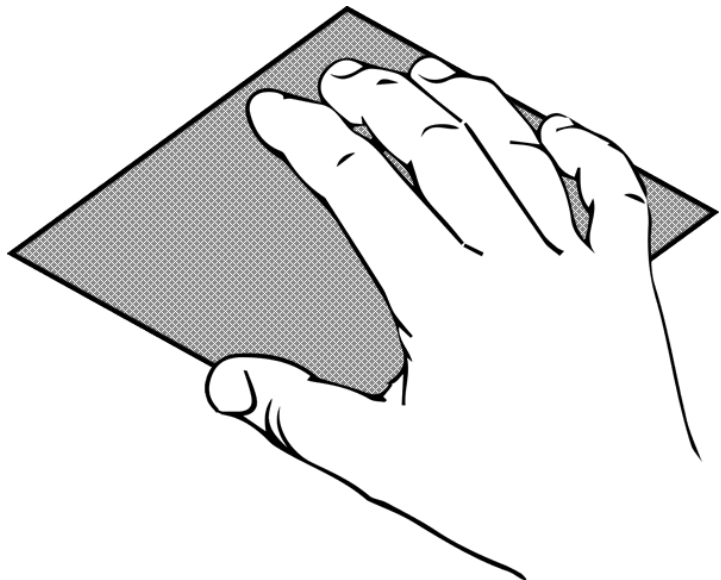
Step 1 - Surface Preparation

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 contaminates from the surfaces.

Scuff *both* surfaces, the hull *and* the base of the transducer, with a medium-grit sandpaper to expose fresh material that will provide proper adhesion.

Remove sanding dust and clean the surface again.

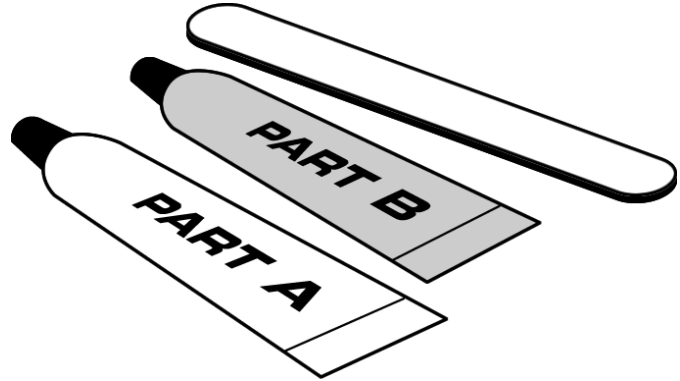


Step 2 - Prepare & Mix Epoxy Resin

Hull Shield ultrasonic transducers are mounted to the hull surface using a 2-part epoxy resin.

Your product comes supplied with an appropriate epoxy resin. If you require additional epoxy, please contact us to receive an approved list of epoxy resins and distributors.

DO NOT use silicone or other single part adhesives.

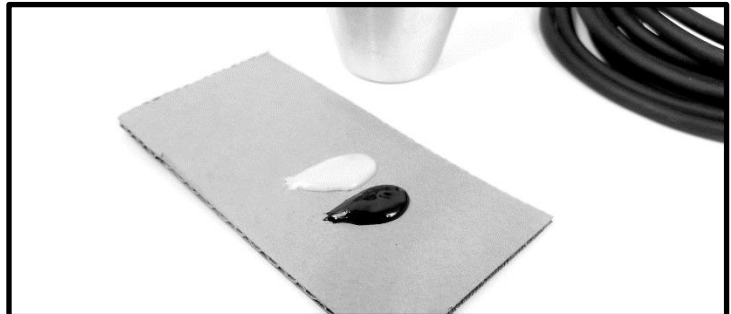


Ensure that you have all parts prepared prior to mixing the 2-part epoxy resin.

Epoxy resin will thicken after mixing - only mix the epoxy when you are ready to attach the transducer!

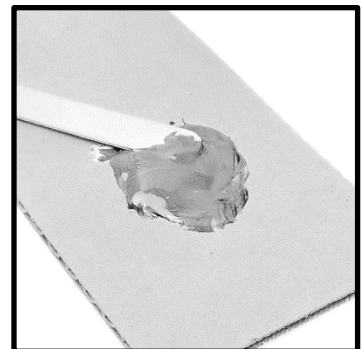


Apply equal parts of A & B epoxy resin onto a disposable mixing surface. Be sure to apply an adequate amount - the resin will need to completely cover the base of the transducer.



Using the applicator, thoroughly mix both parts to an even consistency.

The epoxy is now chemically active and will already begin to set. It's important that you do not delay prior to the next step.



Step 3 - Apply Epoxy Resin to Transducer

Use the applicator to place the epoxy resin in the center of the transducer base.



Spread the epoxy resin outward and away from the center until you achieve a uniform coverage of the entire surface.



Step 4 - Position Transducer

Place the transducer, epoxy side down, into position.

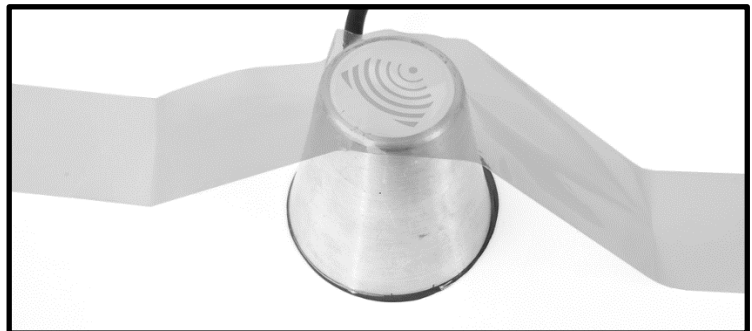
Twist the transducer while applying downward force to ensure the base is making solid contact with the hull surface.



You cannot reposition the transducer after it has been in position for more than 5 minutes. Attempting to do so will result in poor adhesion!

You can be sure that the transducer is making complete contact when you see a bead of epoxy around the entire perimeter of the transducer.

It may be necessary to use an adhesive tape to hold the transducer firmly in place while the epoxy cures. The transducer may slide or move from the intended position when attaching to an un-level surface.



Step 5 - WAIT (Epoxy Cure Time)



DO NOT reposition the transducer!



DO NOT move, bump, nudge, or otherwise disturb the transducer while curing!



DO NOT connect the transducer signal cable until the epoxy has completely cured!

The epoxy resin provided with your product must cure at least 24 hours prior to connecting the transducer to the controller module.

Be sure to not disturb the transducer during the cure process. Improper adhesion can result if the transducer and epoxy is disturbed after 10 minutes of mixing the epoxy resin.

Once the epoxy has fully cured, the transducer will be safe to use with a properly installed controller module. Please see installation and wiring instructions for your product.



WHEN IN DOUBT - CONTACT US

For installation support, please contact us at info@hullshield.net