

OWNER'S GUIDE & INSTALLATION INSTRUCTIONS

Thru-Hull Depth Transducer

Low Profile, Flush, and Retractable Models

6/02
17-006-01 rev. 04

IMPORTANT: Please read these instructions completely before proceeding with the installation. These instructions supersede any other instructions in your instrument manual if they differ.

CAUTION: NEVER USE SOLVENTS

Cleaners, fuel, paint, sealants, and other products may contain strong solvents, such as acetone, which attack many plastics greatly reducing their strength.

Applications

- **Plastic** housing recommended for fiberglass or metal hulls only. Never install a plastic thru-hull sensor in a wood hull, since swelling of the wood may overstress the plastic causing a fracture.
- **Bronze** housing recommended for fiberglass or wood hulls only. Never install a bronze housing in a metal hull, because electrolytic corrosion will occur.
- **Stainless steel** housing recommended for metal hulls to prevent electrolytic corrosion.
- Never install a metal housing in a vessel with a positive ground system.

Identify Your Model

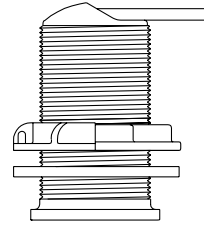
To identify your model, see the cable tag.

Tools and Materials

- Safety goggles
- Dust mask
- Electric drill with 10mm (3/8") or larger chuck capacity
- Drill bit: 3mm or 1/8"
- Hole saw (see table on page 1)
- Countersink tool (installing a flush housing)
- Sandpaper
- Mild household detergent or weak solvent (such as alcohol)
- File (installation in a metal hull)
- Marine sealant
- Additional washer [for aluminum hull less than 6mm (1/4") thick]
- Slip-joint pliers (installing a metal housing)
- Zip-ties
- Water-based antifouling paint (**mandatory in salt water**)
- Installation in a cored fiberglass hull (see page 4):
 - Hole saw for hull interior: (see table on this page)
 - Fiberglass cloth and resin
 - or Cylinder, wax, tape, and casting epoxy

Record the information found on the cable tag for future reference.

Part No. _____ Date _____ Frequency _____ kHz



Flush
P219/B119

Retractable, Low Profile, P17



Mounting Location

Acoustic Noise

Acoustic noise is always present and these sound waves can interfere with the operation of the transducer. Background noise from sources such as: waves, fish, and other vessels cannot be controlled. However, carefully selecting the transducer mounting location can minimize the effect of vessel generated noise from the propeller(s) and shaft(s), other machinery, and other echosounders. The lower the noise level, the higher the echosounder gain that can be used.

Placement

Choose a location where:

- The water flowing across the hull is smoothest with a minimum of bubbles and turbulence (especially at high speeds).
- The transducer will be continuously immersed in water.
- The transducer beam is unobstructed by keel or propeller shaft(s).
- There is a minimum deadrise angle.
- There is adequate headroom inside the vessel for the height of the housing, tightening the nuts, and removing any insert (see table below).

Model	Minimum Headroom	Outside Hull Hole Saw Size	Cored Fiberglass Hull Only Hull Interior Hole Saw Size
B22, B117, P19, P319	95 mm (3-3/4")	51 mm or 2"	60 mm or 2-3/8"
B124	161 mm (6-3/8")	51 mm or 2"	60 mm or 2-3/8"
P5	75 mm (3")	44 mm or 1-3/4"	51 mm or 2"
SS555	90 mm (3-1/2")	57 mm or 2-1/4"	NA
Flush: B21, B119, P219, P269	100 mm (4")	51 mm or 2"	60 mm or 2-3/8"
Retractable: B17, B21, B119, P17, P217, P314	200 mm (8")	51 mm or 2"	60 mm or 2-3/8"
Retractable SS557	200 mm (8")	57 mm or 2-1/4"	NA

Caution: Do not mount the sensor:

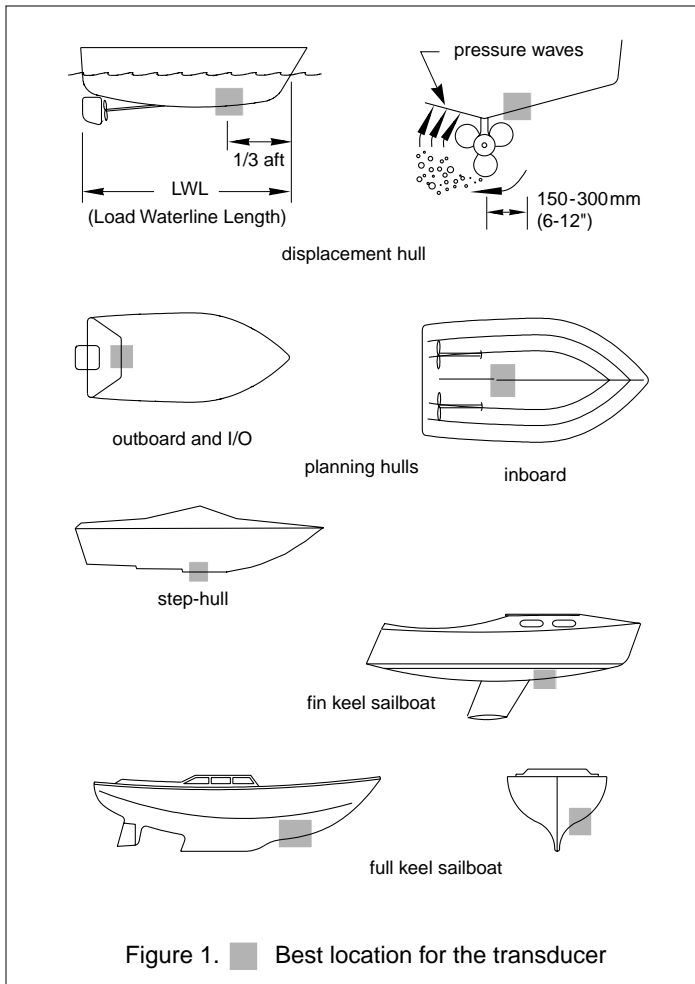
- Near water intake or discharge openings,
- Behind strakes, fittings, or hull irregularities,
- Behind eroding paint (an indication of turbulence).

Boat Types (see Figure 1)

- Displacement hull powerboat**—Locate 1/3 aft LWL and 150–300mm (6–12") off the centerline on the side of the hull where the propeller is moving downward.
- Planing hull powerboat**—Mount well aft, on or near the centerline, and well inboard of the first set of lifting strakes to insure that the transducer is in contact with the water at high speeds. Mount on the side of the hull where the propeller is moving downward.
Outboard and I/O—Mount just forward of the engine(s).
Inboard—Mount well ahead of the propeller(s) and shaft(s).
Step-hull—Mount just ahead of the first step.
Boat capable of speeds above 25kn (29MPH)—Review the installation location and operating results of similar boats before proceeding.
- Fin keel sailboat**—Mount to the side of the centerline and forward of the fin keel 300–600mm (1–2').
- Full keel sailboat**—Locate amidships and away from the keel at the point of minimum deadrise angle.

Fairing

Caution: Never use a fairing with a plastic housing; the protruding transducer would be vulnerable to damage from impact.



Generally, the sensor is mounted *without* a fairing. However, nearly all vessels have some deadrise angle at the transducer mounting location. If the transducer is mounted directly to the hull, the sound beam will not be aimed straight down. It will be tilted at the same angle as the deadrise angle. A fairing is recommended if the deadrise angle at the mounting location exceeds 10°, and you are installing a **metal** housing only.

Installation

Cored fiberglass hull—Follow separate instructions on page 4.

Hole Drilling

Warning: Always wear safety goggles and a dust mask.

1. Drill a 3 mm or 1/8" pilot hole from inside the hull. If there is a rib, strut, or other hull irregularity near the selected mounting location, drill from the outside.
2. Using the appropriate size **outside hull** hole saw, cut a hole from outside of the hull (see table on page 1).
Note: All flush models require a countersink tool to create a "seat" in the hull.
3. Sand and clean the area around the hole, inside and outside, to ensure that the sealant will adhere properly to the hull. If there is any petroleum residue inside the hull, remove it with either mild household detergent or a weak solvent (alcohol) before sanding.
Metal hull—Remove all burrs with a file and sandpaper.

Bedding

Caution: Never pull, carry, or hold the transducer by its cable; this may sever internal connections.

1. Remove the hull nut and washer (see Figure 2).
2. Apply a 2mm (1/16") thick layer of sealant around the lip of the housing that contacts the hull and up the sidewall of the housing. The sealant *must* extend 6mm (1/4") higher than the combined thickness of the hull, washer(s), and the hull nut. This will ensure there is sealant in the threads to seal the hull and to hold the hull nut securely in place.
Stainless steel housing in a metal hull—To prevent electrolytic corrosion, the stainless steel housing *must* be isolated from the metal hull. Slide the isolation bushing onto the housing, then apply additional sealant to the surfaces of the bushing that will contact the hull.

Installing

Note: Ignore any arrows on the housing, insert, and blanking plug.

1. From outside the hull, push the housing into the mounting hole using a twisting motion to squeeze out excess sealant (see Figure 2).
2. From inside the hull, slide the washer onto the housing.
SS555—Slide the stainless steel washer in place against the rubber washer.
Aluminum hull less than 6mm (1/4") thick—Use an additional rubber, fiberglass, or plastic washer. *Never* use bronze, since electrolytic corrosion will occur. *Never* use wood since it will swell, possibly fracturing the plastic housing.
3. Screw the hull nut in place. (If your plastic housing has wrenching flats, *do not* clamp tightly, possibly causing the housing to fracture.)
Plastic hull nut—**Hand-tighten** only. *Do not* over-tighten.
Bronze and SS557 hull nut—Tighten with slip-joint pliers.
SS555—Adjust the jack screws on the jack nut so the threaded ends are flush with the bottom of the nut. Screw the jack nut

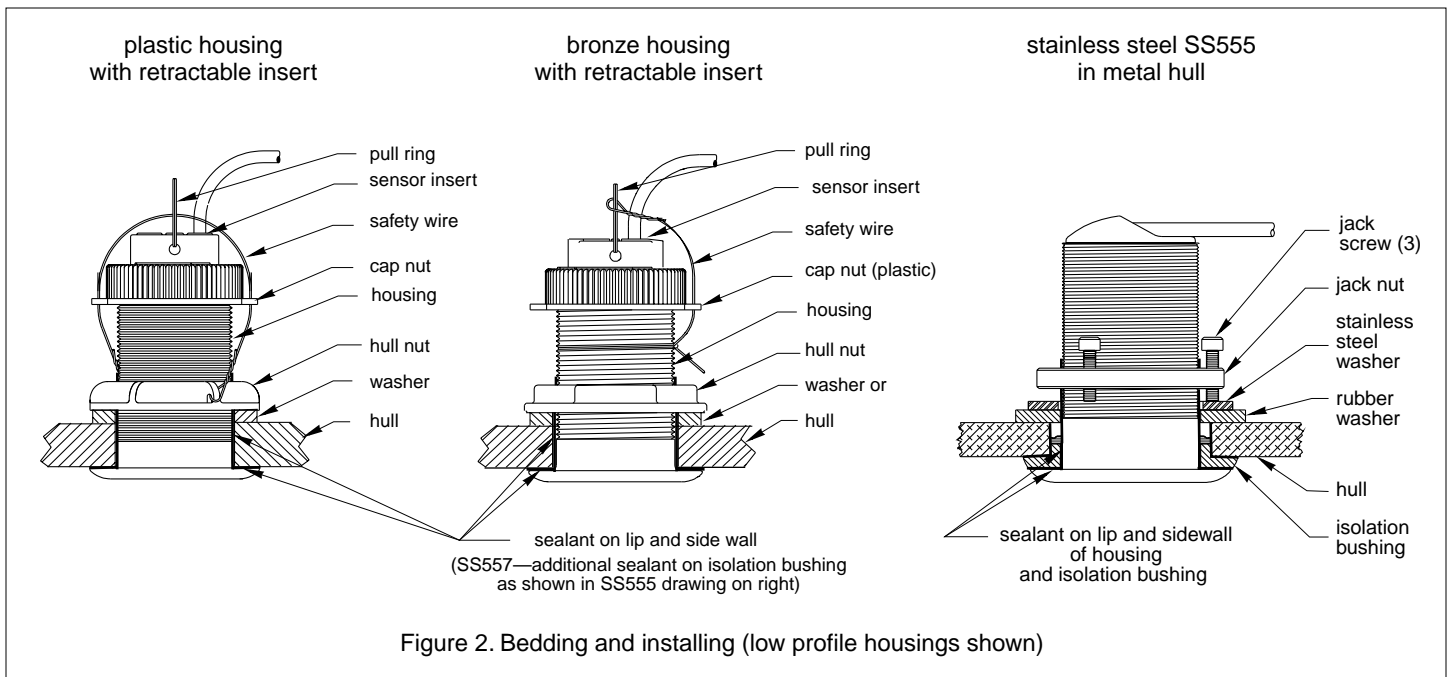


Figure 2. Bedding and installing (low profile housings shown)

onto the transducer with the jack screw heads facing the boat interior. Screw the jack nut against the washer. *Hand-tighten* the nut. Using the Allen wrench provided, tighten each jack screw two revolutions in turn until all three screws are tight. *Do not fully tighten one screw before beginning another.*

Wood hull—Allow for the wood to swell.

4. Remove any excess sealant on the outside of the hull to ensure smooth water flow over the transducer.

5. Retractable models only

Warning: *The O-rings must be intact and well lubricated to make a watertight seal.*

After the sealant cures, inspect the O-rings on the insert (replace if necessary) and lubricate them with the silicone lubricant supplied. Slide the insert into the housing. Seat the insert into place with a twisting motion until the key fits into the notch. *Be careful* not to rotate the housing and disturb the sealant. Screw the cap nut in place and **hand-tighten only**. *Do not* over tighten.

Warning: *Always attach the safety wire to prevent the insert from backing out in the unlikely event that the cap nut fails or is screwed on incorrectly.*

Attach the safety wire.

Plastic housing—Attach the safety wire to one eye in the hull nut. Lead the wire in a counterclockwise direction and thread it through one eye in the cap nut, the pull ring, the second eye in the cap nut, and the second eye in the hull nut. Twist the wire securely to itself.

Metal housing—Wrap one end of the safety wire tightly around the housing and twist it together with the long end. Lead the wire straight up and through the eye in the cap nut. Loop the wire through the pull ring and twist it securely to itself.

Cable Routing & Connecting

Caution: *If your transducer came with a connector, do not remove it to ease cable routing. If the cable must be cut and spliced, use Airmar's splash-proof Junction Box 33-035 and follow the instructions provided. Cutting the cable or removing the connector, except when using Airmar's junction box, will void the warranty.*

1. Route the cable to the instrument, *being careful* not to tear the cable jacket when passing it through the bulkhead(s) and other parts of the boat. To reduce electrical interference, separate the sensor cable from other electrical wiring and the engine. Coil any excess cable and secure it in place using zip-ties to prevent damage.

2. Refer to the echosounder owner's manual to connect the sensor to the instrument.

Checking for Leaks

Warning: *Never install a thru-hull transducer and leave the boat in the water unchecked for several days.*

When the boat is placed in the water, **immediately** check around the thru-hull transducer for leaks. Note that very small leaks may not be readily observed. It is best not to leave the boat in the water for more than 3 hours before checking it again. If there is a small leak, there may be considerable bilge water accumulation after 24 hours. If a leak is observed, repeat "Bedding" and "Installing" on page 2 **immediately**.

Retractable Models Only—Blanking Plug

Warning: *The O-rings must be intact and well lubricated to make a watertight seal.*

1. Inspect the O-rings (replace if necessary) and lubricate them with the silicone lubricant supplied or petroleum jelly (Vaseline®).
2. Remove the paddlewheel insert from the housing by removing the safety wire and unscrewing the cap nut (see Figure 2).
3. With the blanking plug ready in one hand, pull the paddlewheel insert most of the way out. Remove the insert and rapidly replace it with the blanking plug. Seat it into place with a pushing twisting motion until the key fits into the notch in the housing. With practice, only 250ml (10oz.) of water will enter the boat. Screw the cap nut in place and *hand-tighten* only.

Warning: *Always attach the safety wire to prevent the insert from backing out in the unlikely event that the cap nut fails or is screwed on incorrectly.*

4. Reattach the safety wire.

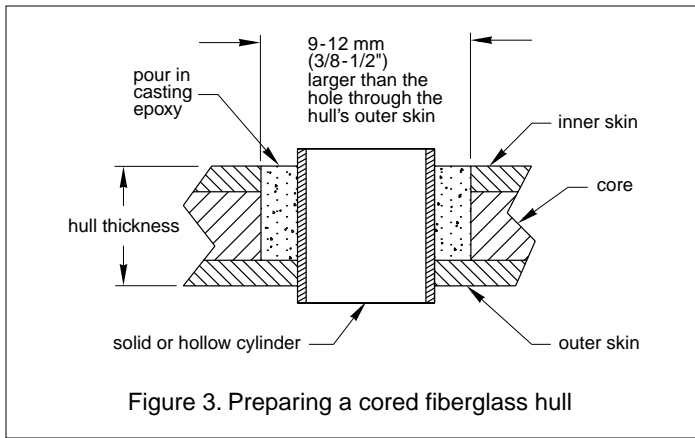


Figure 3. Preparing a cored fiberglass hull

Installation in a Cored Fiberglass Hull

The core (wood or foam) *must* be cut and sealed carefully. The core *must* be protected from water seepage, and the hull *must* be reinforced to prevent it from crushing under the hull nut allowing the housing to become loose.

Warning: Always wear safety goggles and a dust mask.

1. Drill a 3 mm or 1/8" pilot hole from inside the hull (see Figure 3). If there is a rib, strut, or other hull irregularity near the selected mounting location, drill from the outside. (If the hole is drilled in the wrong location, drill a second hole in a better location. Apply masking tape to the outside of the hull over the incorrect hole and fill it with epoxy.)
2. Using the appropriate size **outside hull** hole saw, cut a hole from outside the hull through the *outer* skin only (see table on page 1).
3. From inside the hull, using the appropriate size **hull interior** hole saw, cut through the *inner* skin and most of the core (see table on page 1). The core material can be very soft. Apply only light pressure to the hole saw after cutting through the *inner* skin to avoid accidentally cutting the *outer* skin.
4. Remove the plug of core material, so the *inside* of the outer skin and the inner core of the hull is fully exposed. Sand and clean the inner skin, core, and the outer skin around the hole.

Caution: Completely seal the hull to prevent water seepage into the core.

5. If you are skilled with fiberglass, saturate a layer of fiberglass cloth with a suitable resin and lay it inside the hole to seal and strengthen the core. Add layers until the hole is the correct diameter.

Alternatively, a hollow or solid cylinder of the correct diameter can be coated with wax and taped in place. Fill the gap between the cylinder and hull with casting epoxy. After the epoxy has set, remove the cylinder.

6. Sand and clean the area around the hole, inside and outside, to ensure that the sealant will adhere properly to the hull. If there is any petroleum residue inside the hull, remove it with either mild household detergent or a weak solvent (alcohol) before sanding.
7. Proceed with "Bedding", "Installing", and "Cable Routing & Connecting" on pages 2 and 3.

Maintenance, Repair, and Replacement

Antifouling Paint

Surfaces exposed to salt water *must* be coated with anti-fouling paint. Use **water-based** antifouling paint only. *Never* use ketone based antifouling paint, since ketones can attack many plastics possibly damaging the transducer. Apply antifouling paint every 6 months or at the beginning of each boating season.

Cleaning

Aquatic growth can accumulate rapidly on the transducer's surface, reducing its performance within weeks. Clean the surface with a soft cloth and mild household detergent. If the fouling is severe, use a stiff brush or putty knife to remove the growth taking care to avoid making scratches. Wet sanding is permissible with fine grade wet/dry paper.

Replacement Parts

Lost, broken, and worn parts should be replaced immediately. Obtain parts through your instrument manufacturer or marine dealer.

Model	Hull Nut or Jack As'bly	Cap Nut (Ret. Only)	Housing, Washer & Nut	Blanking Plug
B17 B21 B119	02-030	04-011 (plastic) 02-029 (bronze)	33-100 (low profile, B17) 33-224-01 (flush, B21) 33-091-01 (flush, B119)	33-414
B22 B117 B124	02-030	—	—	—
P5	04-002	—	—	—
P17 P217 P314	04-004	04-011	33-417 (low profile, P17) 33-217 (flush, P217) 33-092-01 (flush, P314)	33-414
P19 P219 P269 P319	04-004	—	—	—
SS555	20-299-01 04-186-1 (isolation bushing)	—	—	—
SS557	02-530-0204-186-1 (isolation bushing)	04-011 (plastic)	33-094-01	33-414

Transducer Replacement

The information needed to order a replacement sensor is printed on the cable tag. *Do not* remove this tag. When ordering, specify the part number, date, and frequency in kHz.