

OWNER'S GUIDE & INSTALLATION INSTRUCTIONS

Removable In-hull Depth Transducer

Model P79

U.S. Patent No. 6,201,767 B1
EP 1 118 074 B1

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

Part No. _____ Date _____ Frequency _____ kHz

03/04
17-217-01 rev. 07

IMPORTANT: Please read the 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

- Fiberglass hulls only
- Recommended for high speed powerboats and racing sailboats
- Accommodates a deadrise angle up to 22°

Tools and Materials Needed

- Adhesive tape
 - Pole
 - Detergent
 - Weak solvent (such as alcohol)
 - Safety goggles (some installations)
 - Dust mask (some installations)
 - Disk sander (some installations)
 - Thin sealable plastic bag (optional)
 - Twist-tie
 - Water based lubricant (K-Y® jelly) (optional)
 - Digital level or bubble level and protractor
 - Carpenter's square
 - Pencil
 - Silicone sealant (such as GE Silicone I or Silicone II)
 - Screwdriver
 - Mineral oil (available at pharmacies) 71 ml (2.4 fl. oz.)
- For a cored fiberglass hull installation:
- Drill
 - Hole saw 100mm or 4"
 - Miniature disk sander
 - Casting epoxy (Polypoxy #7035/7040) or resin
 - Paper cup
 - Stirrer

Mounting Location

Fiberglass Hull

Since the hull absorbs acoustic energy, transmitting through the hull reduces the sensor's performance. Fiberglass hulls are often reinforced in places for added strength. These cored areas contain balsa wood or structural foam which are poor sound conductors. **Do not locate the sensor over coring.**

Caution: Find an area of the boat where the fiberglass is solid:

- There are no air bubbles trapped in the fiberglass resin.
- There is no coring, flotation material, or dead air space sandwiched between the inside skin and outer skin of the hull.

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 affect 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 setting 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 hull below the transducer will be in contact with the water.
- The transducer beam will be unobstructed by the keel or propeller shaft(s).
- The deadrise angle does not exceed 22°.
- There is adequate headroom inside the vessel for the height of the housing, tightening the locking ring, and removing the transducer.

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)

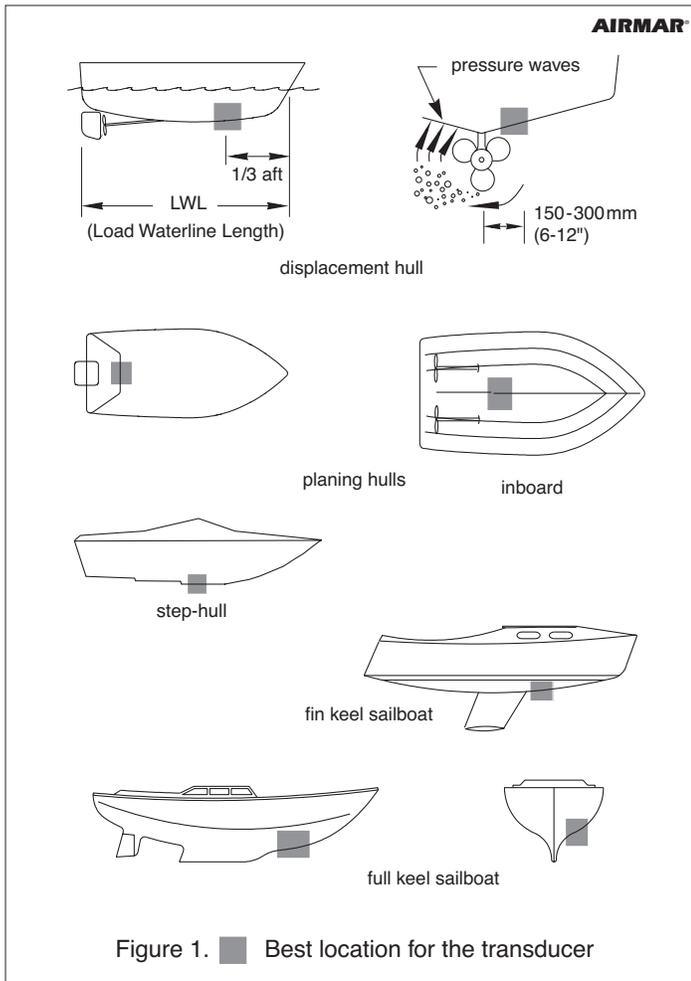


Figure 1. ■ Best location for the transducer

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.

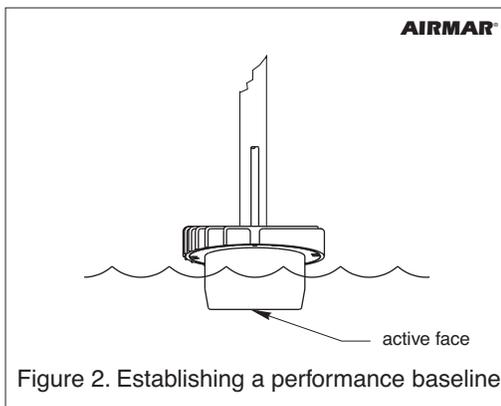


Figure 2. Establishing a performance baseline

- **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.

Test the Selected Mounting Location

Establishing a Performance Baseline

The results of this test are used as a basis of comparison to determine the best in-hull location for the sensor.

1. Take the boat to the maximum depth for which your instrument is rated [up to 150m (500')] or the maximum depth in which you will be operating the echosounder. If deep water is not available, find a location with at least 30m (100').
2. Connect the transducer to the echosounder.
3. Tape the transducer to a pole with the cable side up. Hold it over the side of the boat with the active face submerged in the water (see Figure 2). *Be sure to keep the active face of the transducer parallel to the surface of the water and fully submerged.*
4. Observe the echosounder's performance and the depth reading.

Testing the Mounting Location

While the boat is at the same site (depth of water), test the transducer inside the hull at the mounting location. Use one of the methods below:

- A. This method is recommended if the sensor will be located near the stern and the boat has a minimum deadrise angle. Clean away any large build-up of dirt and/or grease using detergent or a weak solvent such as alcohol. Place the transducer against the hull and allow bilge water to cover the surface where they touch (see Figure 3-A).

- B. **Warning:** Always wear safety goggles and a dust mask.

This method can be used at any location. If the hull surface is not smooth, grind it with a disc sander. Partially fill a thin plastic bag with water, place the transducer inside the bag and close it tightly with a twist-tie. Wet the surface of the hull and press the transducer's active face against it through the bag (see Figure 3-B).

- C. **Warning:** Always wear safety goggles and a dust mask.

This method can be used at any location. If the hull surface is not smooth, grind it with a disc sander. Coat the active face of the transducer with a water-based lubricant (such as K-Y® jelly). Press the active face against the hull with a twisting motion (see Figure 3-C). After testing, wipe all traces of the lubricant from the transducer's face.

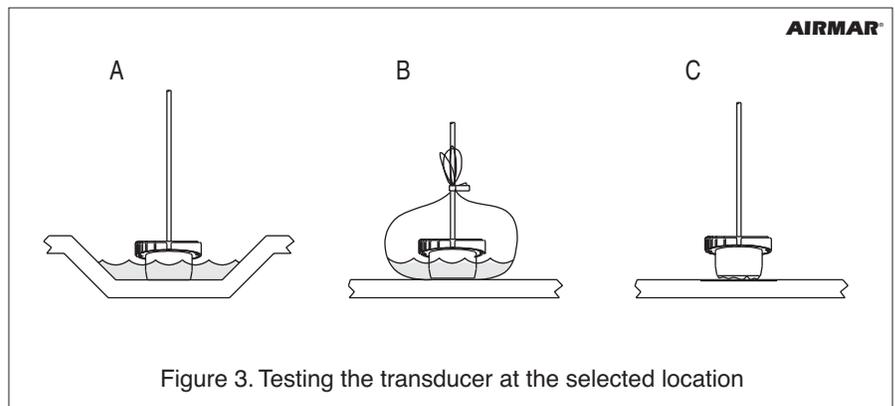


Figure 3. Testing the transducer at the selected location

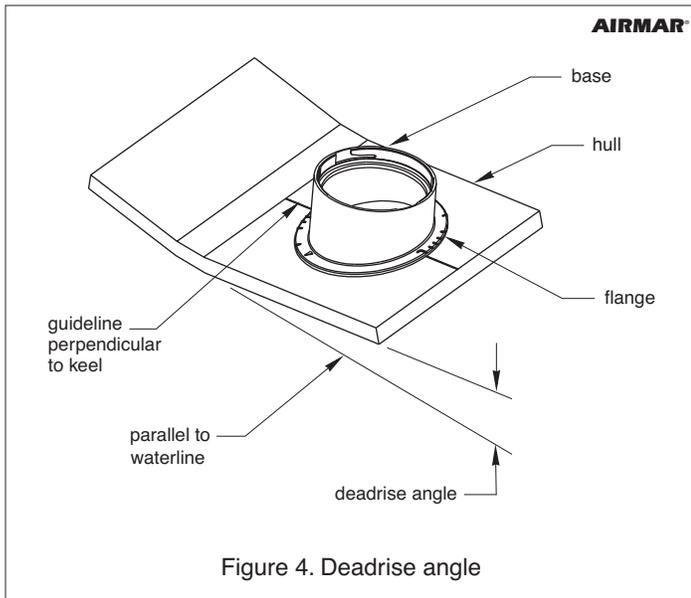


Figure 4. Deadrise angle

Observe the echosounder's performance, and compare it to the baseline. Look for a stable depth reading that is similar to the baseline. If you are testing a fishfinder, compare the thickness and intensity of the bottom trace.

If the performance is close to the baseline, this is a good mounting location. Remember, some energy is lost transmitting through the hull. If the test reading differs markedly from the baseline, you will need to find another location to install the sensor.

If there is no reading or it is erratic, the transducer may be positioned over coring which is absorbing the acoustic energy. Choose another location. If no other spot is available, **check with the boat manufacturer to be certain coring is present before proceeding** with the instructions for "Installation in a Cored Fiberglass Hull" on page 4.

Installation

1. Measure the deadrise angle of the hull at the selected location using a digital level, or bubble level and protractor (see Figure 4). Measure carefully, since the installed transducer must be within 5° of vertical.

Warning: Always wear safety goggles and a dust mask.

2. The hull surface to be bonded must be smooth and free of paint or any other finish. If the surface is rough, use a disk sander to smooth an area 100mm (4") in diameter.
3. To ensure a tight bond, clean and dry both the selected area and the underside of the base. Remove any dust, grease, or oil with a weak solvent, such as alcohol.
4. Using a carpenter's square, draw a line on the hull perpendicular to the keel through the center of the mounting location. This will be used as a guideline to orient the base.
5. The numbers on the flange of the base represent deadrise angles. Identify the number that most closely corresponds to the deadrise angle of your hull. Find its match on the opposite side of the flange. Keeping the keel direction arrows on the side of the base nearest the keel, align the two raised marks indicating your deadrise angle with the guideline drawn on the hull (see Figure 5).

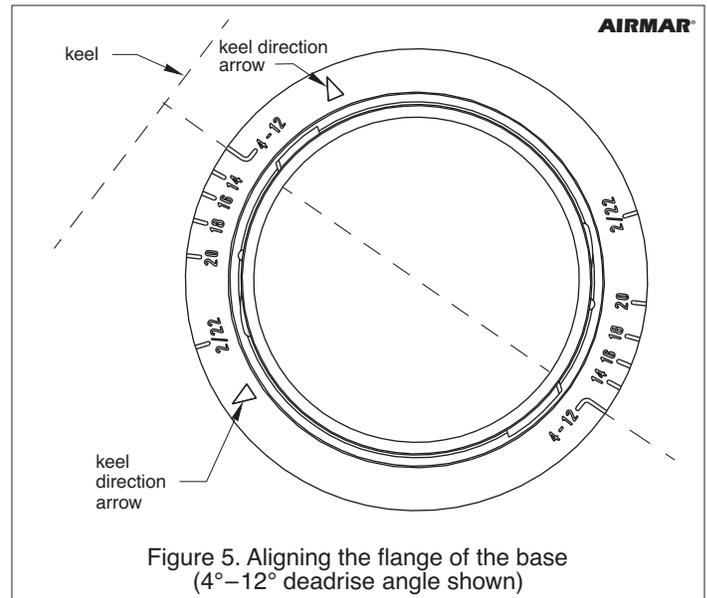


Figure 5. Aligning the flange of the base (4°–12° deadrise angle shown)

Caution: The base must be liquid-tight.

DO NOT use an epoxy adhesive, polyurethane based sealant, or the previously recommended Boatlife® Life Seal® or 3M™ 4200.

6. When you are satisfied that the location of the transducer is optimal and the orientation of the base corresponds to the deadrise angle of your boat, apply a bead of silicone sealant (such as GE Silicone I or Silicone II) to the underside of the flange of the base. (Follow the sealant manufacturer's instructions for its use.) Press the flange firmly in place to form a liquid-tight seal. Allow the sealant to cure.
7. Slide the transducer into the locking ring. Turn the housing until the rib that most closely corresponds to the deadrise angle of your hull is aligned with the angle indicator on the locking ring. To secure the housing to the locking ring, insert the two screws (see Figure 6). **Do not over-tighten the screws.**

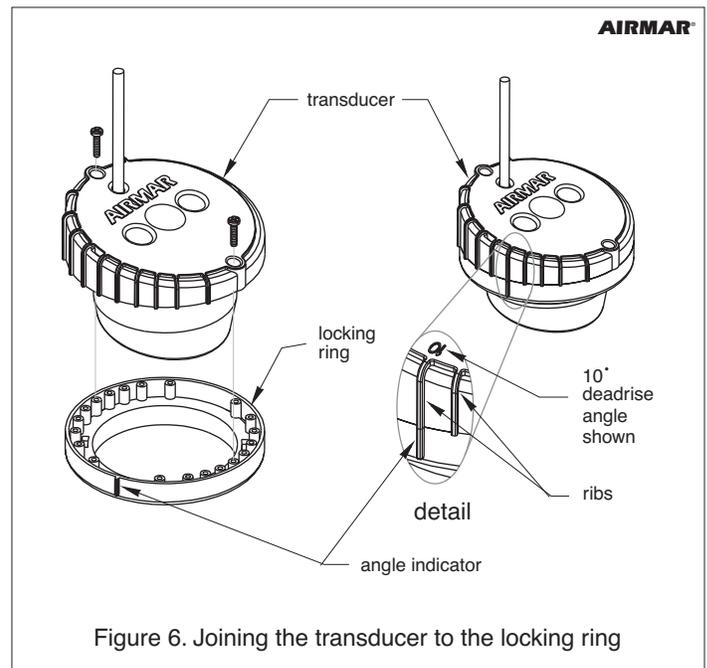


Figure 6. Joining the transducer to the locking ring

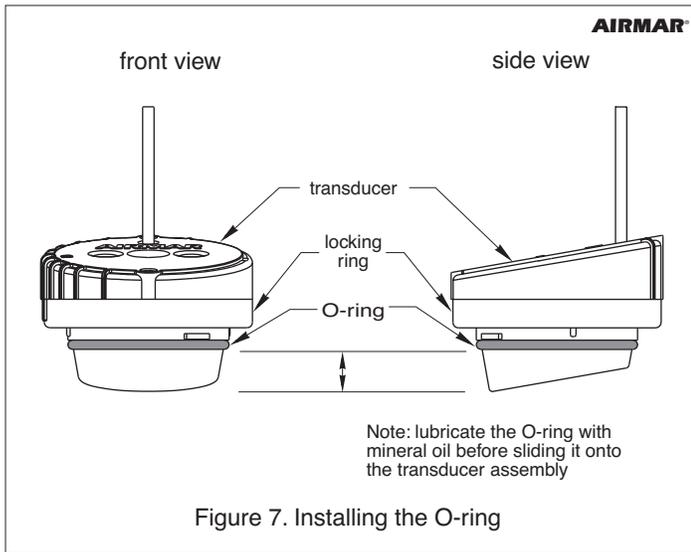


Figure 7. Installing the O-ring

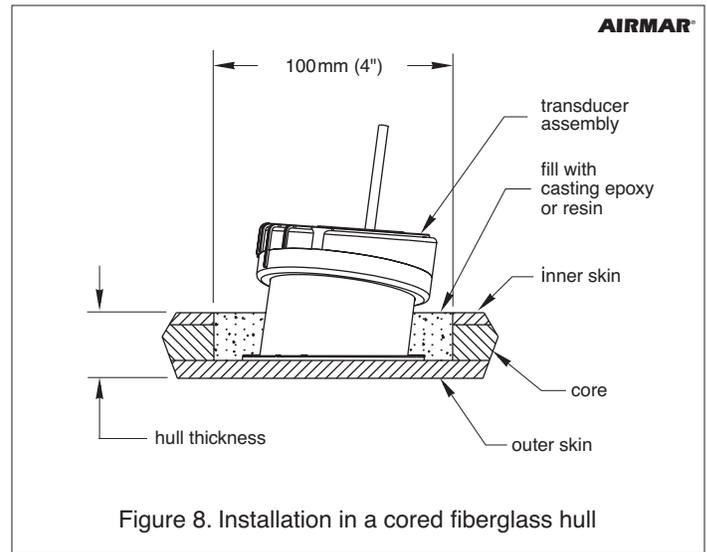


Figure 8. Installation in a cored fiberglass hull

8. Lubricate the O-ring with mineral oil. This will help to seal the assembly and prevent the mineral oil from leaking. Slide the O-ring onto the transducer assembly (see Figure 7).
9. After the sealant on the base has cured, pour 71 ml (2.4 fl. oz.) of mineral oil into the base.
10. Lock the transducer assembly into the base by inserting the keys on the locking ring in the notches in the base. Press down and rotate clockwise until seated (see Figure 6).
11. Route the cable to the echosounder *being careful* not to tear the cable jacket when passing it through the bulkhead and other parts of the boat. To reduce electrical interference, separate the sensor cable from other electrical wiring and sources of electrical noise.

Note: Some transducers are equipped with a short cable, about 1 m (3'), and an extension cable. Be sure to locate the mated 3 pin connectors **well above the bilge waterline**. To facilitate this, use one of the two cable clamps supplied on either side of the connection.

Installation in a Cored Fiberglass Hull

Installation in a cored hull is difficult. The objective is to bond the sensor to the **inside surface of the hull's outer skin** while preventing any moisture from penetrating the core.

Caution: There is no way to determine if the outer skin is solid (no trapped air bubbles in the fiberglass) at the selected location before cutting the inner skin.

Warning: Always wear safety goggles and a dust mask.

1. Using a 100mm or 4" hole saw, cut through the **inner skin** and the core at the selected location (see Figure 8). 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 hull.
2. Remove the plug of core material, so the inner core of the hull is fully exposed. Sand the **inside surface of the outer skin** using a miniature disk sander. Slightly undercut the surrounding coring if possible.
3. Clean and dry both the **inside surface of the outer skin** and the housing with a weak solvent, such as alcohol, to remove any dust, grease, or oil.
4. Place the base in the cavity. Fill the gap between the base and the hull with casting epoxy or resin following the manufacturer's directions for its use.
5. After the casting epoxy or resin has cured, proceed with "Installation", on page 3.

Replacement Parts

To obtain a replacement base and O-ring, order part number 33-268-01 from your marine dealer or instrument manufacturer.

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. For convenient reference, record this information on the top of page one.