

# OWNER'S GUIDE & INSTALLATION INSTRUCTIONS

## In-Hull, Removable, Depth Transducer

Models: M256, M260, R199

12/03

17-300-01 rev.05

**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 boats
- Accommodates a deadrise angle up to 30°

### Tools and Materials

Wrenches

M256, M260	3/16" Allen wrench
	7/16" socket <i>or</i> wrench
R199	9/16" socket <i>or</i> wrench

Rope

Detergent *or* 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 (such as K-Y® jelly) (optional)

Carpenter's level

Pencil

Saw

Scissors

Fiberglass resin

*or* silicone sealant (such as GE Silicone I or Silicone II)

Mineral oil (available at pharmacies)

Funnel

Zip ties

### Assembling the Transducer

1. Remove the paper backing from the adhesive side of the gasket. With the adhesive side facing the plate, align the holes and edges of the gasket with the under side of the plate (see Figure 1). Press the gasket firmly into place.
2. Thread the cable through the cable hole in the gasket and plate.

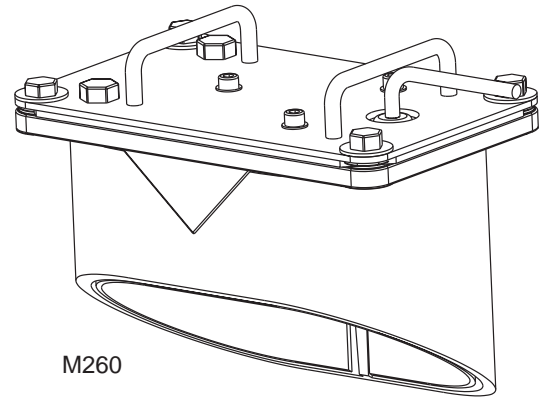
**Caution:** Do not over-tighten the bolts.

3. Rest the plate on the transducer with the gasket side down and align the mounting holes. Fasten the plate to the transducer.

**M256, M260**—Use the three Allen screws and three

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

Part No. \_\_\_\_\_ Date \_\_\_\_\_ Frequency \_\_\_\_\_ kHz



washers supplied. Lightly tighten with a 3/16" Allen wrench.  
**R199**—Use four of the hex-head bolts and lock washers supplied. Lightly tighten with a 9/16" socket or wrench.

4. Thread the cable under the handle as seen in the drawing above.

### Mounting Location

#### Acoustic Noise

Acoustic noise is always present, and these sound waves can interfere with the operation of the transducer. Ambient (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 setting that can be used.

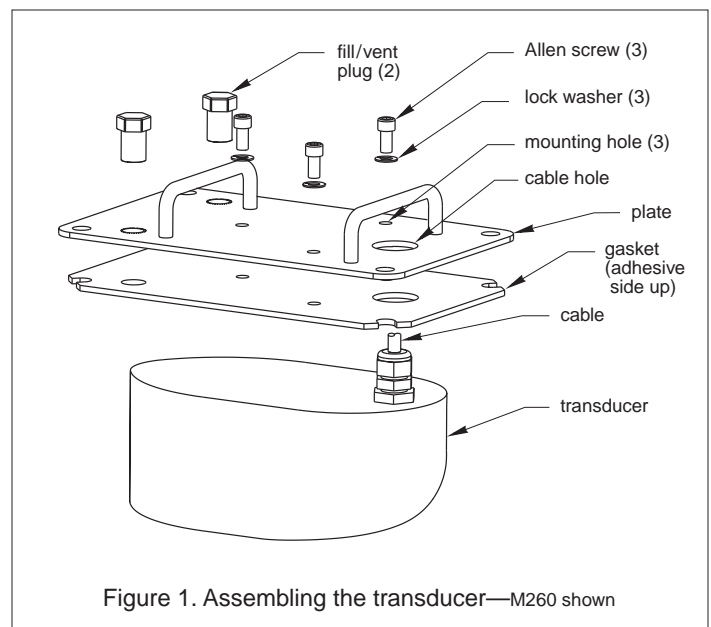
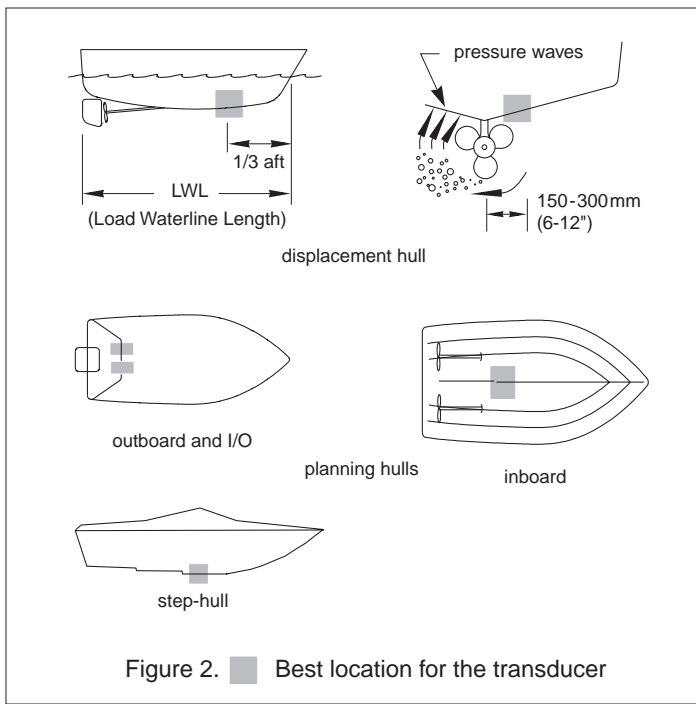


Figure 1. Assembling the transducer—M260 shown



## About Fiberglass Hulls

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

**Caution:** *The fiberglass below the transducer must be solid.*

## Placement

Choose a location where:

- The fiberglass is solid (no air bubbles are trapped in the fiberglass resin) and where no coring, flotation material, or dead air space is sandwiched between the inside skin and outer skin of the hull.
- 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 30°.
- There is adequate space inside the vessel for the size of the tank and removing the transducer.

**Caution:** *Do not mount the transducer:*

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

## Boat Types (see Figure 2)

- **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 blades are 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 blades are moving downward.

2 **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.

## 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 transducer.

1. Take the boat to 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.

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

3. Tie a rope securely around the handles of the transducer (see Figure 3). Lower it over the side of the boat until the active face is submerged in the water.
4. *Be sure* to keep the active face of the transducer parallel to the surface of the water and fully submerged. Observe the echosounder's performance and the depth reading.

### Testing the 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 test methods below:

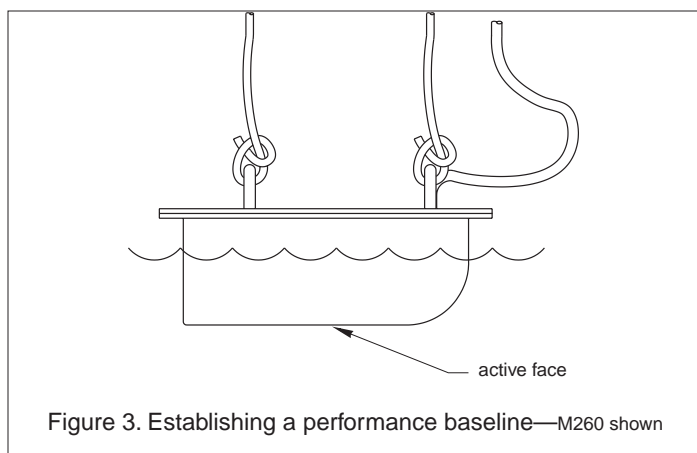
A. This method is recommended if the transducer will be located near the stern and the boat has a minimum deadrise angle. Clean away any build-up of dirt and/or grease using detergent or a weak solvent such as alcohol. Place the transducer against the hull and flood the area with bilge water to cover the acoustic window (see Figure 4-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 active face of the transducer against it through the bag (see Figure 4-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). With a twisting motion, press the face firmly against the hull (see Figure 4-C).



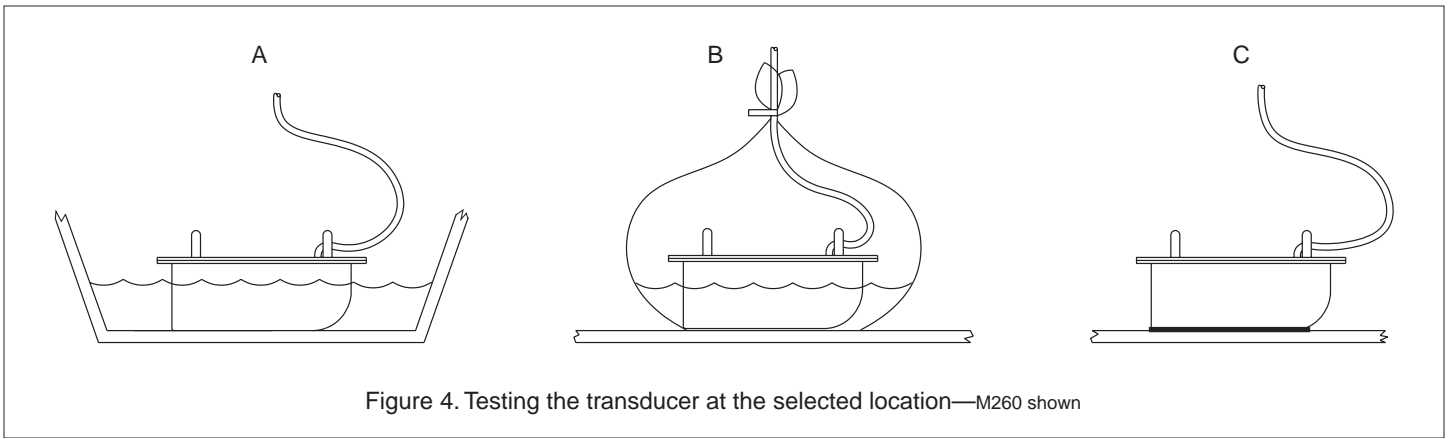


Figure 4. Testing the transducer at the selected location—M260 shown

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

If the performance is close to the baseline, this is a good mounting location. Remember, 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 transducer.

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.

## Installation

### Marking and Cutting

For optimal performance, the transducer *must* be installed so the beam will be aimed straight down. This is accomplished by cutting the tank to match the deadrise angle of the hull.

1. When you are satisfied that the location of the transducer is optimal, place the tank *up-side-down* on the hull at the selected mounting location (see Figure 5). *Be sure the tallest side of the tank is nearest the centerline (keel) of the hull.*

**Caution:** Do not mark or cut the shortest side of the tank.

2. **M260, R199**—Holding a carpenter's level even with the **lower corner** of an angled side of the tank, draw a level line. Repeat this process on the opposite side of the tank. Connect the two

lines along the **tallest** side of the tank, *being sure* the line is level. This will be your cutting guideline.

**M256**—With a carpenter's level held against the short "V" side of the tank, draw a level line even with the point of the "V" (see Figure 6). Hold the carpenter's level against an angled side of the tank even with the line drawn and draw a level line (see Figures 5 and 6). Repeat this process on the opposite side of the tank. Connect the lines along the tallest side of the tank to form a continuous cutting guideline. *Be sure* the guideline is level.

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

3. Before cutting the tank:

- *Be sure* the **tallest** side of the tank will be closest to the centerline (keel) of the boat after the tank is installed.
- If you have marked the tank even with the point of the "V", *be sure* your transducer is a model M256 and not an M260.

Cut the tank along the guideline that you have drawn. It may be necessary to further shape the tank to the hull to ensure a liquid tight bond.

4. The tank is provided with a cork liner to reduce sound echoes. After the tank has been cut, wrap the cork liner around the *inside* of the tank (see Figure 6). Butt the sides of the liner along the center of the tallest side. *Note, there may be a gap between the edges which will not affect performance.* Holding the cork liner 6mm (1/4") below the top of the tank, trace the bottom edge of the tank onto the liner with a pencil.
5. Remove the cork liner from the tank. Use scissors to cut the liner along the line drawn.

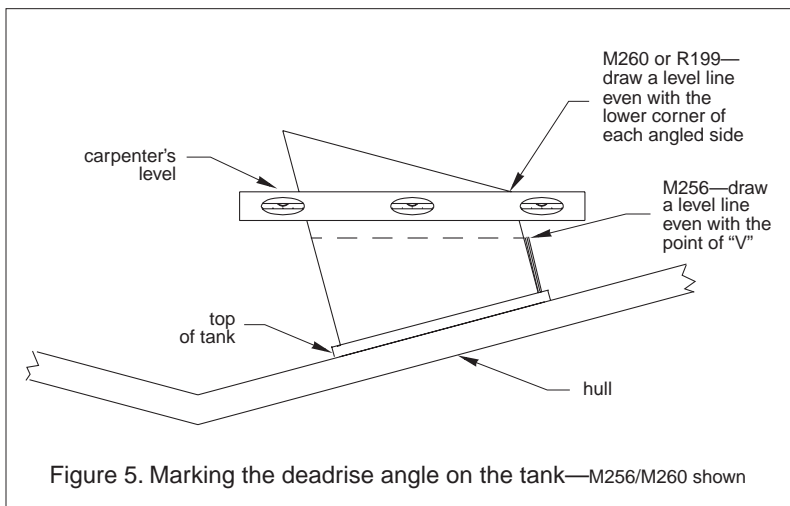


Figure 5. Marking the deadrise angle on the tank—M256/M260 shown

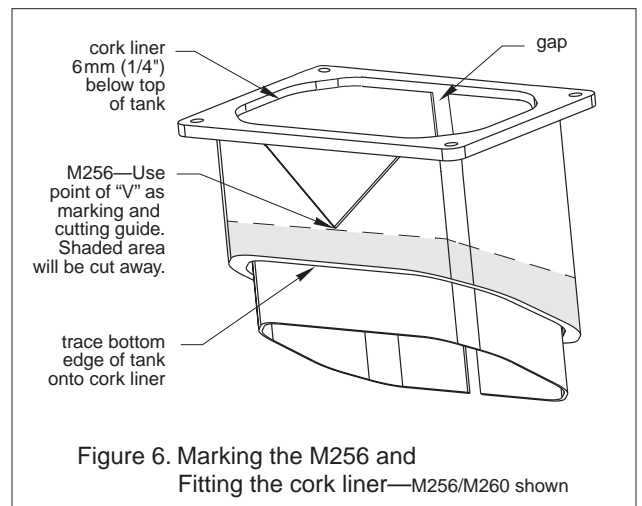


Figure 6. Marking the M256 and Fitting the cork liner—M256/M260 shown

## Bonding the Tank

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

1. 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 slightly larger than the tank.
2. Remove any dust, grease, or oil with a weak solvent, such as alcohol, to ensure a good bond. Clean and dry the selected area.

**Caution:** The tank must be liquid-tight.

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

3. Using standard fiberglass technique, glass the tank to the hull.  
Alternatively, apply a generous bead of silicone sealant (such as GE Silicone I or Silicone II), to the bottom edge of the tank following the manufacturer's instructions (see Figure 7). Press the tank firmly in place. Apply a second bead of sealant around the inside of the tank. Apply a third bead around the outside of the tank.
4. Allow the fiberglass resin or silicone sealant to cure. The seal *must* be liquid-tight.

## Installing the Transducer

1. After the fiberglass resin or silicone sealant has cured around the tank, insert the cork liner (see Figure 7). Butt the edges along the center of the tallest side. Note, there may be a gap. *Be sure* the cork liner does not extend above the tank.
2. Pour mineral oil into the tank until it covers the exposed hull inside the tank.

**Caution:** Do not use sealant or adhesive on the gasket. To do so may break the tank when the transducer is removed.

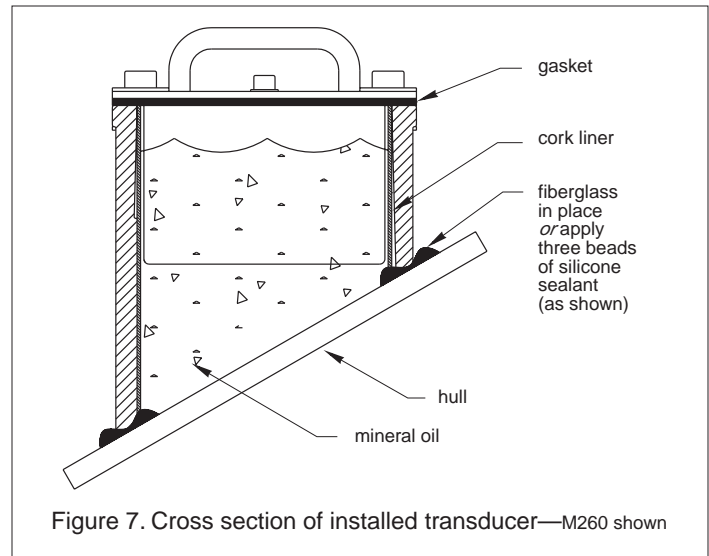
3. Before installing the transducer, wipe it clean of any lubricant that was used in testing the location. Grasp the transducer by the handles and lower it into the tank (see Figure 8). There is no fore or aft to the transducer; it fits either way.

**Caution:** Do not over-tighten the bolts to avoid cracking the tank.

4. Attach the transducer to the tank.  
**M256, M260**—Use the four hex-head bolts and four washers supplied. Lightly tighten with a 7/16" socket or wrench.  
**R199**—Use the six remaining hex-head bolts and six lock washers supplied. Lightly tighten with a 9/16" socket or wrench.
5. Top-off the mineral oil in the tank. Using a funnel, pour mineral oil through one of the fill/vent holes until it is about 25mm (1") from the top of the tank. The second hole will act as a vent. Plug both holes with the plastic plugs supplied.

**Caution:** Do not remove the connector 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.

6. Route the cable to the echosounder *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 transducer cable from other electrical wiring and the engine(s). Coil any excess cable and secure it in place with zip-ties to prevent damage.



7. Refer to your echosounder owner's manual to connect the transducer to the instrument.

## Replacement Transducer & Parts

Obtain replacement parts from your marine dealer or instrument manufacturer.

M256, M260 In-Hull Kit	33-434-01
R199 In-Hull Kit	33-453-01

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

