

# OWNER'S GUIDE & INSTALLATION INSTRUCTIONS

## TRIDUCER® Multisensor with Valve

Models: B744V, B744VL, B66V, B66VL, and SS544V

U.S. Patents: 4,898,029; 5,186,050, Re 33,982. Australian Patent 605,281  
Canadian Patent 1,313,775. Japanese Patent 1851014.

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

11/03

17-118-03 rev. 03

### WARNING: B744V and B744VL

These models must be installed with a fairing (standard or high-performance). If the multisensor is installed without a fairing, there is insufficient surface area to seal the multisensor to the hull. Water may leak into the hull causing damage to the boat or possibly sinking.

### WARNING: B744V, B744VL and SS544V with a high-performance fairing

These models must be installed following the supplemental instructions that came with the high-performance fairing. A high-performance fairing requires an anti-rotation bolt. Failure to install the anti-rotation bolt may result in the fairing rotating while the boat is underway. The effect may be violent movement and loss of steering. This could result in serious injury or death to passengers and/or damage to the boat or other property.

### 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

- **Bronze housings** recommended for fiberglass or wood hulls.  
*Caution: Never install a bronze housing in a metal hull because electrolytic corrosion will occur.*
- **Stainless steel housing** is compatible with all hull materials.
- **Aluminum or steel hull**—Use a stainless steel housing to prevent electrolytic corrosion.  
*Caution: Installation requires an Airmar fairing and an isolation sleeve.*
- **Caution:** Never install a metal housing in a vessel with a positive ground system.

## Pretest

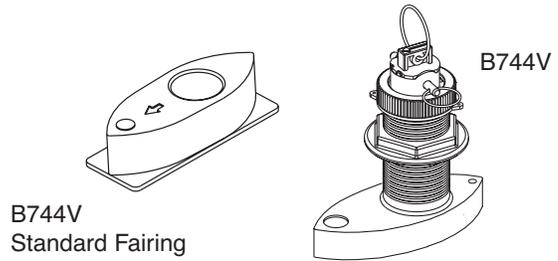
Connect the multisensor to the instrument and spin the paddlewheel. Check for a speed reading (and the approximate air temperature if applicable). If there is no reading or it is inaccurate, return the instrument to the place of purchase.

## Identify Your Model

The model name is printed on the cable tag.

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

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



## Tools and Materials

Fairing (**mandatory for B744V, B744VL, SS544V**)

Digital level or bubble level & protractor (installation with fairing)

Safety goggles

Dust mask

Band saw or hand saw (installation with fairing)

Rasp or power tool (installation with fairing)

Electric drill

Drill bit: 3mm or 1/8"

Hole saw: 51 mm or 2"

Sandpaper

Mild household detergent or weak solvent (alcohol)

File (installation in a metal hull)

Marine sealant

Slip-joint pliers

Zip-ties

Water-based antifouling paint (**mandatory in salt water**)

Installation in a cored fiberglass hull (see page 4):

Hole saw for hull interior: 60mm or 2-3/8"

Cylinder, wax, tape, and casting epoxy

## 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 multisensor's 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:

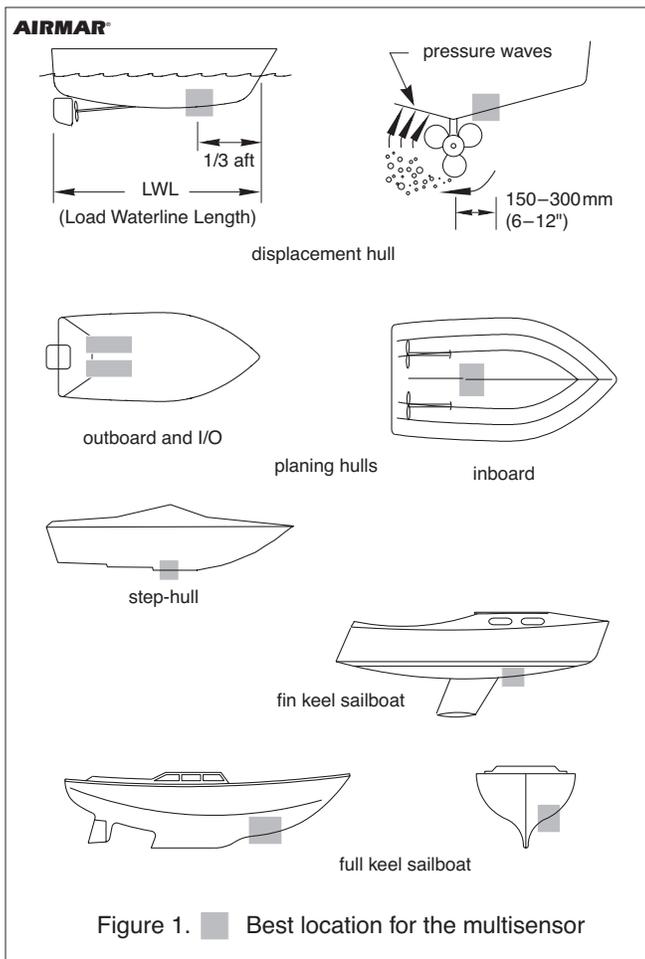
- The water flowing across the hull is smoothest with a minimum of turbulence and bubbles (especially at high speeds).
- The multisensor will be continuously immersed in water.
- There is a minimum deadrise angle.
- The transducer beam will be unobstructed by the keel or propeller shaft(s).
- There is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

**Caution:** Do not mount the multisensor:

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 near the centerline and *well inboard of the first set of lifting strakes* to insure that it 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 forward and to the side of the engine(s).
  - Inboard**—Mount well ahead of the propeller(s) and shaft(s).
  - Step-hull**—Mount just ahead of the first step.
  - Boats capable of speeds above 25kn (29MPH)**—Review multisensor location and operating results of similar boats before proceeding.
- **Fin keel sailboats**—Mount to the side of the centerline and forward of the fin keel 300–600mm (1–2').
- **Full keel sailboats**—Locate amidships and away from the keel at the point of minimum deadrise angle.

## Headroom

Allow adequate headroom inside the vessel for the height of the housing, tightening the nuts and removing the insert.

Model	Min. no fairing	Min. with fairing
B744V	—	255mm (10")
B744VL	—	381mm (15")
B66V	270mm (10 <sup>5</sup> / <sub>8</sub> ")	255mm (10")
B66VL	394mm (15 <sup>1</sup> / <sub>2</sub> ")	381mm (15")
SS544V	—	230mm (9")

## About Fairings

Nearly all vessels have some deadrise angle at the mounting location. If the multisensor is mounted directly to the hull, the sound beam will be tilted off the vertical at the same angle as the deadrise. A fairing is strongly recommended if the deadrise angle exceeds 10° (see Figure 2).

- Increases the sealing surface around the drilled hole to prevent water from leaking into the hull.
- Orients the sound beam straight down by mounting the multisensor parallel to the water surface
- Minimizes aerated water flowing over the transducer's face by mounting it deeper in the water
- **High-performance fairing** has a long streamlined shape for excellent performance above 15 knots (see Replacement Parts on page 6).

## Airmar Polymer Fairing

Made of a high impact polymer with an integrated cutting guide, an Airmar fairing is safer and easier to cut with a band saw and shape with hand tools than custom fairings. It can be shaped to accommodate a deadrise angle of up to 25°. (For fairing part numbers, see "Replacement Parts" on page 6.)

A backing block is used inside the hull to provide a level surface for the hull nut to seat against (see Figure 2). It is fabricated matching the interior deadrise angle of the boat. After cutting an Airmar fairing, use the remaining section with the cutting guide as the backing block.

## Installation (for Standard Fairing Only)

**WARNING: B744V, B744VL, and SS544V with a high-performance fairing must be installed following the supplemental instructions that came with your high-performance fairing. The high-performance fairing requires an anti-rotation bolt. Failure to install the anti-rotation bolt may result in the fairing rotating while the boat is underway. The effect may be violent movement and loss of steering. This could result in serious injury or death to passengers and/or damage to the boat or other property.**

**WARNING: B744V and B744VL must be installed with a fairing (standard or high-performance). If it is installed without a fairing, there is insufficient surface area to seal the sensor to the hull. Water may leak into the hull causing damage to the boat or possibly sinking.**

**CORED FIBERGLASS HULL**—Follow separate instructions on page 4.

## Hole Drilling

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

1. Drill a 3mm or 1/8" pilot hole perpendicular to the waterline 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 pilot 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 51 mm or 2" hole saw, cut a hole from outside the hull. *Be sure* to hold the drill plumb, so the hole will be perpendicular to the water surface.
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.

## Cutting the Standard Fairing

1. Measure the deadrise angle of the hull at the selected location using a digital level, or bubble level and protractor (see Figure 2).
2. Tilt the band saw table to the measured angle and secure the cutting fence (see Figure 4).
3. Place the fairing on the table, so the cutting guide rests against the fence. The arrow will point toward you for installation on the port side and away from you for installation on the starboard side of the boat (see Figures 4 and 5).

**Note:** The **ARROW** always points forward toward the bow. Be sure to orient the fairing on the band saw so the angle cut matches the intended side of the hull and not the mirror image.

4. Adjust the cutting fence. The fairing must be between 6–12mm (1/4–1/2") at its thinnest dimension (see Figure 2).

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

5. Recheck steps 1 through 4. Then cut the fairing.
6. Shape the fairing to the hull as precisely as possible with a rasp or power tool.
7. Use the remaining section of the fairing for the backing block.

## Bedding the Housing

1. Apply a 2mm (1/16") thick layer of marine sealant over the surface of the multisensor housing that will contact the fairing (or hull if no fairing is used) and up the stem, 6mm (1/4") higher than the combined thickness of the fairing, hull, backing block, and hull nut (see Figure 3). This will ensure there is marine sealant in the threads to seal the hull and hold the hull nut securely in place.
2. Slide the fairing (if used) onto the stem and mate the button with the recess in the housing (see Figure 5).
3. Apply a 2mm (1/16") thick layer of marine sealant to the side of the fairing (if used) that will contact the hull (see Figure 3).
4. Apply a 2mm (1/16") thick layer of marine sealant to the side of the backing block (if used) that will contact the hull.

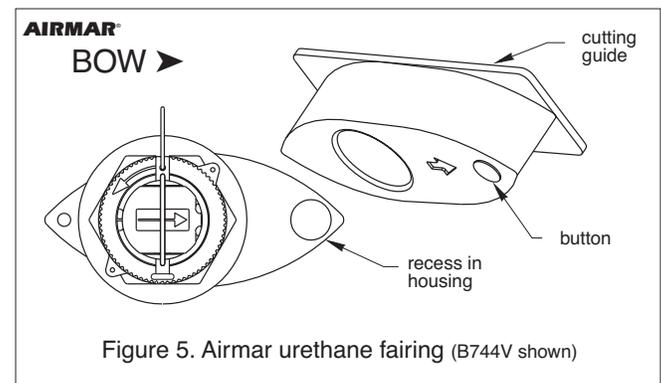
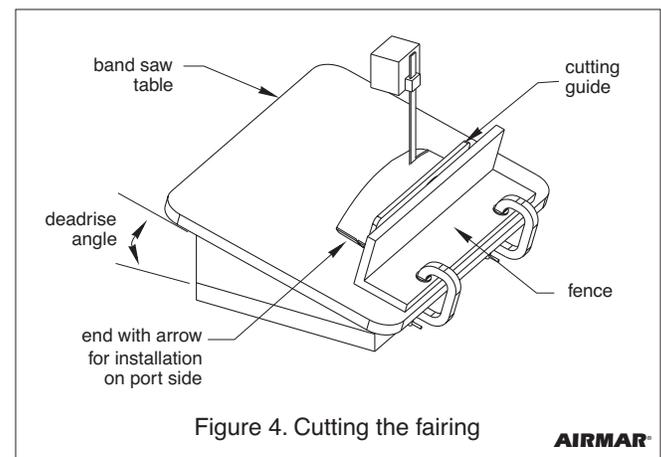
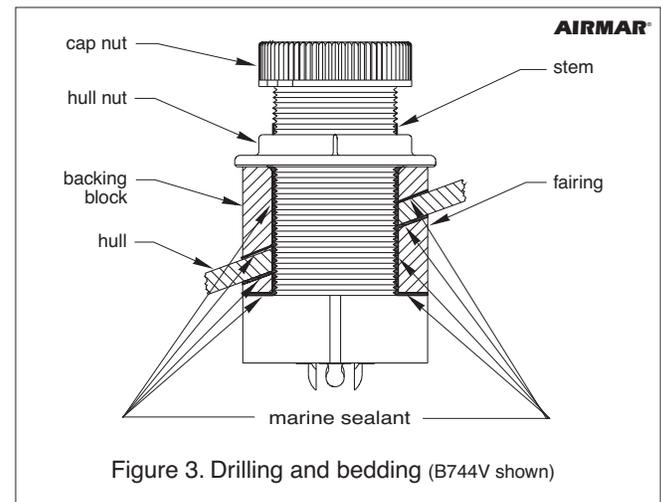
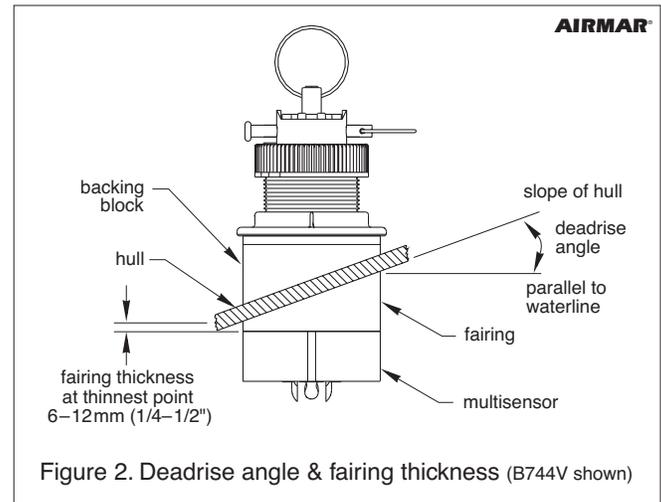
## Installing the Housing

**Caution:** Never strike the multisensor.

1. From outside the hull, push the stem of the multisensor housing (with the fairing in place if used) through the mounting hole using a twisting motion to squeeze out excess sealant (see Figure 3). If an Airmar fairing is used, *be sure* the button on the fairing is mated with the recess in the multisensor, the arrow on the fairing is pointing forward. **Take care to align the assembly parallel to the centerline of the boat** (see Figure 5).
2. From inside the hull, slide the backing block (if used), hull nut, and cap nut along the cable. Slide the backing block onto the stem and seat it firmly against the hull. Screw the hull nut in place. Tighten it with slip-joint pliers (see Figure 3).  
**Wood hull**—Allow for the wood to swell.

**Caution:** Be careful to avoid cross threading the cap nut.

3. *Being sure* the valve assembly is seated firmly in the housing, carefully screw the cap nut in place. **HAND-TIGHTEN** only. Do not over tighten.
4. Remove any excess sealant on the outside of the fairing and hull to ensure smooth water flow over the multisensor.



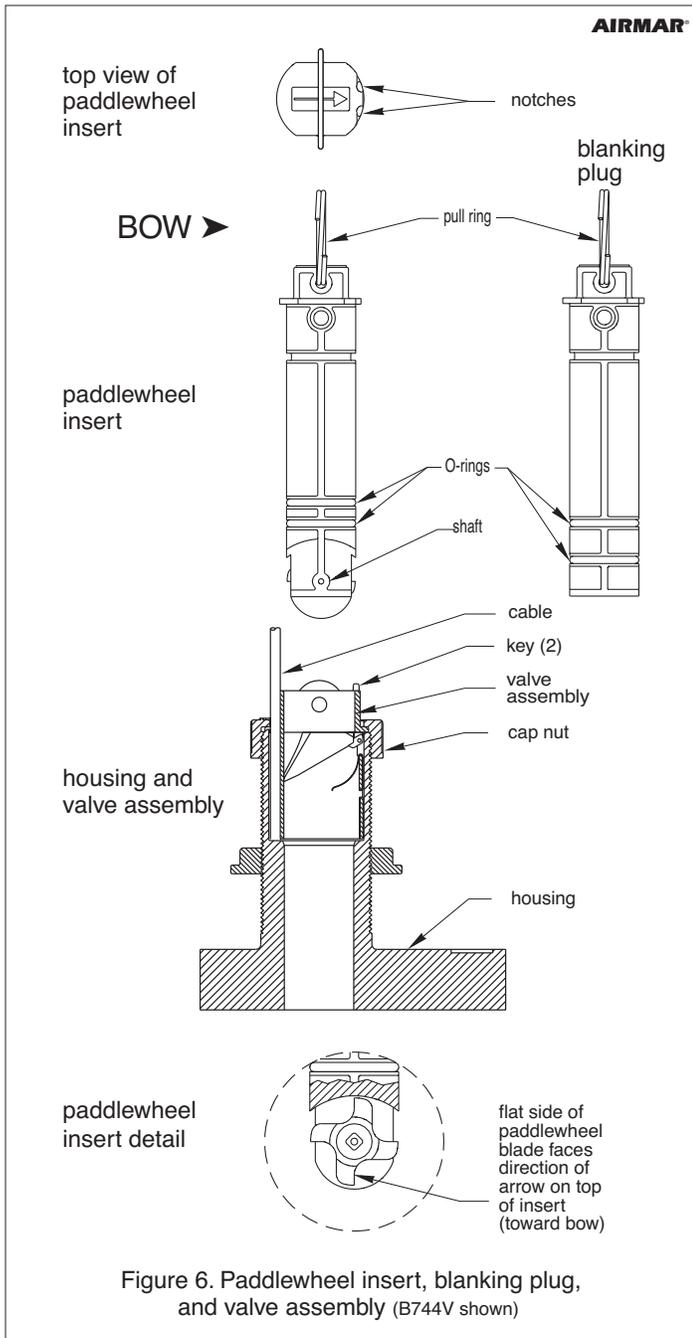


Figure 6. Paddlewheel insert, blanking plug, and valve assembly (B744V shown)

### Installing the Paddlewheel Insert

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

1. Attach one pull ring to the paddlewheel insert. Attach the second pull ring to the blanking plug (see Figure 6).
2. After the sealant cures, inspect the O-rings on the paddlewheel insert and lubricate them with the silicone lubricant supplied.
3. With the arrow on the top of the paddlewheel insert pointing forward toward the bow, slide it into the housing with a twisting motion until it is fully seated. (The insert fits one way only.) *Take care* not to rotate the outer housing and disturb the sealant.
4. Wrap the safety strap around the cable and pass the holed end through the slit in the opposite end. Attach the safety ring to the hole midway in the strap. Insert the retaining pin in the hole in the end of the strap. Slide the free end of the retaining pin through the valve and insert. Secure the retaining pin with the safety ring (see Figure 7).

**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.

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

**Caution:** If the multisensor 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.

6. 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 multisensor cable from other electrical wiring and the engine. Coil any excess cable and secure it in place using zip-ties to prevent damage.
7. Refer to the echosounder owner's manual to connect the multisensor to the instrument.

### Preparing 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 3mm or 1/8" pilot hole perpendicular to the waterline from inside the hull (see Figure 8). 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.

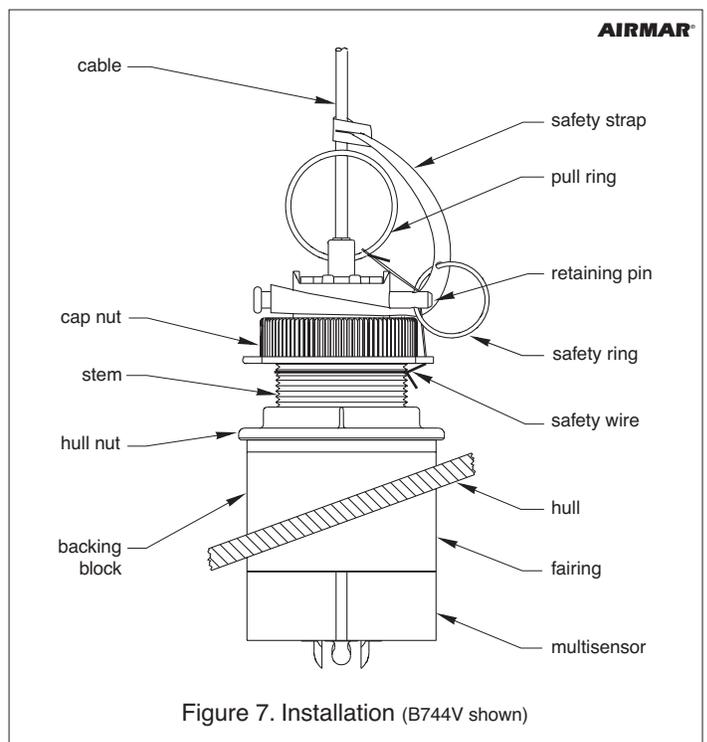
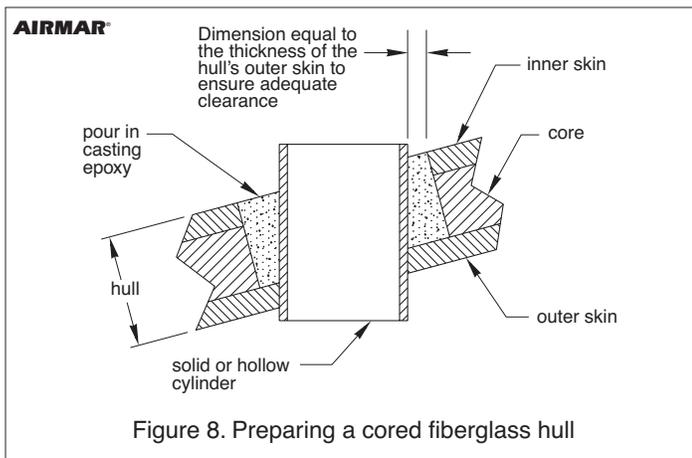


Figure 7. Installation (B744V shown)



- Using the 51 mm or 2" hole saw, cut a hole from outside the hull through the *outer skin* only. *Be sure* to hold the drill plumb, so the hole will be perpendicular to the water surface.
  - The optimal interior hole diameter is affected by the hull's thickness and deadrise angle. It must be large enough in diameter to allow the core to be completely sealed. Using the 60mm or 2-3/8" hole saw, cut through the inner skin and most of the core from inside the hull keeping the drill perpendicular to the hull. 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*.
  - Remove the plug of core material so the *inside* of the outer skin and 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.
- Coat a hollow or solid cylinder of the correct diameter with wax and tape it in place. Fill the gap between the cylinder and hull with casting epoxy. After the epoxy has set, remove the cylinder.
  - 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 such as alcohol before sanding.
  - Proceed with "Bedding the Housing" and "Installing the Housing".

## Check for Leaks

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

When the boat is placed in the water, **immediately** check the thru-hull multisensor 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 the Housing" and "Installing the Housing" **immediately**.

## Antifouling Paint

Marine growth can accumulate rapidly on the multisensor's surface reducing performance within weeks. Surfaces exposed to salt water **must** be coated with antifouling paint. Use **water-based** antifouling paint only. **Never** use ketone-based paint since ketones can attack many plastics possibly damaging the transducer. Reapply paint every 6 months or at the beginning of each boating season.

Paint the following surfaces (see Figure 9):

- Exposed areas of the housing including the acoustic window
- Bore of the housing up 30mm (1-1/4")
- Outside wall below lower O-ring of paddlewheel insert
- Paddlewheel cavity
- Paddlewheel
- Blanking plug below lower O-ring including exposed end

## Operation, Maintenance, Repair, & Parts

### How the Valve Works

The multisensor incorporates a self-closing valve which minimizes the flow of water into the vessel when the paddlewheel insert is removed. The curved flap valve in the valve assembly is activated by both a spring and water pressure. The flap valve is pushed upward to block the opening, so there is no plume of water into the boat (see Figure 6).

**WARNING: THE VALVE IS NOT A WATERTIGHT SEAL.**

Always use the paddlewheel insert or blanking plug secured with the retaining pin, safety ring, and safety wire for a watertight seal.

### Blanking Plug

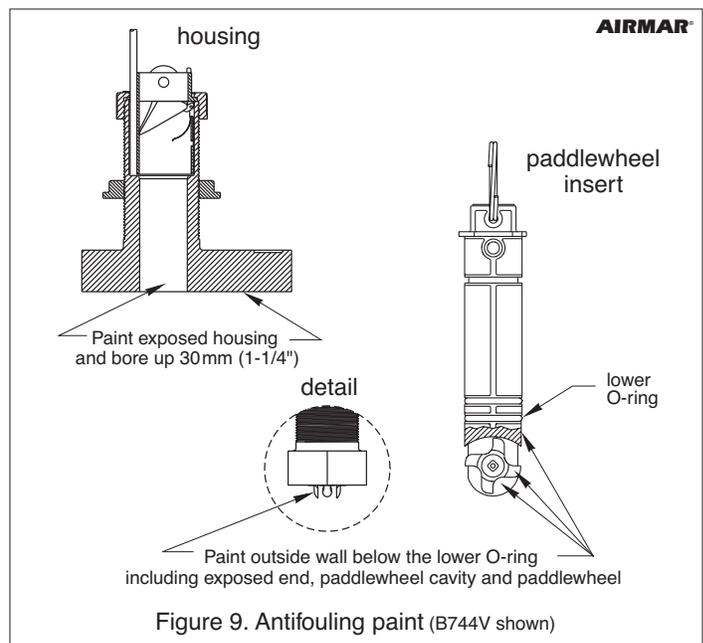
To protect the paddlewheel, use the blanking plug when:

- The boat will be moored in salt water for more than a week.
- The boat will be removed from the water.
- Aquatic growth buildup on the paddlewheel is suspected due to inaccurate readings from the instrument.

**WARNING: The O-rings must be intact and well lubricated for a watertight seal.**

- Inspect the O-rings on the blanking plug and lubricate them with silicone lubricant or petroleum jelly (Vaseline®) (see Figure 6).
- Remove the safety wire from the pull ring and cap nut. Remove the safety ring and pull out the retaining pin (see Figure 7). *Do not* remove the cap nut.
- Grasp the pull ring and remove the paddlewheel insert with a slow pulling motion.
 

**Note:** In the unlikely event that the paddlewheel insert cannot be removed, see "Servicing the Valve Assembly".
- With the arrow on the top pointing forward, slide the blanking plug into the housing until it is fully seated. Secure it with the retaining pin, safety ring, and safety wire (see Figure 6).



## Cleaning the Multisensor

Aquatic growth can accumulate rapidly on the multisensor's surface, reducing its performance in weeks. Clean the surface with mild household detergent. If fouling is severe, use a stiff brush or putty knife to remove the growth being careful to avoid making scratches. The paddlewheel can be removed by pushing out the shaft using a spare shaft or a 4D finish nail with a flattened point. Wet sand the paddlewheel with fine grade wet/dry paper.

## Servicing the Paddlewheel Insert

The water lubricated paddlewheel bearings have a life of up to 5 years on low-speed boats [less than 10kn (11MPH)] and 1 year on high-speed vessels. Paddlewheels can fracture and shafts can bend due to impact with water borne objects and mishandling in boat yards. O-rings must be free of abrasions and cuts to ensure a watertight seal. Order a replacement Paddlewheel Kit #33-113.

1. Using the new paddlewheel shaft, push the old shaft out about 6mm (1/4"). With pliers, remove the old shaft (see Figure 6).
2. Place the new paddlewheel in the cavity with the flat side of the blade facing the direction of the arrow on the top of the insert.
3. Tap in the new shaft until the ends are flush with the insert.
4. Install two O-rings in the *lower* groves near the paddlewheel. *Do not* place them near the pull ring.
5. The remaining two O-rings are placed in a similar position near the *bottom* on the blanking plug.

## Servicing the Valve Assembly

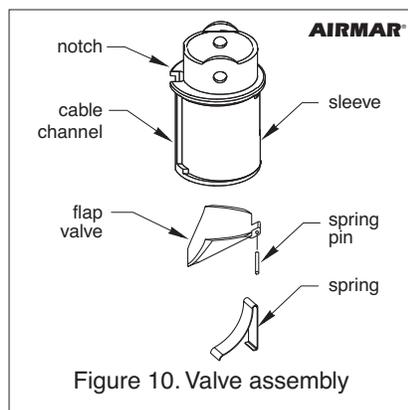
Should the valve fail, remove it for servicing. Order a replacement Paddlewheel and Valve Kit #33-218.

**WARNING: The blanking plug cannot be secured without the valve assembly.** After removing the valve assembly, temporarily insert the blanking plug, but do not leave the boat in the water unattended. THIS IS NOT A WATERTIGHT OR SECURE SEAL!

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

1. Inspect the O-rings on the blanking plug and lubricate them with silicone lubricant or petroleum jelly (Vaseline®) (see Figure 6).
2. Remove the safety wire and unscrew the cap nut. With the blanking plug ready in one hand, *remove the paddlewheel insert and valve assembly as one unit* by grasping the pull ring and pulling upward (see Figure 7). Rapidly replace the valve assembly with the blanking plug to minimize the flow of water into the boat. **TEMPORARILY** secure it with the safety wire.

3. Separate the paddlewheel insert from the valve assembly by removing the safety ring and the retaining pin. Grasp the pull ring and pull slowly upward.



**Warning:** If a new valve assembly is required and not immediately available, the valve sleeve must be reinstalled in the multisensor housing for a watertight seal. Remove the flap valve, spring pin, and spring from the sleeve.

4. Clean, repair, or replace the valve assembly so that the flap valve moves freely and seats against the sleeve (see Figure 10).

**WARNING: The O-rings must be intact and well lubricated for a watertight seal.**

5. To reinstall the valve assembly, inspect the O-rings on the paddlewheel insert and lubricate them with silicone lubricant or petroleum jelly (Vaseline®) (see Figure 6).
6. Slide the paddlewheel insert into the valve assembly. Seat it in place with a twisting motion until the keys fit into the notches. Secure the paddlewheel insert with the retaining pin and safety ring (see Figure 7).

**Caution:** Be careful to avoid cross threading the cap nut.

7. Remove the safety wire from the multisensor. With the valve assembly ready in one hand, remove the blanking plug. Slide the assembly into the multisensor housing with the arrow on the top pointing forward. *Be sure* the cable fits into the cable channel and the key in the housing fits into the notch in the sleeve (see Figure 10). (A pushing twisting motion will locate the key.) 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.

8. Reattach the safety wire (see Figure 7).

## Winterizing

After the boat has been hauled for winter storage, remove the blanking plug to let the water drain away before re-inserting it. This will prevent any water from freezing around the blanking plug and possibly cracking it.

## Replacement Parts

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

Model	Cap Nut	Hull Nut	Standard Fairing	High-Performance Fairing	Blanking Plug	Insert
B744V	04-234-1	02-030	04-469-01	33-476-01	33-385-01	20-752-1
B744VL	04-234-1	02-030	04-469-01	33-476-01	33-483-01	20-752-3
B66V	04-234-1	02-030	33-029	—	33-385-01	20-752-1
B66VL	04-234-1	02-030	33-029	—	33-483-01	20-752-3
SS544V	04-234-1	02-530-02	—	33-356-01	33-484-01	20-178-1

Part	Part No.
Paddlewheel Kit	33-113
Paddlewheel & Valve Kit	33-218

## Replacing the Multisensor

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

**AIRMAR®** 35 Meadowbrook Drive, Milford, New Hampshire 03055-4613, USA  
TECHNOLOGY CORPORATION ■ www.airmar.com