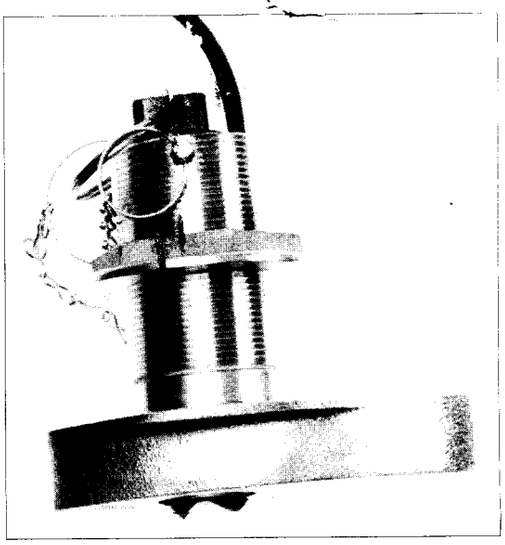
Installation Instructions
AIRMAR Bronze And Stainless Steel Thru-hull TRIDUCER® Multisensor

17-007 Rev 4 2-13-95

***IMPORTANT*: Please read these instructions completely before proceeding with installation.**

- WARNING: **DO NOT USE SOLVENTS.** Do not expose transducer to solvents (especially acetone and methylene chloride) since they attack acoustic window materials causing multisensor failure within 2 to 14 days.
- **Do not** install on vessels with positive ground systems
- **Do not** use a bronze transducer housing in an aluminum or steel hull because electrolytic corrosion will occur. For metal hulls request an **AIRMAR** SS550 stainless steel thru-hull TRIDUCER® multisensor with special fairing block and isolation sleeve. **Follow steps marked ☞ for additional SS550 installation instructions.**
- **Do not** cut cable before reading Step #9 on page 5.
- **Do not** proceed with these instructions if you have a cored hull. Request **AIRMAR** Cored Hull Instructions.



Identify Housing

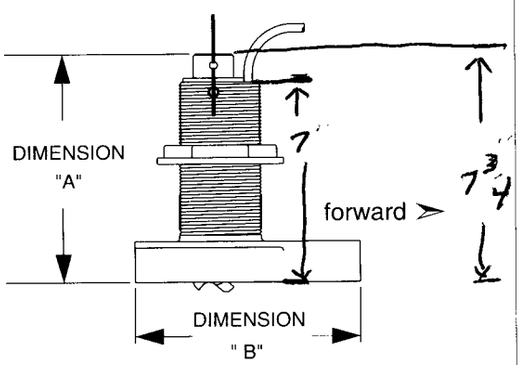


Figure 1: Transducer Identification

Housing	Dimension	
	"A"	"B"
B44	115mm (4.5")	140mm (5.45")
B50, SS550	134mm (5.26")	153mm (6.0")
B55	126mm (4.94")	153mm (6.0")
B56	178mm (7.0")	153mm (6.0")
B62	136mm (5.34")	172mm (6.75")

Tools & Materials

- Variable speed electric drill with chuck capacity of 10mm (3/8") or larger
- 3mm (1/8") Drill bit (may use 3/16" or 1/4")
- 51mm (2") hole saw for Bronze housing

☞ 62mm (2 7/16") hole saw for Stainless Steel Housing.

- Marine Bedding/Sealing Compound; use polysulfide, polyurethane or RTV types only.
- **AIRMAR** fairing block or a fairing block fabricated at boat yard

Mounting Location and Acoustic Noise

Acoustic noise is always present and noise amplitude varies with transducer location. While we cannot do much to combat ambient noise, carefully selecting the transducer mounting location can minimize the effect of vessel generated noise. The lower the acoustic noise level, the better the signal-to-noise ratio and, therefore, the higher the echosounder gain setting that can be used.

A. Vessel Generated Noise Sources

- Propeller(s)
- Propeller Shaft Vibration
- Machinery

  Main Engine Generator

  Gear Pumps
- Flow of water across the hull
- Boundary layer turbulence
- Interference from other echosounders

B. Ambient Noise Sources

- Waves and air bubbles
- Fish and mammals
- Rain and hail
- Other vessels or shore

Mounting Location—Displacement Hulls

The main source of vessel acoustic noise is the propeller. It is very important to position the transducer to minimize noise pickup. Study the hull shape of the vessel carefully to determine the best transducer mounting location. Refer to **Figure 8 & 9** for transducer orientation. To achieve optimal echosounder system operation, the transducer should be mounted in a spot which:

- Minimizes acoustic noise reception
- Minimizes the chance that aerated water will flow across the transducer's acoustic window (ref.**Figure** 2).

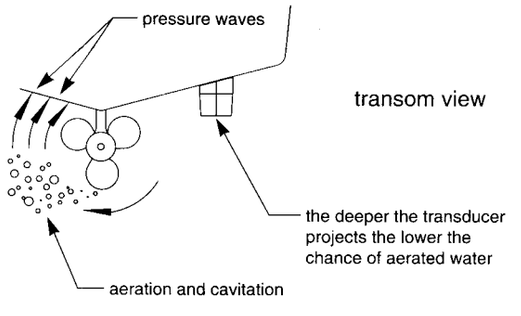


Figure 2: Recommended mounting to avoid aeration

A. On **displacement hulls** (sailboats, trawlers, etc.) Locate the transducer about 1/3 aft along the waterline (ref. **Figure 3**). Generally this provides the best compromise between obtaining aeration-free water and minimizing propeller noise. Aerated water reflects ultrasound and blinds an echosounder. Water near the bow and water near the keel can be quite aerated. Aeration of the transducer can be minimized by keeping the transducer mounted away from the keel, as shown in **Figure2**, and by not mounting too far forward (ref. **Figure 3**). Also keep in mind that the deeper the transducer protrudes into the water, the less chance of aeration.

NOTE: The transducer should not be mounted near any water discharge fittings. Never position a transducer behind any struts or fittings that may cause turbulence. If the boat has previously had bottom paint applied, inspect for areas where paint erosion has taken place. Erosion is caused by turbulent water and these areas are unsuitable transducer mounting locations.

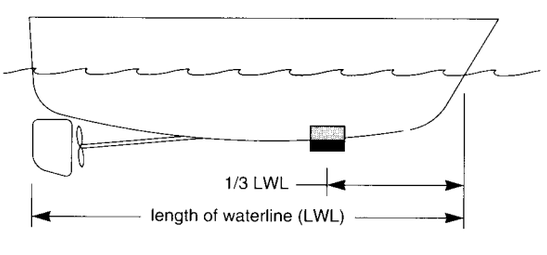


Figure 3: Recommended transducer location Displacement Hulls

B. On **sailboats**, the transducer should be mounted where the acoustic beam will not be shaded by the keel. A spot forward of a fin keel is usually best. Try to find an accessible spot with a minimum deadrise angle.

C. On **planing powerboat hulls**, the transducer should be mounted well aft and close to the keel to insure that the transducer is in contact with the water at higher boat speeds.

- On I/O's, transducer mounting close to the engine(s) usually yields good results.
- On inboards always mount the transducer well ahead of the propeller(s). Turbulence from props seriously degrades transducer performance.
- Make sure transducer is not shaded by the prop shaft(s).
- If the vessel is capable of speeds greater than 25 to 30 knots, you may wish to review installation location and operational results on similar boats before proceeding.

D. Mount the transducer on the side of the hull where the propeller is moving downward. The upward motion of the propeller generates pressure waves and pushes bubbles up against the hull. By mounting on the downward side, the hull shades the transducer from this effect.

E. It is very important that the mounting location have reasonable access from inside the vessel since you must allow for the height of the stem projecting inside the hull. Also, the transducer nut will require tightening from inside the hull.

F. To allow for removal of the paddlewheel, there must be clear headroom above the housing as listed:

B44	125mm (5")
B50, SS550	165mm (6.5")
B55	150mm (6")
B56	200mm (8")
B62	160mm (6")

FAIRING BLOCK

Fairing blocks have three functions:

- vertically orient the sound beam for better performance.
- reduce the chance of aerated water flowing over the transducer face.
- reduce drag.

Nearly all vessels have some deadrise angle at the transducer mounting location. If a thru-hull multisensor were mounted directly to the hull, the sound beam would be tilted off the vertical at the same angle as the deadrise. Generally, if the deadrise angle at the mounting point exceeds 10°, a fairing block is strongly recommended.

Fairing blocks are usually constructed of plastic or wood (such as mahogany or teak) and shaped to both reduce drag and minimize aeration on the transducer face. Best results are obtained with near vertical leading edge fairings because this shape helps to divert aerated water off to the sides of the transducer and not over the acoustic face. The principal contributor to drag is the low pressure zone created behind the transducer. The fairing can be shaped to accommodate deadrise angles up to 25°. A backing block (shim) is necessary inside the hull to provide a level bolting surface and to distribute the forces from the hex nut.

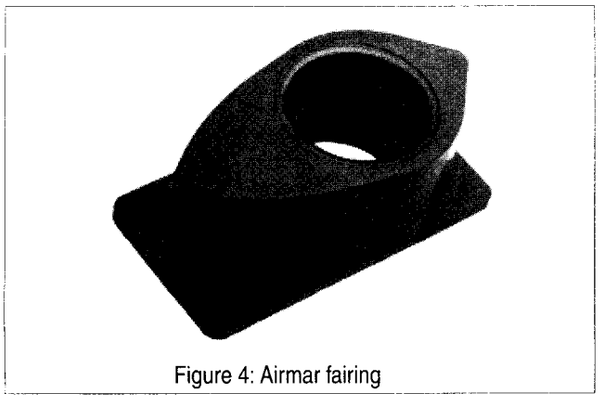


Figure 4: Airmar fairing

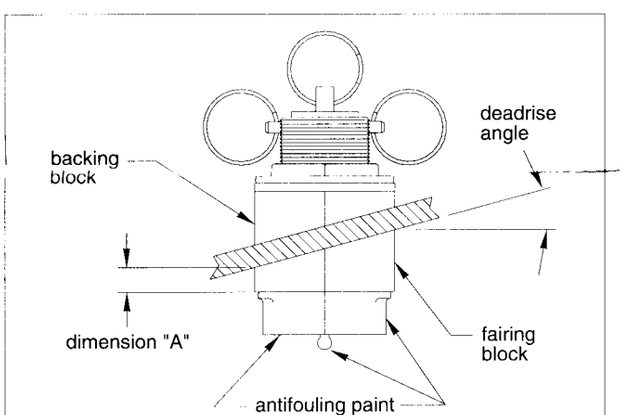
AIRMAR Urethane Fairings

Made of high impact urethane, **AIRMAR** urethane fairings are easy to cut with a band saw and to shape with hand tools. They also incorporate a unique cutting guide (shown in **Figure 4**) which allows easier and safer band saw cutting. To purchase an Airmar fairing, contact the Echosounder manufacturer or distributor. (They may have their own part numbers for these fairing blocks.)

☞ NOTE: All SS550 stainless steel transducers are shipped with a special fairing block and isolation sleeve.

	Model Part Number
• B44	#33-118
• B50,B55, B56	#33-119
☞ SS550	#20-500

before cutting urethane fairing block, measure the deadrise angle of the hull at the selected location (ref. **Figure 5**) using a level and protractor.Tilt the bandsaw table to the measured angle and secure a cutting fence to the table as shown in **Figure 6**. Position the fence so that there is at least 6mm (1/4") of material remaining after the cut is made (ref.**Figure 5** dimension "A")



hull material	dimension "A"
wood	13 mm (1/2")
plastic	7 mm (1/4")

Figure 5: Deadrise & minimum fairing thickness

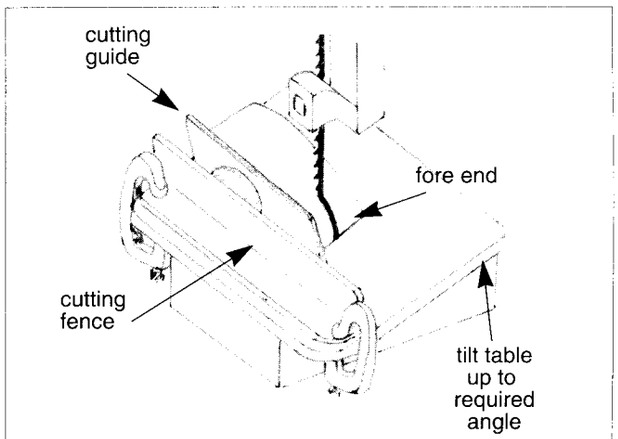


Figure 6: Fairing Block Cutting

☞Before cutting fairing for Stainless Steel installation, remove the isolation sleeve from inside the fairing block. Refer to special installation instructions on page 4.

NOTES:

- Be sure to orient the block properly on the band saw so that the angle you cut is matched to the intended side of the hull, and not the mirror image (ref. **Figure 7**).
- The circular button on the fairing block mates with the circular recess on the housing.
- At larger deadrise angles, some of the cutting guide may remain after making the deadrise angle cut. This remaining guide material should be sanded away. The maximum thickness of the fairing is limited by the deadrise angle of the hull, the hull thickness and transducer stem length. The optimal thickness of the fairing block involves some trade-offs. Thicker blocks yield better results because they project the transducer further into the water, reducing chance of aerated water flow across the transducer face. However, the greater the projection, the greater the chance for impact with water borne objects and the higher the forces applied to them. Generally, **AIRMAR** recommends a minimum fairing block thickness of 6mm (1/4") for plastic and 13mm (1/2") for wood (between the bronze housing and hull) after cutting and shaping (ref. **Figure 5**). With an **AIRMAR** urethane fairing, the cut-away (cutting guide) section can be trimmed to form the backing block.

Wood Fairing

Can be fabricated by most boat yards from such woods as mahogany or teak.

Hole Drilling

1. Drill a 3mm (1/8") test hole from inside the hull to assure unobstructed access to tighten the housing nut and clearance for the cable.

   NOTE: If there is a strake or other hull irregularity near the selected mounting location, it may be desirable to drill from the outside. (If the test hole is drilled in a wrong location, apply masking tape to the outside of the hull over the hole and fill with epoxy. Drill a new hole in a more desirable location.

2. Using the 51mm (2") hole saw or spade bit, drill the mounting hole from the outside of the hull. (Use safety goggles and dust mask.)

☞ For Stainless Steel housing installation, use the 62mm 2 7/16") hole saw.

3. Sand or clean the area around the hole, inside and outside, to assure that the sealing compound will adhere properly to the hull. If there is any petroleum residue inside the hull, remove it with a detergent before sanding.

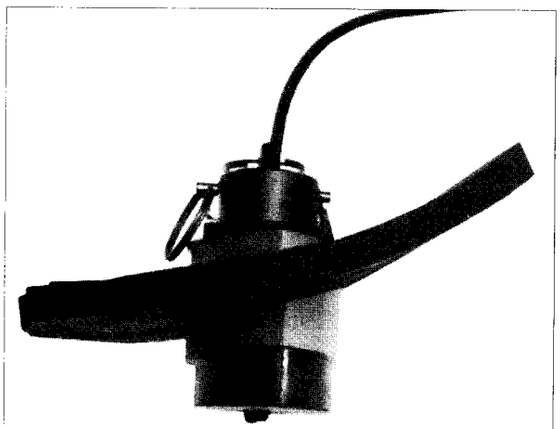


Figure 7: Installation View from Bow

Bedding Procedure/Installation

1. Select a marine grade bedding/caulking compound and follow the directions for its use.
2. Uncoil the transducer cable and remove the skirted nut from the housing and cable.
3. Thread the transducer cable through to the inside of the hull. **Never pull with excessive (2Kg/ 5lbs) force on the transducer cable, since this may sever internal connections. Never hold the transducer in place by applying tension to the transducer cable.**
4. Apply a 1.5mm (1/16") thick layer of sealant on the surfaces of the transducer and fairing block (if used) which mate with each other and to the hull, and bronze housing (ref. **Figure 7 & 8**). A thin layer should also be applied up the sidewalls of the stem to a height of 6mm (1/4") greater than the hull plus fairing block thickness. This will ensure there is sealant material in the threads to seal them and hold the housing nut securely in place.
5. From the outside of the hull, push the housing (with sealant applied) into the mounting hole. Apply a rocking motion to the housing to squeeze out excess sealant. If you have used an **AIRMAR** fairing block, make sure the button engages the recess in the housing to keep the fairing aligned with the TRIDUCER® housing.
6. Tighten the hex nut with a wrench or large slip-joint pliers. (Allow for swelling on wooden hulls.)
7. Remove excess sealant to assure smooth water flow over the transducer.

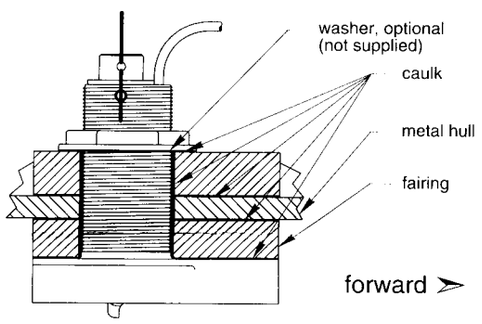


Figure 8: Bronze Housing Installation

☞ Stainless Steel Housing Installation follows the same general steps as a bronze housing. The difference is in the use of the isolation sleeve.

☞ The SS550 multisensor is intended for installation in aluminum or steel hulls. The objective in these installations is to minimize electrolytic corrosion. This is achieved by:

- using stainless steel which has a low galvanic coefficient when in contact with typical hull materials.
- isolation of the transducer from the hull to prevent direct contact of the transducer housing with the hull.

☞ Isolation is achieved by using a fairing block and isolation sleeve. If properly installed, there is at least a 5mm (3/16") barrier of plastic between the hull and the transducer housing.

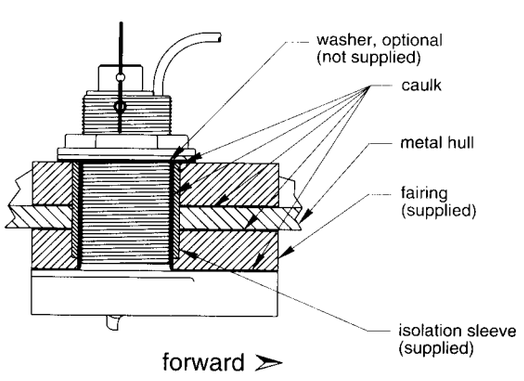


Figure 9: Stainless Steel Housing Installation

☞ Refer to Figure 9 for caulking application, and assembly of isolation sleeve. The isolation sleeve MUST be used to prevent metal to metal contact. Normally you should not have to cut the sleeve. (An exception is when the fairing block is mis-cut and more fairing block material must be removed on a second cut. The sleeve may then be too long, extending above the fairing block. In this case only, the sleeve would have to be shortened.)

8. Route the cable to the instrument, being very careful not to tear the cable jacket when passing the cable through bulkheads, etc. To reduce electrical interference, keep the transducer cable separated from ignition, tachometer, alternator or other electrical wiring. Secure the transducer cable in place to prevent damage using tywraps or lacing twine.
9. **DO NOT remove the molded waterproof connector. Removal voids warranty.** If your installation requires splicing of the cable to ease cable routing, ***AIRMAR*** offers a waterproof junction box (Figure 10, P/N 20-040) which some echosounder manufacturers provide with the transducer. The junction box comes with explicit instructions which must be followed carefully.

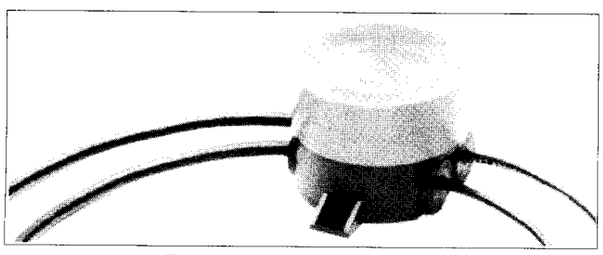


Figure 10: Junction Box

Check for Leaks

When the boat is placed in the water, ***IMMEDIATELY*** check around the thru-hull 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 8-24 hours before checking it again. If there is a leak, there may be considerable water accumulation after 3-24 hours (probably not enough to cause any damage). If a leak is observed, the installation bedding procedure should be repeated immediately. **It is not prudent to install a thru-hull and leave a boat in the water unchecked for several days.**

Maintenance

1. A plug assembly is provided and should be used when the boat is:
   - kept in salt water for a week or more at a slip or mooring.
   - removed from the water with slings or by fork lifts, etc.
2. Marine growth buildup on the paddlewheel will impede or freeze paddlewheel rotation. Should buildup occur, or is suspected due to inaccurate readings from the instrument, remove impeller assembly from thru-hull and replace with the plug assembly.
3. Fouling should be removed with a stiff brush or scraped with a dull edge tool. If fouling is severe, the paddlewheel shaft can be removed by pushing it out by using a spare shaft or a 4D finish nail (with point ground flat). Light hand sanding with wet or dry #220 paper may be needed in severe cases to clean surfaces.
4. A system of rings and a lanyard chain is provided to hold the paddlewheel locking pin captive. When withdrawing the clevis pin, unthread the small ring from one side of the pin only. Do not unthread from the chain. Pull on the large ring to withdraw the pin. All parts should remain captive to prevent them from accidentally sliding into the bilge.
5. Before withdrawing the paddlewheel assembly, have the plug at hand, and make sure it has some lubricant such as Vaseline on the O-rings. Pull the paddlewheel most of the way out and have plug ready in other hand. Remove paddlewheel and replace with plug rapidly. With practice, only 20-40cl (6-12 ounces) of water will enter the boat. When reinserting paddlewheel, make sure O-rings have been inspected, are lubricated, and that arrow on paddlewheel assembly is facing forward.
6. **Always secure paddlewheel assembly or plug insert with clevis pin and locking ring.**

Antifouling Paint

Sea growth can accumulate rapidly on the transducer and seriously reduce performance in a matter of weeks. If the boat is kept in saltwater, it is recommended that these surfaces by coated with a **water base** antifouling paint at the beginning of each boating season:

- Paddlewheel
- Paddlewheel assembly below the lower O-ring, including the paddlewheel cavity
- Exposed areas of the thru-hull housing, including the acoustic window. (Never paint the inside walls of the thru-hull housing).
- Exposed end of the plug assembly, below the lower O-ring.

Use a small brush on the small parts. Make sure paddlewheel spins freely after painting is completed. Use only water based antifouling paint. **Do Not use Ketone based paints** since they attack the potting materials used in the transducer, therefore voiding the warranty.

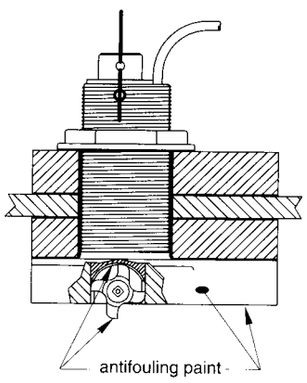


Figure 11: Application of Antifouling Paint

Repairs/Spare Parts

1. The water lubricated paddlewheel bearings have a finite life of 3-5 years on low speed boats (less than 10 knots); 1-2 years on high speed vessels.
2. Paddlewheel shafts can bend and paddlewheels fracture due to impact with water borne objects and from mishandling in boat yards. Broken or worn parts should be replaced immediately.
3. Should the speed function become erratic at cruising speeds, check first for a broken paddlewheel, fouling, or worn bearing. If there is fouling, clean the paddlewheel and cavity. Remove paddlewheel by pushing the shaft out, if necessary.
4. If O-rings are kinked or abraded, or if paddlewheel bearing assembly is worn, order **AIRMAR** Spares Kit #33-113 (Figure 12)which contains:
   - Shaft
   - Paddlewheel/bearing assembly
   - 2 O-Ring pairs

To obtain this kit, contact your marine dealer or the instrument manufacturer directly. Please be sure to specify that you have the **Thru-Hull TRIDUCER®** multisensor.

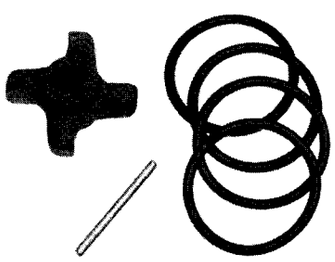


Figure 12: Spares Kit #33-113

Note:

- If there is no fouling of the paddlewheel
- The paddlewheel spins freely
- And the speed reading is zero
- Or if the temperature is significantly[1] in error,

an **AIRMAR** speed/temperature replacement kits may be required. The replacement kit includes a junction box for splicing into the transducer cable (see Fig. 10).

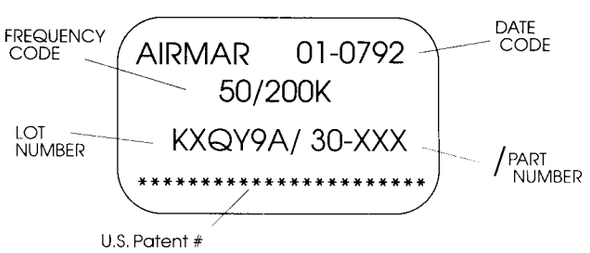
Order Spare Parts kit as follows:

- B44 #33-544
- B50, SS550 B62 #33-550
- B55, #33-554 (for 12m Cable)
- B55 #33-555 (for 4.5m Cable)
- B56 #33-556

For an Airmar speed/temperature repair kit which is specific to your echosounder, and requiring no splicing, contact your instrument manufacturer, mentioning your echosounder model to ensure that the kit is the right one.

Transducer Replacement/Identification

Starting in 1987, most **AIRMAR** transducers have the operating frequency and part number printed on a mylar tag near the connector end of the cable. Do not abrade the marking or remove the tag, since this identifies the transducer should you need a replacement.



1. If temperature error is small, the problem is usually with calibration of the echosounder. Refer to instrument manual.

Airmar Transducer Cable CS P1225