

INSTALLATION INSTRUCTIONS

Thru-Hull Depth Transducer

Low Profile, Flush, and Retractable Models

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

WARNING: NEVER USE SOLVENTS!

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

Applications

- **Plastic** housing is 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 is recommended for fiberglass or wood hulls only. *Never* install a bronze housing in a metal hull, because electrolytic corrosion will occur.
- **Stainless steel** housing is recommended for metal hulls to prevent electrolytic corrosion.
- *Never* install a metal housing in a vessel with a positive ground system.

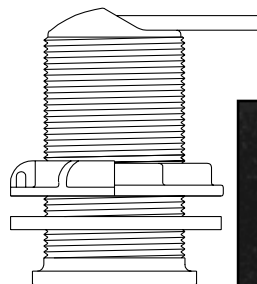
Model Identification

To identify your model, see the top right corner of the **paper** tag affixed to the cable.

12960-0 158 XX-XXX-X REV 02 CUSTOMER MAY REMOVE THIS TAG	B21 XX-XXX-X REV 02	model
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Tools and Materials Needed

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)
Beveled countersink tool for B21, P269, and P314
Countersink tool for B119, P217, and P219
Available from Farallon Electronics: Tel (415) 331-1924
Sandpaper Fax (415) 331-2063
Mild household detergent or weak solvent (alcohol)
File (installation in a metal hull)
Marine sealant
Additional washer for some aluminum installations
Slip-joint pliers for metal housing
Silicone grease or petroleum jelly (Vaseline®) (retractable units)
Zip-ties
Water-based antifouling paint (**mandatory in salt water**)
Installation in a cored fiberglass hull:
Hole saw for hull interior: (see table on page 1)
Fiberglass cloth and resin (see page 4, #5)
or Cylinder, wax, tape, and casting epoxy (see page 4, #5)



P119/B119
Flush

P17, Retractable, Low Profile



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 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 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 the 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	Inside Hull Hole Saw Size ^a
B21, B119, P219, P269	100 mm (4")	51 mm or 2"	60 mm or 2-3/8"
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
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

a. Cored fiberglass hulls only

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

Generally, the sensor is mounted without a fairing. However, a fairing does provide a level mounting surface. 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 be tilted off the vertical at the same angle as the deadrise angle. A

fairing is recommended for **metal** housings if the deadrise angle at the mounting location exceeds 10°.

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

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.

Note: 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 appropriate size 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 any washer (see Figure 2).

Retractable sensor—Also remove the cap nut and the transducer insert.

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, 6 mm (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—Slide the isolation bushing onto the housing, then apply sealant to the bushing surface that will contact the hull.

Installing

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

1. From outside the hull, push the cable and housing into the mounting hole using a twisting motion to squeeze out excess sealant (see Figure 2).

2. Slide the washer onto the housing inside the hull.

SS555—Slide the stainless steel washer in place against the rubber washer.

Aluminum hull less than 6mm (1/4") thick—Use an additional washer. *Never use bronze, since electrolytic corrosion will occur.*

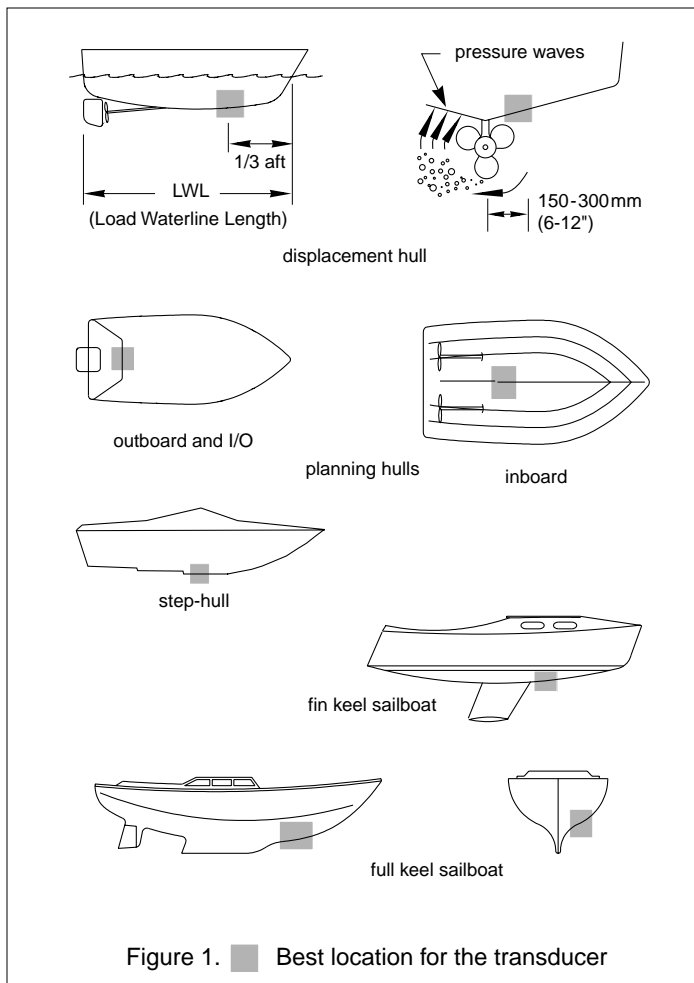


Figure 1. ■ Best location for the transducer

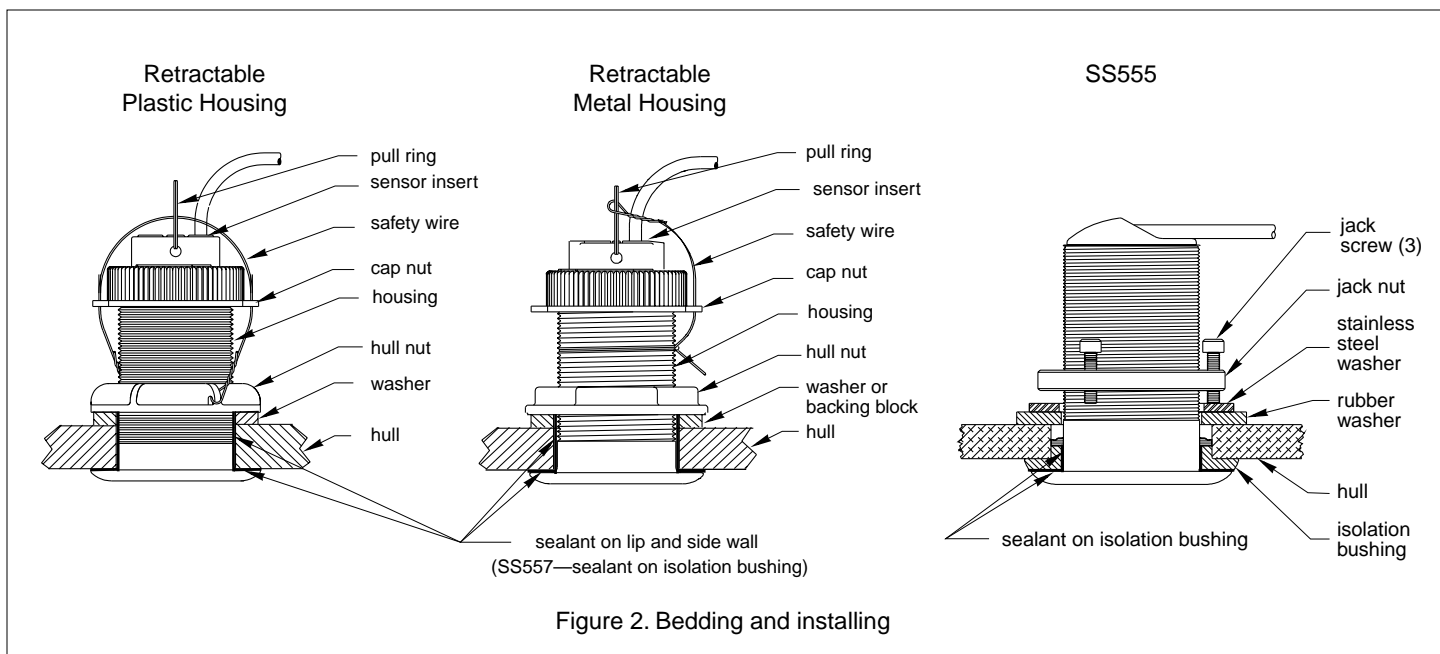


Figure 2. Bedding and installing

3. Screw the hull nut in place.

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 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.*

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

5. **Retractable models only—**After the sealant cures, inspect and lubricate the O-rings on the insert with silicone grease or petroleum jelly. 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 outer 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.

6. 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.

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.

7. 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.

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

Checking for Leaks

Caution: 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" *immediately*.

Blanking Plug for Retractable Models

1. Inspect and lubricate the O-rings on the blanking plug with silicone grease or petroleum jelly.
2. Remove the safety wire from the pull ring and cap nut. Then, unscrew the cap nut (see Figure 2).
3. With the blanking plug ready in one hand, pull the insert most of the way out. Remove the insert and rapidly replace it with the 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.

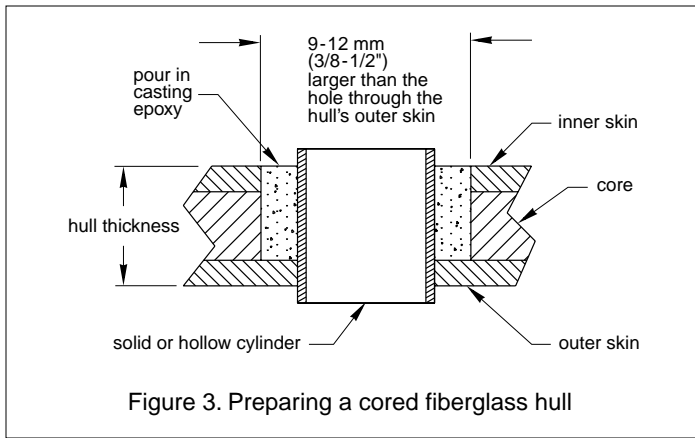


Figure 3. Preparing a cored fiberglass hull

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. Using the appropriate size **inside hull** hole saw, cut through the **inner** skin and most of the core from inside 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.
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: Always 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 (see Figure 3).

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" and "Installing".

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.

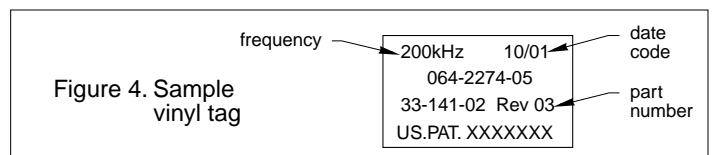
Replacement Parts

Lost, broken, and worn parts should be replaced immediately and can be obtained through your instrument manufacturer or marine dealer. The available parts are listed on the table below.

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

Transducer Replacement

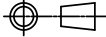
The information needed to order a replacement Airmar sensor is printed on the **vinyl** tag affixed to the cable near the connector end. *Do not* abrade the marking or remove this tag. When ordering, specify the frequency, date code, and part number (see figure 4).

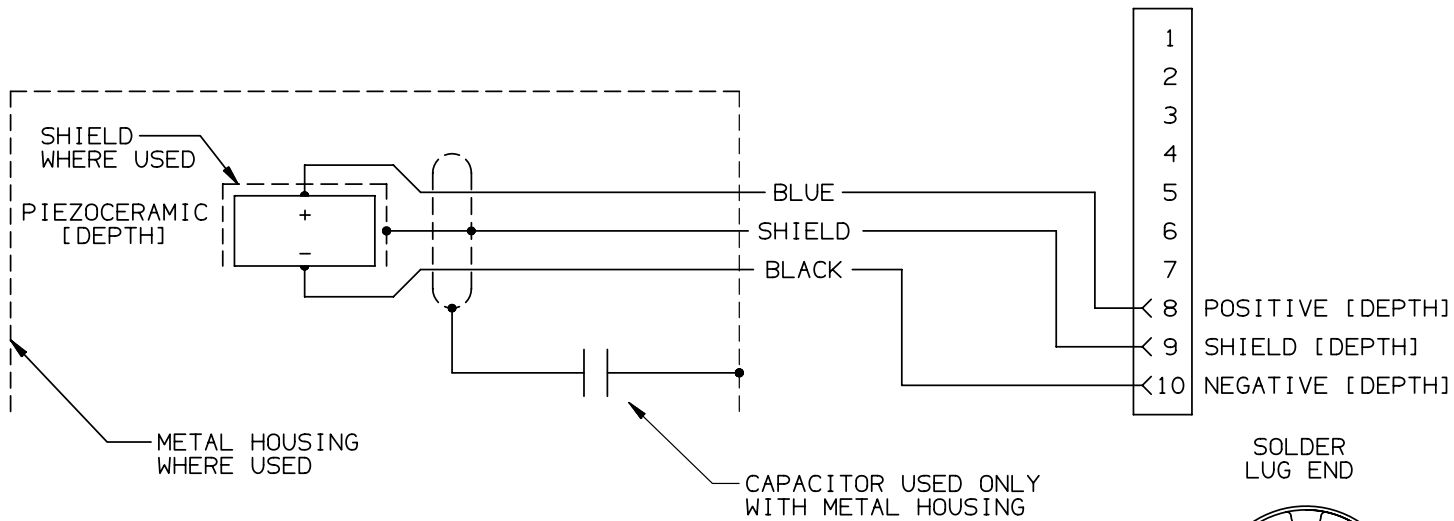
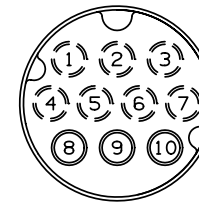


AIRMAR
TECHNOLOGY CORPORATION

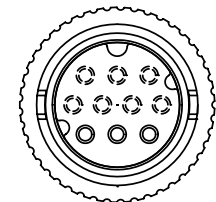
35 Meadowbrook Drive, Milford, New Hampshire 03055-4613, USA

▪ www.airmar.com

THIRD ANGLE PROJECTION		REVISIONS			
	REV	DESCRIPTION	ECO NO	DATE	CHG/CHK
	01	RELEASE TO PRODUCTION	99E0257	10/04/95	FSC/ALN
	01A	CHANGE 05-111-10 TO 05-111-3.	99E0555	07/13/99	JLC/FSC

SOLDER
LUG END

CONTACT END

3/10 PIN FEMALE
FURUNO [DEPTH]

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PL DECIMALS $\pm .02$ 3 PL DECIMALS $\pm .005$ ANGLES $\pm 1/2^\circ$ FRACTIONS $\pm 1/32$ MIN. SURFACE FINISH 250	SIGNATURE	DATE	AIRMAR AIRMAR TECHNOLOGY CORPORATION 35 MEADOWBROOK DR MILFORD NH 03055-4613 USA TEL: 603-673-9570 FAX: 603-673-4624
	DRAWN R. CULLEN	10/02/95	
	CHECKED J. JEFFERS	10/02/95	
	APPROVED M. SIMONEAU	10/02/95	
MATERIAL AIRMAR CABLE #06-001, #06-002, #06-013 AIRMAR CONNECTOR #05-111-3			TITLE WIRING, DEPTH, 3/10 PIN FEMALE CONNECTOR
SIZE B			SCALE: FULL SHEET 1 OF 1
			NUMBER 91-234 REV 01A