DSM300

Digital Sounder Module

Installation Manual

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Contents

Preface

Purpose

Raymarine DSM300 Digital Sounder Modules provide echo sounder data that can be displayed on Raymarine E Series, C Series, and hsb^2 PLUS (Pathfinder) Series display units.

DSM300 Digital Sounder Modules are intended for recreational depth finding and fishfinding purposes. Echo sounder systems require an appropriate Raymarine transducer unit and inter-connecting cable.

This manual contains very important information for installing your DSM300 and transducer. To obtain the best results in operation and performance, please read this handbook thoroughly. Raymarine's Technical Services representatives or your local dealer will be available to answer any questions you may have.

SAFETY NOTICE

This equipment must be installed and operated in accordance with the instructions contained in this manual. Failure to do so can result in personal injury and/or navigational inaccuracies. In particular:

CAUTION: High Voltage

The DSM300 contains high voltages. Adjustments require specialized service procedures and tools only available to qualified service technicians – there are no user serviceable parts or adjustments. The operator should never remove the cover or attempt to service the equipment.

CAUTION: Transducer Cable

Removing the transducer cable from the rear of the DSM300 while the sounder module is powered on can cause sparks. Only remove the transducer cable after power has been removed from the DSM300. As with any electronic device, be sure the sounder module is mounted where it is well ventilated and free from gasoline fumes.

If the transducer cable is accidentally removed while the DSM300 is powered on, remove power from the sounder module, replace the transducer cable, and then return power to the module. As a safety feature, the DSM300 only recognizes that the transducer is connected at power-up.

EMC Conformance

All Raymarine equipment and accessories are designed to the best industry standards for use in the recreational marine environment.

The design and manufacture of Raymarine equipment and accessories conform to the appropriate Electromagnetic Compatibility (EMC) standards, but correct installation is required to ensure that performance is not compromised.

Conventions

Throughout this handbook, the dedicated (labelled) keys are shown in bold capitals; for example, **ENTER**. The soft key functions, menu names and options are shown in normal capitals; for example, SCREEN.

Operating procedures, which may consist of a single key-press or a sequence of numbered steps, are indicated by a ➤ symbol in the margin. When the procedure requires you to press a soft key, the soft key icon is shown in the margin.

Technical Accuracy

To the best of our knowledge, the technical and graphical information contained in this handbook was correct as it went to press. However, the Raymarine policy of continuous improvement and updating may change product specifications without prior notice. As a result, unavoidable differences between the product and handbook may occur from time to time, for which liability cannot be accepted by Raymarine.

Warranty

To register your DSM300 Digital Sounder Module ownership, please take a few minutes to fill out the warranty registration card found at the end of this handbook. It is very important that you complete the owner information and return the card to the factory in order to receive full warranty benefits.

Chapter 1: DSM300 Installation

1.1 Introduction

This chapter provides details for mounting the DSM300 and connecting to the display.

For the system to display depth, water temperature and speed, you must install the transducer type(s) capable of transmitting the appropriate data. Transducer information is provided in Chapter 2.

Planning the Installation

Before you install your system, plan the installation, considering:

- Correct transducer for your application, as described in Section 2.1
- Location of the sounder module, as described in Section 1.3
- Cable Runs, as described in Section 1.5

EMC Installation Guidelines

All Raymarine equipment and accessories are designed to the best industry standards for use in the recreational marine environment.

Their design and manufacture conforms to the appropriate Electromagnetic Compatibility (EMC) standards, but correct installation is required to ensure that performance is not compromised. Although every effort has been taken to ensure that they will perform under all conditions, it is important to understand what factors could affect the operation of the product.

The guidelines given here describe the conditions for optimum EMC performance, but it is recognized that it may not be possible to meet all of these conditions in all situations. To ensure the best possible conditions for EMC performance within the constraints imposed by any location, always ensure the maximum separation possible between different items of electrical equipment.

For optimum EMC performance, it is recommended that wherever possible:

- Raymarine equipment and cables connected to it are:
  - At least 5 ft (1.5 m) from any equipment transmitting or cables carrying radio signals, e.g., VHF radios, cables and antennas. In the case of SSB radios, the distance should be increased to 7 ft (2 m).

  - More than 7 ft (2 m) from the path of a radar beam. A radar beam can normally be assumed to spread 20 degrees above and below the radiating element.
- The equipment is supplied from a separate battery from that used for engine start. Voltage drops below 10 V and starter motor transients can cause the equipment to reset.
  This will not damage the equipment, but may cause the loss of some information and may change the operating mode.
- Raymarine specified cables are used. Cutting and rejoining these cables can compromise EMC performance and must be avoided unless doing so is detailed in the installation manual.
- If a suppression ferrite is attached to a cable, this ferrite should not be removed. If the ferrite needs to be removed during installation it must be reassembled in the same position.

Suppression Ferrites

The following illustration shows typical cable suppression ferrites used with Raymarine equipment. Always use the ferrites supplied by Raymarine.

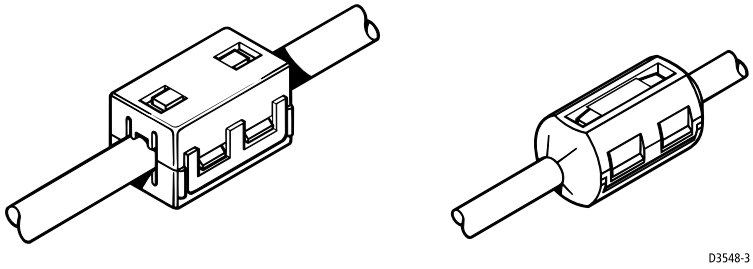


Figure 1-1: Typical Suppression Ferrites

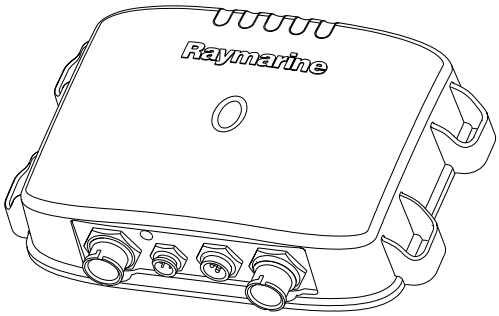
Connections to Other Equipment

If your Raymarine equipment is to be connected to other equipment using a cable not supplied by Raymarine, a suppression ferrite must always be attached to the cable that is closest to the Raymarine unit.

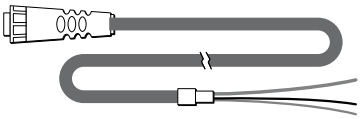
1.2 Unpacking and Inspecting the Components

Unpack your system carefully, to prevent damage to the equipment. Save the carton and packing, in case you need to return the unit for service.

Check that you have all the correct system components:



Digital Sounder Module,
part no. E63069

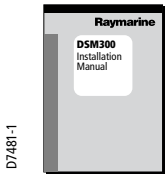


Power Cable, 3m
part no. R69053

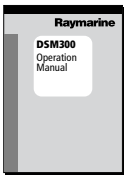
C Series Network Cable, 3m
part no. E65010

hsb² adapter, 4-pin to 3-pin
part no. R69081

Mounting Screws,
No.8 (x4)



Installation Manual,
part no. 87048



Operation Manual for PLUS
Displays, part no. 81249

A 3m-long cable is included for connecting your DSM300 to a C Series display. Longer cables and connection cables for other types of systems must be purchased separately. Select from the following:

Table 1-1: Cable Options

System	Item	Part No.
E Series	SeaTalk^{hs} Network Cable, RJ-45, 1.5m	E55049
	SeaTalk^{hs} Network Cable, RJ-45, 5m	E55050
	SeaTalk^{hs} Network Cable, RJ-45, 10m	E55051
	SeaTalk^{hs} Network Cable, RJ-45, 20m	E55052
C Series	C Series Network Cable, 4-pin-to-4-pin, 10m	E65011
	DSM Cable, 4-pin-to-3-pin, 3m	E65009
	DSM Cable, 4-pin-to-3-pin, 10m	E05016
hsb² PLUS Series (Pathfinder)	hsb² In Line Terminator	R58117
	hsb² Splitter Cable	E55040

1.3 Selecting Sounder Module Mounting Location

The DSM300 is waterproof to IPX-7 is and is designed to be mounted either above or below deck.

Mount the DSM300 where it is:

- protected from physical damage and excessive vibration
- protected from prolonged exposure to rain, salt spray and direct sunlight
- well ventilated
- as close to the transducer as possible

Do not locate the DSM300:

- in the engine compartment
- on the main console

When planning the installation, the following should be considered to ensure reliable and trouble free operation:

- **Access:** There must be sufficient space below the unit to enable cable connections to the panel connectors, avoiding tight bends in the cable.
- **Interference:** The selected location should be far enough away from devices that may cause interference, such as motors, generators, and radio transmitter/receivers. (See the EMC guidelines earlier in this chapter.)
- **Magnetic compass:** Mount the unit at least 3 ft (1 m) away from a magnetic compass.
- **Cable runs:** The unit must be located near a DC power source. The power cable supplied is 10 ft (3 m).
- **Environment:** Good ventilation is required to prevent the unit from overheating.

CAUTION: Do Not Remove the Transducer Cable
Removing the transducer cable from the DSM300 while power is turned on can cause sparks. As with any electronic device, be sure the sounder module is mounted where it is well ventilated and free from gasoline fumes.

1.4 Mounting the Sounder Module

The DSM300 can be mounted either above or below deck using the supplied hardware. To allow for ease of cable connection, mount the sounder module so that the cables hang below the unit.

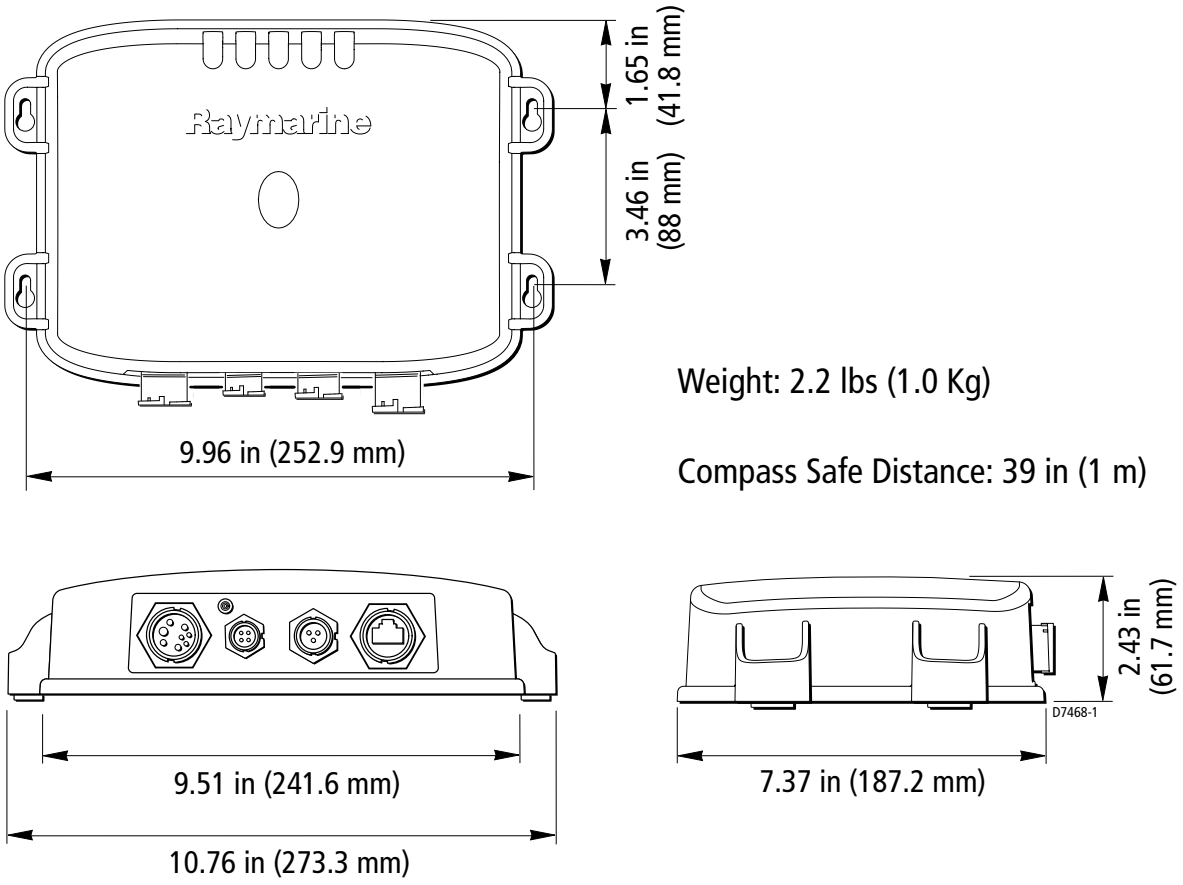
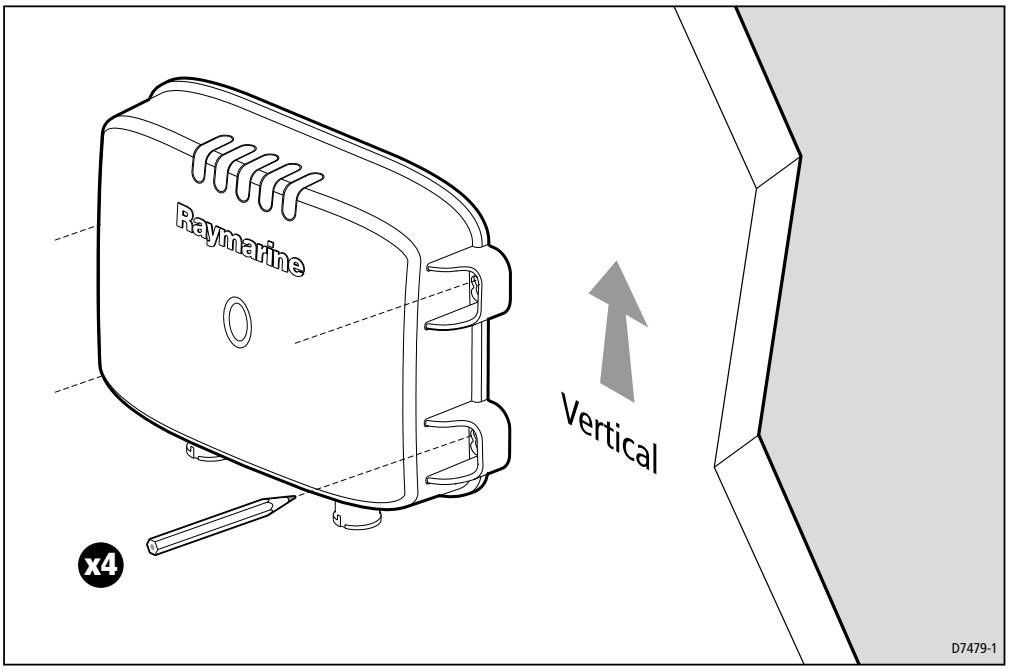


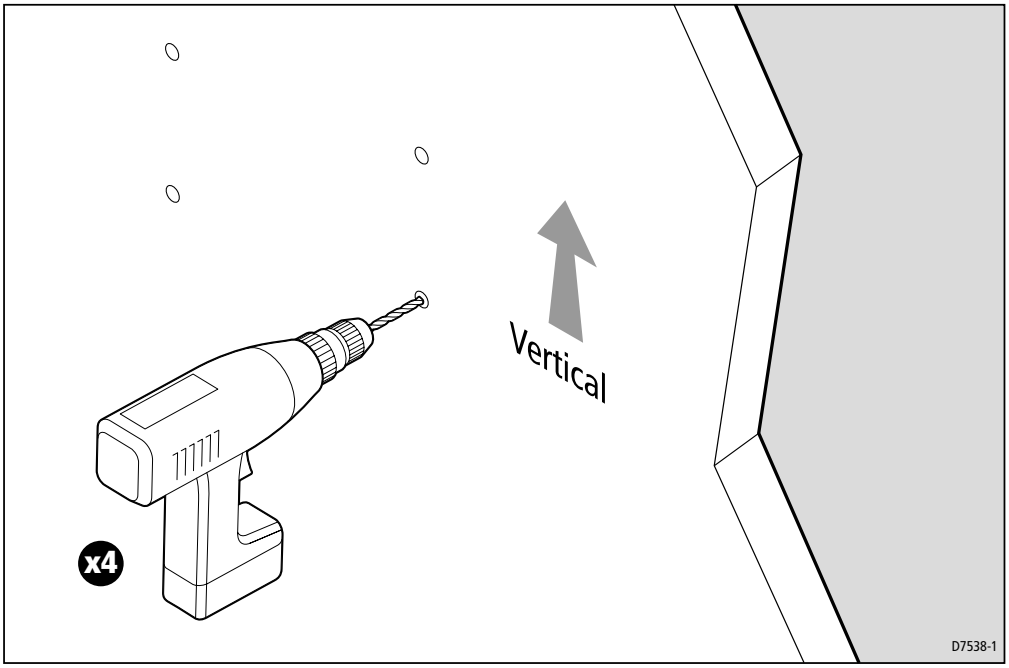
Figure 1-2: DSM300 Dimensions

➤ To mount the DSM300:

1. Hold the module in the location where you want to mount it, making sure it is perpendicular to the deck.
2. Mark the location of the four key holes onto the mounting surface.



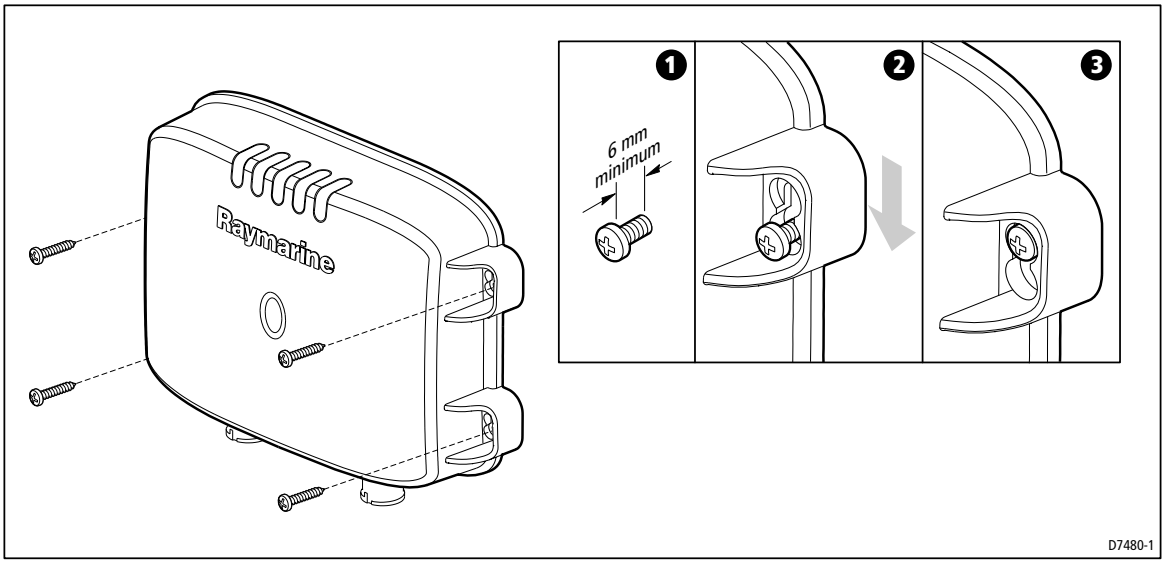
3. Drill a 9/64" pilot hole at each of the marked locations.



Note: *For fiberglass with a gelcoat surface, you should overdrill the surface to prevent the gelcoat from chipping when driving in the screw. Before drilling the pilot hole, hand drill the marked location with an oversized bit and countersink to approximately 3/8" diameter.*

4. Drive the supplied #8 screws into the pilot holes. Screw them in about half way.
5. Mount the module to the surface, slipping the screw heads through the four key holes.

6. Press the module downward so the screws align with the narrow end of the keyholes.



7. Tighten the screws. Do not overtighten.

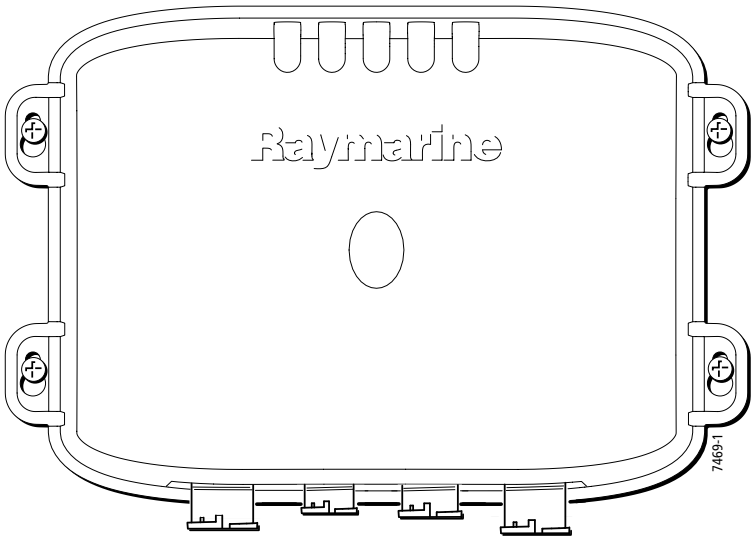


Figure 1-3: Properly Mounted DSM300

1.5 Cable Runs

Consider the following before installing the system cables:

- You will need to attach power, transducer, and display cables.
- All cables should be adequately secured, protected from physical damage, and protected from exposure to heat.
- Avoid running cables through bilges or doorways, or close to moving or hot objects.
- Avoid sharp bends.
- Use a watertight feed-through wherever a cable passes through an exposed bulkhead or deckhead.
- Secure cables in place using tie-wraps or lacing twine. Coil any extra cable and tie it out of the way.

You will need to run the following cables:

- **Power cable**, supplied with the unit. This 10 ft (3 m) cable has a connector plug at one end for connecting to the sounder module, and 3 wires at the other end for connecting the power supply. The power cable may be extended by up to 60 ft (20 m) using a wire gauge of AWG 12 or greater. The DSM300 is intended for use on boat's DC power systems rated from 10.7 V to 32 V.
- **Display cable**, used to connect the DSM300 to a display unit. A 3m-long cable is included for connecting to a C Series display. Connection cables for E Series or hsb^2 PLUS (Pathfinder) Series displays, or longer C Series cables, must be purchased separately. See Table 1-1 "Cable Options" on page 9 for a list of available display cables.
- **Transducer cable**, supplied with the transducer. This 30 ft (10 m) cable has a connector plug (with an outer nut that you must attach) at one end for the sounder module or extension cable. Optional extension cables are listed in Table 2-1 "Accessories" on page 25.

CAUTION: Do Not Cut or Splice the Transducer Cable

- **There is high voltage on the transducer cable. Splicing could create a safety hazard.**
- **Cutting the transducer cable severely reduces sonar performance. If the cable is cut, it must be replaced—it cannot be repaired.**
- **Cutting the transducer cable will void the warranty and invalidate the European CE mark.**

1.6 System Connections

The connector panel provides the following connection sockets:

- **T/D,** 7-pin socket for connecting to the transducer
- **HSB2**, 4-pin socket for connecting to a C Series or hsb² PLUS Series display
- **POWER**, 3-pin socket for connecting to boat's DC power systems rated from 10.7 V to 32 V and one RF ground (screen) connection
- **SEATALK HS,** RJ-45 socket for connecting to an E Series display

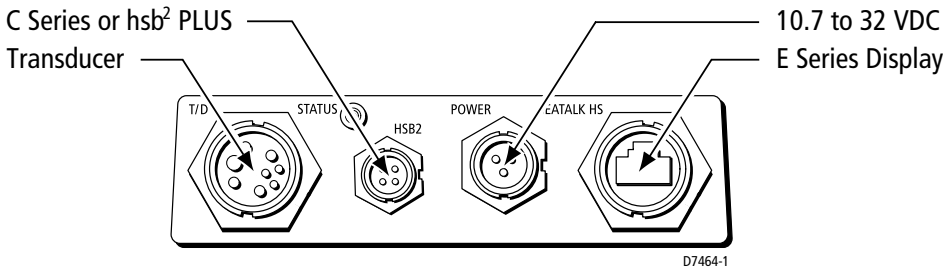


Figure 1-4: DSM300 Connector Panel

CAUTION:
To protect exposed pins, please place the attached dust cover over the socket (4-pin or RJ-45) to which you are not connecting a cable.

The following sections detail the connectors used when installing the DSM300.

DC Power Connection

The DSM300 is intended for use on boat's DC power systems rated from 10.7 V to 32 V.

The power connection to the unit should be made at either the output of the battery isolator switch or at a DC power distribution panel. Power should be fed directly to the DSM300 via its own dedicated cable system and protected by a thermal circuit breaker or fuse on the red (positive) wire that is installed close to the power connection.

DC power is connected at the 3-pin POWER connector on the unit's connector panel. The connector (viewed from the outside) and pin functions are shown in the following diagram and table.

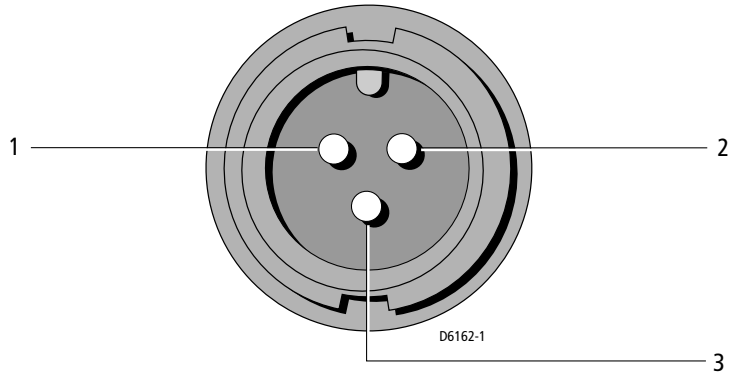


Figure 1-6: Power Connector

Pin No.	Function	Color
1	Battery positive (12/24/32 V systems)	Red
2	Battery negative	Black
3	Shield (drain wire)	No insulation

The RED wire must be connected to the feed from the positive (+) battery terminal and the BLACK wire to the feed from the negative (–) battery terminal. The shield wire (drain) should be connected to the boat's RF ground. See "Ground Connection" on page 17.

Install a quick blow 8 amp fuse on the red (positive) wire.

CAUTION:
If the power connections are accidentally reversed the system will not work. Use a multimeter to ensure that the input power leads are connected for correct polarity.

There is no power switch on the DSM300. The unit turns on when the power cord is attached to boat's power and plugged into the POWER connector on the connector panel.

Note: *You should locate the DSM300 so that the power cord can be easily removed, if necessary. If the sounder is placed in a difficult-to-reach location, Raymarine strongly suggests installing an on/off switch on the DSM300 power cord at a point where it is easily accessible.*

Transducer Connection

A 30 ft (10m) cable is supplied with the transducer. For details see "Transducer Cable" on page 26. The connector pins are shown in the following diagram, together with the connections and wire colors; this is information is provided as an aid to fault diagnosis.

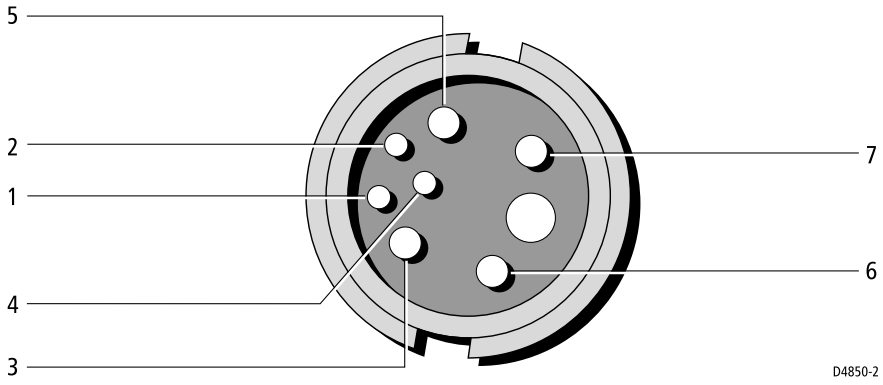


Figure 1-7: DSM300 Transducer Connector

Pin No	Function	Color	Pin No	Function	Color
1	Speed	Red	5	Speed/Temp Ground	Brown
2	Temp	White	6	+ Depth	Blue
3	Shield	Drain	7	– Depth	Black
4	Sense	Green			

Ground Connection

It is important that an effective RF ground is connected to the system. A single ground point should be used for all equipment. You can ground the DSM300 by connecting the drain wire (shield) of the Power Input cable to the boat's RF ground. If you need to extend the wire, the extension wire should be an 8 mm braid or AWG 10 multi-stranded cable.

If your boat has a dedicated ground strap available, you can alternatively attach it to the ground wing nut on the rear panel of the module. If your boat does not have an RF system, connect the drain wire to the negative battery terminal.

The DC system should be either:

- Negative grounded, with the negative battery terminal connected to the boat's ground.
- Floating, with neither battery terminal connected to the boat's ground.

This system is not intended for use on "positive" ground vessels.

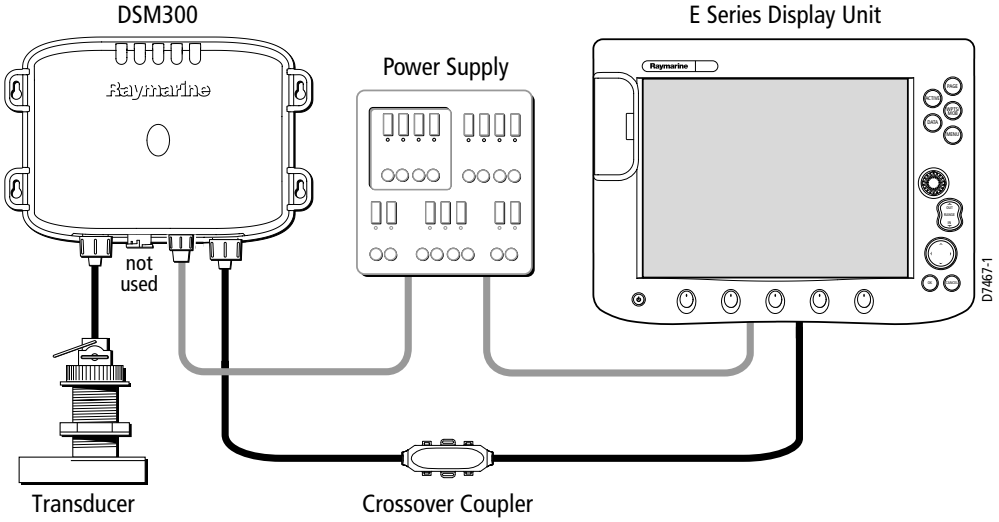


Figure 1-8: Using the DSM300 with an E Series Display

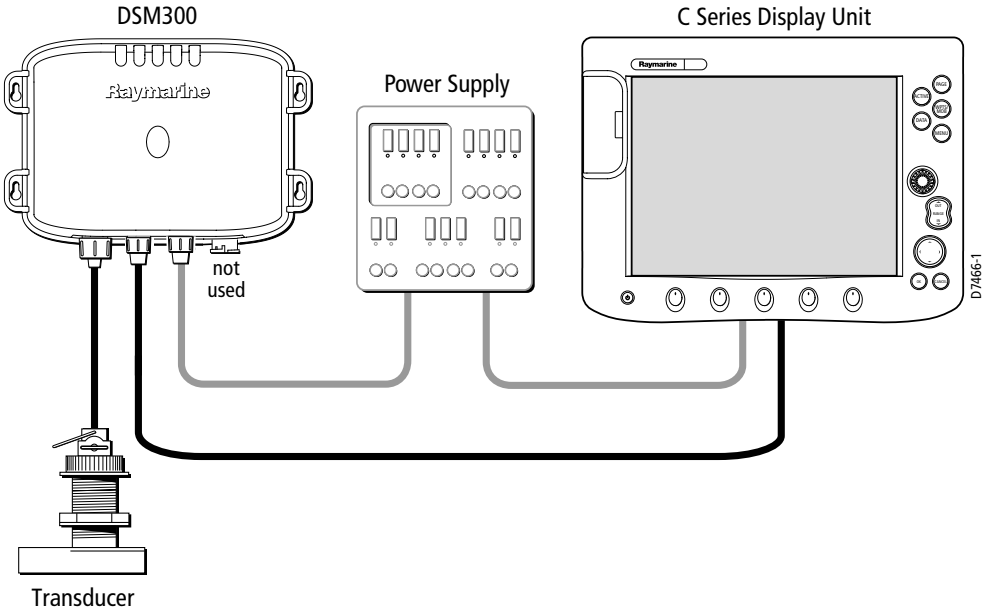


Figure 1-9: Using the DSM300 with a C Series Display

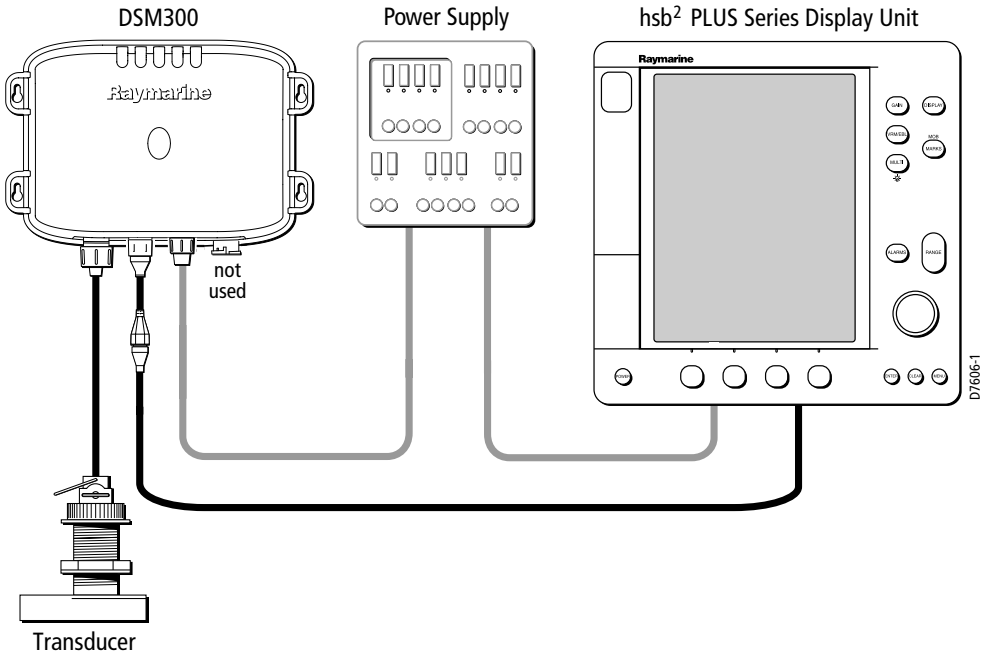


Figure 1-10: Using the DSM300 with an hsb^2 PLUS Series Display

1.7 Configuration

How you configure your DNT300 depends on the type of display to which you will be connecting it.

Configuring the DSM300 with E Series Displays

The E Series system operates on the SeaTalk^{hs} network, which uses cables with an RJ-45 modular connector. See Table 1-1 for a list of available E Series cables. When the DSM300 is used with a single display, connection is made via a SeaTalk^{hs} Crossover Coupler.

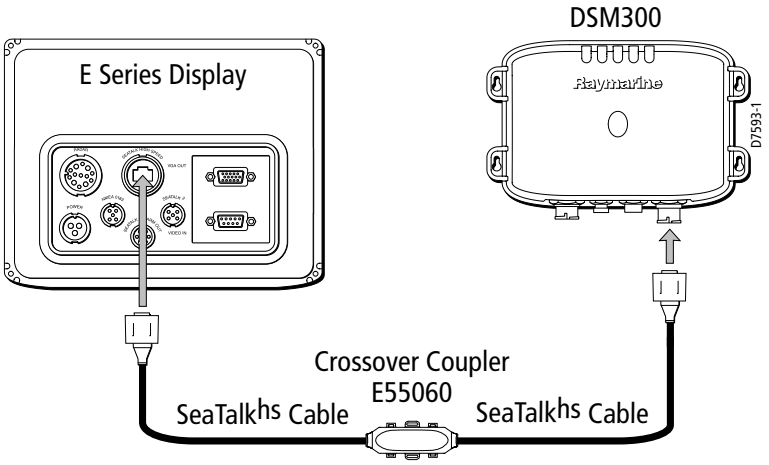


Figure 1-11: Configuring an E Series System - Single Display

When used in a multiple display system, connect the DSM300 to the SeaTalk^{hs} Network Switch.

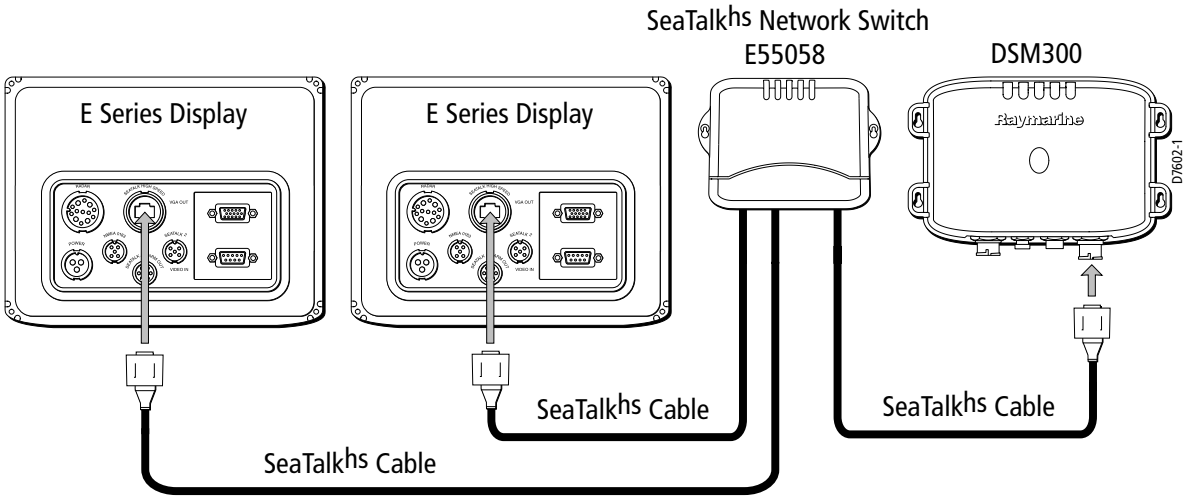


Figure 1-12: Configuring an E Series System - Multiple Displays

Configuring the DSM300 with C Series Displays

The C Series system uses cables with a round 4-pin twist-lock network connector. A 3m-long C Series cable is included with your DSM300. If a longer cable is required, an optional 10m C Series cable (part number E65011) is available from Raymarine.

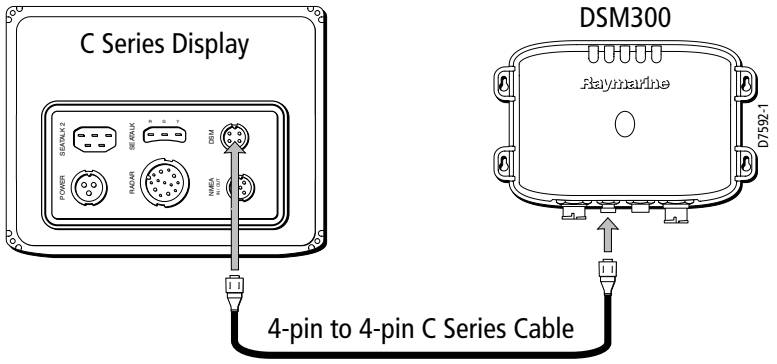


Figure 1-13: Configuring a New C Series System

The product that the DSM300 replaces—the DSM250 sounder module—has a triangular 3-pin network connector. If you are replacing an old DSM250 with a new DSM300 in an existing C Series network, you will need to install the supplied 4-pin to 3-pin hsb^2 adapter. Connect the 4-pin end of the adapter to the DSM300 and then connect the 3-pin end of the DSM cable to the DSM300.

Unlike the DSM250, however, the DSM300 network connection is internally terminated. **When replacing a DSM250 with a DSM300, DO NOT USE the hsb^2 Inline Terminator that was connected to the DSM250.**

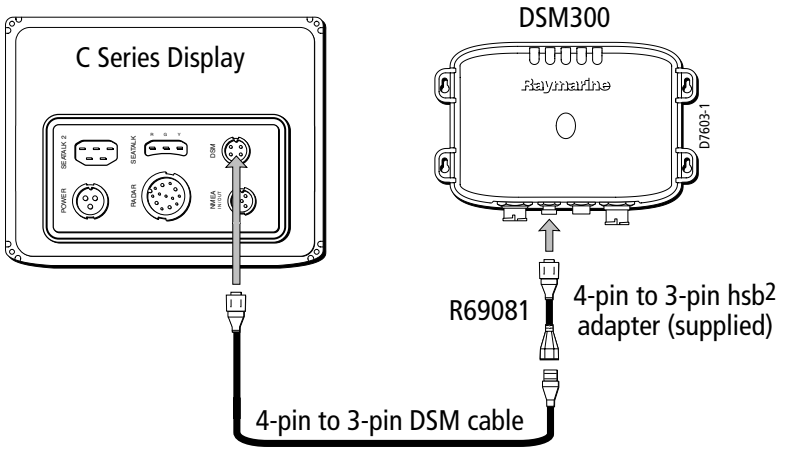


Figure 1-14: Replacing a DSM250 in an Existing C Series System

Configuring the DSM300 with hsb² (Pathfinder) Series Displays

hsb² PLUS network cables have a triangular 3-pin connector on both ends. When using the DSM300 with an hsb² PLUS Series display, connect the supplied 4-pin to 3-pin hsb² adapter between the DSM300 and the network cable.

The hsb² system must be terminated at both ends of the network. If a PLUS Series display is the last device on the network, an inline terminator is installed on the cable where it connects to the display. The network connection in the DSM300, however, is internally terminated; it does not require an inline terminator.

Because the DSM300 is internally terminated, it must be installed at the end of the hsb² network. You must NOT use an inline terminator on the DSM300 end of the network. If an hsb² splitter is used, you must connect it to a display and not to the DSM300.

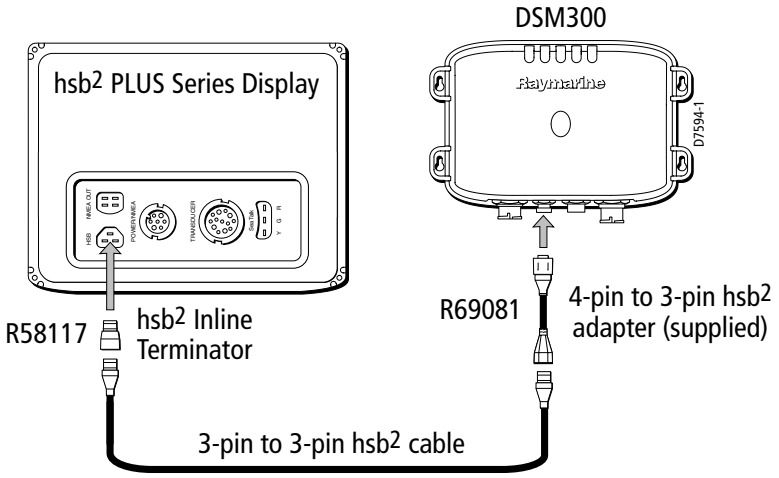


Figure 1-15: Installing a DSM300 in the hsb² PLUS System - Single Display

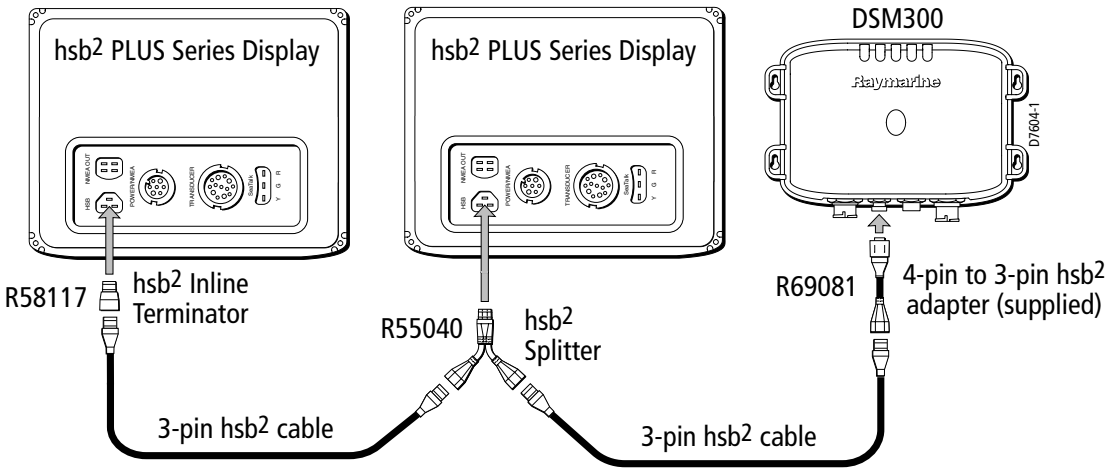


Figure 1-16: Installing a DSM300 in the hsb² PLUS System - Multiple Displays

Chapter 2: Transducer Installation

Transducers enable fishfinder systems to display depth, water temperature and/or speed information, depending on the type of transducer(s) installed. This chapter describes the transducers that are available for use with the DSM300.

This chapter also provides general information for installing the three main types of transducers: transom mount, thru-hull and in-hull. Specific instructions for installing your particular model are included with your transducer.

2.1 Selecting the Correct Type of Transducer

Before you start the installation, check that you have the correct transducer for your application.

Applications

Transom Mount Transducers are recommended for personal watercraft and powerboats with outboard, inboard-outboard and jet drives. They are NOT recommended for large or twin screw inboard boats.

- Adjusts to transom angles from 3° – 16°. For angles greater than 16°, a tapered plastic, wood or metal shim will be needed.
- Designed for operation from 5 – 58 m.p.h. (4 – 50 knots).

Thru-Hull Transducers are recommended for boats with straight-shaft inboard engines.

In-Hull Transducers are recommended for fiberglass hulls, especially in high speed power boats and racing sailboats.

Materials

Plastic housings are recommended for fiberglass or metal hulls.

Bronze housings are recommended for wood or fiberglass hulls.

Stainless Steel housings are recommended for steel or aluminum hulls.

Notes: **(1)** *Installation of a bronze housing in a metal hull requires using of a fairing, available from your Raymarine dealer.*
(2) *Never install a metal housing in a vessel with a positive ground system.*

The DSM300 can be used with any of the following transducers:

Mounting Method	Part No. (Model)	Sensor Type	Material	Max. Power
Transom	E66049 [1, 2] (M260)	Depth	Cast Urethane	1000W
	E66078 [3] (M256)	Depth	Cast Urethane	1000W
	E66019 (ST69)	Speed, Temp	Plastic	600 W
	E66054 (P66)	Depth, Speed, Temp	Plastic	600W
Thru-Hull	E66013 (P319)	Depth	Plastic	600 W
	E66014 (B117)	Depth	Bronze	600 W
	E66015 (SS555)	Depth	Stainless Steel	600 W
	E66076 [4] (R99)	Depth	Cast Urethane	2000W
	E66024 [5] (B256)	Depth, Temp	Bronze	600 W or 1000 W
	E66033 [5] (B260)	Depth, Temp	Bronze	600 W or 1000 W
	E66053 [4] (SS560)	Depth, Temp	Stainless Steel	1000W
	E66018 (ST600/B120)	Speed, Temp	Bronze	600 W
	E66030 (ST600/P120)	Speed, Temp	Plastic	600 W
	E66056 [4] (B744V)	Depth, Speed, Temp	Bronze	600 W

Mounting Method	Part No. (Model)	Sensor Type	Material	Max. Power
	E66057 [4] (B744VL)	Depth, Speed, Temp	Bronze	600 W
In-Hull	E66008 (P79)	Depth	Plastic	600 W
	E66049 [1] (M260)	Depth	Cast Urethane	1000W
	E66075 (R199)	Depth	Cast Urethane	2000W

[1] Can be used In-Hull or Transom mounted
[2] Requires E66047 kit to complete transom mount installation
[3] Includes transom mounting kit
[4] Includes high-speed fairing
[5] Must be installed with a high-speed fairing (sold separately)

Accessories

The following optional equipment is also available from Raymarine for your transducer:

Table 2-1: Accessories

Item	Part No.	For Use With
Transducer Extension Cable, 10 ft (3 m)	E66009	Depth Transducers
Transducer Extension Cable, 18 ft (5 m)	E66010	Depth Transducers
Transducer Y-Cable	E66022	Speed/Temp Transducers
High Speed Fairing	E66023	E66056(B744V), E66057(B744VL)
	E66025	E66024 (B256)
	E66034	E66033 (B260)
In-Hull Mounting Kit	E66050	E66049 (M260)
Transom Mounting Kit	E66047	E66049 (M260), E66046 (M256)

Notes: **(1)** *To ensure proper alignment and a secure fit, many thru-hull transducers require a fairing for installation. In addition to improving sounder performance at all speeds, the fairing allows better fitting to the hull and dramatically increases the sealing surface.*

(2) *This information was current as of the date this handbook was printed. New transducer models are constantly becoming available. Check with your dealer for the most current list.*

2.2 Transducer Cable

A 30 ft (10m) cable is supplied with the transducer. The transducer cable may be extended up to a maximum of 60 ft (20 m) using optional extension cables.

The transducer cable connector has a nut that has been removed to aid installation. To allow you to complete the installation without cutting the cable, ensure that any holes you drill are large enough to accept the connector, with the nut removed.

After the cable has been run through the holes, this nut must be attached before the cable can be connected, as described in *Transducer Cable Connections*.

CAUTION: Do Not Splice the Cable
Do not cut the transducer cable or remove the connector. Do not try to shorten or splice the cable. If the cable is cut, it cannot be repaired. Cutting the cable will also void the warranty.

- For a Transom mount installation – route the cable up and over the top edge of the transom as shown in Figure 2-2 . Secure the cable using cable clamps (available from your local marine equipment supplier).

  If you do not want to expose the cable on deck, you may drill a hole 13/16" (21 mm) through the transom for the cable (with connector attached). To seal the opening, use a feed-thru cap where the cable passes through the transom.
- For either type of installation – run the cable through the interior of the boat.
- If the 30 ft (10 m) cable is not long enough, extension cables are available from your Raymarine dealer. See Table 2-1 on page 25. Total cable length from the transducer to the DSM must not exceed 60 ft (20 m). When you attach the extension cable, be sure that the connections are watertight. Use Dow Corning DC-4 or an equivalent sealing compound to protect the connector assemblies.

CAUTION:
Do not pull on the cable as this can damage the transducer wires.

Transducer Cable Connections

The transducer cable connector (and Y-connector, if supplied) has a nut that has been removed to aid installation. To allow you to complete the installation without cutting the cable, ensure that any holes you drill are large enough to accept the connector, with the nut removed (approximately 13/16" or 21mm).

Before attaching the transducer cable, you will need to attach the connector nut and split ring. These items, plus a wedge tool, are included in the transducer packaging.

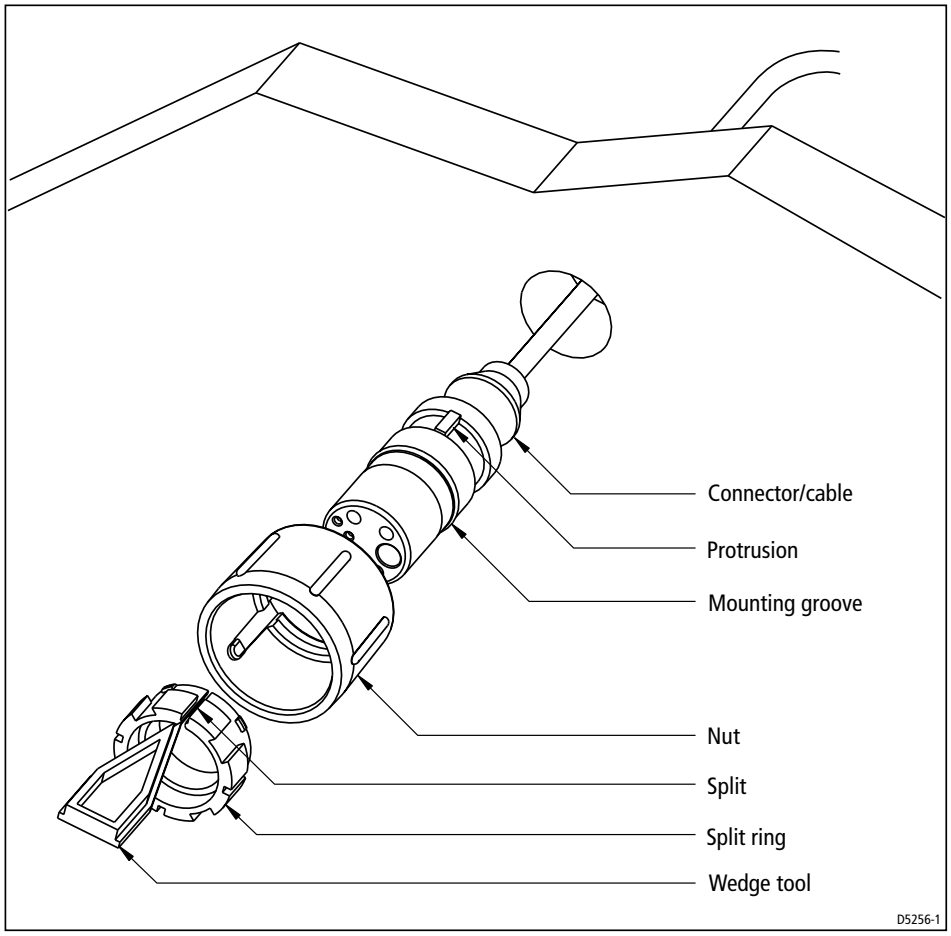


Figure 2-1: Assembling the Transducer Connector

➤ To attach the transducer cable connector:

1. Slip the nut over the connector cable end. Push it past the connector and over the cable.
2. Insert the wedge tool into the groove in the split of the split ring and slide the wedge tool until its squared end is flush with the larger edge of the split ring.
3. Slip the split ring and wedge tool over the connector body until aligned with the mounting groove on the connector.
4. Remove the wedge tool and seat the split ring in the mounting groove, making sure the connector protrusion falls into the split.
5. Slip the nut forward until it stops. Twist until the protrusions on the inside of the nut align with the grooves on the split ring.
6. Slip the nut forward and snap into place.

The transducer cable is attached to the 7 pin male connector on the DSM. How you connect the cable to the unit depends on the type of transducer you have installed:

- **Combined depth/speed/temp transducers** have a 7 pin female connector. Attach the transducer cable connector directly to the sounder module.
- **Combined speed/temperature transducers** have a 3 pin female connector that requires the use of an additional Y-shaped cable (Raymarine part number E66022) to attach to the 7 pin connector on the DSM300. This Y-cable is included with your speed/temperature transducer.

  Attach the 7 pin female connector on the Y-cable to the sounder module, and then attach the transducer cable to the 3 pin male connector on the Y-cable.
- **Depth-only transducers** have a 7 pin female connector.
  Attach the transducer cable connector directly to the sounder module.

  If being installed in conjunction with a speed/temperature transducer, attach the Y-cable's 7 pin female connector to the sounder module, and then attach the transducer cable to the 7 pin male connector on the Y-cable.

Note: *If your system requires both a Y-cable and a transducer extension cable, ensure that you connect the Y-cable to the sounder module and the extension cable to the transducer.*

CAUTION: Do not cut or splice the transducer cable:

- **There is high voltage on the transducer cable. Splicing could create a safety hazard.**
- **Cutting the transducer cable severely reduces sonar performance. If the cable is cut it must be replaced, not repaired.**
- **Cutting the transducer cable will void the warranty and invalidate the CE mark.**

CAUTION: Removing the Transducer Cable

Removing the transducer cable from the rear of the DSM300 while the sounder module is powered on can cause sparks. Only remove the transducer cable after power has been removed from the DSM300.

If the transducer cable is accidentally removed while the DSM300 is powered on, remove power from the sounder module, replace the transducer cable, and then return power to the module. As a safety feature, the DSM300 only recognizes that the transducer is connected at power-up.

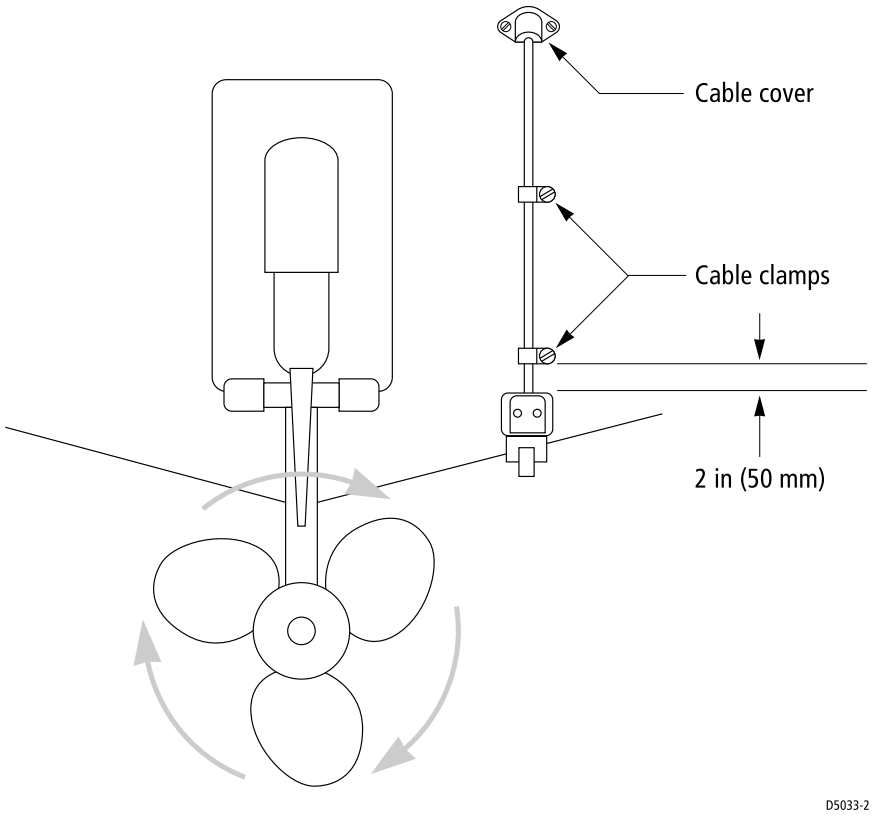


Figure 2-2: Installing the Cable on a Transom Mount Transducer

2.3 Selecting the Equipment Location

Transducer Mounting Location

It is very important that you mount the transducer correctly. The transducer provides the most reliable readings if it looks into water that is smooth and undisturbed.

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, rain and other vessels cannot be controlled. Carefully selecting the transducer's mounting location can minimize noise generated by the vessel's propeller(s), shaft(s), machinery, and other echo sounders. The lower the noise level, the higher the echo sounder gain that can be used, and the better the sounder's performance.

To ensure accurate readings, DO NOT mount the transducer in an area of turbulence or bubbles:

- near water intake or discharge openings
- behind strakes, fittings or hull irregularities
- behind eroding paint (an indication of turbulence)

Choose a location where:

- The water flowing across the hull is smoothest with a minimum of turbulence and bubbles (especially at high speeds).
- The transducer will be continuously covered by water when the boat is moving. If the transducer is mounted near the side of the boat, it may be exposed when the boat is turning.
- The transducer beam is unobstructed by the keel or propeller shaft.
- There is a minimum deadrise angle.
- There is adequate headroom inside the vessel for the height of the thru-hull housing, tightening the nuts, and removing the valve assembly insert.

Transom Mount Transducer

- Single drive boat – Refer to Figure 2-3 . If your boat has one propeller (outboard or inboard), mount the transducer about 18" (455 mm) to the side of the boat's centerline. To reduce any interference caused by air bubbles, choose the side on the downstroke of the propeller (usually the starboard side).
- Twin drive boat – If your boat has twin propellers (outboard or inboard-outboard), mount the transducer between the drives near the centerline of the boat. If the boat will be operated at high speeds, the transducer may be mounted closer to the centerline of the hull.
- If the propeller can be turned to steer the boat, allow at least 2" (50 mm) beyond the swing radius of the propeller. This will prevent the propeller from damaging the transducer when it is turned.

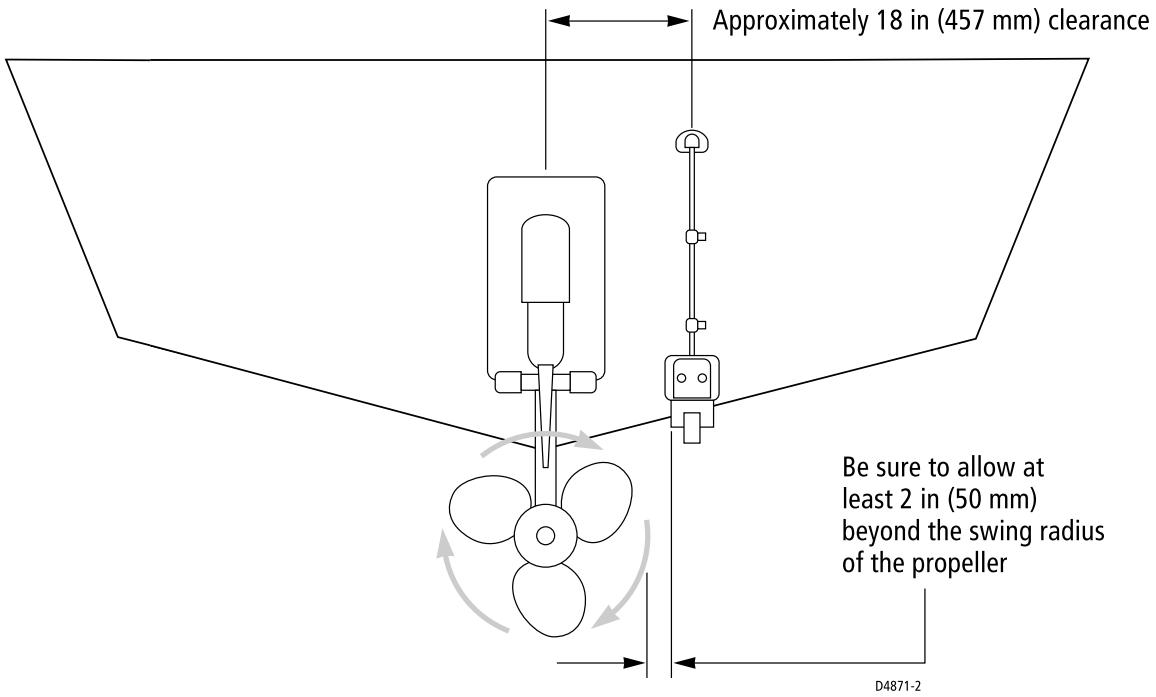


Figure 2-3: Transom Mount Transducer Location

- Do not mount the transducer behind any hull fittings, intakes or other parts extending from the hull that may cause turbulence or air bubbles.
- The bracket has a quick-release mechanism, shown Figure 2-4 . This allows the transducer to flip up if it hits any debris or the bottom. Allow enough clearance above the transducer for it to swing upwards completely – this is about 10" (254 mm), measured from the bottom of the transom.

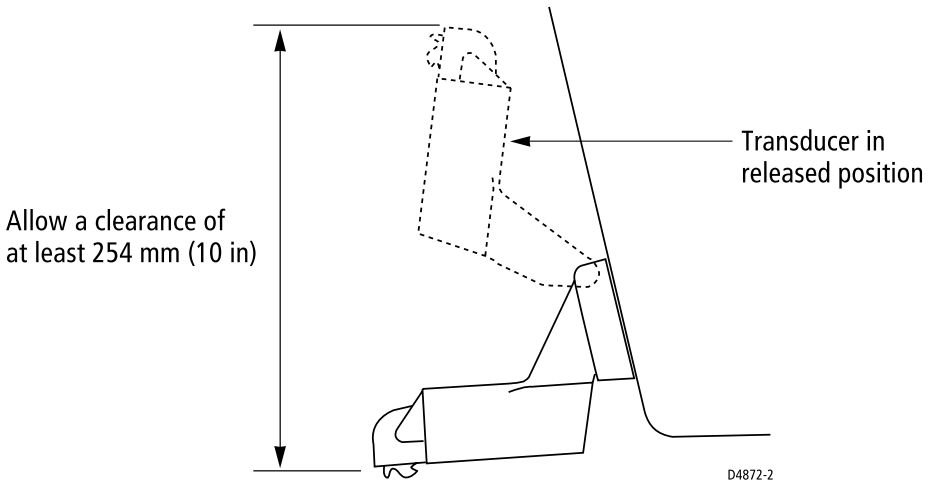


Figure 2-4: Transom Mount Transducer - Quick-release Bracket

- On a boat with a fiberglass hull, the leading edge of the transducer should extend 1/8" (3.2 mm) to 1/4" (6 mm) below the bottom edge of the hull as shown in Figure 2-5 . On an aluminum hull, the transducer should extend a bit more – 1/4" (6 mm) to 3/8" (9 mm)
- If the boat will be trailered, be sure the transducer will not hit any rollers, bunks or fittings on the trailer.

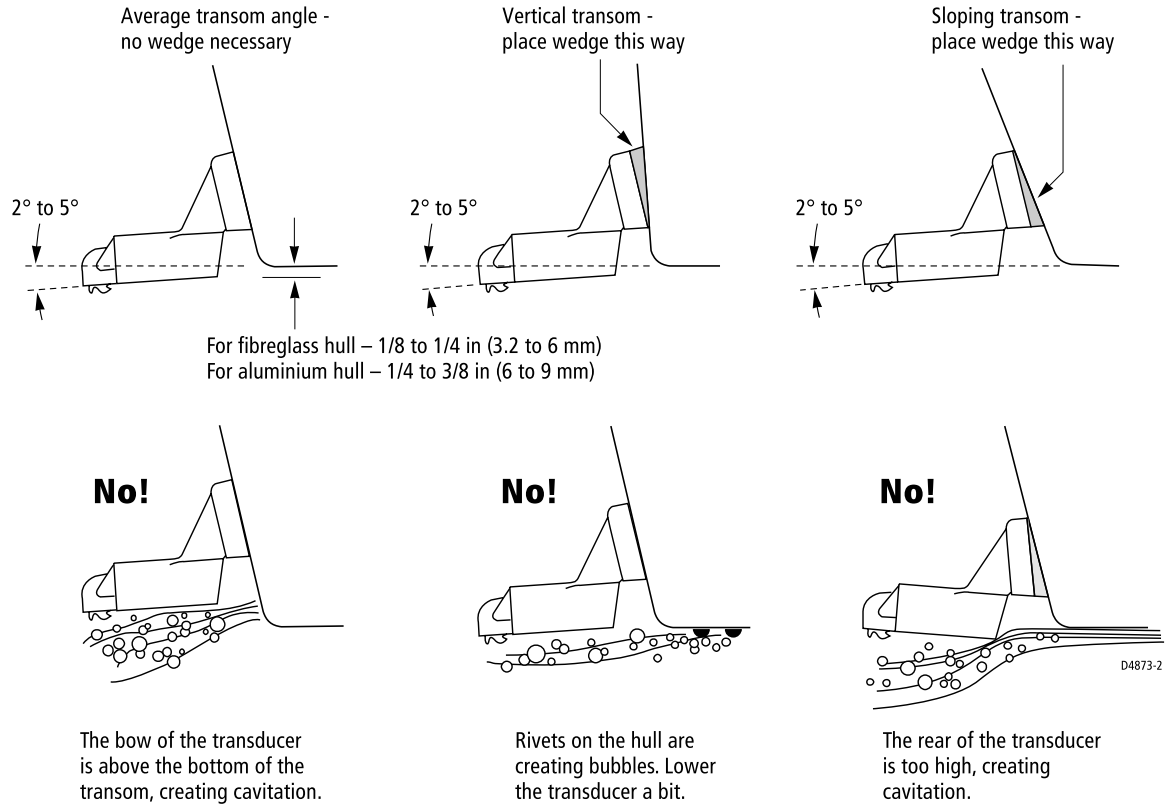


Figure 2-5: Transom Mount Transducer - Vertical Position

Thru-hull Transducer and In-hull Transducer

Similar consideration should be given to the location of thru-hull and in-hull transducers. Figure 2-6 shows the best transducer location for different hull types.

- Displacement hull powerboat – Locate at 1/3 aft load waterline length (LWL) and 6 - 12" (150-300 mm) 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 ensure 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 just forward of the engine(s).
Inboard – mount well forward of the propeller(s) and shaft(s).
Step-hull – Mount just ahead of the first step.
Boats capable of speeds above 25 kn (29 m.p.h.) – Review transducer 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 1 - 2 ft (300-600 mm).
- Full keel sailboats – Locate amidships and away from the keel at the point of minimum deadrise angle.
- Fiberglass Hulls – 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. If you cannot avoid locating the sensor over coring, follow the instructions for "Installation in a Cored Fiberglass Hull" on page 55.
- Thru-hull Transducer Headroom– Allow adequate headroom inside the vessel for the height of the thru-hull housing, tightening the nuts and removing the insert. The minimum headrooms are:
  With fairing: 10" (254 mm)
  Without fairing: 12" (305 mm)
- In-hull Transducer – Find a location 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 the outer skin of the hull.

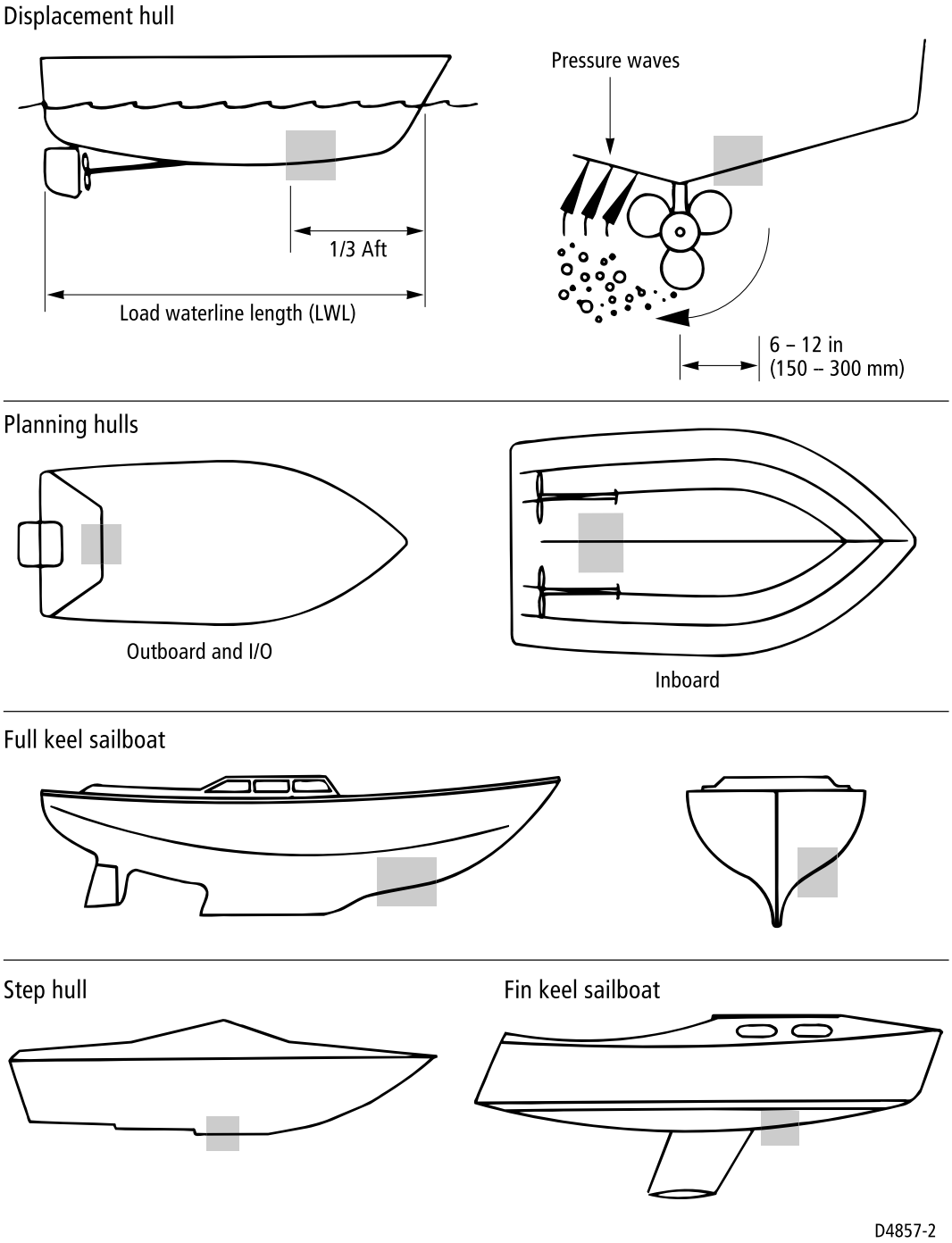


Figure 2-6: Best Location for Thru Hull Transducer

2.4 Installing the Transom Mount Transducer

Preparation

Transducer Mounting Bracket

When installed, the lower surface of the transducer should tilt down toward the rear at a slight angle (2° to 5°). The mounting bracket includes a wedge; depending on the angle of the transom on your boat, you may need to install this wedge to get the correct transducer angle.

1. To attach the transducer to the bracket, insert the transducer mounting lugs into the slot in the bracket as shown in Figure 2-7 .

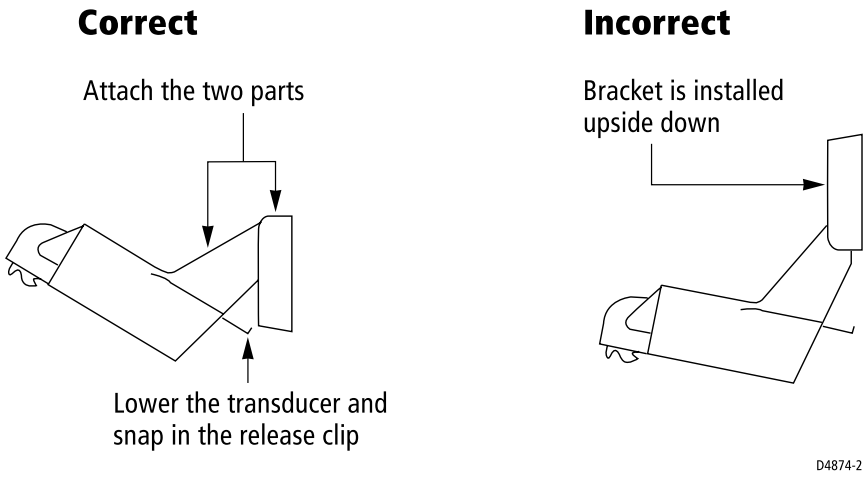


Figure 2-7: Fitting the Transducer to the Bracket

2. Looking at the rear of the boat, be sure the bracket is vertical (perpendicular to the water line) and hold the bracket (plus the wedge, if used) against the transom.
   Trace the position of the screw slots, then mark the screw positions as shown in Figure 2-8 . The outer two screws should be placed about 1/4" (6 mm) up from the bottom of each slot, the center screw should be placed about 1/4" (6 mm) down from the top. This will allow the bracket to be adjusted up or down. Remove the bracket.

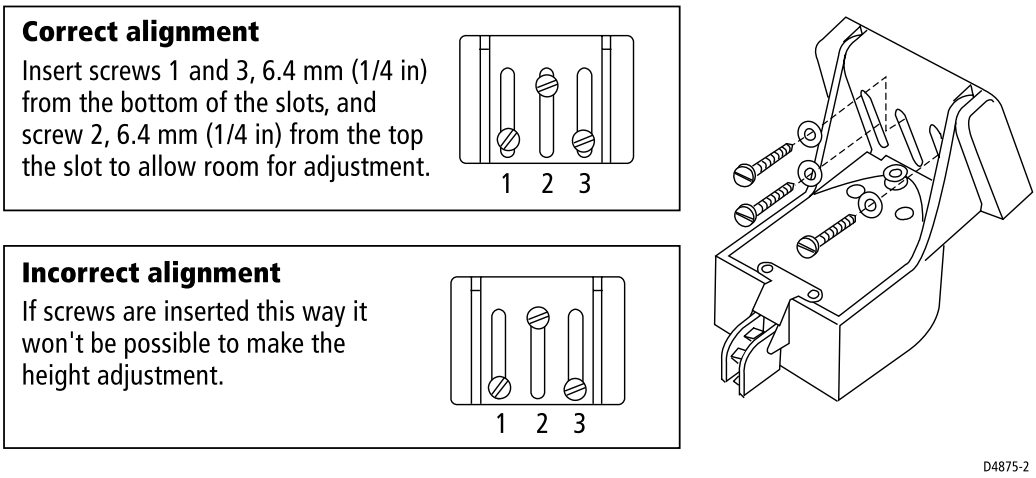


Figure 2-8: Position of Screws in Mounting Bracket

Installation

1. On a fiberglass hull, to minimize surface cracking of the gel coat: Before drilling the pilot holes, use a 1/4" (6 mm) drill bit to drill a shallow hole (chamfer) at each location about 1/16" (1.5 mm) deep.
   Drill pilot holes 3/4" (19 mm) deep using a 9/64" (3.6 mm) drill bit.
   To prevent drilling too deeply, wrap masking tape around the drill bit about 7/8" (22 mm) from the tip. Drill in only as far as the tape.
2. Apply a good quality marine sealant to the pilot holes to protect the hull from water penetration.
3. Attach the bracket to the hull using the panhead screws with flat washers. Do not completely tighten the screws yet.
4. Move the bracket up or down so the leading edge of the transducer has the clearance shown in Figure 2-5 .
5. Once the bracket is in the correct position tighten the screws.

2.5 Installing the Thru-hull Transducer

Tools and Material Needed

Water-based antifouling paint (mandatory for boats kept in salt water)
Safety goggles
Dust mask
Electric drill
Drill bit: 1/8" (3 mm)

Hole saw:
- Fiberglass or wood Drill 2" (51 mm)
- Aluminium or steel hull Drill 2-1/8" (54 mm)

Sandpaper
File (for installation in a metal hull)
Mild household detergent or weak solvent (alcohol)
Marine sealant
Slip-joint pliers
Silicone grease or petroleum jelly
Tie-wraps
Cored fiberglass hull installation:
- Hole saw for hull interior 2-3/8" (60 mm)
- Cylinder, wax, tape and casting epoxy

Fairing;
- Level and protractor (installation with a fairing)
- Rasp (installation with a fairing)

Preparation

Fairing

Most vessels have a deadrise angle at the transducer's mounting location. If the transducer is mounted directly to the hull, the sonar beam will be tilted off-vertical at the same angle as the deadrise. To offset this deadrise angle, you can install a transducer fairing. Different fairings are available to fit various transducers.

CAUTION: Using a Fairing
If thru-hull transducers are not carefully installed and fitted to the shape of the hull, the vessel may take on water. To ensure proper alignment and a secure fit, these transducer models MUST be installed with a fairing. In addition to improving sounder performance at all speeds, the fairing allows better fitting to the hull and dramatically increases the sealing surface.

Fairings are also strongly recommended for use with other high performance transducers. See the table that follows.

The fairing is used to:

- Vertically orient the sound beam by mounting the transducer parallel to the water surface
- Minimize aerated water flowing over the transducer's face by mounting it in deeper water
- Reduce drag by directing the water around the multisensor

The fairing is made of high impact urethane with an integrated cutting guide. It can be shaped to accommodate a deadrise angle of up to 25° and a range of hull thicknesses as follows:

Fairing No.	Used with Transducer No. (model)	Max. Hull Thickness with Fairing
E66023	E66056 (B744V)	1" (26mm)
E66023	E66057 (B744VL)	3-3/4" (87mm)
E66025	E66024 (B256)	1-3/4" (45mm)
E66034	E66033 (B260)	1-3/4" (45mm)

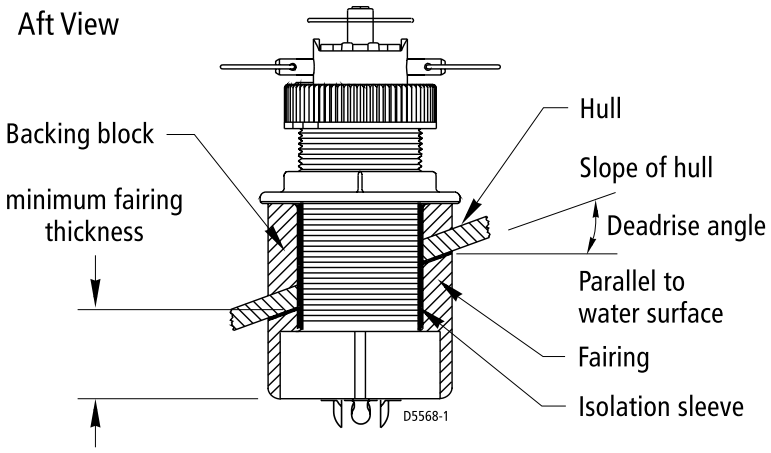


Figure 2-9: Deadrise Angle and Fairing Thickness

Backing Block

A backing block is used inside the hull to provide a level surface for the hull nut to seat against (see Figure 2-9). After cutting the fairing, use the remaining section with the cutting guide as the backing block (see Figure 2-10).

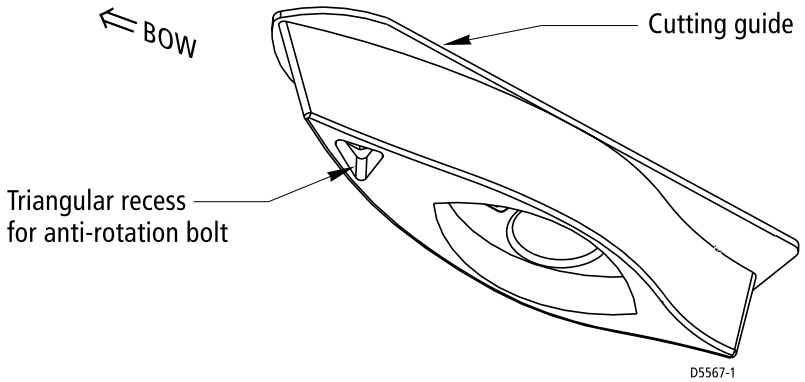


Figure 2-10: Transducer Fairing

Cutting the Fairing

1. Measure the deadrise angle of the hull at the selected location using a digital level, or bubble level and protractor (see Figure 2-9).
2. Tilt the band saw table to the measured angle and secure the cutting fence (see Figure 2-11).

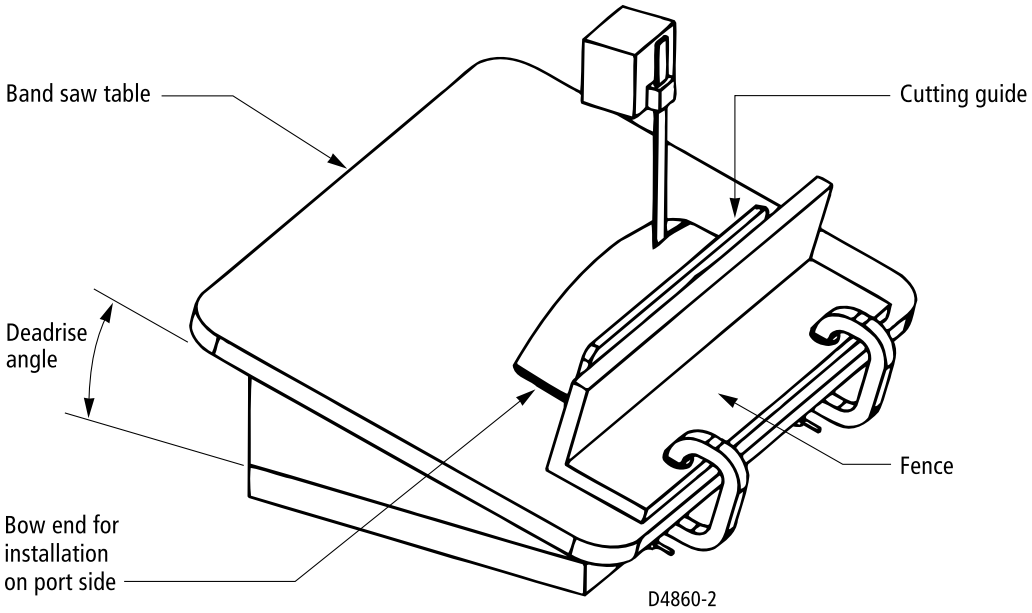


Figure 2-11: Cutting the Fairing

CAUTION:
The arrow on the fairing always points forward towards the bow. Be sure to orient the fairing on the band saw so the angle cut matches the intended side of the hull.

3. Place the fairing on the table so the cutting guide rests against the fence. The arrow/blunt end will point toward you for installation on the port side and away from you for installation on the starboard side of the boat.

CAUTION:
Always wear safety goggles and a dust mask when drilling.

4. Recheck steps 1 through 3, then cut the fairing.
5. Shape the fairing to the hull as precisely as possible with a rasp or power tool.

Antifouling Paint

Marine growth can accumulate rapidly on the transducer's surface, reducing performance in 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 six months or at the beginning of each boating season.

It is easier to apply antifouling paint before installation, but allow sufficient drying time. As illustrated in Figure 2-12 , paint the following surfaces:

Exposed area of the housing, including the acoustic window
Bore of the housing up to 1-1/4" (30 mm)
Outside wall below lower O-ring
Exposed end of the paddle wheel insert
Paddle wheel cavity
Paddle wheel
Blanking plug below the lower O-ring and the exposed end

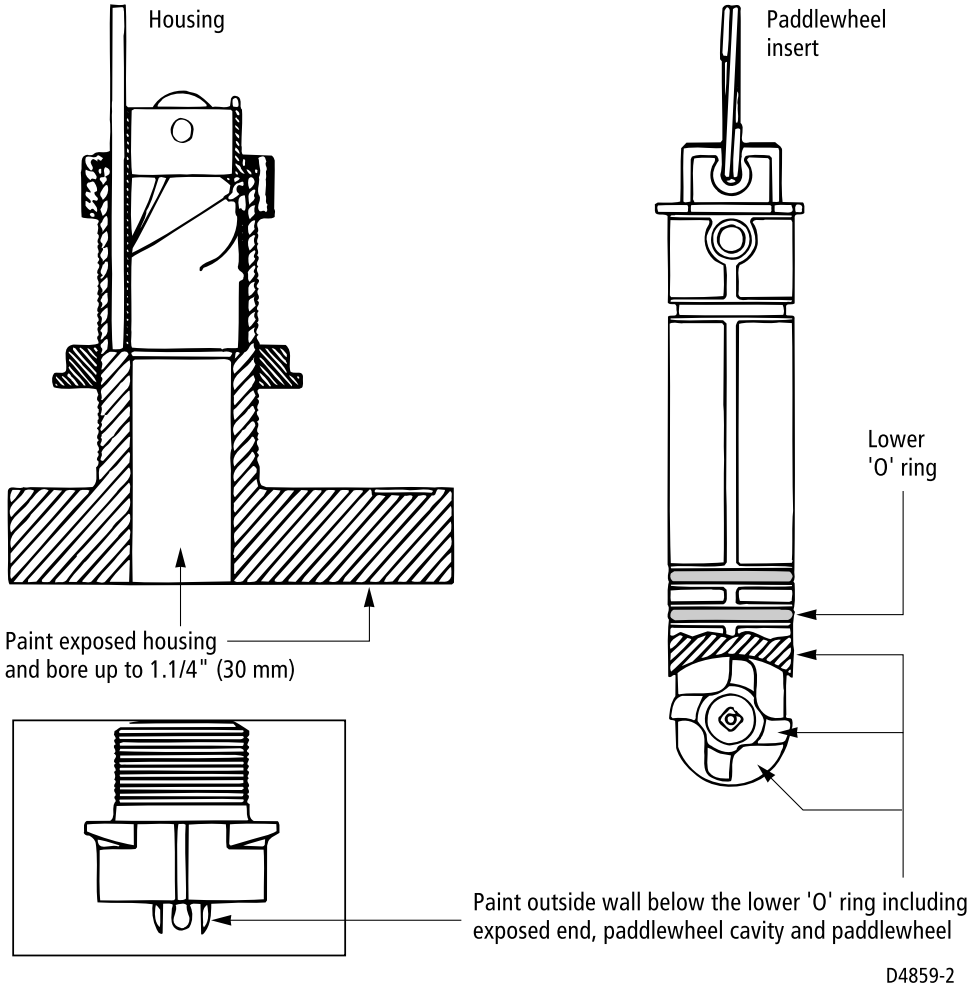


Figure 2-12: Applying Antifouling Paint

Installation

Note: *To install the thru-hull transducer in a cored fiberglass hull, follow the instructions in Installation in a Cored Fiberglass Hull on page 48.*

Drilling Holes

CAUTION:
Always wear safety goggles and a dust mask when drilling.

1. Drill a 1/8" (3 mm) pilot hole perpendicular to the water line from inside the hull (see Figure 2-9).
   If there is a rib or strut near the 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. Cut a hole from outside the hull:
   Fiberglass or wood hull – Use a 2" (51 mm) hole saw.
   Aluminium or steel hull – Use a 2-1/8" (54 mm) hole saw to accommodate the isolation sleeve used to prevent contact between the stainless steel housing and the metal 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 a mild household detergent or a weak solvent (alcohol) before sanding.
4. Remove one safety ring, the retaining pin, the cap nut, and the hull nut from the transducer (see Figure 2-13).

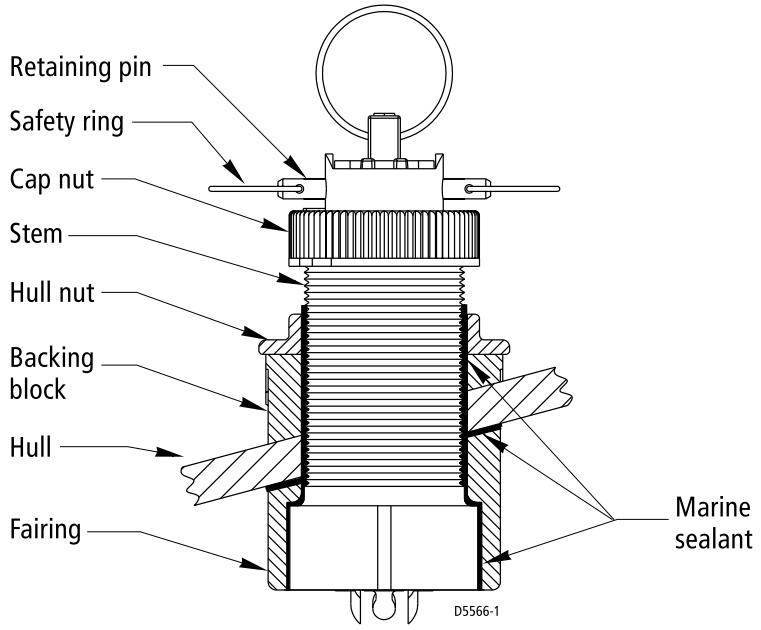


Figure 2-13: Seating

Dry Fit for Fairing

CAUTION:
If a fairing is used, the anti-rotation bolt must be installed to prevent the fairing from rotating when the boat is underway.

1. Dry fit the transducer to locate the hole for the anti-rotation bolt.
2. Thread the transducer cable through the large hole in the fairing and through the mounting hole in the hull. Seat the transducer firmly in the recess in the fairing.

Note: *The transducer must be flush with the fairing. If it is recessed more than 1/64" (0.5mm) inside the fairing, you may carefully file or sand the fairing flush with the transducer.*

CAUTION:
Always wear safety goggles and a dust mask.

3. Attach the drill bit to your drill appropriate for your fairing:

Fairing	Used with Transducer	Drill Size
E66023	E66056 (B744V), E66057 (B744VL)	3/8" (10mm)
E66025	E66024 (B256)	1/2" (13mm)
E66034	E66033 (B260)	1/2" (13mm)

4. Slide the transducer's stem with the fairing in place into the mounting hole. Be sure the triangular recess in the fairing is pointing forward toward the bow.
5. While holding the assembly in place and using the bolt hole in the fairing as your guide, drill a hole through the hull for the anti-rotation bolt.
6. Remove the assembly and cable from the mounting hole.
7. Sand and clean the area around the hole, inside and outside, to ensure that the sealant will adhere properly to the hull.
   Metal hull - Remove any burrs around both holes with a file and sandpaper.

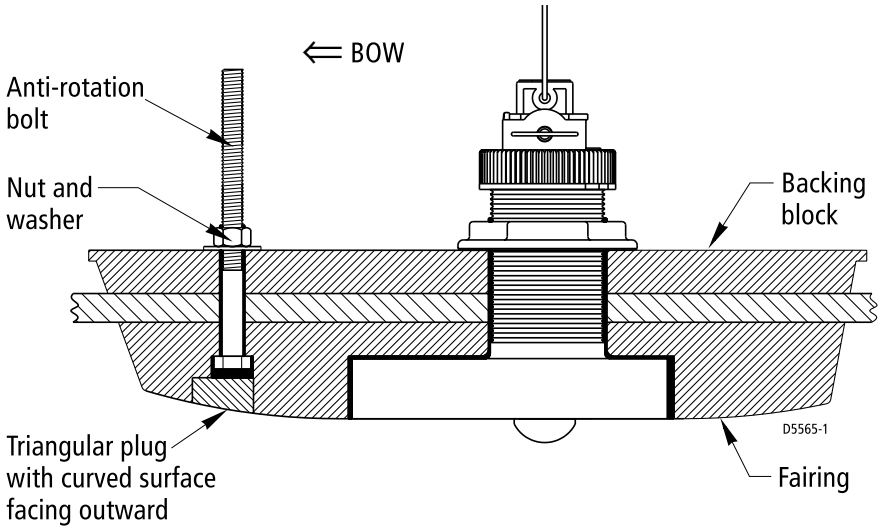


Figure 2-14: Using a Fairing and Backing Block

Seating

1. Remove the transducer from the fairing, if used.
2. Stainless steel transducer in metal hull - Slide the appropriate size isolation sleeve over the cable and onto the stem of the transducer as far down as possible (see Figure 2-9).

Be sure the top of the isolation sleeve will be below the top of the backing block to prevent the sleeving from interfering with tightening the hull nut.

CAUTION:
To prevent electrolytic corrosion, never allow direct contact between a stainless steel transducer and a metal hull.

3. Apply a 1/16" (2mm) thick layer of marine sealant to the sides of the transducer that will contact the fairing, if used, and up the stem 1/4" (6mm) higher than the combined thickness of the fairing, hull, backing block, and hull nut. This will ensure there is marine sealant in the threads to seal the hull and hold the hull nut securely in place (see Figure 2-13).

   Stainless steel transducer in metal hull - Apply the marine sealant to the outside of the sleeving instead of the stem itself.
4. If a fairing is used, thread the transducer cable through the fairing and seat the transducer firmly within the recess in the fairing.
5. Apply a 1/16" (2mm) thick layer of marine sealant to the surface of the fairing that will contact the hull, if used.

Attaching the Transducer

1. From outside the hull, thread the cable through the mounting hole.
2. Push the stem of the transducer (with the fairing in place) into the mounting hole using a twisting motion to squeeze out excess sealant.
3. From inside the hull, slide the backing block onto the transducer cable and stem, seating it firmly against the hull (Figure 2-15).

CAUTION:
Be careful to avoid cross threading the cap nut.

4. Screw the hull nut in place and tighten it with slip-joint pliers.
   Stainless steel transducer in metal hull - Be sure the top of the isolation sleeve is below the top of the backing block to prevent the sleeving from interfering with tightening the hull nut.
5. Apply a 1/16" (2mm) thick layer of marine sealant to the anti- rotation bolt, 1/4" (6mm) higher than the combined thickness of the fairing, hull, backing block, washer, and nut. This will ensure that there is marine sealant on the threads to seal the hull and hold the nut securely in place (see Figure 2-14).
6. Push the bolt through the fairing, if used, and into the hull.
7. From inside the hull, slide the washer and nut onto the bolt. Screw the nut in place and tighten it with slip-joint pliers.
   Wood hull - Allow for the wood to swell.

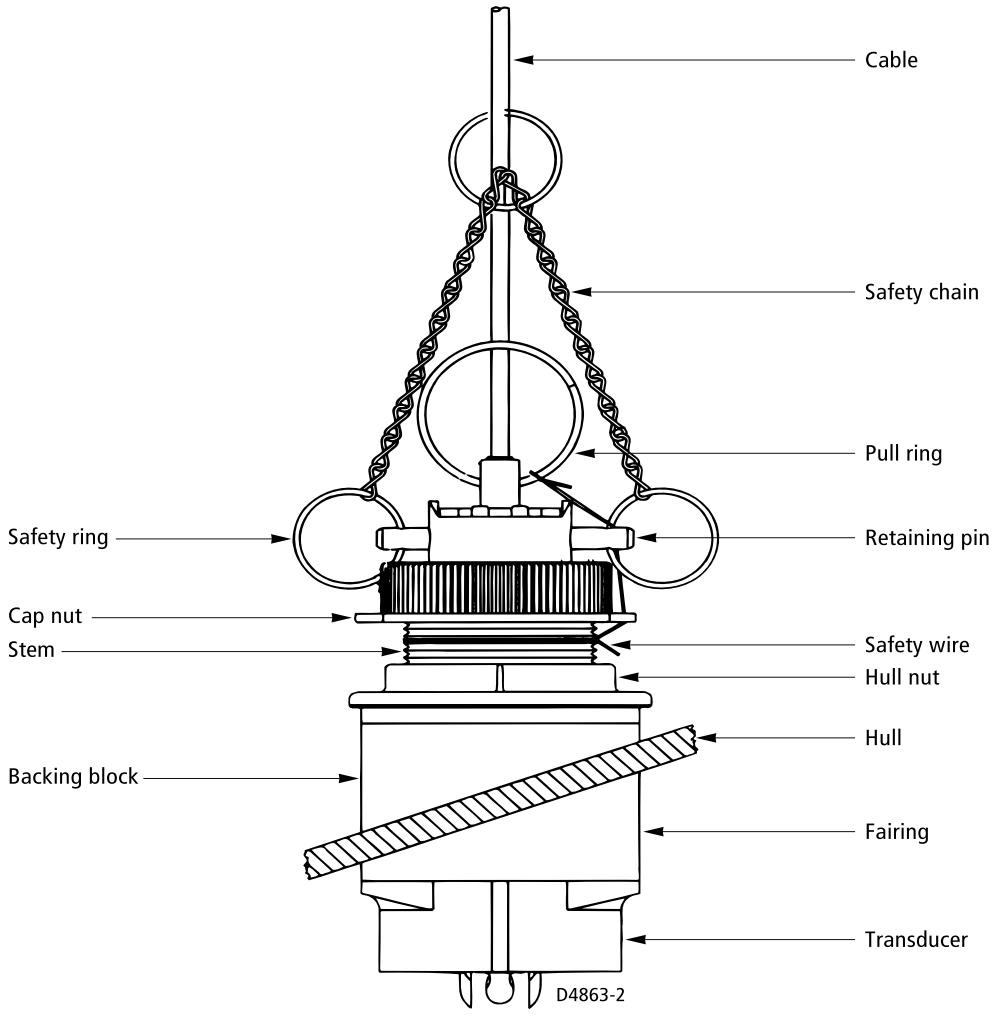


Figure 2-15: Fore View of Transducer Installation

8. If a fairing is used, apply marine sealant to the flat side of the triangular plug. Push the plug into the triangular recess in the fairing. The triangular plug fits one way only. Be sure the curved side of the plug is exposed, matching the curve on the outside of the fairing. Tap it into place with a mallet.

CAUTION:
For smooth water flow over the transducer's sensor, be sure that the external surface of the installed triangular plug is FLUSH with the external curved surface of the fairing.

9. Being sure the valve assembly is seated firmly in the housing, carefully screw the cap nut in place. Hand tighten it only; *do not over tighten*.
10. Remove any excess sealant on the outside of the hull to ensure smooth water flow over the transducer.

11. After the sealant cures, inspect and lubricate the O-rings on the paddle wheel insert with silicone grease or petroleum jelly (see Figure 2-16).
12. Slide the paddle wheel insert into the valve assembly with the arrow on the top pointing forward until it is fully seated (the insert fits one way only). Take care not to rotate the outer housing and disturb the sealant.
13. Slide the center ring of the safety chain onto the cable. Slide the retaining pin in place and reattach the safety ring (Figure 2-15).

CAUTION:
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.

14. 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 one of the safety rings. Loop the wire through the pull ring and twist it securely to itself.
15. Route the cable to the transducer, being careful not to tear the cable jacket when passing it through the bulkhead(s) and other parts of the boat.
16. Attach the connector nut to the cable per instructions in *Transducer Cable Connections* on *page 26*.
17. Attach the assembled connector cable to the transducer.
18. Route the other end of the cable to the DSM, 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.
19. Coil any excess cable and secure it in place using tie-wraps to prevent damage.

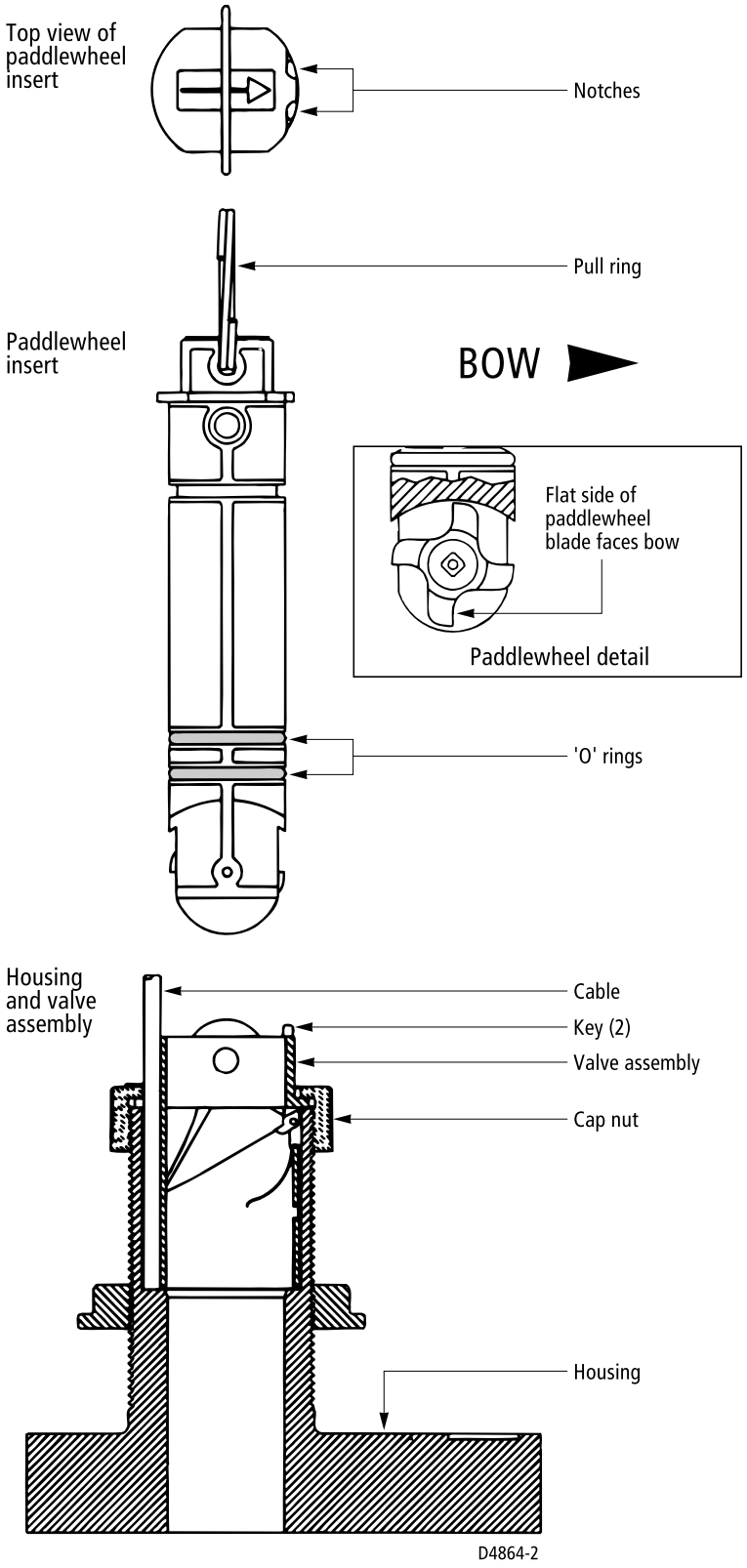


Figure 2-16: Servicing the Paddle Wheel Insert and Valve Assembly

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.

CAUTION:
Always wear safety goggles and a dust mask when drilling.

1. Drill a 1/8" (3 mm) pilot hole perpendicular to the waterline from inside the hull. If there is a rib or strut near the selected mounting location, drill from the outside (see Figure 2-16). 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 a 2" (51 mm) hole saw, cut a hole from outside the hull through the outer skin only.
3. Using the 2 3/8" (60 mm) 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

Note: *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.*

4. Remove the plug of core material so the inside of the outer skin and inner core of the hull is fully exposed. Clean and/or sand the inner skin, core, and the outer skin around the hole.

CAUTION:
Completely seal the hull to prevent water seepage into the core.

5. 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 (see Figure 2-17).

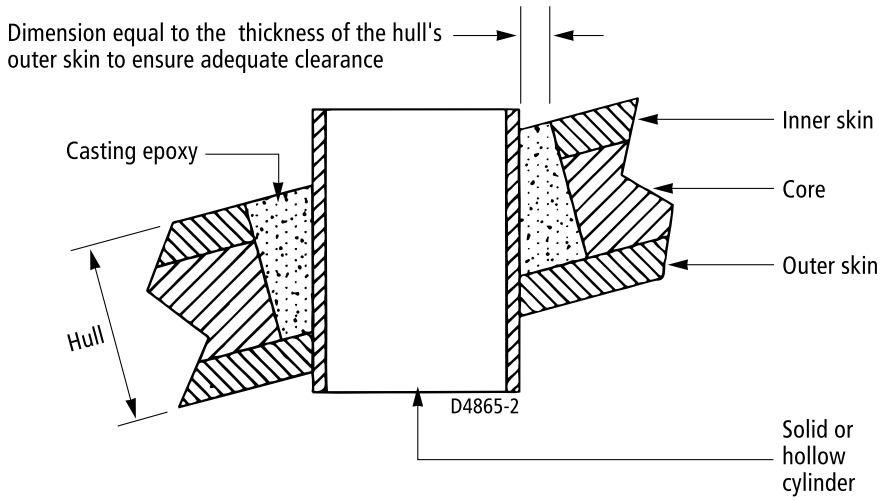


Figure 2-17: Preparing a Cored Fiberglass Hull

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 *Seating* on *page 43* and *Attaching the Transducer* on *page 44*.

Check for Leaks

CAUTION:
Never install a thru-hull transducer and leave the boat unchecked for several days.

1. 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. Do 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 (probably not enough to cause water damage). If a leak is observed, repeat *Seating* on *page 43* and *Attaching the Transducer* on *page 44* immediately.

2.6 Installing the In-hull Transducer

Tools and Material Needed

Tape
Pole
Detergent
Weak solvent (alcohol)
Safety goggles
Dust mask
Disc sander
Thin, sealable plastic bag (optional)
Twist-tie
Petroleum jelly (Vaseline®)
Level and protractor
Carpenter's square
Pencil
Adhesive (Loctite #5699 or 3M #4200)
Screwdriver
Silicone grease (optional)
Mineral oil 2.4 fl oz. (71 mil)
Cored fiberglass hull installation:
- Drill
- Hole saw for hull interior 4" (100 mm)
- Miniature disk sander
- Casting epoxy (polyproxy #7035/7040) or resin
- Paper cup
- Stirrer

Testing the Selected Mounting Location

Establishing a Performance Baseline

The results of this test are used to determine the best in-hull location for a transducer.

1. Take the boat to the maximum depth for which your instrument is rated, or the maximum depth in which you will operate the sounder.
2. Connect the transducer to the DSM. Refer to *Transducer Cable Connections* on *page 26*.

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 2-18). Keep the active face of the transducer parallel to the surface of the water.
4. Observe the sounder's performance and depth reading.

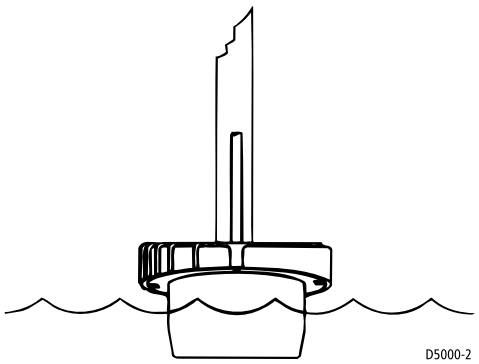


Figure 2-18: Establishing a Performance Baseline

Testing the Mounting Location

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

1. This method is recommended if the sensor will be located near the stern and the boat has a minimum deadrise angle.
   i. Clean away any large build-up of dirt and/or grease using detergent or a weak solvent such as alcohol.
   ii. Place the sensor against the hull and allow bilge water to cover the surface where they touch (see Figure 2-19 A).

CAUTION:
Always wear safety goggles and a dust mask.

2. This method can be used at all hull locations.
   i. If the hull surface is not smooth, grind it with a disc sander.
   ii. Partially fill a thin plastic bag with water, place the sensor inside the bag and close it tightly with a twist-tie.
   iii. Wet the surface of the hull and press the sensor face against it through the bag (see Figure 2-19 B).
3. This is the least desirable testing method, as it may be difficult to remove all traces of the petroleum jelly before bonding the base to the hull.
   i. If the hull surface is not smooth, grind it with a disc sander.
   ii. Coat the face of the sensor with petroleum jelly.

iii. Press it against the hull with a twisting motion (see Figure 2-19 C).

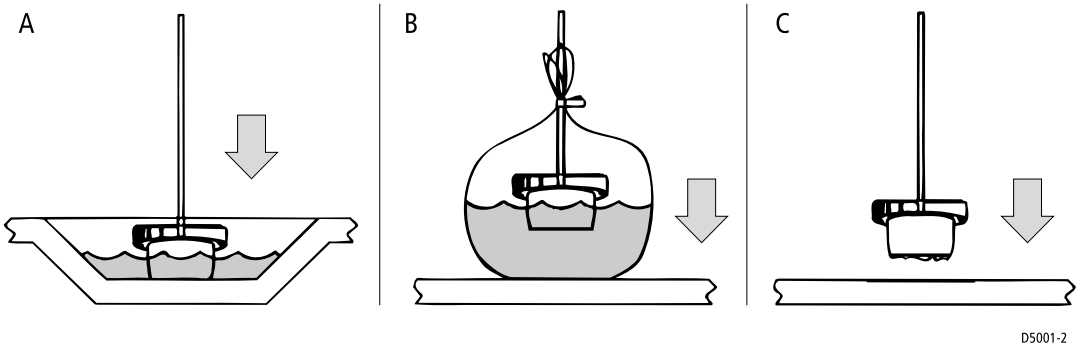


Figure 2-19: Testing the Transducer at the Selected Location

Observe the sounder'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, some energy is lost transmitting through the hull.

If the test reading differs markedly from the baseline, you need to find another location to install the transducer.

If there is no reading or it is erratic, the sensor 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 *Installation in a Cored Fiberglass Hull* on *page 55*.

Installation

1. Measure the deadrise angle of the hull at the selected location using a level and protractor (see Figure 2-20). Measure carefully, since the installed transducer must be within 5 ° of vertical.

CAUTION:
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 disc sander to smooth an area 4" (100 mm) in diameter.
3. Remove any dust, grease or oil with a weak solvent, such as alcohol, to ensure a good bond. Clean and dry both the selected area and the underside of the base.

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.

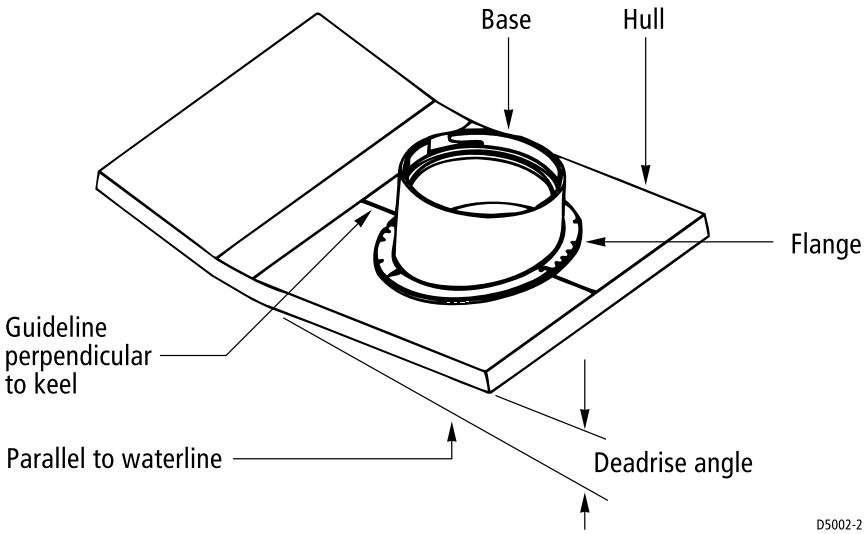


Figure 2-20: Deadrise Angle

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 2-21).

CAUTION:
The base must be liquid-tight.

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 adhesive to the bottom of the base flange. (Follow the adhesive manufacturer's instructions for use).
   Press the flange firmly in place to form a liquid-tight seal and allow the adhesive to cure.

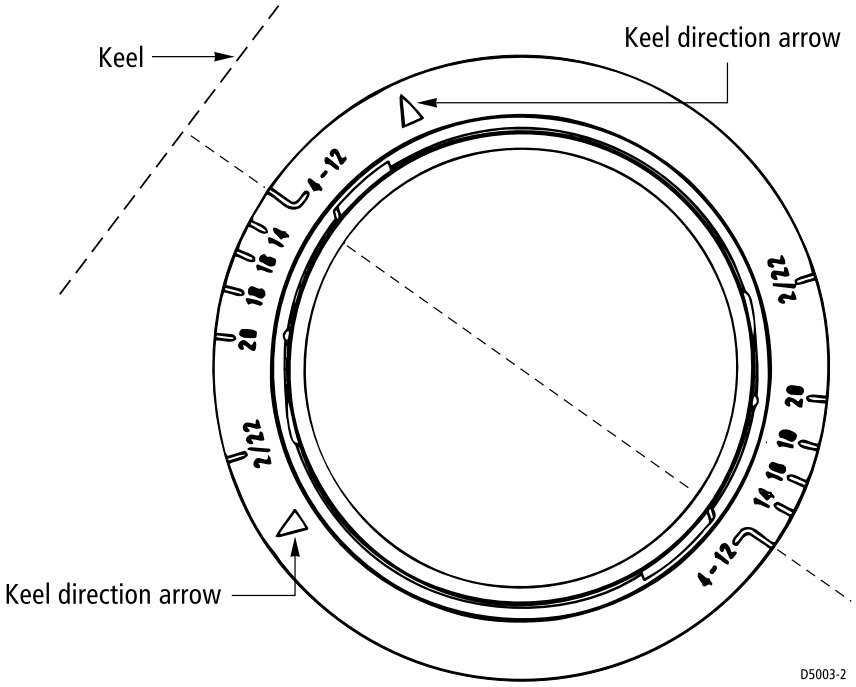


Figure 2-21: Aligning the Base Flange with 4–12° Deadrise Angle

7. Slide the transducer housing 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 two screws (see Figure 2-22). Do not overtighten the screws.

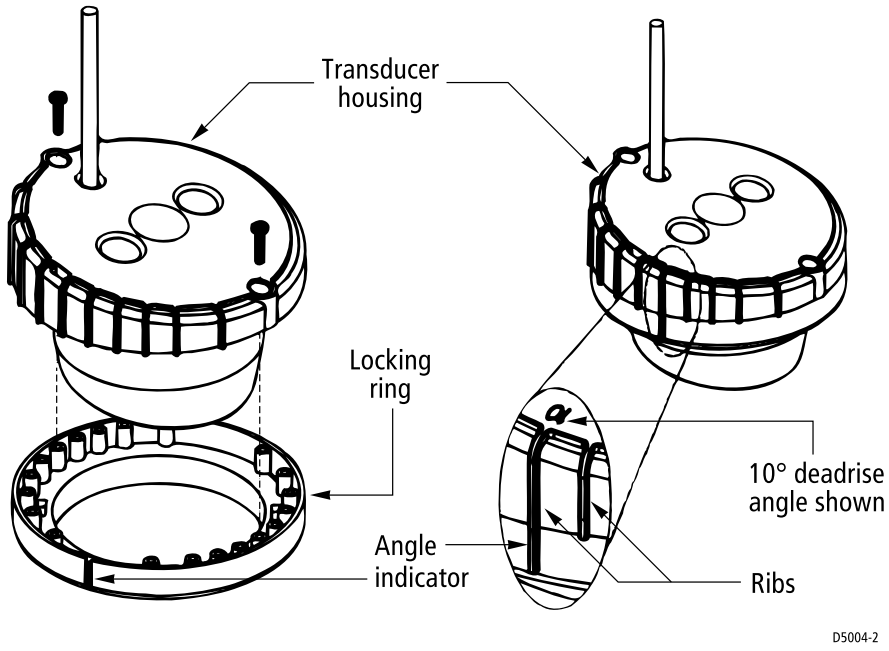


Figure 2-22: Joining the Transducer Housing to the Locking Ring

8. Lubricate the O-ring with silicone grease or petroleum jelly. Slide the O-ring onto the transducer assembly (see Figure 2-23).

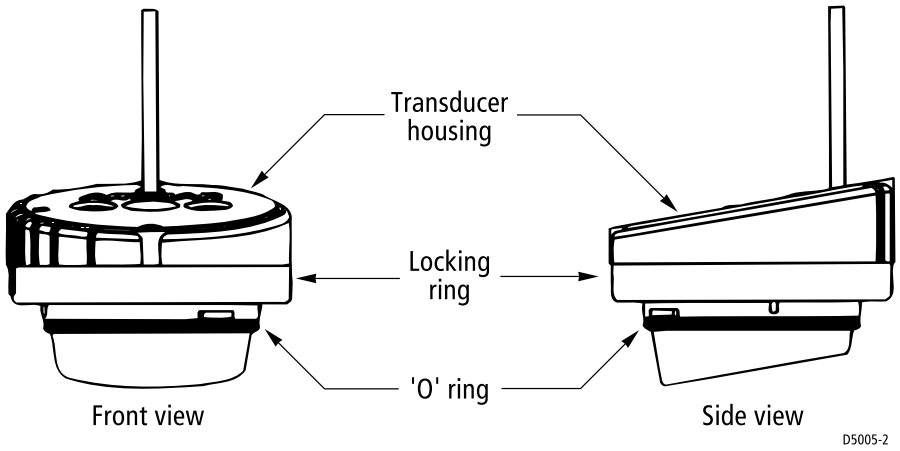


Figure 2-23: Installing the O-ring

9. When the adhesive on the base has cured, pour 2.4 fl. oz. (71 mil) 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 2-22).
11. Route the cable to the transducer, being careful not to tear the cable jacket when passing it through the bulkhead(s) and other parts of the boat.
12. Attach the connector nut to the cable per instructions in *Transducer Cable Connections* on *page 26*.
13. Attach the assembled connector cable to the transducer.
14. Route the other end of the cable to the DSM, 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.
15. Coil any excess cable and secure it in place using tie-wraps to prevent damage.

Note: *If you are using an extension cable, be sure to locate the mated 3-pin connectors well above the bilge waterline. To facilitate this, use cable clamps 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 4" (100 mm) hole saw, cut through the inner skin and the core at the selected location (see Figure 2-24). 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 disc 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.

CAUTION:
Do not proceed if the hull temperature is below 60° F (15° C) since the cure time of the casting epoxy will be greatly extended.

4. If the hull temperature is above 60° F (15° C), mix a half cup of casting epoxy stirring carefully to avoid trapping air in the mixture.
   Pour this around the housing until the cavity is full. Allow the casting epoxy to set for at least 1 hour.

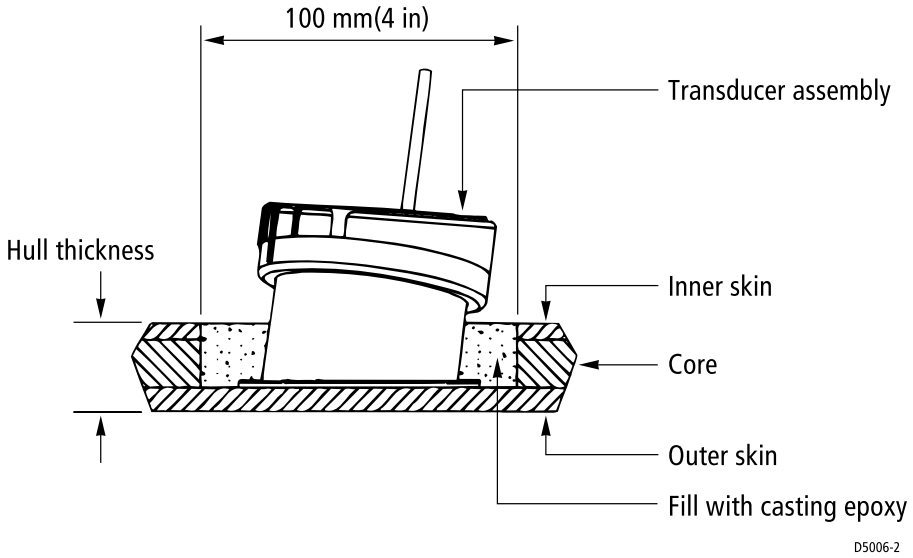


Figure 2-24: Installation in a Cored Fiberglass Hull

5. Proceed with step 7 of "Installation" on page 54.

Chapter 3: Maintenance and Problem Solving

This chapter provides information on routine maintenance and on possible causes of problems you may experience with your DSM300.

3.1 Maintenance

CAUTION:
The sounder unit contains high voltage. Adjustments require specialized service procedures and tools only available to qualified service technicians. There are no user serviceable parts or adjustments and the operator should not attempt to service the equipment. The operator should not remove the rear cover of the module.

Routine Checks

The DSM300 is a sealed unit. Maintenance procedures are therefore limited to the following periodic checks:

- Examine the cables for signs of damage, such as chafing, cuts or nicks.
- Check that the cable connectors are firmly attached.

Cleaning Instructions

Cleaning the Module

The DSM300 is a sealed unit and does not require regular cleaning. However, if you find it necessary to clean the unit, please follow these basic procedures:

- Ensure power is off.
- Wipe the module clean with a damp cloth.
- If necessary, use IPA (isopropyl alcohol) or a mild detergent solution to remove grease marks.

Cleaning the Transducer

Sea growth can collect quickly on the bottom of the transducer, this can reduce the performance in just a few weeks. To prevent the build-up of sea growth, coat the transducer with a thin layer of paint.

Use only a water-based antifouling paint, or a water-based paint specifically designed for transducers. Apply the paint with a brush.

If your transducer becomes fouled or stops working because of sand or sea growth, use a stiff brush to clean it. You may sand the surface with a fine-grit wet or dry sandpaper (#320 grade or finer), but this will affect the performance of the unit when the boat is moving at higher speeds.

The paddle wheel mechanism may become jammed by dirt, grit or barnacles. Work the contaminant out of the mechanism, then clean the unit with soap and water or alcohol.

Cleaning the Hull

Use caution when sanding or cleaning the outside of the hull near the transducer.

CAUTION:
Harsh cleaning solvents such as acetone may damage the transducer.

EMC Servicing and Safety Guidelines

- Raymarine equipment should be serviced only by authorized Raymarine service technicians. They will ensure that service procedures and replacement parts used will not affect performance. There are no user serviceable parts in any Raymarine product.
- Some products generate high voltages, so never handle the cables/connectors when power is being supplied to the equipment.
- When powered up, all electrical equipment produces electromagnetic fields. These can cause adjacent pieces of electrical equipment to interact with one another, with a consequent adverse effect on operation.
  To minimize these effects and enable you to get the best possible performance from your Raymarine equipment, guidelines are given in the installation instructions, to enable you to ensure minimum interaction between different items of equipment, i.e. ensure optimum Electromagnetic Compatibility (EMC).
- Always report any EMC-related problem to your nearest Raymarine dealer. We use such information to improve our quality standards.
- In some installations, it may not be possible to prevent the equipment from being affected by external influences. In general this will not damage the equipment but it can lead to spurious resetting action, or may result in momentary faulty operation.

3.2 Resetting the System

The Reset function returns the DSM300 to its factory default values. How you perform the reset depends on the type of display the sounder module is connected to.

CAUTION: Factory Reset
The factory reset clears the sonar depth offset and speed and temperature calibrations.

For E Series and C Series Displays...

➤ To perform the factory reset:

1. Make sure that FISHFINDER is the active screen on the display.
2. Press **MENU**.
3. Scroll to and then select FISHFINDER SETUP.
4. Scroll to and select DSM Reset.
5. Scroll to Reset DSM?
6. To confirm the reset, select YES.
   i. The power on the DSM300 cycles OFF and ON.
   ii. The introductory logo is displayed.
   iii. After a few seconds an application page and a navigation warning is displayed.
7. To continue, read the warning and then press **OK**.
   The reset is complete.

For hsb² PLUS Series Displays...

➤ To perform the factory reset:

1. Make sure that SONAR is the active screen on the display.
2. Press **MENU**.
3. Press the SONAR SET UP soft key to display the Sonar Set Up page.
4. Press and hold **MENU** for 5 seconds.
   The RESET TO DEFAULTS soft key appears.
5. Press RESET TO DEFAULTS.
   New soft keys appear: ARE YOU SURE? YES. NO.
6. Press YES to confirm the reset.
   i. The power on the DSM300 cycles OFF and ON.
   ii. The message SONAR DATA UNAVAILABLE appears.

iii. An audible alarm is sounded.

iv. The normal sonar image resumes scrolling across the display. The reset is complete.

➤ To cancel the reset:

Before pressing YES as described in item 4 above, press any of the following keys: **DISPLAY**, **MULTI**, **VRM/EBL**, **MARKS**, **RANGE**, **GAIN**, or **ALARMS**.

This action opens up a new menu according to the key pressed.

—or—

Press either the **ENTER** or **CLEAR** key. This action returns the unit to the Sonar Set Up menu.

3.3 Problem Solving

All Raymarine products are, prior to packing and shipping, subjected to comprehensive test and quality assurance programs. However, if this unit should develop a fault, please refer to the following table to identify the most likely cause and the corrective action required to restore normal operation.

If you still have a problem after referring to the table below, contact your local dealer, national distributor or Raymarine Technical Services Department for further advice. Always quote the product serial numbers. The serial number is printed on the back of the unit.

Common Problems and Their Solutions

Table 3-1: Common Sounder Problems

Problem	Correction
Display "freezes"	1. Check the scroll speed is not set to zero. 2. Check the transducer cable for damage. If damaged, the cable and transducer must be replaced as a unit.
Sounder does not display fish	1. Fish arches are not displayed if the boat is stopped - fish appear on the display as straight line. 2. Ensure the transducer is within 10° of vertical. 3. Check that the gain is not set too low.
Sounder does not see bottom or fish	1. If you have a transom-mount transducer, check that the transducer hasn't kicked-up on hitting an object. 2. Check that the gain is not set too low. 3. Check that the transducer is within 10° of vertical. 4. Check that the transducer face is not covered or fouled. If necessary, clean the transducer. 5. Check the voltage from the power source; if this is too low it can affect the transmitting power of the sounder.
Sounder displays a lot of background noise	1. Check that the gain is not set too high. 2. Check that the transducer is mounted correctly and is clean.
Sounder speed or log readings are wrong	1. Check that the transducer paddle wheel is clean. 2. If necessary add a speed offset. 3. If receiving SeaTalk speed, unplug the SeaTalk connector from the display.

Table 3-1: Common Sounder Problems

Problem	Correction
Sounder temperature readings are wrong	1. If necessary, adjust the TEMP CALIBRATE parameter. 2. If receiving SeaTalk temperature, unplug the SeaTalk connector from the display.
Sonar display is unreliable at high boat speeds	1. Turbulence around the transducer may be confusing the unit.

Status LED

The LED on the connector panel provides valuable information on the status of your DSM300. The LED blinks green while the module is operating normally. If the unit detects a problem, the LED blinks amber to indicate a warning or red for an error. The number of times the LED blinks is a code representing the nature of the problem. For multiple warnings/errors, the codes are given in sequence with a 1.5 second pause between strings.

The following table shows the various LED status codes and their meanings.

Table 3-2: Status LED Warning Indications

	Color	No of blinks	Meaning	Cleared every 10 min
W	Amber	1	Transducer Sense Failure	
A		2	Network not detected[1]	
R		3	High Temperature Warning	✓
N		4	Reserved	
I		5	Reserved	
N		6	Reserved	
G		7	Reserved	
S		8	Watchdog Timeout Reboot	✓

[1]After 30 seconds of no network activity, the DSM300 enters Standby mode: No sonar pings are emitted and no warnings are output on the LED. Instead, the LED blinks green once every 10 seconds.

For example, if the Transducer Sense fails and the network is not detected, the LED blinks amber once, pauses 1.5 secs, blinks amber twice 0.5 secs apart, pauses 1.5 secs, and then repeats the sequence until the problems are resolved or up to 10 minutes elapse.

Table 3-3: Status LED Error Indications

	Color	No of blinks	Meaning	Cleared every 10 min
	Red	1	Unknown Error	✓
E		2	Battery Voltage Error	✓
R		3	High Temperature Error	✓
R		4	Flash Memory Failure	
O		5	Reserved	
R		6	Reserved	
S		7	Reserved	
		8	Hardware Monitor Failure	

A solid red LED (not blinking) indicates a fatal error condition. If the event of a fatal error, the system will power cycle to attempt to self-correct the condition. If the condition persists, please contact Raymarine Customer Service.

3.4 How to Contact Raymarine

On the Internet

Visit the Raymarine World Wide Web site for the latest information on Raymarine electronic equipment and systems at:

www.raymarine.com

Customer Support

Navigate to the **Customer Support** page for links to:

- Finding Factory Service locations and Authorized Dealers near you
- Registering your Raymarine products
- Accessing handbooks in Adobe Acrobat format
- Downloading RayTech software updates
- Accessing the Raymarine solution database

Clicking the Find Answers link routes you to our solution database. Search questions and answers by product, category, keywords, or phrases. If the answer you are seeking is not available, click the Ask Raymarine tab to submit your own question to our technical support staff, who will reply to you by e-mail.

In the US

Accessories and Parts

Many Raymarine accessory items and parts can be obtained directly from your authorized Raymarine dealer.

However, if you are in need of an item not available from the retailer, please contact Raymarine Technical Services at:

1-800-539-5539 ext. 2333, or
1-603-881-5200 ext. 2333.

Technical Service is available Monday through Friday 4:00 AM to 6:00 PM Eastern Time.

Please have the Raymarine item or part number ready when calling if placing an order. If you are not sure which item is appropriate for your unit, you should first contact the Technical Support Department to verify your requirements.

Technical Support

For technical support, call:

1-800-539-5539 ext. 2444, or
1-603-881-5200 ext. 2444.

Our Technical Support Specialists are available to answer questions about installing, operating and trouble-shooting all Raymarine products.

Questions can be sent directly to our Technical Support Department via the Internet. Point your browser to www.raymarine.com and click on the Customer Support link. From there, select Find Answers and click the Ask Raymarine tab.

Product Repair and Service

In the unlikely event your Raymarine unit should develop a problem, please contact your authorized Raymarine dealer for assistance. The dealer is best equipped to handle your service requirements and can offer timesaving help in getting the equipment back into normal operation.

In the event that repairs can not be obtained conveniently, product service may also be obtained by returning the unit to:

Raymarine, Inc.
Product Repair Center
22 Cotton Road, Unit D
Nashua, NH 03063-4219

The Product Repair Center is open Monday through Friday 8:15 a.m. to 5:00 p.m. Eastern Time. All products returned to the Repair Center are registered upon receipt. Should you wish to inquire about the repair status of your unit, contact the Product Repair Center at:

1-800-539-5539 ext. 2118, or
1-603-881-5200 ext. 2118.

Please have the unit serial number, ready when you call. We will do everything possible to make the repair and return your unit as quickly as possible.

In Europe

In Europe, Raymarine support, service and accessories may be obtained from your authorized dealer, or contact:

Raymarine Ltd
Anchorage Park
Portsmouth, Hampshire
England PO3 5TD
Tel:+44 (0) 23 9269 3611
Fax:+44 (0) 23 9269 4642

Technical Support

The Technical Services Department handles inquiries concerning installation, operation, fault diagnosis and repair. For technical helpdesk contact:

Tel:+44 (0) 23 9271 4713
Fax:+44 (0) 23 9266 1228

Accessories and Parts

Raymarine accessory items and parts are available through your authorized Raymarine dealer. Please refer to the lists of component part numbers and optional accessories in the Installation chapter of this manual and have the Raymarine part number ready when speaking with your dealer.

If you are uncertain about what item to choose for your Raymarine unit, please contact our Customer Services Department prior to placing your order.

Worldwide Support

Please contact the authorized distributor in the country.

Appendix A: Specifications

General

Approvals: CE - conform to	 89/336/EEC (EMC), EN60945:1997
Size:	10.76" x 7.37" x 2.43" (273.3 x 187.2 x 61.7 mm)
Weight:	2.2 lbs (1.0 kg)
Mounting	Four keyholed mounting tabs, mounting screws
Power: Voltage Current Fuse	Reverse polarity protected External 10.7—32 VDC required 0.5 A (8.0 A peak) 8 A (recommended)
Environmental: Operating Range: Storage Range: Humidity:	Waterproof to IPX-7 –10°C to +50°C –20°C to +70°C up to 95% at 35°C non-condensing
Connectors	7 pin transducer 4 pin hsb^2 input/output 3 pin power RJ-45 SeaTalk HS

Sounder Features

	with standard transducer	**with high performance transducer**
Output Power:	Adjustable to 600 watts RMS	Adjustable to 1000 Watts RMS
Frequency	Dual 50 kHz and 200 kHz	Dual 50 kHz and 200 kHz
Pulse Length:	100 µsec to 4 msec	100 µsec to 4 msec
Max. Trans-mit Rate:	1580 pulses / min. @ 50' range	1580 pulses / min. @ 50' range
Depth:	3 to 3000 ft (1000 m)	3 to 5000 ft (1700 m)
Transducer:	Transom-mount, in-hull, or thru-hull	Transom-mount, in-hull, or thru-hull

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