

Triducer[®] Multisensor (AM000006/AM000008/AM000015)

Hardware Installation Manual

Publication type: Hardware Installation Manual
Publication number: AM000006
Title: Triducer[®] Multisensor
Subject:
Issue: 1.0
Publication date: 23 August 2010
Total number of pages: 25

Author: E.J. Varkevisser

Table of contents

	Page #
Figures	4
References	6
Introduction	7
About the hardware installation manual.....	7
Abbreviations list	8
Revision history	8
Safety instructions	9
1. Receiving, unpacking and checking.....	10
1.1 Procedure.....	10
1.2 Type designation.....	10
2. Installation and mounting.....	11
2.1 Applications.....	11
2.2 Tools and materials.....	11
2.3 Installation instructions.....	12
2.3.1 Pre-test.....	12
2.3.2 Antifouling paint.....	12
2.3.3 Mounting location.....	14
2.3.4 Hull types	14
2.4 Installation	15
2.4.1 Hole drilling	15
2.4.2 Bedding	15
2.4.3 Installing	16
2.4.4 Checking for leaks	18
2.4.5 Installation in a cored fiberglass hull	18
3. Maintenance, parts and replacement.....	20
3.1 Using the blanking plug.....	20
3.2 Servicing the insert	21
3.3 Winterizing	21
3.4 Replacement parts.....	22
3.4.1 Multi-sensor replacement.....	22
4. Technical specifications	23
5. Outline drawing	24

Figures

Figure 2-1: Antifouling paint	12
Figure 2-2: Best location for multi-sensor	13
Figure 2-3: Bedding and installation	16
Figure 2-4: Preparing a cored fibreglass hull	19
Figure 3-1: Paddlewheel and O-ring replacement	21

NOTICE

**This document contains proprietary information.
No part of this document may be photocopied, reproduced or
translated into another language without the prior written consent of
Free Technics B.V.**

References

AIRMAR Technology Corporation:
<http://airmartechonology.com/>

Introduction

The DST800 multi-sensor offers depth, speed, and temperature functions in one compact thru-hull fitting. Digital signal processing inside the housing provides depth, speed, and temperature data to a chart plotter, radar screen, or digital display, eliminating the need for a dedicated depth sounder.

About the hardware installation manual

The hardware installation manual provides instructions for the installation and mounting of the DST800 multi-sensor as used within FT NavVision®. The chapters and sections are organized in chronological order in which the specific components must be installed and connected (where applicable).

NOTE:

This section provides only a summary of the most important safety requirements and notes, which will be mentioned in the individual sections. To protect your health and prevent damage to the devices, it is essential to read and carefully follow the safety instructions.

The hardware installation manual contains the following chapters:

- Chapter "Safety instructions" presents warning, caution and note information, which the user should pay attention to.
- Chapter "Receiving, unpacking and checking" contains instructions on how to receive, unpack or check the interface.
- Chapter "Installation and mounting" contains instructions on how to install, mount and/or wire the interface.
- Chapter "Maintenance, parts and replacing" contains instructions on how to maintain service and replace specific parts of the sensor.
- Chapter "Technical specifications" contains an overview of the main features and specifications.

Abbreviations list

NMEA National Marine Electronics Association
SS Stainless Steel

Revision history

Revisions issued since publication.

Issue	Date	Revision	Reason
1.0	23-Aug-10		First release

Safety instructions

The indications NOTE, CAUTION and WARNING have the following significance:

NOTE:

An operating procedure, practice or condition etc., which it is essential to emphasize.

CAUTION

An operating procedure, practise or condition etc., which, if not strictly observed, may damage or destroy equipment.

WARNING

An operating procedure, practise or condition etc., which, if not carefully observed may result in personal injury or loss of life.

1. Receiving, unpacking and checking

1.1 Procedure

1. Remove the transport casing
2. Visually inspect the respective parts
3. Check that all items are included in accordance with the delivery documents.
4. Check for transport damages.
In case of transport damage appropriate action must be taken against the latest carrier and the nearest certified dealer or representative should be informed.
5. Store the part in the original transport package in a dry and dust free place, if the unit is not to be installed immediately. Observe the environmental requirements stated in the specifications

NOTE:

Notify your sales representative if any of the above items is missing or damaged.

1.2 Type designation

Multi-sensor type	Detail
P617V (AM000006)	Plastic housing recommended for fiberglass or metal hulls only.
B617V (AM000008)	Bronze housing recommended for fiberglass or wood hulls
SS617V (AM000015)	Stainless steel housing compatible with all hull materials. Recommended for aluminum hulls to prevent electrolytic corrosion <i>provided the stainless steel housing is isolated from the metal hull.</i>

2. Installation and mounting

2.1 Applications

CAUTION

- **NEVER** install a metal housing in a vessel with a positive ground system.
- **NEVER** use a fairing with a plastic housing; the protruding multi-sensor would be vulnerable to damage from impact.
- Cleaners, fuel, paint, sealants, and other products may contain strong solvents, such as acetone, which attack many plastics greatly reducing their strength.
- **NEVER** install a plastic housing in a wood hull since swelling of the wood may overstress the plastic causing a fracture.
- **NEVER** mount a bronze housing in an aluminum hull because electrolytic corrosion will occur.

2.2 Tools and materials

Tool / material	Detail
Water-based antifouling paint	<i>NOTE: Mandatory in salt water</i>
Safety goggles	
Dusk mask	
Electric drill with 10 mm or larger chuck capacity. Drill bit: Hole saw:	3 mm 51 mm (plastic or bronze housing) 57 mm (stainless steel housing in a metal hull)
Countersink tool	Installing a flush housing
Sandpaper	
Mild household detergent or Weak solvent (such as alcohol)	
File	Installation in a metal hull
Marine sealant	Suitable for below waterline
Additional washer	For aluminum hull less than 6 mm thick
Slip-joint pliers	Installing a bronze housing
Zip ties	
Installation in a cored fiberglass hull: <ul style="list-style-type: none"> • Hole saw for hull interior • Fiberglass cloth and resin • Or cylinder, wax, tape, and casting epoxy 	60 mm

2.3 Installation instructions

NOTE:

Record the information (part number, date, frequency) found on the cable tag for future reference.

2.3.1 Pre-test

- Connect the multi-sensor to the instrument and spin the paddlewheel.
- Check for a speed reading and the approximate air temperature.
- If there are no readings or they are inaccurate, check all the connections and repeat the test. If there are still no readings or they are inaccurate, return the product to the place of purchase.

2.3.2 Antifouling paint

Aquatic growth can accumulate rapidly on the surface of the multi-sensor surface reducing performance within weeks. Surfaces exposed to salt water *must* be coated with antifouling paint.

CAUTION

- Use **WATER-BASED** antifouling paint only.
- **NEVER** use ketone-based paint, since ketones can attack many plastics possibly damaging the sensor.

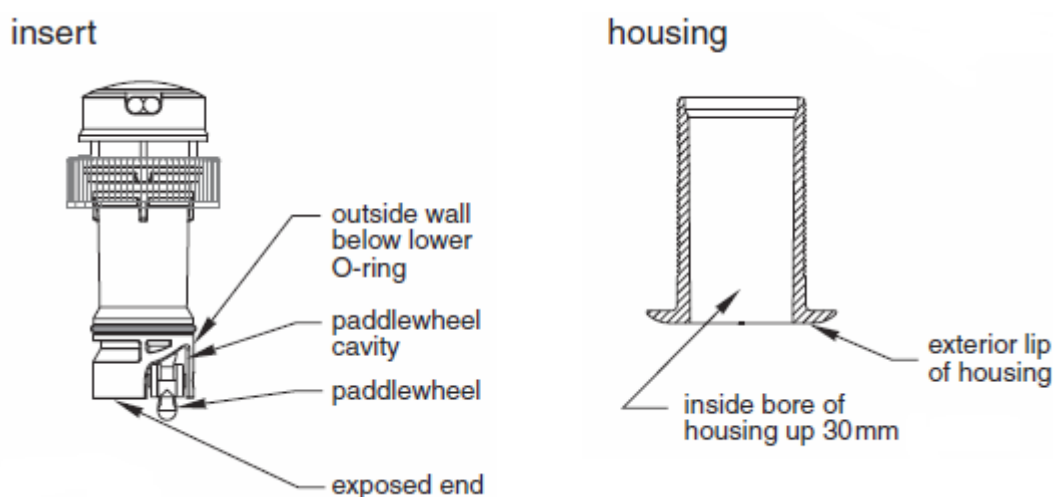


Figure 2-1: Antifouling paint

It is easier to apply antifouling paint before installation, but allow sufficient drying time. Reapply paint every 6 months or at the beginning of each boating season. Paint the following surfaces (see Figure 2-1):

- Outside wall of the insert below the lower O-ring
- Paddlewheel cavity
- Paddlewheel
- Exposed end of the insert
- Exterior lip of the housing
- Bore of the housing up 30 mm
- Blanking plug below the lower O-ring including the exposed end.

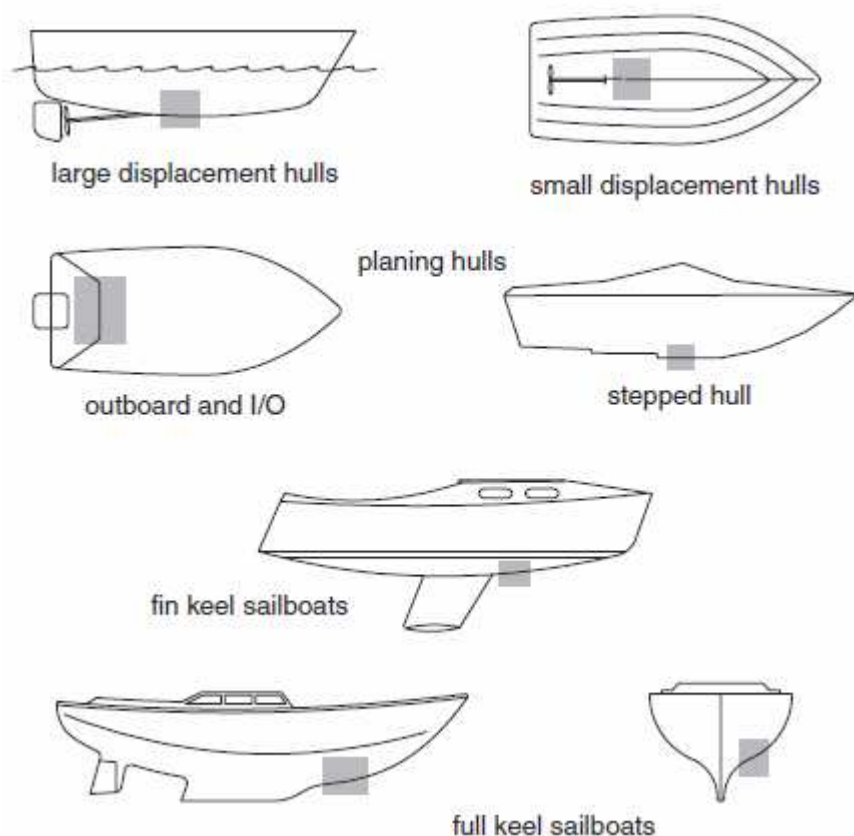


Figure 2-2: Best location for multi-sensor

2.3.3 Mounting location

CAUTION

DO NOT MOUNT near water intake or discharge openings, or behind strakes, fittings, or hull irregularities.

- The water flowing across the hull *must* be smooth with a minimum of bubbles and turbulence (especially at high speeds).
- The multi-sensor *must* be continuously immersed in water
- The transducer beam *must* be unobstructed by the keel or propeller shaft(s).
- Choose a location away from interference caused by power and radiation sources such as: the propeller(s) and shaft(s), other machinery, other echo-sounders, and other cables. The lower the noise level, the higher the echo-sounder gain setting that can be used.
- Choose a location with a minimum dead rise angle, so the transducer beam will be aimed at the bottom.
- Choose an accessible spot inside the vessel with adequate headroom for the height of the housing, tightening the nuts, and removing the insert. Allow a minimum of 280 mm.

2.3.4 Hull types

- **Displacement hull powerboats**
Locate amidships near the centerline (see Figure 2-2). The starboard side of the hull where the propeller blades are moving downward is preferred.
- **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 multi-sensor will be in contact with the water at high speeds. The starboard side of the hull where the propeller blades are moving downward is preferred.
- **Outboard and I/O**
Mount just forward of the engine(s).
- **Inboard**
Mount well ahead of the propeller(s) and shaft(s).
- **Stepped hull**
Mount just ahead of the first step.
- **Boat capable of speeds > 25 kn (29 MPH)**
Review the installation location and operating results of similar boats before proceeding.
- **Fin keel sailboats**
Mount on or as close as possible to the centerline and forward of the fin keel 300 - 600 mm.
- **Full keel sailboats**
Locate amidships and away from the keel at the point of minimum dead rise.

2.4 Installation

Cored fiberglass hull - Follow separate instructions as described in 2.4.5.

2.4.1 Hole drilling

WARNING

Always wear safety goggles and a dust mask.

1. Drill a 3 mm 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.
2. Using the appropriate size hole saw, cut a hole from outside the hull.
Flush housing - Use a countersink tool to make 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.

2.4.2 Bedding

CAUTION

Stainless steel housing must be isolated from a metal hull to prevent electrolytic corrosion.

Apply a 2 mm thick layer of marine sealant around the lip of the housing that contacts the hull and up the sidewall of the housing (see Figure 2-3). The sealant must extend 6 mm higher than the combined thickness of the hull, the washer(s), and the hull nut. This will ensure there is marine sealant in the threads to seal the hull and to hold the hull nut securely in place.

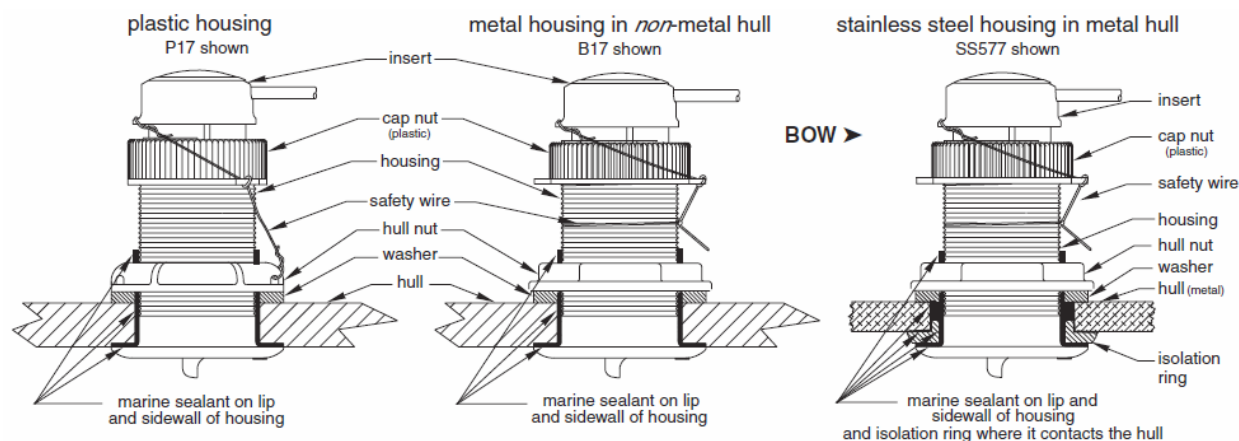


Figure 2-3: Bedding and installation

Stainless steel housing in a metal hull - To isolate the stainless steel housing from the metal hull, slide the isolation ring onto the housing. Apply *additional* sealant to the surfaces of the ring that will contact the hull, filling any cavities in and around the ring.

2.4.3 Installing

CAUTION

Never pull, carry, or hold the multi-sensor by the cable as this may sever internal connections.

1. From outside the hull, push the housing into the mounting hole using a twisting motion to squeeze out excess marine sealant (see Figure 2-3). *Align the arrow on the lip of the housing to point forward toward the bow.* If the multi-sensor is not installed on the centerline of the boat, angle the housing slightly toward the centerline to align it with the water flow.
2. From inside the hull, slide the washer onto the housing.
Aluminum hull less than 6 mm thick - Use an additional rubbery, fiberglass, or plastic washer. *Never* use bronze since electrolytic corrosion will occur. *Never* use wood since it will swell, possibly fracturing the plastic housing.

WARNING

- **Stainless steel housing in a metal hull only**
- **Be sure the washer contacts the hull. Do not tighten the hull nut with the washer against the isolation ring as the housing will not be firmly installed. If necessary, sand the isolation ring until the washer rests against the hull.**

3. Screw the hull nut in place *being sure* the arrow on the lip of the housing is still positioned forward toward the bow.
Plastic housing - *Do not* clamp tightly on the wrenching flats, possibly causing the housing to fracture.
Plastic hull nut - *HAND-TIGHTEN* only. *Do not* over tighten.
Metal hull nut - Tighten with slip-joint pliers.
Cored fiberglass hull - *Do not* over tighten, crushing the hull.
Wood hull - Allow the wood to swell before tightening the nut.
4. Remove any excess marine sealant on the outside of the hull to ensure smooth water flow over the multi-sensor.

WARNING

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

5. After the marine sealant cures, inspect the O-rings on the insert (replace if necessary) and lubricate them with the silicone lubricant supplied.

WARNING

Be sure the insert is fully inserted into the housing, and the cap nut is screwed on completely.

6. Slide the paddlewheel insert into the housing with the *arrow on the top pointing forward toward the bow*. Screw the cap nut several turns until the threads are engaged. The arrow on the top of the insert, the cable exit, and the arrow on the lip will all be aligned. Continue to tighten the cap nut. *Be careful* not to rotate the housing and disturb the sealant. *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.

7. Attach the safety wire.
Plastic housing - Attach the safety wire to one eye in the hull nut. Keeping the wire taut throughout, lead the wire in a counterclockwise direction and thread it through one eye in the cap nut. Thread the wire through the eye a second time. Then lead the wire through the eye in the insert. 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. Keeping the wire taut throughout, lead the wire straight up and through one eye in the cap nut. Thread the wire through the eye a second time. Then lead the wire counterclockwise and through the eye in the insert. Twist the wire securely to itself.

CAUTION

If your multi-sensor 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 no. 33-035 and follow the instructions provided. Cutting the cable or removing the waterproof connector (except when using Airmar's junction box) will void the multi-sensor warranty.

8. 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 Multi-sensor cable from other electrical wiring and the engine. Coil any excess cable and secure it in place with zip-ties to prevent damage.
9. Refer to the instrument owner's manual to connect the multi-sensor to the instrument.

2.4.4 Checking for leaks

WARNING

DO NOT leave the boat in the water unchecked for several days.

When the boat is placed in the water, **immediately** check around the thru-hull multi-sensor for leaks. Note that very small leaks may not be readily observed.

Do not 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** (see 2.4.2 and 2.4.3).

2.4.5 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 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 (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 51 mm hole saw, cut the hole from outside the hull through the *outer* skin only (see Figure 2-4).
3. From inside the hull, use a 60 mm hole saw to cut through the *inner* skin and most of the core. 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.

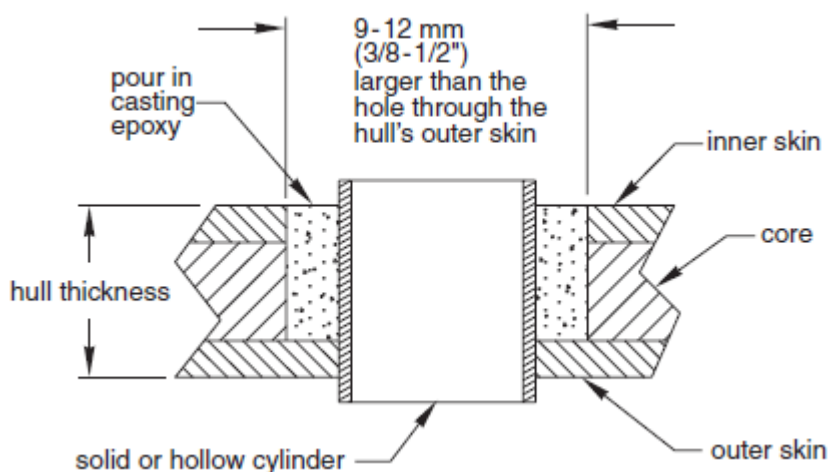


Figure 2-4: Preparing a cored fiberglass hull

4. Remove the plug of core material so the *inside* of the outer skin and the inner core of the hull are fully exposed. Sand and clean the inner skin, core, and the outer skin around the hole.

CAUTION

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

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.
6. 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.
7. 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.
8. Proceed with "Bedding" and "Installing" (see 2.4.2 and 2.4.3).

3. Maintenance, parts and replacement

3.1 Using the blanking plug

To protect the paddlewheel, use the blanking plug:

- When the boat will be kept in salt water for more than a week.
- When the boat will be removed from the water.
- When aquatic growth build-up on the paddlewheel is suspected due to inaccurate readings from the instrument.

WARNING

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

1. On the blanking plug, inspect the O-rings (replace if necessary) and lubricate them with the silicone lubricant supplied or petroleum jelly (Vaseline®) (see Figure 3-1).
2. Remove the insert from the housing by removing the safety wire and unscrewing the cap nut (see Figure 2-3). This will jack out the insert.
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 blanking plug. With practice, only 250 ml of water will enter the boat.

WARNING

Be sure the blanking plug is fully inserted into the housing, and the cap nut is screwed on completely.

4. Screw the cap nut several turns until the threads are engaged. Continue to tighten the cap nut. HAND-TIGHTEN only. Do not over tighten.

WARNING

Always attach the safety wire to prevent the blanking plug from backing out in the unlikely event that the cap nut fails or is screwed on incorrectly.

5. Reattach the safety wire.

3.2 Servicing the insert

Aquatic growth can accumulate rapidly on the depth transducer's surface and impede or freeze the paddlewheel's rotation reducing performance within weeks.

Clean the insert with a Scotch-Brite® scour pad and mild household detergent, being careful to avoid scratching the depth transducer. If fouling is severe, remove the paddlewheel (see step #1 below). Lightly wet sand it with fine grade wet/dry paper.

The water lubricated paddlewheel bearings have a life of up to 5 years on low-speed boats (less than 10 kn) and 1 year on high-speed vessels. Paddlewheels can fracture and shafts can bend due to impact with water borne objects and mishandling in boat yards.

O-rings *must* be free of abrasions and cuts to ensure a watertight seal. Order a replacement paddlewheel kit 33-398-04.

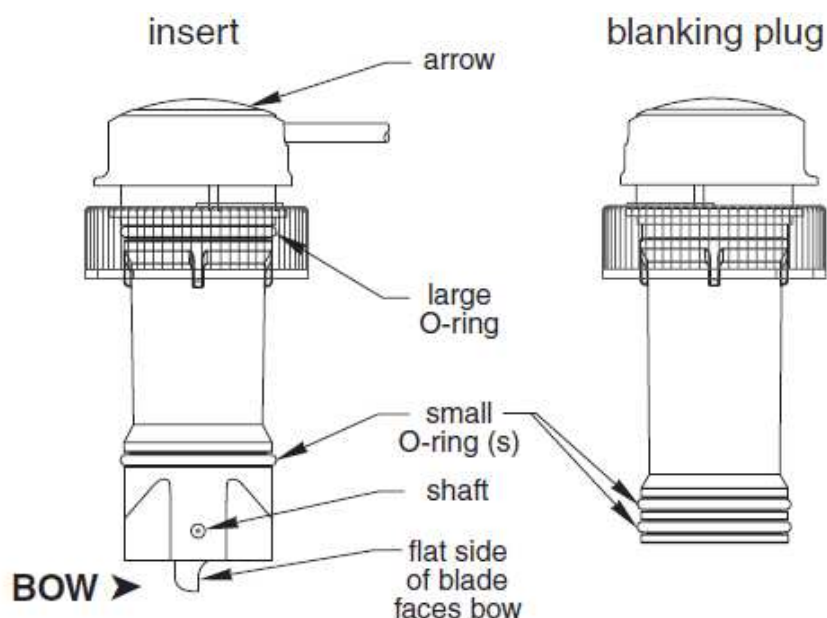


Figure 3-1: Paddlewheel and O-ring replacement

1. To remove the old paddlewheel shaft, grasp the end with small diagonal wire cutters and pull (see Figure 3-1).
2. Place the new paddlewheel in the cavity with the flat side of the blade facing the same direction as the arrow on the top of the insert.
3. Tap the new shaft into place until the end is flush with the outside wall of the insert.
4. Install a large O-ring near the top of the insert. Install a small O-ring near the paddlewheel.
5. Place the remaining two O-rings near the bottom of the blanking plug.

3.3 Winterizing

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

3.4 Replacement parts

Lost, broken, or worn parts should be replaced immediately. Obtain parts from your marine dealer.

If you have purchased a plastic housing and have a wood hull or desire greater strength, purchase an AIRMAR[®] metal housing.

Blanking plug	Hull nut or isolation ring	Paddlewheel, shaft & O-rings	Housing, nut & washer
33-538-01	04-004 (plastic) 02-030 (bronze) 02-570-01 (stainless steel) 04-186-1 (isolation ring)	33-398-04	33-417 (plastic, P17) 33-100 (bronze, B17) 33-495-01 (stainless steel SS577)

3.4.1 Multi-sensor replacement

The information needed to order a replacement AIRMAR[®] multi-sensor is printed on the cable tag. *Do not* remove this tag. When ordering, specify the part number, date, and frequency in kHz. For convenient reference, record this information on the top of page one.

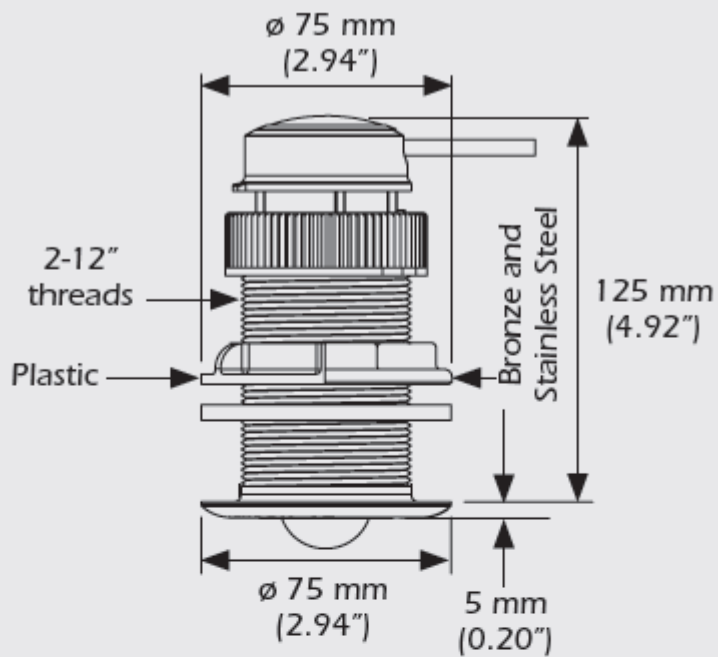
4. Technical specifications

Detail	Description
Weight	0,9 kg – Plastic 1,6 kg – Bronze 1,9 kg – Stainless steel
Acoustic window	Urethane
Hull deadrise	Up to 22°
Data update rate	1 per second
Minimum depth range	0,5 m
Maximum depth range	Up to 70 m (NMEA 0183) Up to 100 m (NMEA 2000)
Pressure rating	3 m
Pulse rating	20000 p/NM ¹ (5,6 Hz per knot)
Supply voltage	10 – 25 VDC (NMEA 0183) 9 – 16 VDC (NMEA 2000)
Supply current	40 mA (NMEA 0183) 200 mA (NMEA 2000)
Standard cable length	10 m (NMEA 0183) 6 m (NMEA 2000)
Temperature sensor accuracy	± 0,5°C
Temperature sensor range	-10°C – 40°C
CE regulation	Complies to IERC945

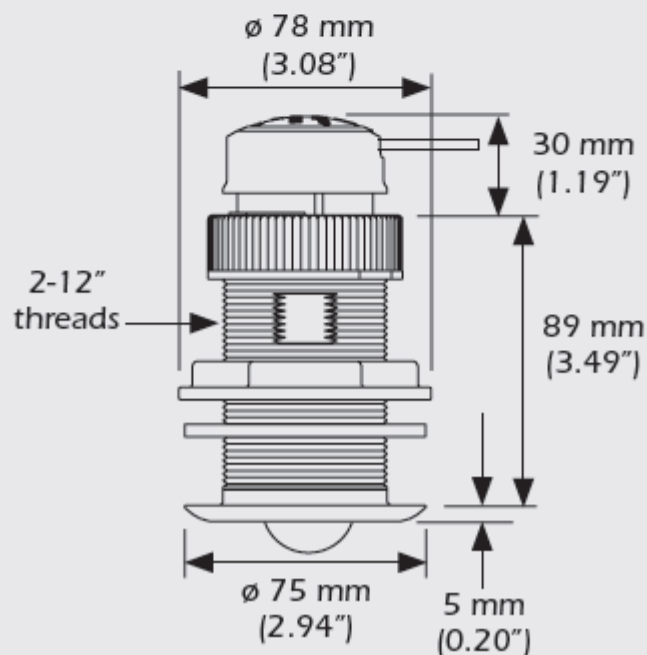
¹ NM = Nautical mile

5. Outline drawing

P617V Plastic, B617V Bronze, and SS617V Stainless Steel



B17V Bronze



Free Technics

Technical & customer support
The Netherlands

Free Technics B.V.
Eikenlaan 259J
2404 BP, Alphen aan den Rijn
The Netherlands

Telephone: +31 172418 890
Fax: +31 172418 899
www.freetechnics.eu