RVM-400 SERIES

THRU-HULL REALVISION™ MAX 3D SONAR TRANSDUCERS

INSTALLATION INSTRUCTIONS

English (en-US)
Date: 01-2023
Document number: 87437 (Rev 1)

Raymarine®

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CHAPTER 1: IMPORTANT INFORMATION

Safety warnings

Warning: Product installation and operation

- This product must be installed and operated in accordance with the instructions provided. Failure to do so could result in personal injury, damage to your vessel and/or poor product performance.
- Raymarine highly recommends certified installation by a Raymarine approved installer. A certified installation qualifies for enhanced product warranty benefits. Register your warranty on the Raymarine website: www.raymarine.com/warranty

Warning: High voltage

This product contains high voltage. Do NOT remove covers or attempt to access internal components, unless specifically instructed in the documentation provided.

Warning: Switch off power supply

Ensure the vessel's power supply is switched OFF before starting to install this product. Do NOT connect or disconnect equipment with the power switched on, unless instructed in this document.

Warning: Transducer cables

Do not remove the transducer cable whilst the product is powered on, doing so can cause sparks. If the transducer cable is accidently removed whilst the product is powered on, switch the product's power off, replace the cable and then switch the power back on.

Warning: Sonar operation

- NEVER touch the transducer face when the sonar is powered on.
- SWITCH OFF the sonar if divers are likely to be within 7.6 m (25 ft) of the transducer.

Product warnings

Warning: Maximum transducer cable length

The maximum length of cable between a RealVision™ Max 3D transducer and a MFD/sonar module (including the transducer's captive cable) must NOT exceed 18 m (59 ft). Cable lengths greater than this may cause damage to the RealVision™ Max 3D transducer and MFD/sonar module.

Warning: Positive ground systems

Do not connect this unit to a system which has positive grounding.

Warning: Transducer operation

Only test and operate the transducer in the water. Do NOT operate out of water as overheating may occur.

Caution: Do not cut transducer cables

- 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.

Caution: Service and maintenance

This product contains no user serviceable components. Please refer all maintenance and repair to authorized Raymarine dealers. Unauthorized repair may affect your warranty.

Warning: Marine-grade sealant

Only use marine-grade neutral cure polyurethane sealants. Do NOT use sealants containing acetate or silicone, which can cause damage to plastic parts.

Warning: Petrochemicals

Prolonged exposure to petrochemicals such as gasoline and diesel oil etc. may cause the transducer to discolor and degrade.

Warning: Anti-fouling

- Failure to comply with the provided anti-fouling and transducer cleaning instructions may affect your product warranty.
- Only use water-based anti-fouling paint.
- Do NOT use ketone or copper-based anti-fouling paint.

Regulatory notices

Declaration of Conformity

FLIR Belgium BVBA declares that the following products are in compliance with the EMC Directive 2014/30/EU:

- RVM-400 RealVision™ Max 3D Stainless steel thru-hull transducer, part number A80704
- RVM-412 Port RealVision™ Max 3D Stainless steel thru-hull transducer, part number A80705
- RVM-412 Starboard RealVision™ Max 3D Stainless steel thru-hull transducer, part number A80706
- RVM-420 Port RealVision™ Max 3D Stainless steel thru-hull transducer, part number A80707
- RVM-420 Starboard RealVision™ Max 3D Stainless steel thru-hull transducer, part number A80708

The original Declaration of Conformity certificate may be viewed on the relevant product page at www.raymarine.com/manuals.

Disclaimer

Raymarine does not warrant that this product is error-free or that it is compatible with products manufactured by any person or entity other than Raymarine.

Raymarine is not responsible for damages or injuries caused by your use or inability to use the product, by the interaction of the product with products manufactured by others, or by errors in information utilized by the product supplied by third parties.

Warranty registration

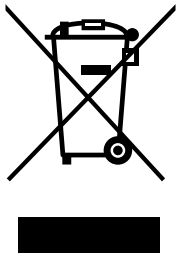
To register your Raymarine product ownership, please visit www.raymarine.com and register online.

It is important that you register your product to receive full warranty benefits. Your unit package includes a bar code label indicating the serial number of the unit. You will need this serial number when registering your product online. You should retain the label for future reference.

Product disposal

Dispose of this product in accordance with the WEEE Directive.

The Waste Electrical and Electronic Equipment (WEEE) Directive requires the recycling of waste electrical and electronic equipment which contains materials, components and substances that may be hazardous and present a risk to human health and the environment when WEEE is not handled correctly.



Equipment marked with the crossed-out wheeled bin symbol indicates that the equipment should not be disposed of in unsorted household waste.
Local authorities in many regions have established collection schemes under which residents can dispose of waste electrical and electronic equipment at a recycling center or other collection point.
For more information about suitable collection points for waste electrical and electronic equipment in your region, refer to the Raymarine website: www.raymarine.eu/recycling.

IMO and SOLAS

The equipment described within this document is intended for use on leisure marine boats and workboats NOT covered by International Maritime Organization (IMO) and Safety of Life at Sea (SOLAS) Carriage Regulations.

Technical accuracy

To the best of our knowledge, the information in this document was correct at the time it was produced. However, Raymarine cannot accept liability for any inaccuracies or omissions it may contain. In addition, our policy of continuous product improvement may change specifications without notice. As a result, Raymarine cannot accept liability for any differences between the product and this document. Please check the Raymarine website (www.raymarine.com) to ensure you have the most up-to-date version(s) of the documentation for your product.

Publication copyright

CHAPTER 2: DOCUMENT INFORMATION

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2.1 Applicable products

This document is applicable to the following products:

- **RVM-400** all-in-one RealVision™ Max 3D Stainless steel thru-hull transducer, part number A80704
- **RVM-412** split pair 12° RealVision™ Max 3D Stainless steel thru-hull transducers, part number T70543
- **RVM-420** split pair 20° RealVision™ Max 3D Stainless steel thru-hull transducers, part number T70544

2.2 Document information

This document contains important information related to the installation of your Raymarine® product.

The document includes information to help you:

- Plan your installation and ensure you have all the necessary equipment.
- Install and connect your product as part of a wider system of connected marine electronics.
- Troubleshoot problems and obtain technical support if required.

This and other Raymarine® product documents are available to download in PDF format from www.raymarine.com/manuals

2.3 Product documentation

The following documentation is applicable to your product:

Applicable documents

- **87437** — RVM-4xx series RealVision ™ Max 3D Transom Mount Transducer Installation Instructions (This document).
- **87422** — RVM-4xx series RealVision ™ Max 3D Transom Mount Transducer Mounting Template.
- **81406** — LightHouse™ 4 Advanced Operation Instructions (Includes transducer calibration and operation instructions for the Sonar / Fishfinder app on your MFD).

This and other Raymarine product documents are available to download in PDF format from www.raymarine.com.

Related documents

- **87436** — RVM1600 RealVision ™ Max 3D External Sonar Module Installation Instructions.

Document illustrations

Your product and if applicable, its user interface may differ slightly from that shown in the illustrations in this document, depending on product variant and date of manufacture.

All images are provided for illustration purposes only.

Operation instructions

For detailed operation instructions for your product, refer to the documentation that accompanies your display.

All product documentation is available to download from the Raymarine website: www.raymarine.com/manuals.

CHAPTER 3: PRODUCT AND SYSTEM OVERVIEW

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3.1 Product overview

The RVM-4xx series transducers are RealVision™ Max 3D stainless steel thru-hull transducers.

In conjunction with a RealVision™ Max 3D compatible multifunction display or sonar module, the RVM-4xx series transducers produce realistic 3D representations of the objects below your vessel, to help you identify underwater structures and locate fish.

RealVision™ Max 3D transducers benefit from improved ping rates and tighter beamwidths, resulting in sharper sonar images, detailed wrecks, and distinct fish targets. RealVision™ Max 3D transducers also provide higher contrast color palettes for accentuating targets, allowing fish targets to stand out from the water column noise.

Sonar channels:

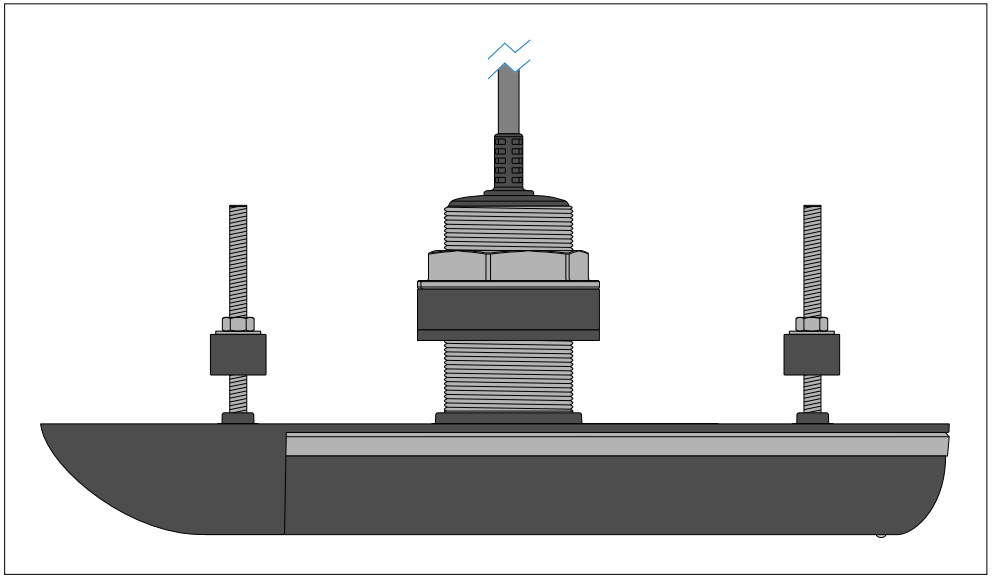
- RealVision™ Max 3D transducers offer the following sonar channels:
  - RealVision™ Max 3D
  - SideVision™
  - DownVision™
  - Conical High CHIRP / Low CHIRP 600 W / 200 kHz
- RealVision™ Max 3D transducers include a built-in AHRS (Attitude and Heading Reference System) sensor that helps stabilize 3D imaging automatically, by compensating for vessel motion.

Stainless steel transducers are suitable for installations on vessels with fiberglass, metal or wooden hulls.

Important:

- When installing the transducer on a vessel that has a metal hull you must use ALL of the supplied isolator parts to ensure the transducer metalwork is fully isolated from the metal hull.
- Do NOT install stainless steel transducers on vessels with a positive ground system.

These transducers are capable of producing 3D sonar images when connected to a **RealVision™ Max 3D** variant MFD running **LightHouse™ 4** software, or a **LightHouse™ 4** compatible MFD used in conjunction with an RVM1600 **RealVision™ Max 3D** sonar module. The RVM-4xx series includes 5 transducer variants, each having the same external shape and dimensions.



The transducers differ internally, and contain different numbers and types of transmit and receive elements. Your installation should comprise either a single **RVM-400** transducer, or a split-pair of **RVM-412s** or **RVM-420s** transducers.

The hull geometry of your vessel determines the most appropriate transducers to use. You should fit transducers whose elements are angled to match within ±6° of your hull's deadrise angle, as detailed below:

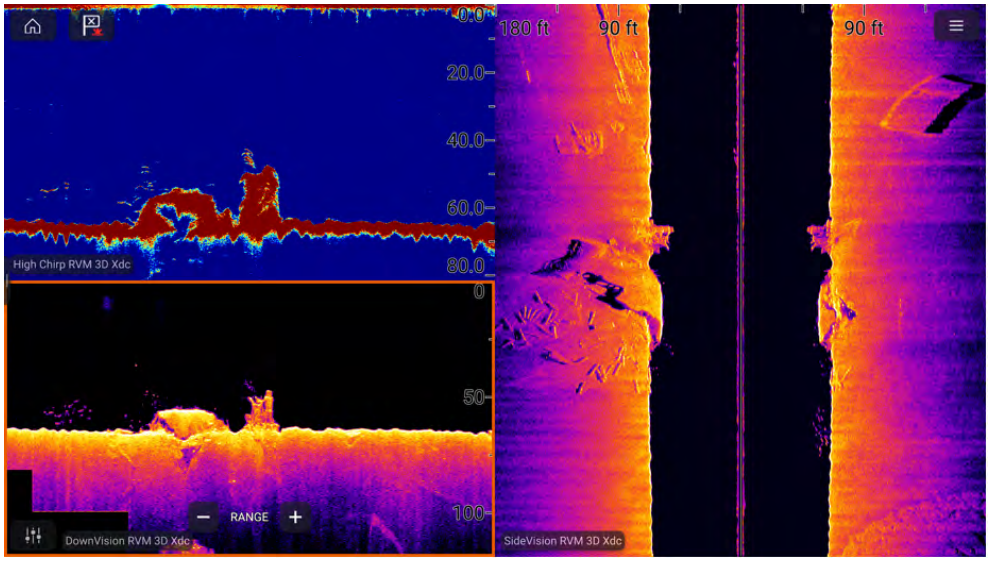
- **RVM-400** RealVision™ Max 3D stainless steel 0° (for deadrise 0° to 6°) thru-hull all-in-one transducer (Part number: A80704)
- **RVM-412 Port** and **RVM-412 Starboard** RealVision™ Max 3D stainless steel 12° (for deadrise 6° to 18°) thru-hull split-pair transducers (System pack part number: T70543)
  - **RVM-412 Port** port transducer (Part number: A80705)
  - **RVM-412 Starboard** starboard transducer (Part number: A80706)
- **RVM-420 Port** and **RVM-420 Starboard** RealVision™ Max 3D stainless steel 20° (for deadrise 14° to 26°) thru-hull split-pair transducer (System pack part number: T70544)
  - **RVM-420 Port** port transducer (Part number: A80707)
  - **RVM-420 Starboard** starboard transducer (Part number: A80708)

RealVision™ Max 3D overview

RealVision™ Max 3D transducers offer the following range of improvements over RealVision™ 3D transducers:

- Improved ping rates and tighter beamwidths, resulting in sharper sonar images, detailed wrecks, and distinct fish targets.
- Higher resolution DownVision and SideVision imaging, combined with higher contrast color palettes — making it easier to identify structure, and allowing fish targets to stand out from the water column noise.
- More accurate target location capability, making it easier to pinpoint the position of a wreck or set up a drift.
- New 600 W High CHIRP frequency provides deeper traditional sonar range and stronger target returns.

RealVision™ 3D Max screen example



Sonar range

The sonar range is the effective depth or distance that the transducer can operate to, **in optimum weather conditions**.

The following ranges apply to RealVision™ Max 3D sonar channels:

Note:

The listed sonar channel ranges are indicative only, and are subject to change depending upon the connected transducer.

Sonar channel	Range
CHIRP sonar:	0.6 m (2 ft) to 366 m (1,200 ft)
DownVision™:	0.6 m (2 ft) to 183 m (600 ft)
SideVision™:	0.6 m (2 ft) to 91 m (300 ft)
RealVision™ Max 3D:	0.6 M (2 ft) to 91 m (300 ft)

Compatible sonar modules and displays

Transducers must be connected to a compatible sonar module to interpret and transmit the sonar image to a display screen. The sonar module may be external or internal (built-in) to the display.

Your transducer is compatible with the following sonar modules:

- Axiom™ 2 Pro range of MFDs, which include a compatible internal sonar module.
- RVM1600 RealVision™ Max 3D external sonar module.

Note:

The transducer is NOT compatible with the RVX1000 RealVision™ 3D external sonar module, or the internal sonar modules built-in to Axiom™, Axiom™+ and Axiom™ Pro MFDs.

RealVision transducer extension cables

Your transducer is supplied with a fitted cable, for some installations (including all split-pair transducer installations) it may be necessary to extend the length of the transducer cable.

Note:

- For best performance, cable runs should be kept to a minimum.
- Only use Raymarine® transducer extension cables.

Raymarine® offers he following optional extension cables are available:

- RealVision™ transducer extension cable 3 m (9.8 ft) (part number A80475)

- RealVision™ transducer extension cable 5 m (16.4 ft) (part number A80476)
- RealVision™ transducer extension cable 8 m (26.2 ft) (part number A80477)

Split pair transducers: Extension cables fitted between the transducer and the ‘Y’ cable must be fitted in equal length pairs (i.e.: each transducer’s final cable length must be the same).

Warning: Maximum transducer cable length

The maximum length of cable between a RealVision™ Max 3D transducer and a MFD/sonar module (including the transducer’s captive cable) must NOT exceed 18 m (59 ft). Cable lengths greater than this may cause damage to the RealVision™ Max 3D transducer and MFD/sonar module.

CHAPTER 4: PARTS SUPPLIED

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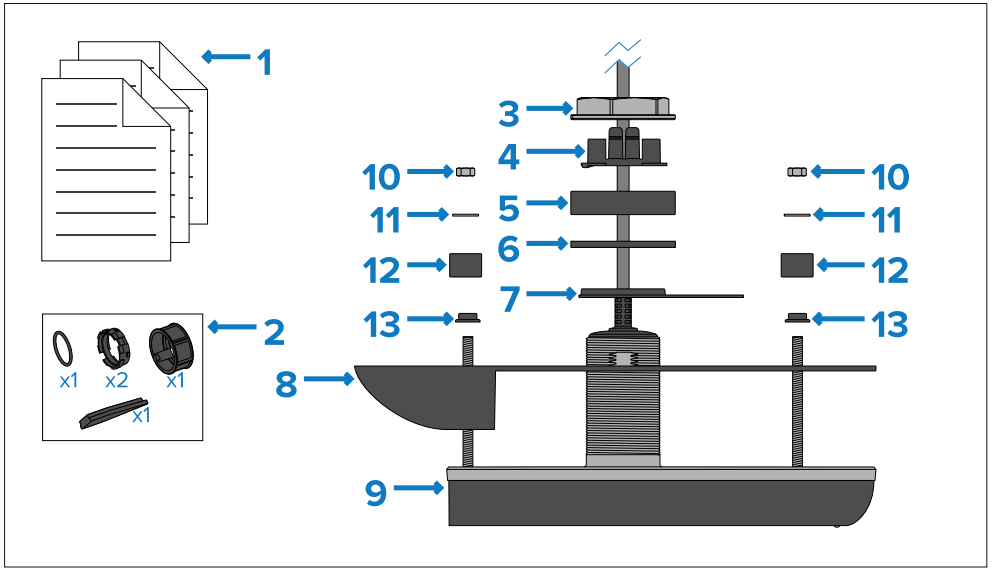
4.1 Parts supplied — RVM-4xx series transducers

The following parts are supplied with each RVM-4xx series transducer.



Item	Description
1	Documentation pack
2	Locking collar kit (for transducer cable connector), consisting of: • 2 x Split rings (includes spare) • 1 x O-ring • 1 x Locking collar • 1 x Split ring fitting tool
3	Hull nut
4	Cable protector
5	Large internal isolator sleeve
6	Rubber washer
7	External isolator plate
8	High speed nose cone
9	Transducer (including fitted cable — refer to length stated below)
10	2 x Nuts for anti-rotation studs
11	2 x Small washers for Anti-rotation studs
12	2 x Small internal isolator sleeves
13	2 x External isolator sleeves

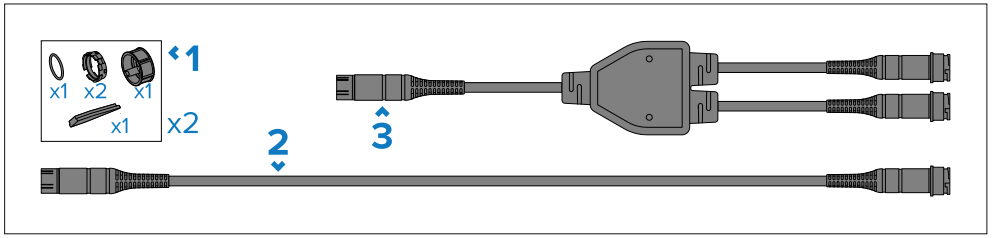
Transducer cable length

The length of the cable fitted to the transducer is:

- **RVM-400** — 8 m (26.2 ft)
- **RVM-412** and **RVM-420** — 2 m (6.5 ft)

Additional parts supplied

The following additional cables are supplied when ordering a split pair set of transducers.



Item	Description
1	2 x Locking collar kit, consisting of: • 2 x Split rings (includes a spare) • 1 x O-ring • 1 x Locking collar • 1 x Split ring fitting tool
2	Extension cable 8 m (26.2 ft.) for connecting the single end of the “Y-cable” adapter to a compatible MFD or sonar module.
3	“Y-cable” adapter for connecting a split pair of transducers to a single extension cable. Cable length: 0.3 m (0.98 ft.)

CHAPTER 5: PRODUCT DIMENSIONS

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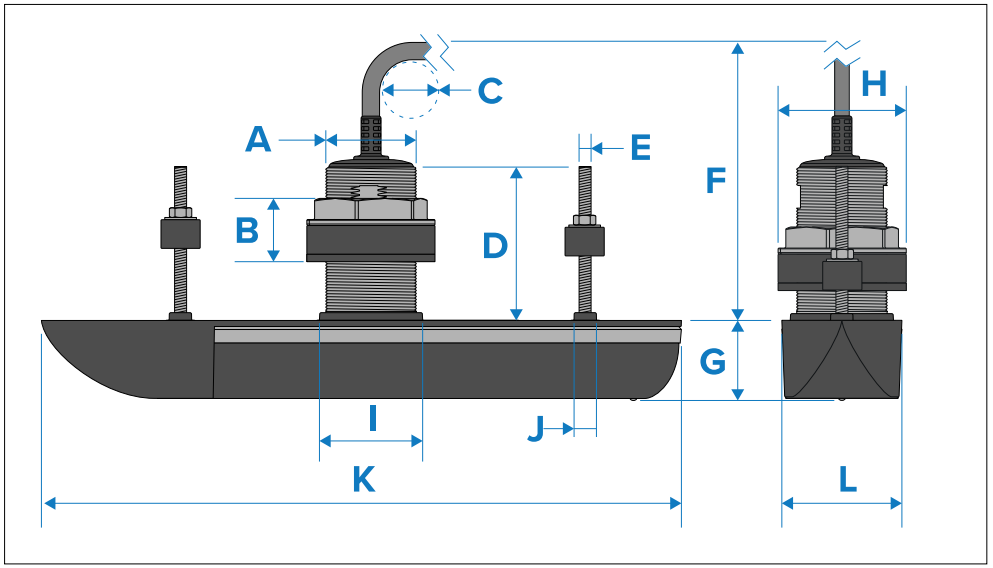
5.1 Transducer dimensions — RVM-4xx

The dimensions relevant for installation are shown below.

All transducers in the RVM-4xx series have the same external dimensions.



Item	Dimension
A	60.00 mm (2.36 in)
B	42.00 mm (1.65 in)
C	35.00 mm (1.40 in)
D	101.50 mm (3.99 in)
E	8.00 mm (0.31 in)
F	170.60 mm (6.72 in)
G	53.10 mm (2.10 in)
H	85.00 mm (3.35 in)
I	68.00 mm (2.68 in)
J	14.90 mm (0.59 in)
K	424.69 mm (16.72 in)
L	79.64 mm (3.14 in)

Nut sizes

- Hull nut — 68 mm (2 ¾ in) across flats
- Anti-rotation nut — 13 mm (½ in) across flats

Transducer cable length

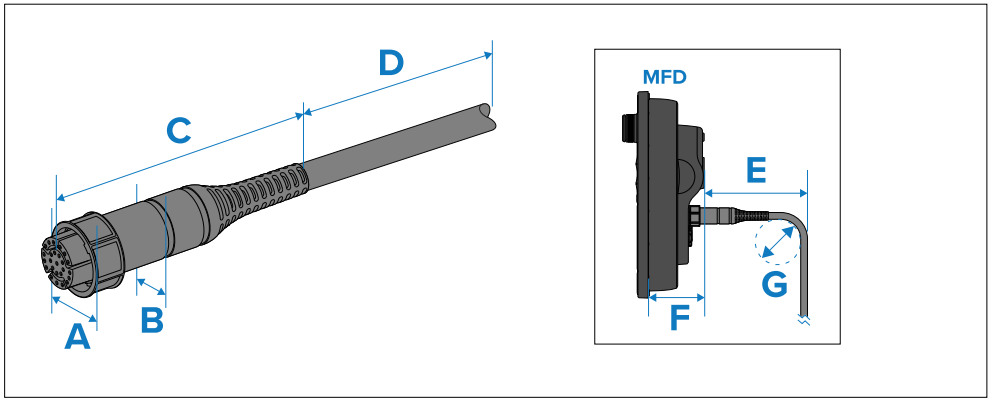
The length of the cable fitted to the transducer is:

- **RVM-400** — 8 m (26.2 ft)
- **RVM-412** and **RVM-420** — 2 m (6.5 ft)

RealVision transducer cable connector dimensions

The dimensions of the transducer cable and cable connector are shown below.

Cable connector dimensions



Item	Dimension
A	32.00 mm (1.26 in)
B	25.00 mm (1.00 in)
C	96.00 mm (3.80 in)
D	Cable length: • **Single (All-in-one) transducer** fitted cable length: 8 m (26.2 ft). • **Split pair transducer** fitted cable length: 2 m (6.5 ft).

Item	Dimension
E	This dimension is dependent on your MFD variant. Refer to your MFD installation instructions.
F	This dimension is dependent on your MFD variant. Refer to your MFD installation instructions.
G	35.00 mm (1.40 in)

Note:

For installations where space behind the display is limited, a right-angled transducer cable adaptor is available (A80515). Using the right angled cable adaptor will reduce dimension E above by 20 mm (0.79 in.)

CHAPTER 6: LOCATION REQUIREMENTS

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6.1 Warnings and cautions

Important:

Before proceeding, ensure that you have read and understood the warnings and cautions provided in the following section of this document:
p.7 — Important information

Warning: Switch off power supply

Ensure the vessel's power supply is switched OFF before starting to install this product. Do NOT connect or disconnect equipment with the power switched on, unless instructed in this document.

6.2 Location requirements

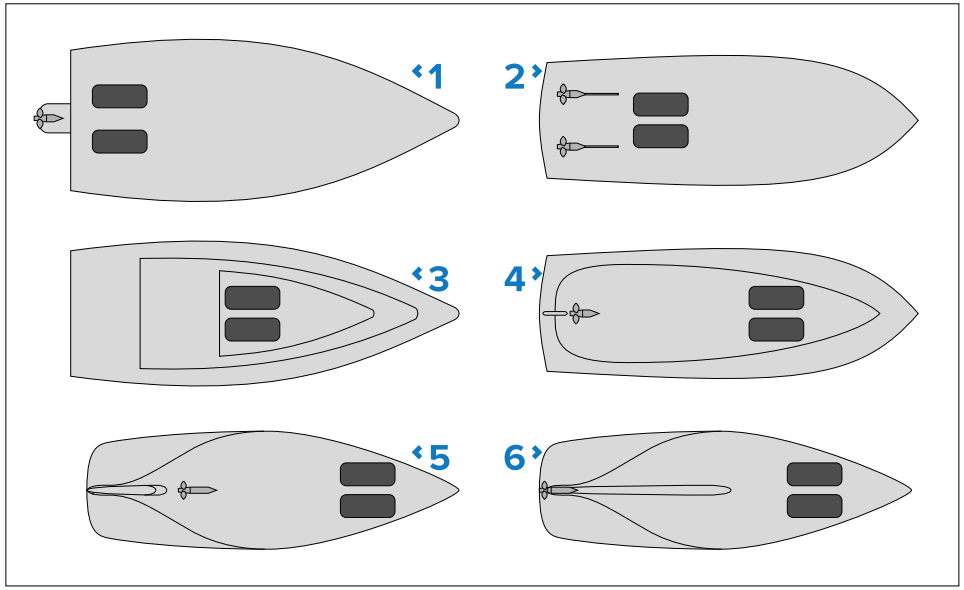
Follow the guidelines below when selecting a location for your single transducer or split-pair transducers.

For best performance, transducers should be installed in a location with the least turbulence and aeration.

Important:

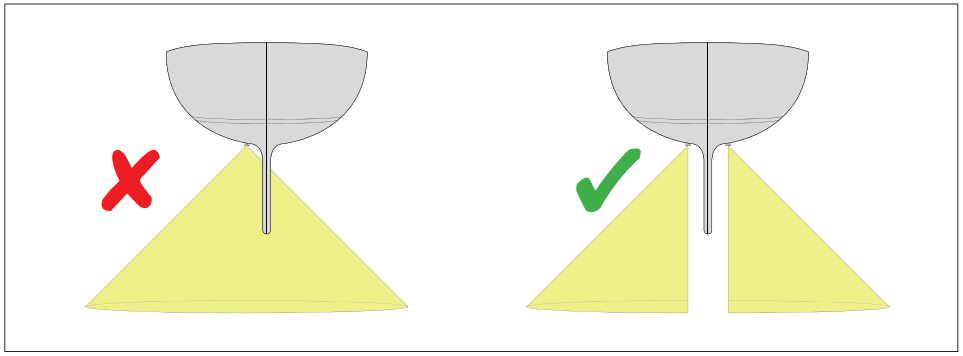
Do NOT install transducers in-line with trailer rollers, your vessel's engine intake or discharge openings.

- Transducers should be installed as close to the center line of the vessel as possible.

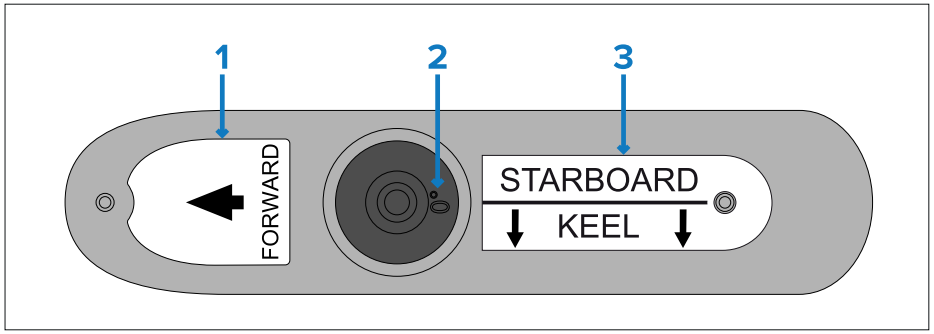


1. **Outboard or I/O (Planing hull)** — mount forward and to the side of the propeller(s).
2. **Inboard (Planing hull)** — mount forward of the propeller(s) and shaft(s).
3. **Stepped hull (Planing hull)** — mount on the first step as far aft as possible.
4. **Displacement hull** — mount approximately 1/3 of the way along the length of the hull, measured along the waterline.
5. **Fin keel (Keel sailboat)** — mount forward of the keel, ensuring that the keel will not obstruct the transducers wide beam width.
6. **Full keel (Keel sailboat)** — mount away from the keel at a location with minimum dead rise, ensuring that the keel will not obstruct the transducers wide beam width.

- The mounting surface should be flat so that transducer sits flush against the hull.
- When installing split-pair transducers with angled elements, you must ensure that the hull's deadrise angle at the chosen mounting location is appropriate for the selected transducers.
- When fitting to a hull with a keel, ensure that the transducer beam will not be obstructed by the keel. If the transducer cannot be fitted fore or aft of the keel then use split pair transducers to overcome the obstruction.

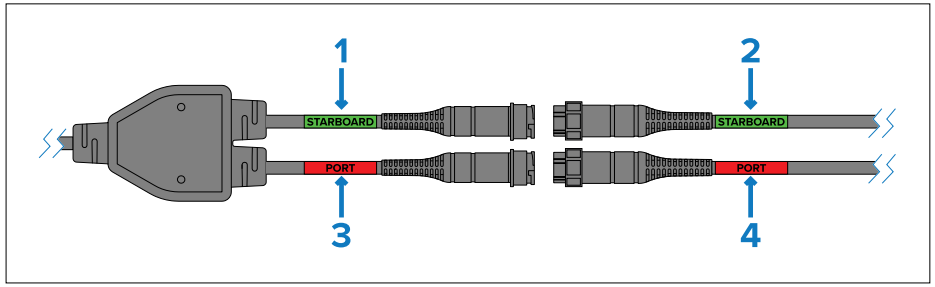


- The transducers should be installed away from any protrusions such as other transducers, steps, ribs, strakes, or rows of rivets.
- Transducers should be installed in a location where no load will be applied to the transducers during, launching, lifting, trailering and storage of the boat.
- Transducers must be installed in the correct orientation, with the anti-rotation bolt closest to the stern of the vessel. Additionally, a direction arrow pointing to the bow is embossed on the anti-rotation bolt cap.
- When installing split-pair transducers:
  - the correct transducer (port or starboard) must be installed in the matching (port or starboard) side of the hull. The transducers have labels on the top face that identify which side they should be installed on and the transducer's element angle:



1. Direction to vessel bow
2. Element angle and vessel side:
   - Single (all-in-one) transducers are marked "0°"
   - Split pair ("12°" or "20°")
   - Split pair — port, "P" or starboard, "S")
3. Split pair — Vessel side and direction to vessel keel (Single all-in-one transducers do not include this label.)

  - each transducer in a split pair have labels on the transducer cables and also labels on the accompanying 'Y' cable which identify the side:



1. **Green** — Starboard-side Y cable.
2. **Green** — Starboard side transducer cable.
3. **Red** — Port side Y cable.
4. **Red** — Port side transducer cable.

  - choose mounting positions that are symmetric about the center line of the vessel.
  - choose mounting positions that are at least 300 mm (12 inches) below the water line.
- Transducers should be installed in a location where there is sufficient clearance inside the hull to fit the nut and have at least 100 mm (4 in) of headroom to allow for withdrawal.
- To avoid interference with the internal magnetometer, mount transducers at least 1 m (39 inches) from other electrical devices.

Cored fiberglass hull mounting

It is recommended that the transducer is mounted in a non-cored section, if installation in a cored section is required then the area around the hole must be adequately strengthened to ensure it is not damaged when tightening the hull and anti-rotation nuts.

Important:

Installation in a cored fiberglass hull should only be carried out by a competent marine installer.

Warning: 2 person installation required

To prevent potential product damage, vessel damage and personal injury 2-person installation is recommended.

6.3 EMC installation guidelines

Raymarine® equipment and accessories conform to the appropriate Electromagnetic Compatibility (EMC) regulations, to minimize electromagnetic interference between equipment and minimize the effect such interference could have on the performance of your system.

Correct installation is required to ensure that EMC performance is not compromised.

Note:

In areas of extreme EMC interference, some slight interference may be noticed on the product. Where this occurs the product and the source of the interference should be separated by a greater distance.

For **optimum** EMC performance we recommend that wherever possible:

- Raymarine® equipment and cables connected to it are:
  - At least 1 m (3.3 ft) 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 2 m (6.6 ft).
  - More than 2 m (6.6 ft) 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 product is supplied from a separate battery from that used for engine start. This is important to prevent erratic behavior and data loss which can occur if the engine start does not have a separate battery.
- Raymarine® specified cables are used.
- Cables are not cut or extended, unless doing so is detailed in the installation manual.

Note:

Where constraints on the installation prevent any of the above recommendations, always ensure the maximum possible separation between different items of electrical equipment, to provide the best conditions for EMC performance throughout the installation.

CHAPTER 7: INSTALLATION

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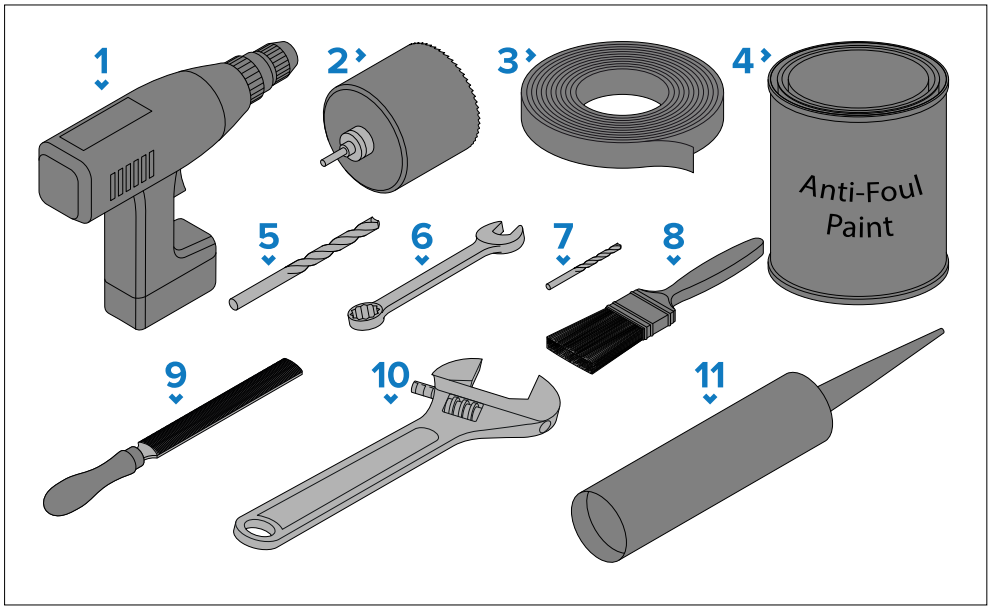
7.1 Tools required

The following tools are required to install any of the transducers listed under “Applicable products”.



1. Power drill
2. Hole cutter suitable for 68 mm (2 $^{43}/_{64}$ inch) external isolator plate boss(1)
3. Masking / adhesive tape
4. Water based anti-fouling paint
5. Drill bit suitable for 15 mm ($^{19}/_{32}$ inch) external isolator sleeve boss)(1)
6. 13 mm (½ inch) wrench (spanner) or suitable size adjustable wrench (spanner)
7. Drill bit (suitable for pilot holes)
8. Paint brush (for application of anti-fouling paint)
9. Half round file
10. Large adjustable wrench (spanner) suitable for hull nut 68 mm (2 ¾ inch)
11. Marine grade sealant

Note:

(1) It is recommended that you cut holes the same size as the stated values and then, if necessary, carefully file the hole to allow parts to be fitted correctly.

If a hole cutter / drill bit of the specified size(s) is not available, use a slightly smaller size and then carefully file the hole to the correct size. Alternatively, for larger holes, you could use a jigsaw to cut the hole and then carefully file the edge to create a circle the required size.

Warning: Marine-grade sealant

Only use marine-grade neutral cure polyurethane sealants. Do NOT use sealants containing acetate or silicone, which can cause damage to plastic parts.

7.2 Testing the transducer

Transducer operation should be checked before installation. For the purposes of this test you do not need to assembly the connector locking collar.

For detailed information on using the Fishfinder / Sonar app please refer to the operation instructions for your MFD.

1. Connect the transducer to the relevant connector on your MFD or sonar module that is connected to your MFD.
2. Fully submerge the transducer in water.
3. Power up your MFD and / or Sonar module.
4. Open a Fishfinder / Sonar app on your MFD.
5. If required, select the relevant transducer from the Transducer settings tab (*[Menu > Transducer > Transducer]*).
6. If required, select the relevant channel from the Channel selection options (*[Menu > All channels]*).
7. Check that accurate depth and where applicable temperature readings are displayed.
8. If you experience difficulties obtaining readings then contact Raymarine Technical Support.

Warning: Transducer operation

Only test and operate the transducer in the water. Do NOT operate out of water as overheating may occur.

7.3 Transducer mounting

The mounting procedure below should be read thoroughly before attempting to mount the transducer.

Stainless steel transducers are suitable for installations on vessels with fiberglass, metal or wooden hulls.

Important:

- You must use ALL of the supplied parts when installing the transducer.
- When installing the transducer on a vessel that has a metal hull the supplied isolator parts ensure that the transducer metalwork is fully isolated from the metal hull.
- Do NOT install stainless steel transducers on vessels with a positive ground system.

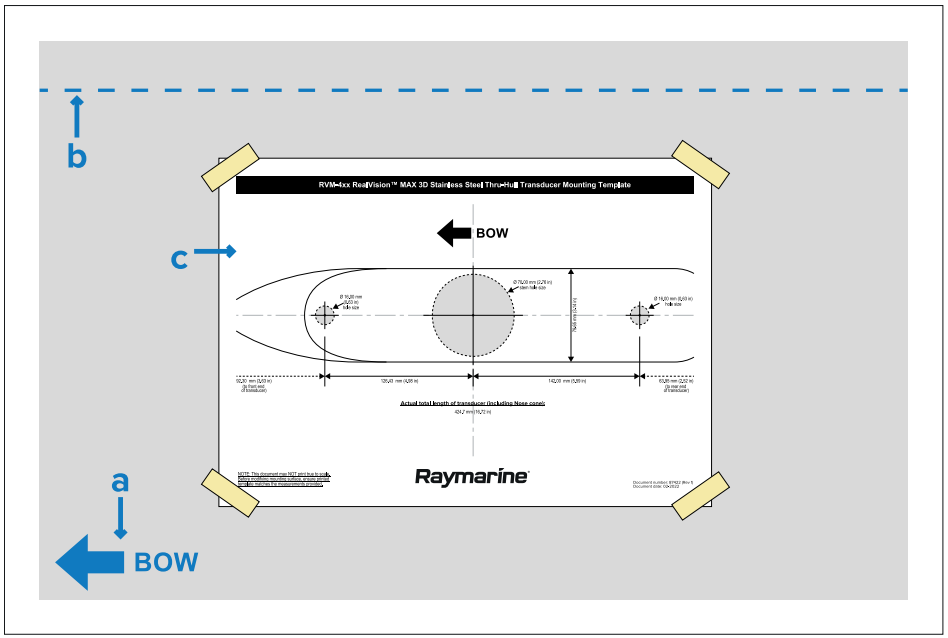
Important:

- Only perform the installation with your vessel out of the water.
- Do NOT lift or suspend the transducer using its cable.
- Ensure that the transducer body is supported during installation.
- Do NOT remove the label attached to the transducer cable; as it helps to ensure correct connection.
- Do NOT overtighten the hull nut or anti-rotation bolt. Overtightening can cause damage to the hull which may result in water leaking into the vessel.

Drilling holes in the hull

To install a thru-hull transducer you must drill 3 holes in the hull of your vessel. You should use the supplied mounting template to mark the hole location.

1. Ensure that you are using the correct transducer (i.e.: port / starboard, 0°, 12° or 20° tilted element) for your chosen mounting location.
2. Using self-adhesive tape, attach the supplied mounting template to your chosen mounting location, ensuring that:



   i. the ‘Bow’ arrow on the template is pointed towards the vessel’s bow.
   ii. the mounting template is parallel to the centerline of the vessel.
   iii. the template is flat and not creased.
3. Pierce the template at each hole center and mark the hole locations on the hull using a pencil or marker..
4. Remove the template from the hull.
5. Drill a pilot hole for the transducer stem hole.
6. (1) Drill a hole suitable for the 68 mm (2 $^{43}/_{64}$ inch) boss on the top of the external isolator plate. The boss on the external isolator plate must sit inside the hull.

Important:

(1) It is recommended that you cut holes the same size as the stated values and then, if necessary, carefully file the hole to allow parts to be fitted correctly.

If a hole cutter / drill bit of the specified size(s) is not available, use a slightly smaller size and then carefully file the hole to the correct size. Alternatively, for larger holes, you could use a jigsaw to cut the hole and then carefully file the edge to create a circle the required size.

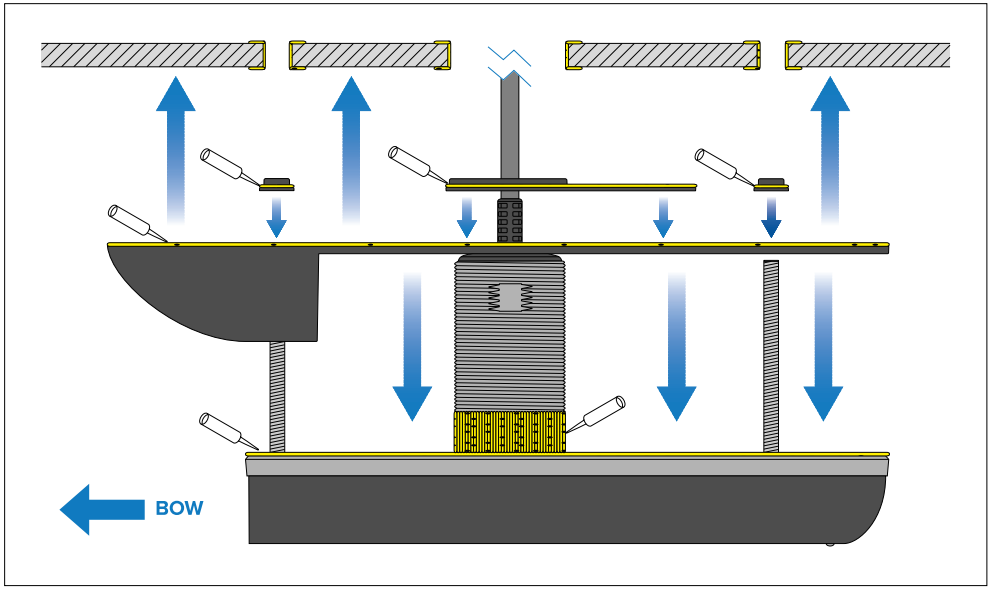
7. Using a half round file and / or sandpaper, ensure there are no rough edges or burrs around the transducer stem hole.
8. Drill the two 15 mm ($^{19}/_{32}$ inch) holes for the anti-rotation bolts.

Assembling the external components

The steps below will guide you through the assembly of the external components.

Note:

To achieve a long lasting watertight seal, ensure that all parts are clean and dry and apply a generous amount of marine-grade sealant to all mating surfaces.



1. Ensure correct orientation using the markings and labels on the top face of the transducer.
2. Remove the orientation labels and clean to ensure there is no residual label glue.
3. Using an appropriate cloth and cleaning agent (for example: isopropyl alcohol), wipe clean ALL surfaces of the supplied components and the mounting location, both outside and inside the hull ensuring that they are free from grease and debris.
4. Ensure all surfaces are dry.
5. Apply a thick bead of marine-grade sealant all over the top face of the transducer so that it is completely covered.
6. Feed the transducer cable, stem and anti-rotation studs through the holes in the high speed nose cone, positioning the high speed nose cone over the transducer, and then slide the transducer into the nose.
7. Apply pressure to the high speed nose cone, to compress the sealant against the transducer.
8. Feed the transducer cable through the stem hole in the external isolator plate, and then position the external isolator plate in the recess in the top of the high speed nose cone.
9. Feed an external isolator sleeve over both of the anti-rotation studs, positioning them in the hole recesses in the top of the high speed nose cone.

10. Apply a thick bead of marine-grade sealant:
    i. all over the top face of the high speed nose cone, external isolator plate, and external isolator sleeves, ensuring that they are completely covered.
    ii. all around the bottom part of the threaded section of the transducer stem and the anti-rotation studs, ensuring that the sealant will protrude approximately 6 mm (0.24 in) above the final tightened nuts.
    iii. all around and inside the holes you have drilled in the hull.
11. Guide the transducer cable through the large stem hole in the hull.
12. Guide the transducer stem and anti-rotation studs up through the holes in the hull.
13. Support the transducer from beneath.

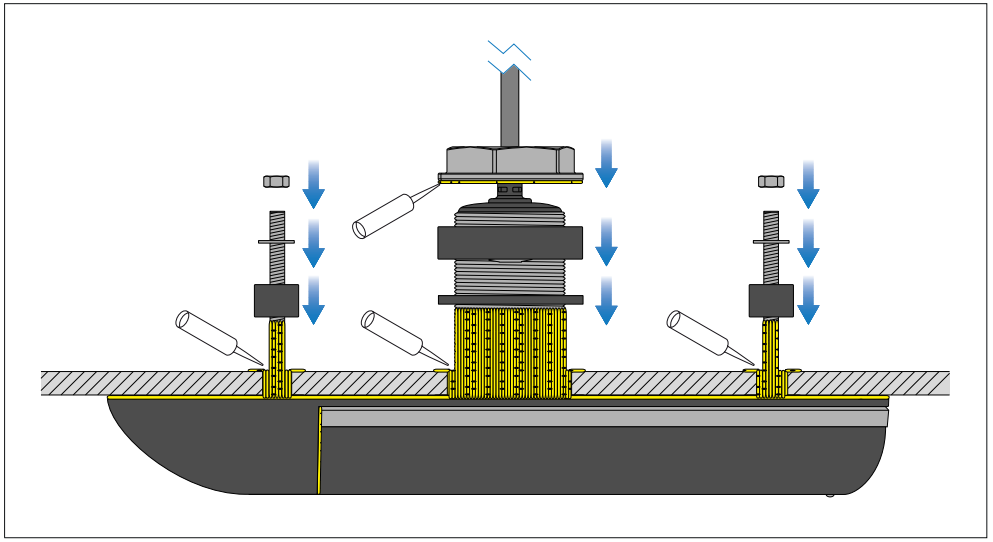
Assembling the internal components

Follow the steps below to fit the transducer to your hull.

Note:

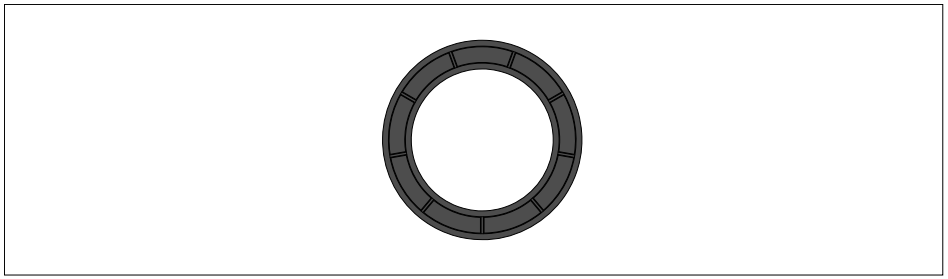
To achieve a long lasting watertight seal, ensure that all parts are clean and dry and apply a generous amount of marine-grade sealant to all mating surfaces.

Mounting and sealant application



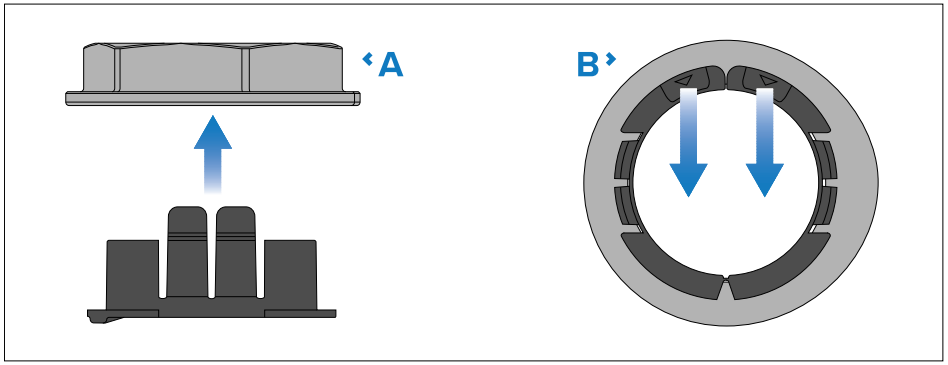
1. From inside the vessel, apply a continuous, thick bead of marine-grade sealant all around the base of the protruding transducer stem and anti-rotation bolt threads.
2. Guide the rubber washer down the transducer cable, and over the threaded section of the transducer stem, compressing the sealant so that the rubber washer sits flush on the hull.
3. If necessary, apply additional marine-grade sealant to the transducer stem, above the rubber washer.
4. With the top face pointing upwards, guide the large isolator bush down the transducer cable and over the transducer stem, ensuring it sits flush on the rubber washer.

Large isolator bush top face



5. If necessary, apply additional marine-grade sealant to the transducer stem, above the large isolator bush.
6. Ensuring the cable protector is fitted to the hull nut, guide the nut down the transducer cable, resting the nut on top of the transducer stem.

Cable protector fitting and removal



- ***A*** *— Fitting*

- ***B*** *— Removal*

7. Remove the cable protector by pulling the 2 tabs away from the back of the hull nut.
8. Apply a thick bead of marine grade sealant to the bottom face of the hull nut.
9. Screw the hull nut onto the transducer stem so that it is hand tight.
10. From outside the vessel ensure that the transducer is pushed fully in to the high speed nose cone.

    It is recommended that a second person holds the high speed nose cone in place whilst the stem and anti-rotation nuts are fully tightened.

11. Fully tighten, using a 70 mm (2 $^{3}/_{4}$ inch) wrench (spanner) or large adjustable wrench.

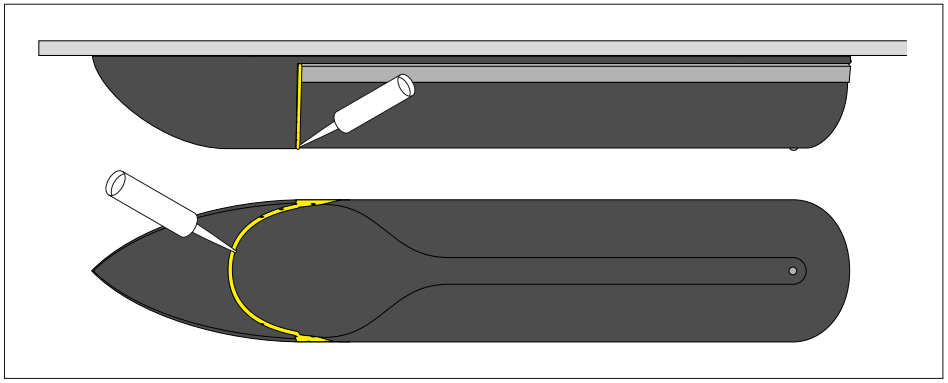
    Ensure that the hull nut is adequately tightened. You should see the sealant protruding from the edges of all applied surfaces.

12. Place the small internal isolator sleeves over the anti-rotation studs, ensuring they sit flush on the interior of the hull.
13. If necessary, apply additional marine-grade sealant to the anti-rotation studs, above the small internal isolator sleeves.
14. Place the small washers over the anti-rotation studs.
15. If necessary, apply additional marine-grade sealant to the anti-rotation studs above the small washer.
16. Screw the anti-rotation nuts onto the studs and fully tighten, using a 13 mm ($^{1}/_{2}$ inch) wrench (spanner) or adjustable wrench.

Finalizing the installation

Follow the steps below to finalize the installation of you transducer.

1. Apply a thick bead of marine-grade sealant in the gap between the transducer and nose cone on the bottom and both sides, as shown below.



2. Remove any excess sealant on the outside of the hull and transducer, ensuring a smooth transition between nose cone and transducer, and transducer and hull.
3. Ensure that the marine-grade sealant has fully cured

    Refer to the sealant manufacturer's instructions for curing times.

4. Unless local environmental regulations prohibit, apply a water-based anti-fouling paint to the bottom face of the transducer, ensuring all of the externally exposed transducer surfaces are coated and the paint overlaps onto the hull.
5. Check for leaks around the transducer immediately upon putting the vessel back in the water.

Important:

Do NOT leave your vessel in the water unchecked after installing your transducer. Very small leaks may not be immediately obvious, and a considerable volume of bilge water could accumulate over the course of a day, or overnight.

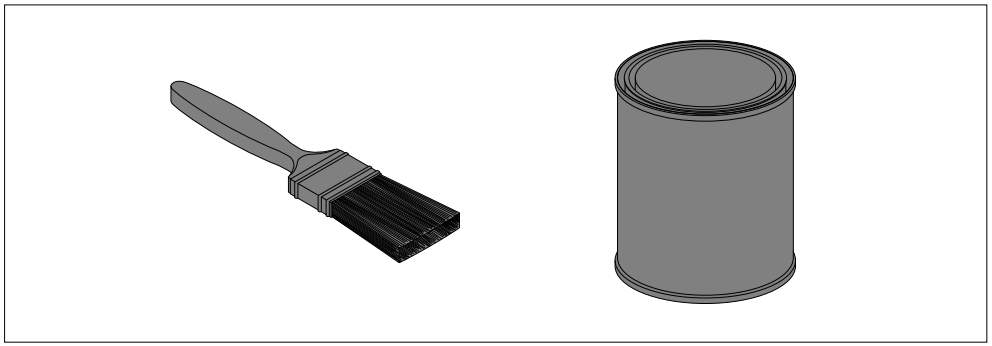
6. Check for leaks at regular intervals after installation, until you are satisfied that there are no leaks.
7. Add a regular check for leaks around the transducer to your routine vessel maintenance schedule.

Anti-fouling

Where local regulations allow, it is recommended that you coat your transducer using a water-based anti-fouling paint. This will help prevent the build-up of barnacles and other organic growth, which can cause increased drag that will degrade sonar performance.

Important:

- Before applying water-based anti-fouling paint, check that local environmental rules and regulations do not prohibit the use of anti-fouling paint.
- Never use copper-based anti-fouling paint as this can impact transducer performance.
- Never use ketone-based anti-fouling paint as this can attack the transducer's plastic, damaging the transducer.
- Paint your transducer using a brush, do not use a spray can or a sponge roller as these methods can cause tiny air bubbles to be incorporated in the paint, which will also reduce transducer performance.



The anti-fouling paint should be applied in a thin and even coat covering all externally exposed transducer surfaces.

You should clean your transducer regularly and re-apply anti-fouling paint every 6 months, or sooner depending on how rapidly organic growth builds up.

CHAPTER 8: CABLES AND CONNECTIONS — GENERAL INFORMATION

CHAPTER CONTENTS

8.1 General cabling guidance

Cable types and length

It is important to use cables of the appropriate type and length.

- Unless otherwise stated only use cables supplied by Raymarine.
- Where it is necessary to use non-Raymarine cables, ensure that they are of correct quality and gauge for their intended purpose. (e.g.: longer power cable runs may require larger wire gauges to minimize voltage drop along the run).

Strain relief

Use adequate strain relief for cabling to ensure that connectors are protected from strain and will not pull out under extreme sea conditions.

Cable shielding

Ensure that cable shielding is not damaged during installation and that all cables are properly shielded.

Caution: Transducer cable

- Do NOT use the transducer cable to lift or suspend the transducer; always support the transducer body directly during installation.
- Do NOT cut, shorten, or splice the transducer cable.
- Do NOT remove the connector.

If the cable is cut, it cannot be repaired. Cutting the cable will also void the warranty.

CHAPTER 9: CONNECTIONS

CHAPTER CONTENTS

9.1 Cable routing

Cable routing requirements for the transducer cable.

Important:

To avoid interference, the cable must be routed as far away from VHF radio antenna cables as possible.

Important:

The transducer cable's connector is supplied with a separate locking collar assembly. Ensure that you route the cable all the way to your compatible sonar module or MFD **before** attaching the locking collar.

- Check that the cable is long enough. If you are installing split-pair transducers, you must use a Y-cable (A80478) along with an extension cable to connect the transducers to your to your compatible sonar module or MFD.
- Use grommets in any pass-through holes to prevent damage to the transducer cable.
- Secure the cable at regular intervals using suitable cable clips (not supplied).
- Take care not to apply excessive strain to the cable where it leaves the transducer. Where possible, allow the cable to lay naturally as it leaves the transducer, before securing it with cable clips.
- Do not bend the transducer cable beyond its minimum bend radius. This is particularly important at the point where the cable leaves the transducer.
- Any excess cable should be coiled up at a convenient location.

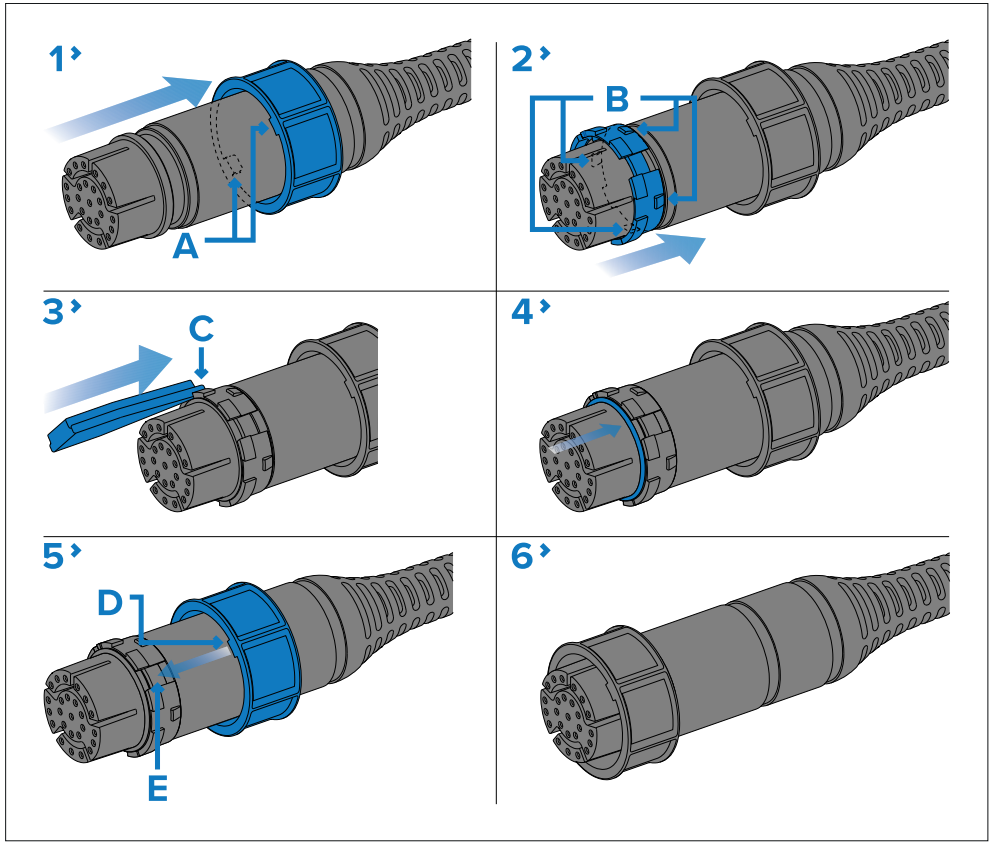
9.2 Attaching the connector locking collar

The supplied cable is provided with a separate locking collar assembly, ensuring that the cable connection is secure.

This procedure describes how to attach the locking collar to the cable connector. The locking collar parts are supplied in a separate bag, in the package with your product.

Important:

Ensure that you route the cable all the way to its destination **before** attaching the locking collar.



1. Slide the locking collar over the end of the connector, then push it towards the cable-end of the connector. Ensure that the lugs on the locking collar (labelled 'A' in the illustration), are closest to the plug-end of the connector.
2. Slide the split-ring over the end of the connector, then push it towards the cable-end of the connector. Ensure that the tabs on the split-ring (labelled 'B' in the illustration), are closest to the cable-end of the connector.

   The split-ring slides easily for approximately 1 cm (0.39 in) onto the connector, before butting up against the connector moulding.

3. Carefully insert the pointed end of the supplied tool into the split-ring's gap (labelled 'C' in the illustration). Use the tool to gently lever the split ring over the moulding on the connector until it snaps into position approximately 0.5 cm further back towards the cable-end of the connector.

   Always use the supplied tool when attaching the split ring. The split ring may become overstretched and break if you try to attach it without using the tool. A spare split ring is supplied with the locking collar assembly, in case of breakage.

4. Slide the O-ring (arrowed) over the end of the connector, and ensure that it is seated squarely against the connector moulding, adjacent to the split-ring.
5. Slide the locking collar towards the plug-end of the connector, rotating the collar as necessary to ensure that the lugs on the locking collar (labelled 'D' in the illustration) pass through the channels (labelled 'E') in the split-ring.

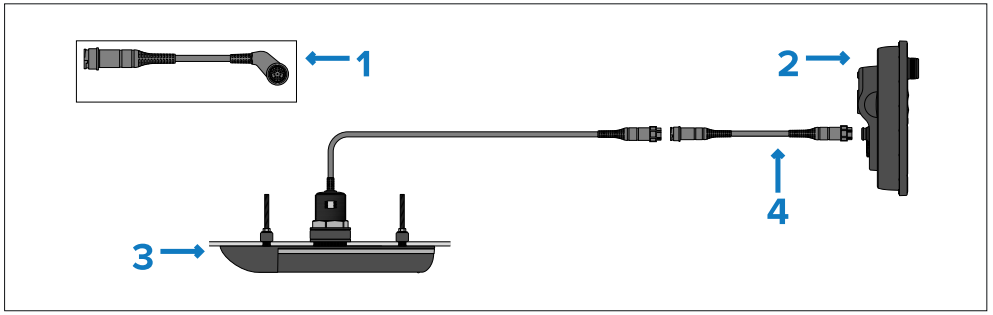
   The locking collar slides easily towards the plug-end of the connector, before butting up against the split-ring moulding.

6. Grasp the body of the connector with one hand, then with the other hand, pull the locking collar firmly towards the plug-end of the connector.

   As you pull the locking collar, it clicks into place over the split-ring. The locking collar stays in position on the connector, but rotates freely.

9.3 RVM-400 connection

The all-in-one transducer can be connected directly to the MFD or sonar module.

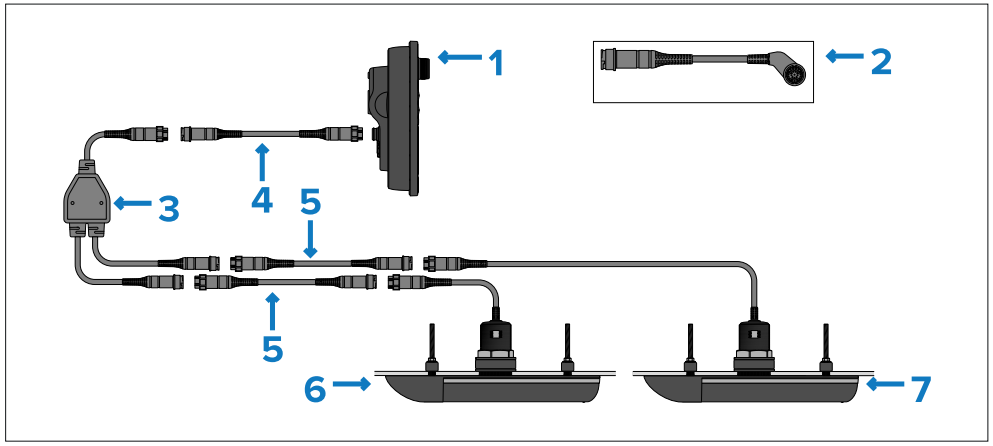


1. Optional right-angled adaptor (A80515), supplied separately (used to reduce the space required behind an MFD).
2. Compatible MFD or sonar module.
3. Transducer.
4. To extend the cable run, optional extension cables can be fitted between the transducer and the MFD or sonar module.

- For compatible MFD and sonar modules refer to:
  p.14 — Compatible sonar modules and displays
- For details on extension cables refer to:
  p.37 — RealVision™ Max 3D transducer extension cables

9.4 RVM-412 / RVM-420 connection

Split pair transducers are connected to the MFD or sonar module using the supplied 'Y' cable and extension cable.



1. Compatible MFD or sonar module.
2. Optional right angled adaptor (A80515) supplied separately (used to reduce the space required behind an MFD).
3. 'Y' cable (supplied)
4. 8 m (26.2 ft) extension cable (supplied)
5. Optional extension cables can be fitted between the transducer and 'Y' cable if required, or between supplied extension cable and MFD or sonar module.

6. Transducer, e.g.: RVM-412 Port.
7. Transducer, e.g.: RVM-412 Starboard.

- For compatible MFD and sonar modules, refer to: **p.14 — Compatible sonar modules and displays**
- For details on extension cables, refer to: **p.37 — RealVision™ Max 3D transducer extension cables**

9.5 RealVision transducer extension cables

Your transducer is supplied with a fitted cable, for some installations (including all split-pair transducer installations) it may be necessary to extend the length of the transducer cable.

Note:

- For best performance, cable runs should be kept to a minimum.
- Only use Raymarine® transducer extension cables.

Raymarine® offers he following optional extension cables are available:

- RealVision™ transducer extension cable 3 m (9.8 ft) (part number A80475)
- RealVision™ transducer extension cable 5 m (16.4 ft) (part number A80476)
- RealVision™ transducer extension cable 8 m (26.2 ft) (part number A80477)

Split pair transducers: Extension cables fitted between the transducer and the 'Y' cable must be fitted in equal length pairs (i.e.: each transducer's final cable length must be the same).

Warning: Maximum transducer cable length

The maximum length of cable between a RealVision™ Max 3D transducer and a MFD/sonar module (including the transducer's captive cable) must NOT exceed 18 m (59 ft). Cable lengths greater than this may cause damage to the RealVision™ Max 3D transducer and MFD/sonar module.

9.6 Making connections

Follow the steps below to connect the transducer cable to a RealVision™ Max 3Dsonar-capable device (i.e.: Axiom™ 2 Pro MFD or RVM1600 sonar module).

1. Ensure that the vessel's power supply is switched off.
2. Connect cables as follows:
   i. Connect the cable from each transducer to the Y-cable tails (A80478); check the colored labels on the cables to ensure that the transducers are connected to the correct Y-cable tail.
   ii. Connect an extension cable to the remaining free plug on the Y-cable. See **p.37 — RealVision™ Max 3D transducer extension cables**.
3. Ensuring correct orientation, push the transducer cable (or extension cable) connector fully onto the corresponding connector on your MFD or sonar module.
4. Turn the locking collar clockwise to secure the cable.

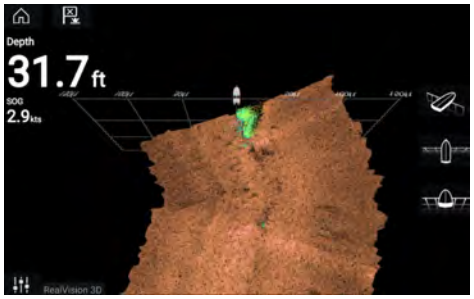
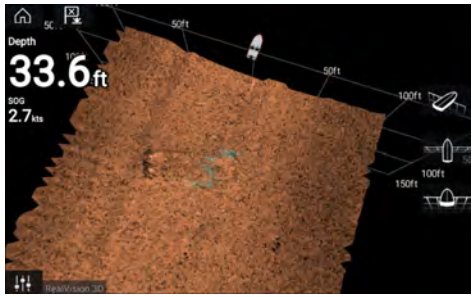
CHAPTER 10: SYSTEM CHECKS AND TROUBLESHOOTING

CHAPTER CONTENTS

10.1 RealVision™ AHRS calibration

RealVision™ transducers include a built-in AHRS (Attitude and Heading Reference Sensor), which measures the motion of your vessel to assist in the rendering of sonar images. After installation all RealVision™ transducers require calibration.

An uncalibrated transducer can produce an offset to the front edge of the render of the bottom in the sonar image, as illustrated below.

Uncalibrated	Calibrated
	

Calibration is an automatic process and starts after your vessel has turned approximately 100° at a speed of between 3 –15 knots. Calibration requires no user input, however at least a 270° turn is required before the calibration process can determine the local deviation and apply a relevant offset.

The time it takes to complete the calibration process will vary according to the characteristics of the vessel, the installation environment of the transducer, and the levels of magnetic interference at the time of conducting the process. Sources of significant magnetic interference may increase the time required to complete the calibration process. Certain areas with substantial magnetic deviation may require extra circles or “figure of 8” manoeuvres to be performed. Examples of such sources of magnetic interference include:

- Vessel engines
- Vessel alternators
- Marine pontoons
- Metal-hulled vessels
- Underwater cables

Note:

In some circumstances, it is beneficial to disable Realvision AHRS if local sources of magnetic interference are distorting the sonar image. Realvision AHRS can be disabled from *[Settings]*.

[Menu > Settings > Sounder > AHRS stabilization]

Note:

The Calibration process will require repeating after a *[Sonar reset]* or MFD *[Factory reset]*.

10.2 Troubleshooting

The troubleshooting section provides possible causes and the corrective action required for common problems that are associated with the installation and operation of your product.

Before packing and shipping, all Raymarine® products are subjected to comprehensive testing and quality assurance programs. If you do experience problems with your product, this section will help you to diagnose and correct problems to restore normal operation.

If after referring to this section you are still having problems with your product, please refer to the *Technical support* section of this manual for useful links and Raymarine® Product Support contact details.

Operation instructions

For detailed operation instructions for your product, refer to the documentation that accompanies your display.

All product documentation is available to download from the Raymarine website: www.raymarine.com/manuals.

Sonar troubleshooting

Scrolling image is not being displayed

Possible causes	Possible solutions
Sonar disabled	Enable *[Ping]* from the Fishfinder app's sounder tab: *[Menu > Settings > Sounder > Ping enable]*.
Incorrect transducer selected	Check that the correct transducer is selected in the Fishfinder app's Transducer tab: *[Menu > Settings > Transducer]*.
Damaged cables	1. Check that the transducer cable connector is fully inserted and locked in position. 2. Check the power supply cable and connectors for signs of damage or corrosion, replace if necessary. 3. With the unit turned on, try flexing the cable near to the display connector to see if this causes the unit to re-boot/lose power, replace if necessary. 4. Check the vessel's battery voltage, the condition of the battery terminals and power supply cables, ensuring connections are secure, clean and free from corrosion, replace if necessary. 5. With the product under load, using a multi-meter, check for high voltage drop across all connectors/fuses etc (this can cause the Fishfinder applications to stop scrolling or the unit to reset/turn off), replace if necessary.
Damaged or fouled transducer	Check transducer condition, ensuring it is not damaged and is free from debris/fouling. If necessary, clean or replace your transducer. After cleaning or replacement coat the transducer using a water-based anti-fouling paint.
Wrong transducer fitted	Check product and transducer documentation and ensure that the transducer is compatible with your system.
External sonar module: network connection problem.	Check that the unit is correctly connected to your display or network switch. Check all connections to ensure that they are secure, clean and free from corrosion, replace if necessary.
External sonar module: software mismatch between equipment may prevent communication.	Ensure all Raymarine® products contain the latest available software, check the Raymarine® website: www.raymarine.com/software for software compatibility.

No depth reading / lost bottom lock

Possible causes	Possible solutions
Transducer location	Check that the transducer has been installed in accordance with the instructions provided with the transducer.
Transducer angle	If the transducer angle is too great the beam can miss the bottom, adjust transducer angle and recheck.
Transducer kicked-up	If the transducer has a kick-up mechanism, check that it has not kicked up due to hitting an object.
Power source insufficient	With the product under load, using a multi-meter, check the power supply voltage as close to the unit as possible to establish actual voltage when the current is flowing. (Check your product's Technical specification for power supply requirements.)
Damaged or fouled transducer	Check transducer condition, ensuring it is not damaged and is free from debris/fouling. If necessary, clean or replace your transducer. After cleaning or replacement coat the transducer using a water-based anti-fouling paint.

Possible causes	Possible solutions
Damaged cables	1. Check the unit's connector for broken or bent pins. 2. Check that the cable connector is fully inserted into the unit and that the locking collar is in the locked position. 3. Check the cable and connectors for signs of damage or corrosion, replace if necessary. 4. With the unit turned on, try flexing the power cable near to the display connector to see if this causes the unit to re-boot/lose power, replace if necessary. 5. Check the vessel's battery voltage, the condition of the battery terminals and power supply cables, ensuring connections are secure, clean and free from corrosion, replace if necessary. 6. With the product under load, using a multi-meter, check for high voltage drop across all connectors/fuses etc (this can cause the Fishfinder applications to stop scrolling or the unit to reset/turn off), replace if necessary.
Vessel speed too high	Slow vessel speed and recheck.
Bottom too shallow or too deep	The bottom depth may be outside of the transducers depth range, move vessel to shallower or deeper waters as relevant and recheck.
Ping depth limit set	If using a transducer with greater than 600 W power, check if the *[Ping depth limit]* has been enabled: *[Menu > Settings > Transducer > Ping depth limit]*. If you are in water deeper than the specified *[Ping depth limit]* then the transducer may not provide depth readings. Disable or adjust setting and retry.

Poor / problematic image

Possible causes	Possible solutions
Targets will appear differently if your vessel is stationary (e.g.: fish will appear on the display as straight lines).	Increase vessel speed.
Scrolling paused or speed set too low	Unpause or increase sonar scrolling speed.
Sensitivity settings may be inappropriate for present conditions.	Check and adjust sensitivity settings or perform a Sonar reset.
Damaged cables	1. Check the unit's connector for broken or bent pins. 2. Check that the cable connector is fully inserted into the unit and that the locking collar is in the locked position. 3. Check the cable and connectors for signs of damage or corrosion, replace if necessary. 4. With the unit turned on, try flexing the power cable near to the display connector to see if this causes the unit to re-boot/lose power, replace if necessary. 5. Check the vessel's battery voltage, the condition of the battery terminals and power supply cables, ensuring connections are secure, clean and free from corrosion, replace if necessary. 6. With the product under load, using a multi-meter, check for high voltage drop across all connectors/fuses etc (this can cause the Fishfinder applications to stop scrolling or the unit to reset/turn off), replace if necessary.

Possible causes	Possible solutions
Transducer location	• Check that the transducer has been installed in accordance with the instructions provided with the transducer. • If a transom mount transducer is mounted too high on the transom it may be lifting out of the water, check that the transducer face is fully submerged when planing and turning.
Transducer kicked-up	If the transducer has a kick-up mechanism, check that it has not kicked up due to hitting an object.
Damaged or fouled transducer	Check transducer condition, ensuring it is not damaged and is free from debris/fouling. If necessary, clean or replace your transducer. After cleaning or replacement coat the transducer using a water-based anti-fouling paint.
Damaged transducer cable	Check that the transducer cable and connection is free from damage and that the connections are secure and free from corrosion.
Turbulence around the transducer at higher speeds may affect transducer performance	Slow vessel speed and recheck.
Interference from another transducer	1. Turn off the transducer causing the interference. 2. Reposition the transducers so they are farther apart.
Unit power supply fault	Check the voltage from the power supply, if this is too low it can affect the transmitting power of the unit.

Resetting the sonar module

You can use the reset function on a compatible Raymarine multifunction display to restore the sonar module to its factory default settings.

In the fishfinder application:

1. Select *[Menu]*.
2. Select *[Set-up]*.
3. Select *[Sounder Set-up]*.
4. Select *[Sonar Reset]*.
5. Select *[Yes]* to confirm or *[No]* to abort the operation, as appropriate.

The unit will now be reset to factory default settings.

CHAPTER 11: MAINTENANCE

CHAPTER CONTENTS

11.1 Routine checks

The following periodic checks should be made:

- Examine cables for signs of damage, such as chafing, cuts or nicks.
- Check that the cable connectors are firmly attached and that their locking mechanisms are properly engaged.

Note:

Cable checks should be carried out with the power supply switched off.

Warning: High voltage

This product contains high voltage. 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 product.

11.2 Transducer cleaning

You must clean your transducer regularly to remove organic growth. Organic growth can build up quickly on the bottom face of your transducer; this can impact transducer performance in a matter of weeks.

Important:

- When cleaning growth from an anti-fouled transducer, take care not to let paint dust and other debris enter the water, as this can have an impact on aquatic life.
- Take care not to scratch the surface of the transducer as this can impact transducer performance.
- Do NOT use harsh cleaning solvents such as acetone as this will damage the transducer.

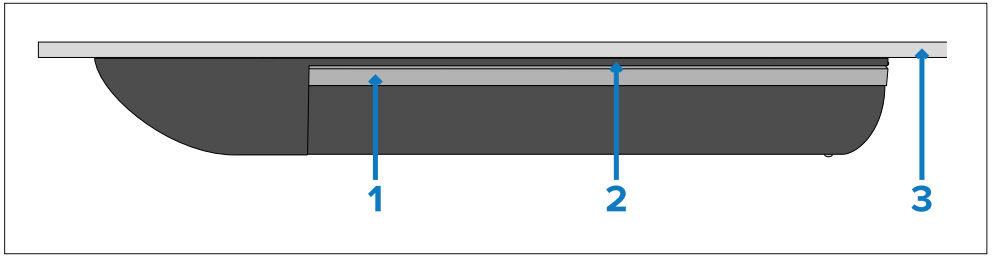
Follow the guidance below to clean growth from your transducer:

- Use a soft cloth and a mild household cleaning detergent to clean mild growth build up.
- Use a scouring pad, such as a green Scotch Brite™ pad and a mild household cleaning detergent to clean moderate growth build up.
- You may need to use a fine grade wet and dry paper and a mild household cleaning detergent to clean severe build up.

11.3 Bridging material removal

On metal hulled vessels, to prevent galvanic corrosion, the metal parts of your stainless steel transducer must NOT touch the hull. The included high speed nose cone and isolation parts ensure a gap exists between the two surfaces.

When cleaning your transducer, particular attention must be given to the edge of the high speed nose cone. **Ensure that there is no growth or material attached that bridges the gap between the metal part of the transducer and a metal hull.**



1. Metal part of transducer.
2. High speed nose cone.
3. Metal hull.

11.4 Re-applying anti-fouling paint

If you have applied anti-fouling paint to your transducer, it is important to re-apply it at least every 6 months, to maintain effectiveness.

Follow the instructions below to re-apply anti-fouling paint.

Important:

- Following environmental best practice, preparation and re-application of the anti-fouling paint should be performed using suitable washdown facilities, which ensures paint particles do not enter the water and impact aquatic life.
- Take care not to scratch the transducer face, as this may impact transducer performance.

1. Remove your vessel from the water.
2. Clean your transducer, ensuring all organic growth is removed.
3. Remove any flaking anti-foul paint.
4. Use a soft dry cloth to remove any loose bits of paint.
5. Re-apply a water-based anti-fouling paint.

CHAPTER 12: TECHNICAL SUPPORT

CHAPTER CONTENTS

12.1 Raymarine product support and servicing

Raymarine provides a comprehensive product support service, as well as warranty, service, and repairs. You can access these services through the Raymarine website, telephone, and e-mail.

Product information

If you need to request service or support, please have the following information to hand:

- Product name.
- Product identity.
- Serial number.
- Software application version.
- System diagrams.

You can obtain this product information using diagnostic pages of the connected display.

Servicing and warranty

Raymarine offers dedicated service departments for warranty, service, and repairs.

Don't forget to visit the Raymarine website to register your product for extended warranty benefits: http://www.raymarine.co.uk/display/?id=788.

United Kingdom (UK), EMEA, and Asia Pacific:

- E-Mail: emea.service@raymarine.com
- Tel: +44 (0)1329 246 932

United States (US):

- E-Mail: rm-usrepair@flir.com
- Tel: +1 (603) 324 7900

Web support

Please visit the "Support" area of the Raymarine website for:

- **Manuals and Documents** — http://www.raymarine.com/manuals
- **Technical support forum** — https://raymarine.custhelp.com/app/home
- **Software updates** — http://www.raymarine.com/software

Worldwide support

United Kingdom (UK), EMEA, and Asia Pacific:

- Help desk: https://raymarine.custhelp.com/app/ask
- Tel: +44 (0)1329 246 777

United States (US):

- Help desk: https://raymarine.custhelp.com/app/ask
- Tel: +1 (603) 324 7900 (Toll-free: +800 539 5539)

Australia and New Zealand (Raymarine subsidiary):

- E-Mail: aus.support@raymarine.com
- Tel: +61 2 8977 0300

France (Raymarine subsidiary):

- E-Mail: support.fr@raymarine.com
- Tel: +33 (0)1 46 49 72 30

Germany (Raymarine subsidiary):

- E-Mail: support.de@raymarine.com
- Tel: +49 40 237 808 0

Italy (Raymarine subsidiary):

- E-Mail: support.it@raymarine.com
- Tel: +39 02 9945 1001

Spain (Authorized Raymarine distributor):

- E-Mail: sat@azimut.es
- Tel: +34 96 2965 102

Netherlands (Raymarine subsidiary):

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- Tel: +31 (0)26 3614 905

Sweden (Raymarine subsidiary):

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- Tel: +358 (0)207 619 937

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- Tel: +47 692 64 600

Denmark (Raymarine subsidiary):

- E-Mail: support.dk@raymarine.com
- Tel: +45 437 164 64

Russia (Authorized Raymarine distributor):

- E-Mail: info@mikstmarine.ru
- Tel: +7 495 788 0508

12.2 Learning resources

Raymarine has produced a range of learning resources to help you get the most out of your products.

Video tutorials

Raymarine official channel on YouTube

- http://www.youtube.com/user/RaymarineInc

Training courses

Raymarine regularly runs a range of in-depth training courses to help you make the most of your products. Visit the Training section of the Raymarine website for more information:

- http://www.raymarine.co.uk/view/?id=2372

Technical support forum

You can use the Technical support forum to ask a technical question about a Raymarine product or to find out how other customers are using their Raymarine equipment. The resource is regularly updated with contributions from Raymarine customers and staff:

- https://raymarine.custhelp.com/app/home

CHAPTER 13: TECHNICAL SPECIFICATION

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13.1 Physical specification

Specification	
Dimensions:	• **Length:** 424.69 mm (16.72 in) — including high speed nose cone • **Height:** 223.70 mm (8.81 in.) — including cable bend radius • **Width:** 79.64 mm (3.14 in) — including high speed nose cone
Cable length:	• **RVM-400:** 8 m (26.2 ft) • **RVM-412 / RVM-420:** 2 m (6.5 ft) + 8 m (26.2 ft) extension cable = 10 m (32.8 ft)
Weight:	• **RVM-400:** 4.56 kg (including cable) • **RVM-412 / RVM-420:** 3.87 kg (including cable)

13.2 Environmental specification

Specification	
Operating temperature range:	–2°C (28.4°F) to + 55°C (131°F)
Storage temperature range:	–20°C (23°F) to + 70°C (158°F)
Waterproof rating:	• IPx6 (surfaces exterior to hull, only) • IPx7 • IPx8

13.3 RealVision™ Max 3D sonar specification

The following specification only applies to RealVision™ Max 3D products.

Specification	
Sonar channels:	• RealVision™ Max 3D • SideVision™ • DownVision™ • Conical High CHIRP/Low CHIRP 600 W/200 kHz
Sensors:	• Temperature sensor • AHRS (Attitude and Heading Reference System) sensor

Sonar range

The sonar range is the effective depth or distance that the transducer can operate to, **in optimum weather conditions**.

The following ranges apply to RealVision™ Max 3D sonar channels:

Note:

The listed sonar channel ranges are indicative only, and are subject to change depending upon the connected transducer.

Sonar channel	Range
CHIRP sonar:	0.6 m (2 ft) to 366 m (1,200 ft)
DownVision™:	0.6 m (2 ft) to 183 m (600 ft)
SideVision™:	0.6 m (2 ft) to 91 m (300 ft)
RealVision™ Max 3D:	0.6 M (2 ft) to 91 m (300 ft)

13.4 Conformance specification

Specification	
Standards:	• EN 60945:2002 • IEC 28846:1993 • EMC Directive 2014/30/EU • Australia and New Zealand: C-Tick, Compliance Level 2

CHAPTER 14: SPARES AND ACCESSORIES

CHAPTER CONTENTS

14.1 Spares

The following spares are available for your product.

- **R70615** — RealVision™ 25–pin locking collar kit (Includes: 2 x Split rings (includes spare), 1 x O-ring, 1 x Locking collar and 1 x Split ring fitting tool).
- **R70867** — RealVision™ RVM-4xx mounting kit (Includes: Hull nut, Cable protector, Large internal isolator sleeve, Rubber washer, External isolator plate, High speed nose cone, 2 x anti-rotation studs, 2 x Nuts for anti-rotation studs, 2 x Small washers for Anti-rotation studs, 2 x Small internal isolator sleeves and 2 x External isolator sleeves).

14.2 Accessories

The following accessories are available for you product.

- **A80515** — RealVision™ 3D Transducer right-angled adapter cable 400 mm (15.7 in.)
- **A80475** — RealVision™ 3D Transducer extension cable 3 m (11.8 ft.)
- **A80476** — RealVision™ 3D Transducer extension cable 5 m (19.7 ft.)
- **A80477** — RealVision™ 3D Transducer extension cable 8 m (31.5 ft.)
- **A80478** — RealVision™ 3D Transducer Y-cable for connecting split pair transducers. Cable length: 0.3 m (0.98 ft.)

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