RVM1600

REALVISION™ MAX 3D SONAR MODULE

INSTALLATION INSTRUCTIONS

English (en-US)
Date: 01-2023
Document number: 87436 (Rev 1)
© 2023 Raymarine UK Limited

Raymarine®

Legal notices

Trademark and patents notice

Raymarine, **Tacktick**, **Clear Pulse**, **Truzoom**, **SeaTalk** , **SeaTalk hs**, **SeaTalkng** , and **Micronet**, are registered or claimed trademarks of Raymarine Belgium.

FLIR, **YachtSense**, **DockSense**, **LightHouse**, **RangeFusion**, **DownVision**, **SideVision**, **RealVision**, **HyperVision**, **Dragonfly**, **Element**, **Quantum**, **Axiom**, **Instalert**, **Infrared Everywhere**, **The World's Sixth Sense** and **ClearCruise** are registered or claimed trademarks of FLIR Systems, Inc.

All other trademarks, trade names, or company names referenced herein are used for identification only and are the property of their respective owners.

This product is protected by patents, design patents, patents pending, or design patents pending.

Fair Use Statement

You may print no more than three copies of this manual for your own use. You may not make any further copies or distribute or use the manual in any other way including without limitation exploiting the manual commercially or giving or selling copies to third parties.

English (en-US)
Document number: 87436 (Rev 1)
AC;40104;2023-01-20T17:33:14

CONTENTS

CHAPTER 1 IMPORTANT INFORMATION 8
Safety warnings 8
Product warnings 8
Regulatory notices 9
Water ingress 9
Disclaimer 9
Declaration of Conformity 9
Product disposal 9
Warranty registration 9
IMO and SOLAS 9
Technical accuracy 10
Publication copyright 10

CHAPTER 2 DOCUMENT INFORMATION 11
2.1 Applicable products 12
2.2 Product documentation 12
2.3 Document illustrations 12
2.4 LightHouse™ 4 operation instructions 12
Multifunction display software version 12
2.5 Transducer installation instructions 12

CHAPTER 3 PRODUCT AND SYSTEM OVERVIEW 13
3.1 Product overview 14
Sonar channels 14
Sonar channel ranges 14
3.2 Required additional components 15
3.3 Typical system 15
3.4 Compatible multifunction displays and software 16
Compatible MFDs 17
3.5 Software updates 17
3.6 Sonar technology 18
Traditional sonar technology 18
CHIRP technology 18
3.7 Sonar overview 19
RealVision™ Max 3D overview 19
RealVision™ 3D overview 19
DownVision™ overview 20
SideVision™ overview 20
CHIRP Sonar overview 21

CHAPTER 4 PARTS SUPPLIED 22
4.1 Parts supplied 23
4.2 Inline fuse requirement 23
Inline fuse and thermal breaker ratings 23

CHAPTER 5 PRODUCT DIMENSIONS 24
5.1 Product dimensions 25

CHAPTER 6 COMPATIBLE TRANSDUCERS 26
6.1 Compatible transducers 27
RealVision™ Max 3D transducers 27
RealVision™ 3D transducers 27
SideVision™ transducers 28

DownVision™ transducers 28
CPT-S conical beam transducers 29
CHIRP transducers 29
Traditional transducers 31

CHAPTER 7 LOCATION REQUIREMENTS 33
7.1 Warnings and cautions 34
7.2 General location requirements 34
7.3 Ignition Protection 34
7.4 Cable routing requirements 34
7.5 EMC installation guidelines 34
7.6 Suppression ferrites 35
7.7 Connections to other equipment 35
7.8 Compass safe distance 35

CHAPTER 8 MOUNTING 36
8.1 Tools required 37
8.2 Fixing screw suitability 37
8.3 Mounting the unit 37

CHAPTER 9 CABLES AND CONNECTIONS — GENERAL INFORMATION 38
9.1 General cabling guidance 39
Cable types and length 39
Cable routing 39
Strain relief 39
Circuit isolation 39
Cable shielding 39
Suppression ferrites 39
Connections to other equipment 40
Connecting cables 40
9.2 Typical system 40
9.3 Expanded system 41
9.4 Connections overview 42

CHAPTER 10 NETWORK CONNECTIONS 43
10.1 Network connection 44
Multifunction display network connection 44
Multifunction display network connection (extended cables) 44
Multiple multifunction display network connections 45

CHAPTER 11 POWER CONNECTIONS 46
11.1 Power connection 47
Inline fuse and thermal breaker ratings 47
11.2 Power distribution 47
11.3 Power cable extension (12 / 24 V systems) 49
11.4 Power cable drain wire connection 50

CHAPTER 12 TRANSDUCER CONNECTIONS 51
12.1 Transducer connections 52
RealVision™ Max 3D / RealVision™ transducer connection 53
Split-pair RealVision™ Max 3D / RealVision™ 3D transducer connections 53
DownVision™ / SideVision™ transducer connections 54

CPT-S conical beam transducer connections 54
CHIRP transducer connections 55
Traditional transducer connections 55
Simultaneous RealVision™ Max 3D / RealVision™ 3D transducer and traditional transducer connections 56
Transducer cable extension 56

CHAPTER 13 OPERATION 57
13.1 LightHouse™ 4 operation instructions 58
Multifunction display software version 58

CHAPTER 14 SYSTEM CHECKS AND TROUBLESHOOTING 59
14.1 Initial power-on test 60
14.2 Troubleshooting 60
LED Diagnostics 60
Sonar troubleshooting 61
Diagnostic product information 64
Resetting the sonar (LightHouse™ 4 / LightHouse™ 3) 64

CHAPTER 15 MAINTENANCE 65
15.1 Routine checks 66
15.2 Unit cleaning instructions 66
Transducer cleaning 66
Re-applying anti-fouling paint 66

CHAPTER 16 TECHNICAL SUPPORT 68
16.1 Raymarine product support and servicing 69
Diagnostic product information 70
Remote Support via AnyDesk 70
16.2 Learning resources 70

CHAPTER 17 TECHNICAL SPECIFICATION 71
17.1 Physical specification 72
17.2 Power specification 72
17.3 Environmental specification 72
17.4 Sonar specification 72
Sonar channels 72
Sonar range 72
Traditional sonar range 73
17.5 Conformance specification 73

CHAPTER 18 SPARES AND ACCESSORIES 74
18.1 Compatible transducers 75
18.2 Spares and accessories 75
18.3 RayNet to RayNet cables and connectors 76
18.4 RayNet to RJ45, and RJ45 (SeaTalkhs) adapter cables 77

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. 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.

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: Product grounding

Before applying power to this product, ensure it has been correctly grounded, in accordance with the instructions provided.

Warning: Positive ground systems

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

Warning: Power supply voltage

Connecting this product to a voltage supply greater than the specified maximum rating may cause permanent damage to the unit. Refer to the product's information label for the correct voltage.

Caution: Power supply protection

When installing this product ensure the power source is adequately protected by means of a suitably-rated fuse or thermal circuit breaker.

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.

Regulatory notices

Water ingress

Water ingress disclaimer

Although the waterproof rating capacity of this product meets the stated water ingress protection standard (refer to the product's *Technical Specification*), water intrusion and subsequent equipment failure may occur if the product is subjected to high-pressure washing. Raymarine will not warrant products subjected to high-pressure washing.

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.

Declaration of Conformity

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

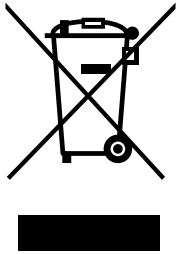
- RVM1600 3D CHIRP Sonar Module, part number: E70665

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

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.

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.

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

Copyright ©2023 Raymarine UK Ltd. All rights reserved. No parts of this material may be copied, translated, or transmitted (in any medium) without the prior written permission of Raymarine UK Ltd.

CHAPTER 2: DOCUMENT INFORMATION

CHAPTER CONTENTS

- 2.1 Applicable products — page 12
- 2.2 Product documentation — page 12
- 2.3 Document illustrations — page 12
- 2.4 LightHouse™ 4 operation instructions — page 12
- 2.5 Transducer installation instructions — page 12

2.1 Applicable products

This document is applicable to the following products:

RVM1600 3D CHIRP Sonar Module — (E70665)

2.2 Product documentation

The following documentation is applicable to your product:

Applicable documents

- **87436** — RVM1600 3D CHIRP Sonar Module Installation Instructions (this document).
- **87435** — RVM1600 3D CHIRP Sonar Module Mounting Template.
- **81406** — LightHouse™ 4 Advanced Operation Instructions.

2.3 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.

2.4 LightHouse™ 4 operation instructions

Please refer to the LightHouse™ 4 operation instructions for information on how to operate your product.

The LightHouse™ 4 operation Instructions (document number **81406**) can be downloaded from the Raymarine® website: www.raymarine.com/manuals.
Please check the website to ensure you have the latest documentation.

Multifunction display software version

To ensure optimum performance and compatibility with external devices, your multifunction display must be using the latest software version.

Visit www.raymarine.com/software to download the latest software.

2.5 Transducer installation instructions

This document includes installation instructions for the sonar module only. For installation instructions for a connected transducer, please refer to the documentation that accompanies the transducer.

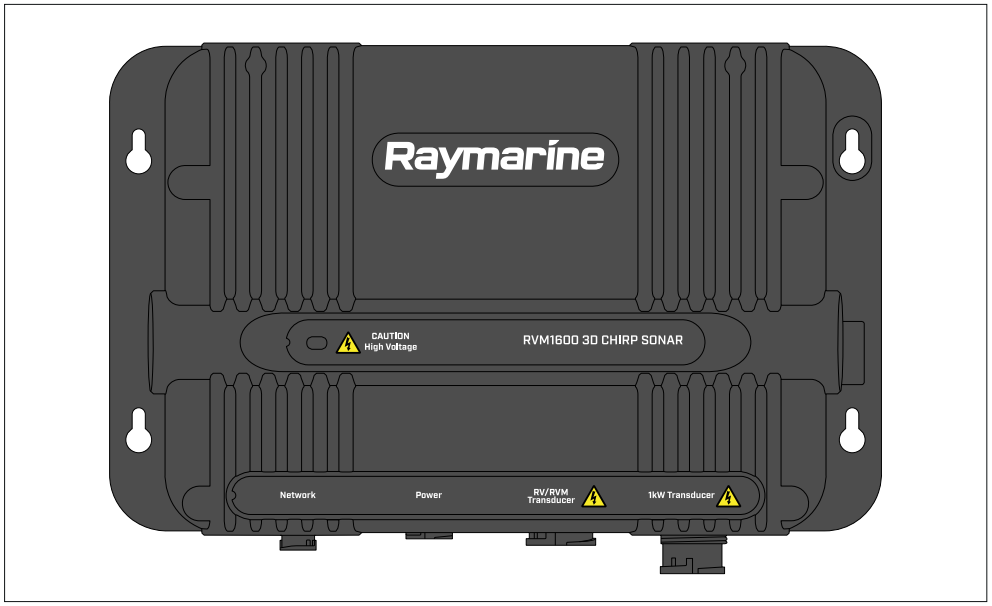
CHAPTER 3: PRODUCT AND SYSTEM OVERVIEW

CHAPTER CONTENTS

- 3.1 Product overview — page 14
- 3.2 Required additional components — page 15
- 3.3 Typical system — page 15
- 3.4 Compatible multifunction displays and software — page 16
- 3.5 Software updates — page 17
- 3.6 Sonar technology — page 18
- 3.7 Sonar overview — page 19

3.1 Product overview

The RVM1600 is a high power sonar module supporting multiple sonar channels and transducers — RealVision™ 3D, DownVision™, and SideVision™. It also supports traditional and CHIRP transducers. In conjunction with a compatible multifunction display and transducer, the RVM1600 produces realistic 3D representations of the objects below your vessel to help you identify underwater structures and locate fish.



The RVM1600 sonar module has the following features:

- RealVision™ Max 3D technology provides improved ping rates and tighter beamwidths, resulting in sharper sonar images, detailed wrecks, and distinct fish targets.
- RealVision™ Max 3D technology also provides higher contrast color palettes for accentuating targets, allowing fish targets to stand out from the water column noise.
- The RVM1600 supports a new 600 W High CHIRP frequency, providing extended traditional sonar range, and stronger target returns.
- Allows multifunction displays which **do not** have a built-in RealVision™ Max 3D sonar module to display RealVision™ Max 3D data.
- Enables LightHouse™ 4 multifunction displays to display sonar data from RealVision™ Max 3D and RealVision™ 3D transducers, as well as up to 1kW CHIRP and traditional transducers.
- 12 V or 24 V dc operation.
- Supports transducers with temperature and speed sensors.
- Ignition protection to EN ISO 8846:2017 standard.
- Waterproof to IPx6 & IPx7.
- Robust and waterproof high-speed network connection, via a RayNet network cable.

Sonar channels

Your product supports the following sonar channels:

RV / RVM transducer connection

CHIRP sonar channels	
3D Vision (RealVision™)	DownVision™
SideVision™	High CHIRP
Sonar (CPT-S transducer)	

1 kW transducer connection

CHIRP / traditional sonar channels	
High CHIRP	Medium CHIRP
Low CHIRP	Low frequency
Conical sonar	Medium frequency
High frequency	

Sonar channel ranges

Your product supports transducers which contain the sonar channel ranges **(in optimum weather conditions)** listed below.

Note:

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

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)

Traditional sonar range

The following ranges apply to Traditional sonar channels:

Sonar channel	Range
Traditional sonar:	0.9 m (3 ft) to 1,524 m (5,000 ft) (in optimum conditions, using a 1 kW transducer)

3.2 Required additional components

This product forms part of a system of electronics and requires the following additional components for full operation.

Compatible transducer

For a list of compatible transducers, refer to the following section:
p.26 — Compatible transducers

Compatible Raymarine® multifunction display

For a list of compatible multifunction displays, refer to the following section:
p.16 — Compatible multifunction displays and software

Network cables

For information on the network cables that are suitable for your product, refer to the following section: **p.43 — Network connections**

Cable extensions

Some installations may also require extensions to network, power or transducer cables. For further information on cable extensions, refer to the following sections:

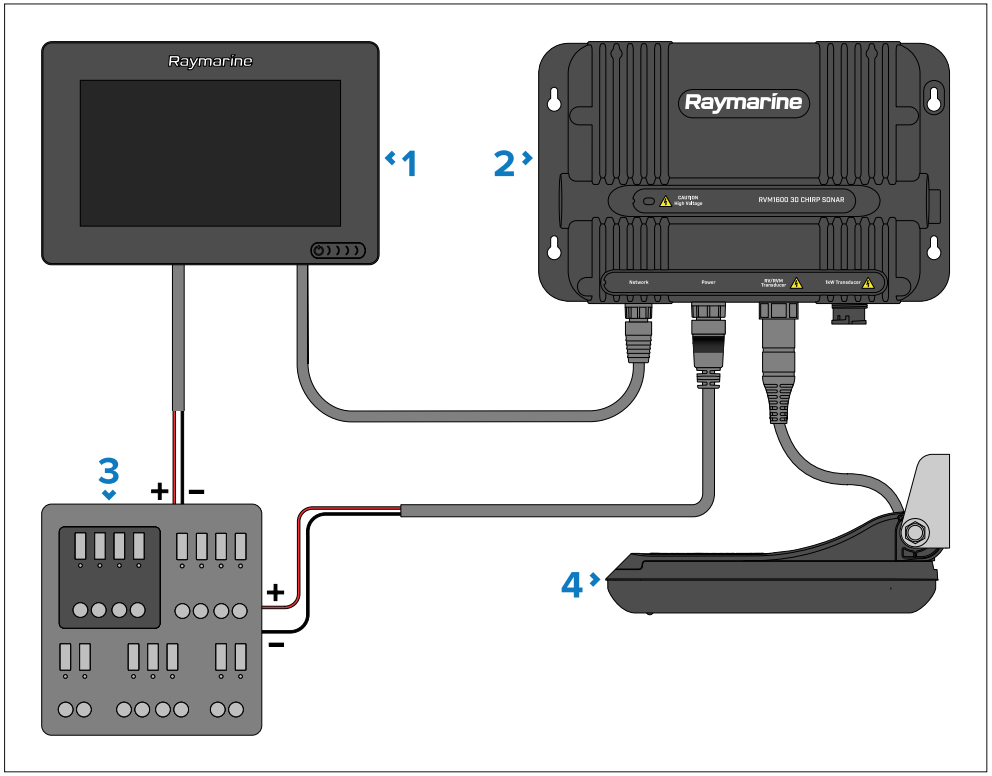
- **p.43 — Network connections**
- **p.46 — Power connections**
- **p.51 — Transducer connections**
- **p.75 — Spares and accessories**

3.3 Typical system

The following illustration provides an example of a typical system, including the available connections and types of devices that can be connected to your sonar module.

Note:

This system configuration is shown as an example only and may differ from your planned installation.



Note:

Grounding connections and fuses are not shown in the illustration above, but MUST be implemented. Refer to the *Power Connections* section for more information on the correct implementation.

1. Compatible Raymarine® multifunction display.
2. Sonar module.
3. Power supply for the RVM1600 (12 or 24 V dc), and multifunction display (refer to your MFD Installation instructions for the specific voltage requirements).
4. Transducer (RVM-100 illustrated).

Note:

For information on how to connect your products, refer to the following sections:

- **p.43 — Network connections**
- **p.46 — Power connections**
- **p.51 — Transducer connections**

For information on available cables and accessories, refer to the following section: **p.74 — Spares and accessories**

3.4 Compatible multifunction displays and software

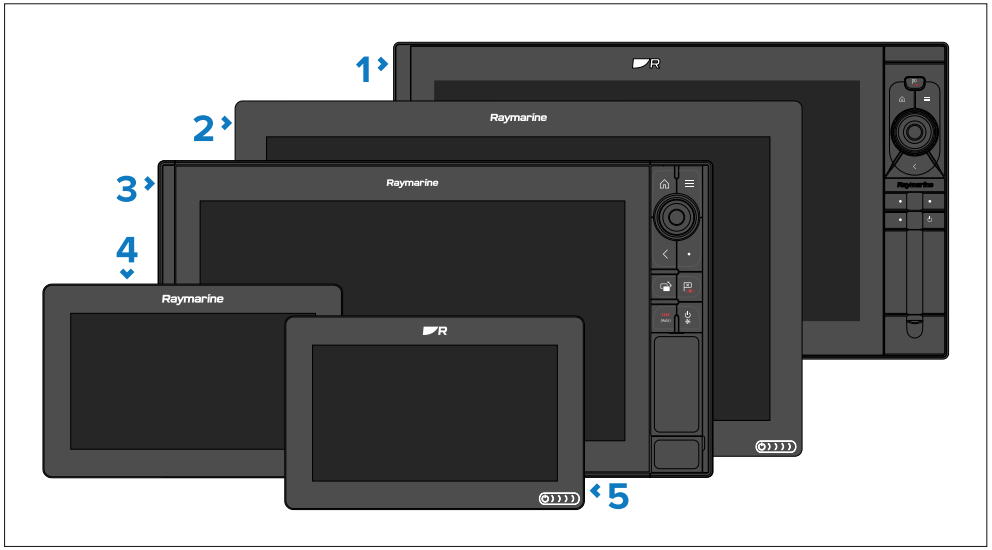
This product is only compatible with Raymarine® multifunction displays running LightHouse™ 4 software, version 4.1 or later.

Note:

Every multifunction display within the system must be running LightHouse™ 4. Ensure that all multifunction displays are running the latest software version by visiting the Raymarine® website: www.raymarine.com/software

Compatible MFDs

The RVM1600 is compatible with the following multifunction displays:



1. Axiom 2 Pro
2. Axiom 2 XL
3. Axiom XL
4. Axiom Pro
5. Axiom
6. Axiom +

3.5 Software updates

The software running on the product can be updated.

- Raymarine® periodically releases software updates to improve product performance and add new features.
- The software on many products can be updated using a connected and compatible multifunction display (MFD).
- Refer to www.raymarine.com/software/ for the latest software updates and the software update procedure for your specific product.

Important:

- To prevent potential software-related issues with your product, always follow the relevant update instructions carefully and in the sequence provided.
- If in doubt as to the correct procedure for updating your product software, refer to your dealer or Raymarine® technical support.

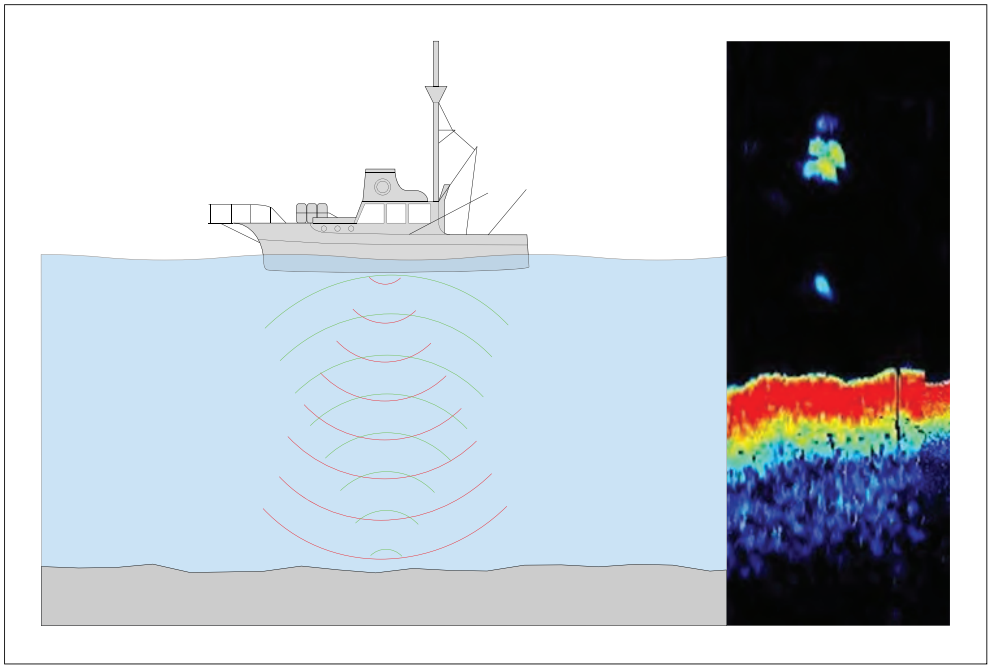
Caution: Installing software updates

- The software update process is carried out at your own risk. Before initiating the update process ensure you have backed up any important files.
- Ensure that the unit has a reliable power supply and that the update process is not interrupted.
- Damage caused by an incomplete update is not covered by Raymarine warranty.
- By downloading the software update package, you agree to these terms.

3.6 Sonar technology

Traditional sonar technology

Traditional sonar uses a single carrier frequency or carrier wave for the sonar ping. The sonar works by measuring the time it takes the ping echo to return to the transducer to determine target depth.

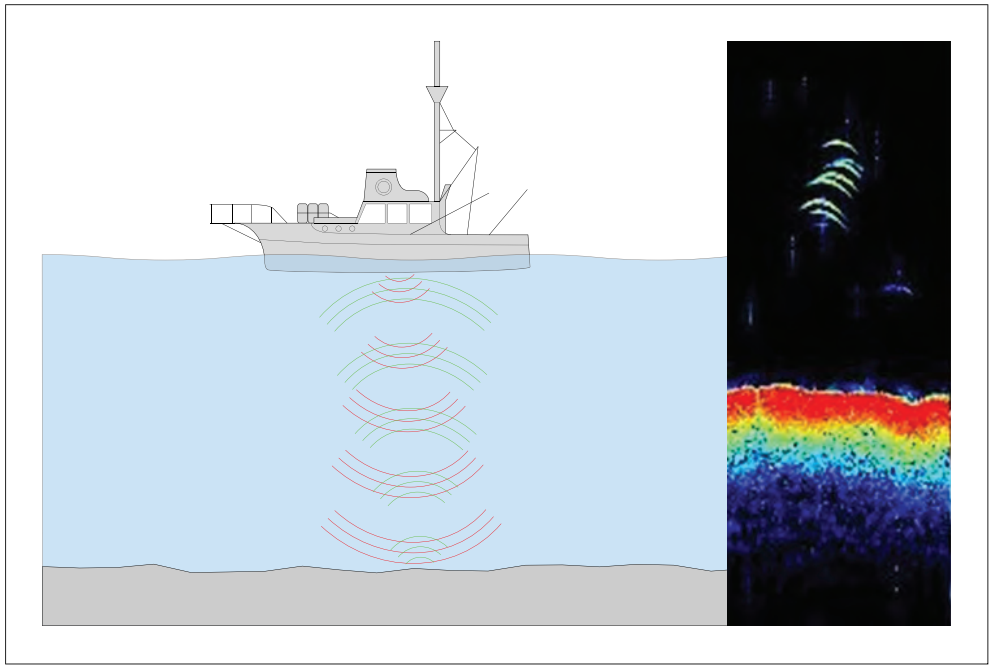


CHIRP technology

CHIRP (Compressed High Intensity Radar Pulse) sonar uses a swept frequency signal covering a wide range of frequencies which produces more accurate images with higher detail than traditional sonar.

Benefits of CHIRP sonar include improvements to target resolution, bottom detection (through bait balls and thermoclines) and detection sensitivity.

CHIRP is utilized by RealVision™ Max 3D, RealVision™ 3D, SideVision™ and DownVision™ transducers.



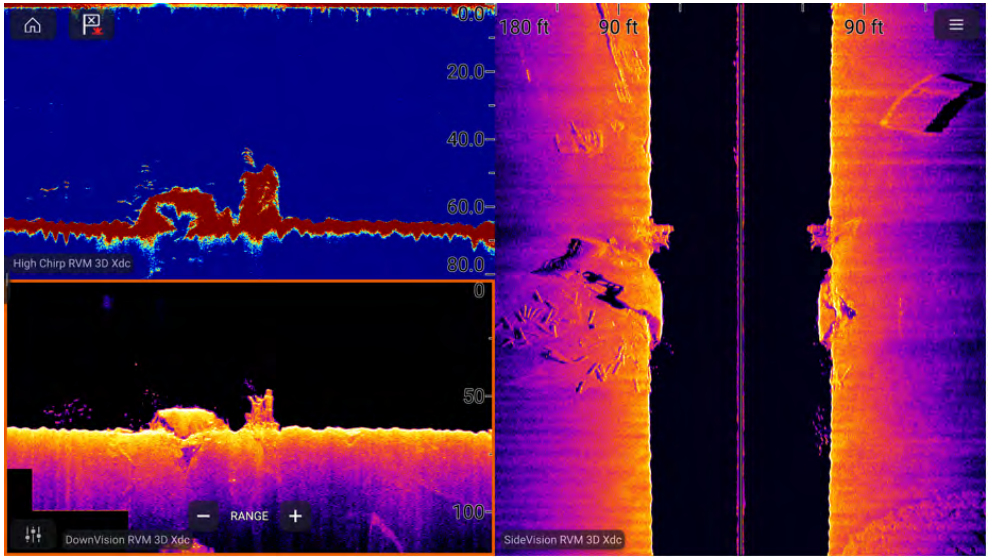
3.7 Sonar overview

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

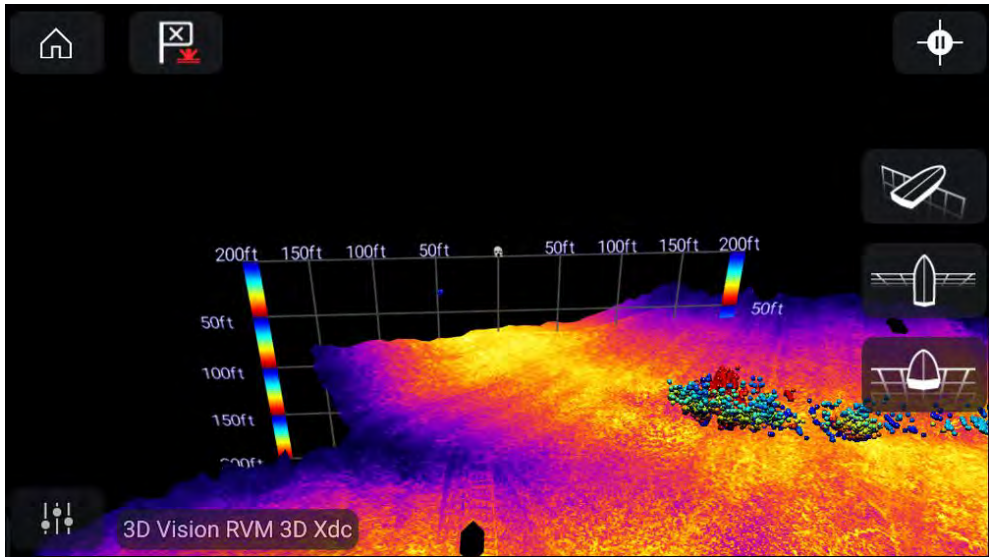


RealVision™ 3D overview

RealVision™ 3D transducers combine DownVision™, SideVision™, high frequency CHIRP Sonar, and RealVision™ 3D to deliver life-like 3D sonar imagery.

RealVision™ 3D provides a true, easy-to-understand view of bottom topography, debris, and fish.

RealVision™ 3D screen example



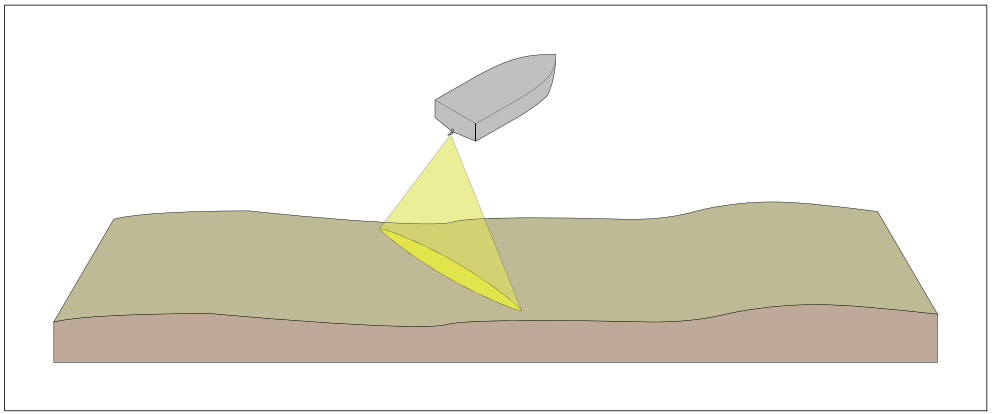
Note:

The “Depth” figure shown in the illustration above assumes that you have a device in your system that provides depth data. Please be aware that not all transducers and / or sonar modules support depth sensing. For more information, refer to the latest specifications and documentation available for your particular products on the Raymarine® website (www.raymarine.com).

DownVision™ overview

DownVision™ produces a wide-angle side-to-side beam and a thin fore-to-aft beam. The coverage of the DownVision™ beam is a water column directly beneath and to the sides of the vessel.

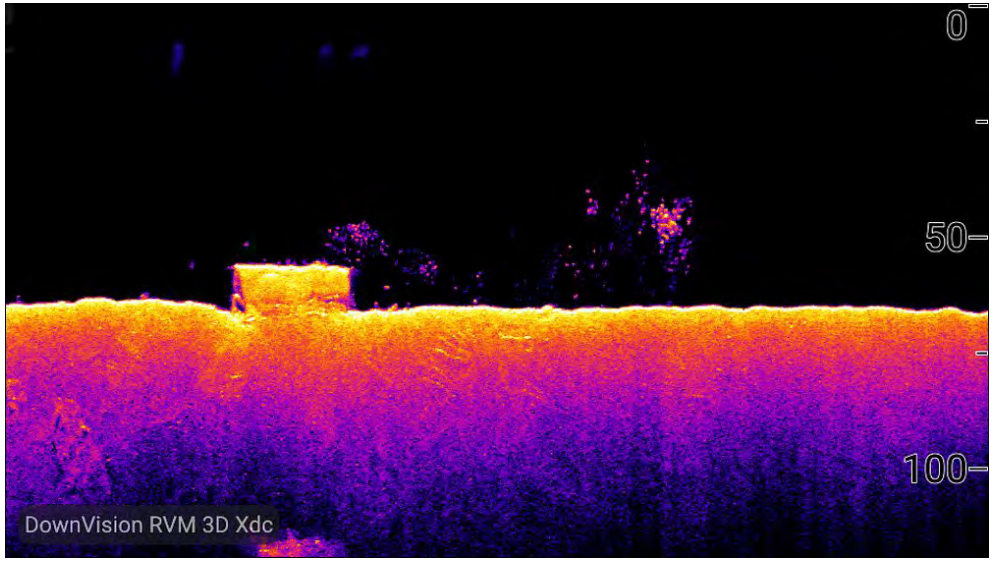
DownVision™ beam



DownVision™ is effective at lower vessel speeds. In deeper waters the CHIRP bandwidth is automatically optimized to improve bottom lock and the detection of moving objects (e.g. fish) in the wider water column.

The wide, thin beam produces clear target returns. The use of CHIRP processing and a higher operating frequency provide a more detailed image, making it easier to identify bottom structures around which fish may reside.

DownVision™ screen example

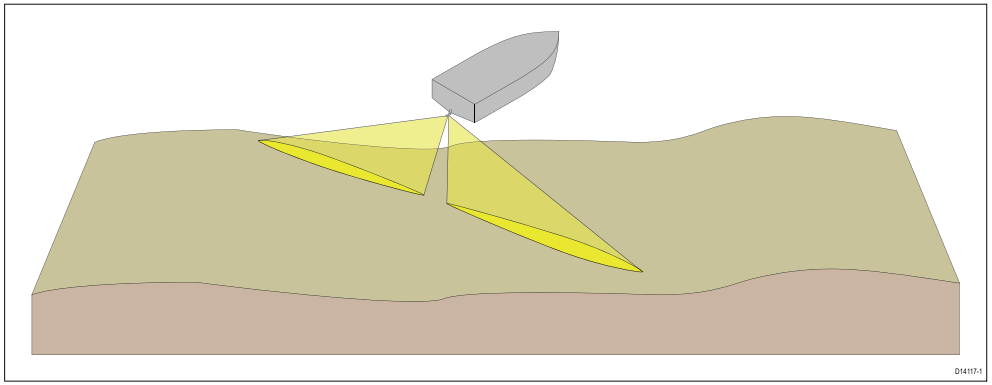


SideVision™ overview

SideVision™ interprets signals from a pair of side-looking transducers and builds up a detailed underwater view as your vessel moves forward. The transducers send pulses of sound waves into the water on each side of your vessel, and record the sound waves that reflect off the bottom, and off objects on the bottom or suspended in the water column. The received echoes are affected by the bottom material (for example mud, gravel or rock), and by any other objects in their path (for example cables on the sea floor, bridge piers, wrecks, shoals or fish).

SideVision™ produces 2 wide-angle side-to-side beams, each with a thin fore-to-aft beam. The coverage of the **SideVision™** beams is a swath on each side of the vessel.

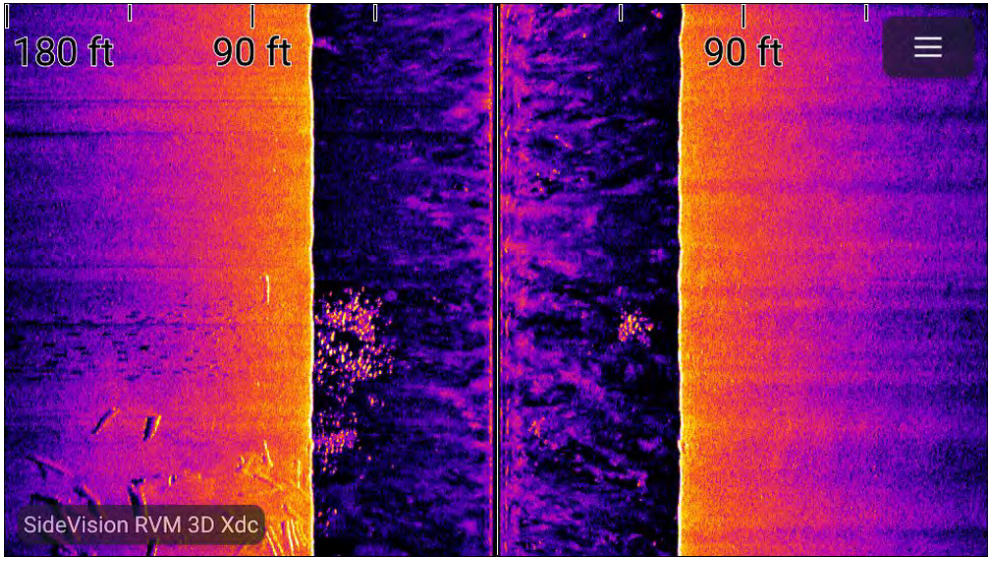
SideVision™ beams



SideVision™ is effective at lower vessel speeds. The wide, thin beams produce clear target returns. As your vessel moves forward, subsequent returns build up to provide an image of the sea floor on each side of your vessel.

The use of CHIRP processing and a high operating frequency provide a detailed image, making it easier to identify bottom structures around which fish may reside. The narrow angle the beams make with the bottom at longer ranges can reveal the shadows of structures that protrude from the bottom.

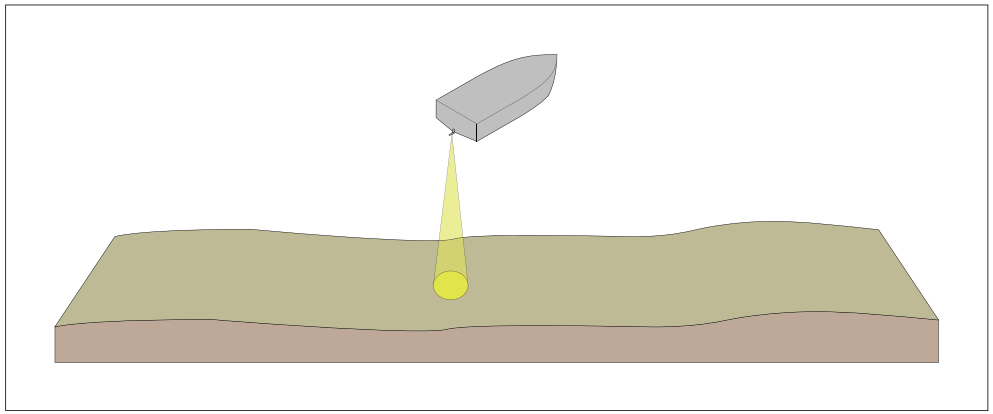
SideVision™ screen example



CHIRP Sonar overview

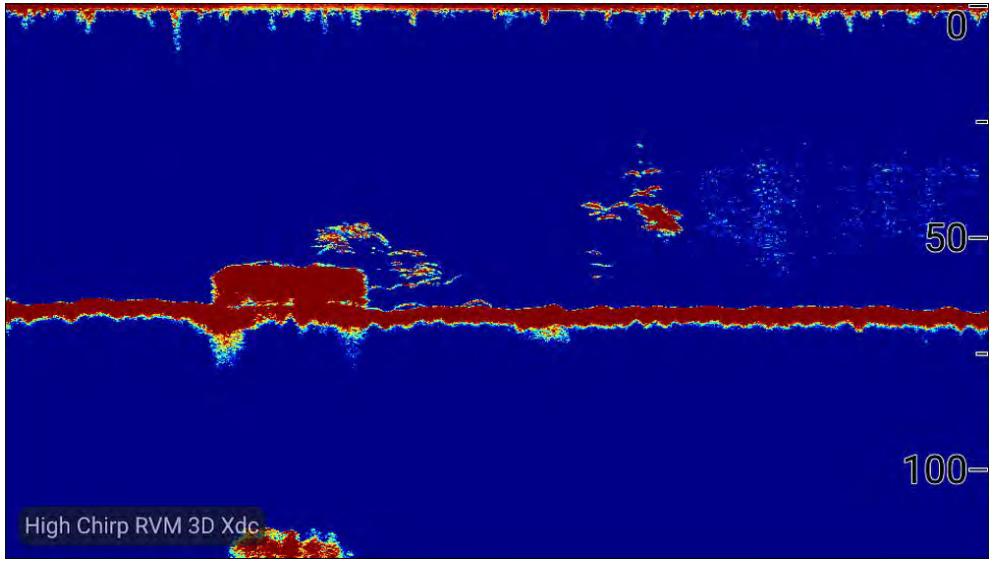
CHIRP sonar produces a conical shaped beam. The coverage of the conical beam is the water column directly beneath the vessel.

Conical beam



Sonar is effective at a range of speeds. In deeper waters the CHIRP bandwidth is automatically optimized to improve bottom lock and the detection of moving objects (e.g. fish) in the wider water column.

CHIRP sonar screen example

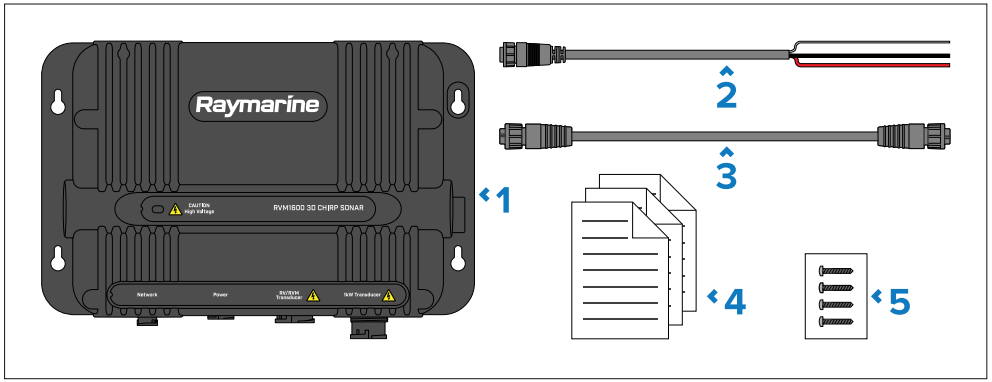


CHAPTER 4: PARTS SUPPLIED

CHAPTER CONTENTS

- 4.1 Parts supplied — page 23
- 4.2 Inline fuse requirement — page 23

4.1 Parts supplied

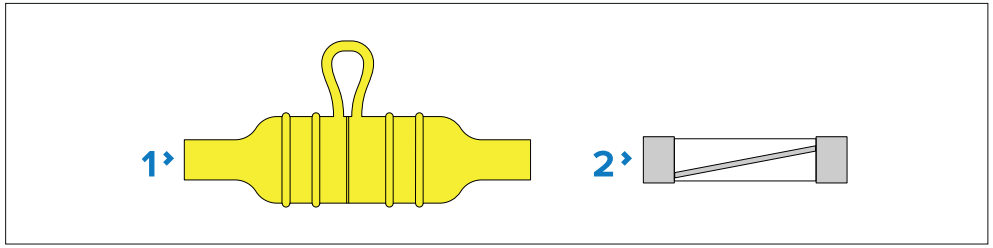


Item	Description
1	RVM1600 3D CHIRP sonar module.
2	Power cable 1.5 m (4.9 ft).
3	RayNet (female) to RayNet (female) network cable 2 m (6.6 ft).
4	Documentation pack.
5	Mounting screws M4.5 x 20 (x4).

4.2 Inline fuse requirement

Your product requires a suitably-rated inline fuse to be fitted to the red power wire, housed in a waterproof fuse holder.

This fuse and its fuse holder are **NOT supplied** with your product, and must be obtained separately, from a marine or electrical retailer.



1. Waterproof fuse holder.
2. Suitably-rated inline fuse.

Fuse ratings:

- Voltage rating — must be equal to or greater than the voltage of your vessel's power supply.
- Current rating — refer to the appropriate *Inline fuse and thermal breaker rating* section of this document for further details.

Inline fuse and thermal breaker ratings

The following inline fuse and thermal breaker ratings apply to your product:

Inline fuse rating	Thermal breaker rating
5 A	5 A

Important:

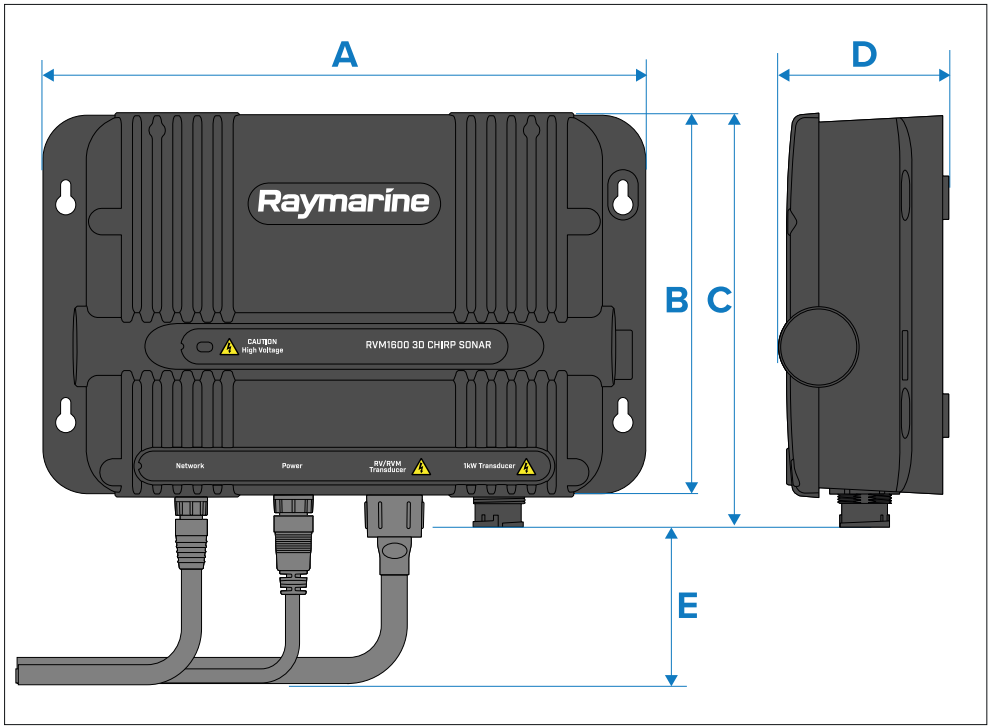
The suitable fuse rating for the thermal breaker is dependent on the number of devices you are connecting. If in doubt consult an authorized Raymarine® dealer.

CHAPTER 5: PRODUCT DIMENSIONS

CHAPTER CONTENTS

- 5.1 Product dimensions — page 25

5.1 Product dimensions



Item	Dimension
A	299.4 mm (11.79 in)
B	188.0 mm (7.40 in)
C	209.9 mm (8.26 in)
D	84.4 mm (3.32 in)
E	80.0 mm (3.15 in)

CHAPTER 6: COMPATIBLE TRANSDUCERS

CHAPTER CONTENTS

- 6.1 Compatible transducers — page 27

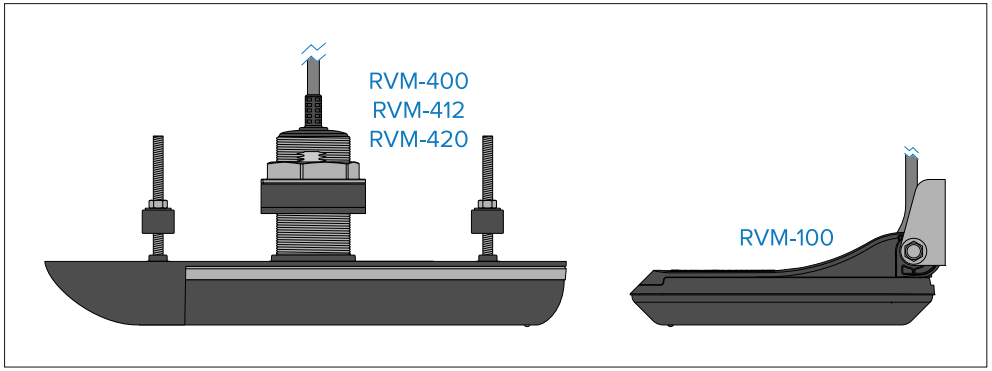
6.1 Compatible transducers

the following section will outline which transducers are compatible with your sonar module (based upon the transducer technology that you wish to use):

1. p.27 — RealVision™ Max 3D transducers
2. p.27 — RealVision™ 3D transducers
3. p.28 — SideVision™ transducers
4. p.28 — DownVision™ transducers
5. p.29 — CPT-S conical beam transducers
6. p.29 — CHIRP transducers
7. p.31 — Traditional transducers

RealVision™ Max 3D transducers

- RealVision™ Max 3D transducers connect directly to the 25–pin RV/RVM transducer connector.
- RealVision™ Max 3D split-pair transducers are supplied with a Y-cable (part number: A80478) and extension cable (part number: A80477) to connect both transducers to the 25–pin RV/RVM transducer connector.



Transom mount transducers

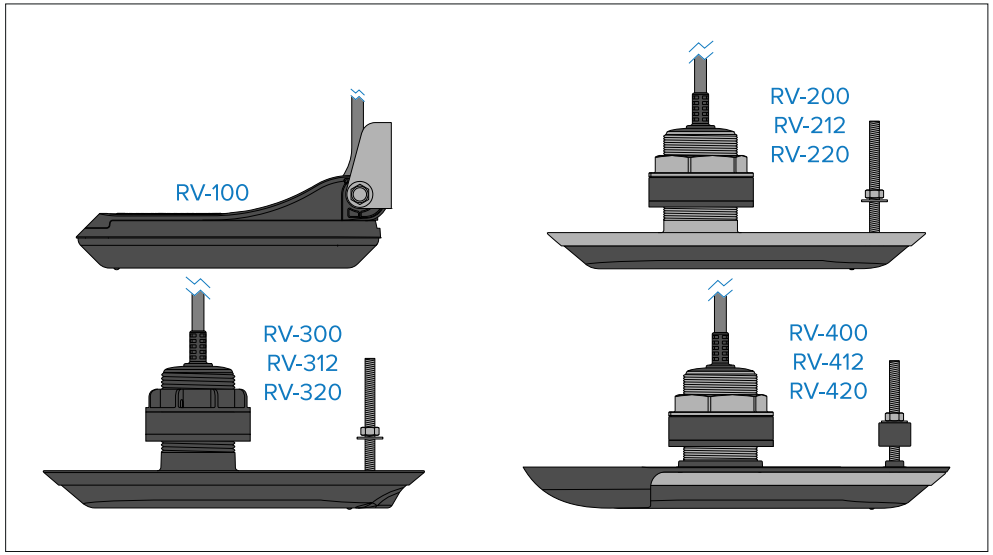
Part number	Transducer description
A80703	**RVM-100** RealVision™ Max 3D plastic transducer

Thru-hull mount transducers

Part number	Transducer description
A80704	**RVM-400** RealVision™ Max 3D stainless steel 0° transducer
T70543: A80705 A80706	**RVM-412P** / **RVM-412S** RealVision™ Max 3D stainless steel 12° split-pair transducers
T70544: A80707 A80708	**RVM-420P** / **RVM-420S** RealVision™ Max 3D stainless steel 20° split-pair transducers

RealVision™ 3D transducers

- RealVision™ Max 3D transducers connect directly to the 25–pin RV/RVM transducer connector.
- RealVision™ Max 3D split-pair transducers are supplied with a Y-cable (part number: A80478) and extension cable (part number: A80477) to connect both transducers to the 25–pin RV/RVM transducer connector.



Transom mount transducers

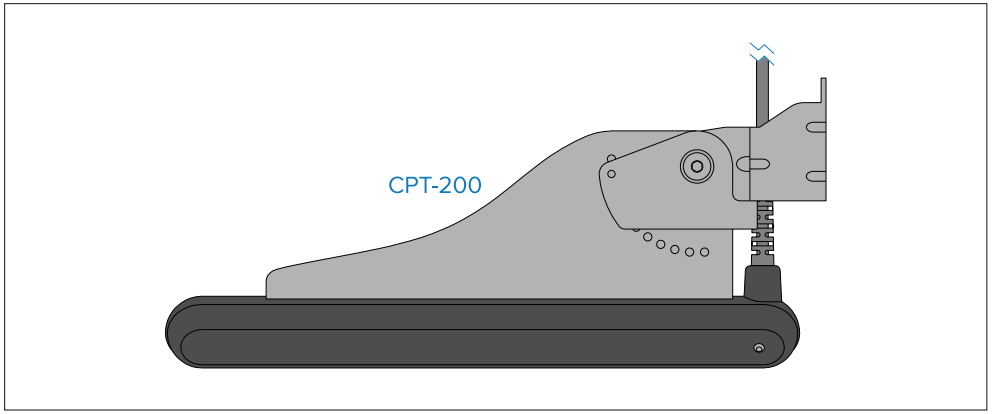
Part number	Transducer description
A80464	**RV-100** RealVision™ 3D plastic transducer

Thru-hull mount transducers

Part number	Transducer description
A80465	**RV-200** RealVision™ 3D bronze 0° transducer
T70318: A80466 A80467	**RV-212P** / **RV-212S** RealVision™ 3D bronze 12° split-pair transducers
T70319: A80468 A80469	**RV-220P** / **RV-220S** RealVision™ 3D bronze 20° split-pair transducers
A80470	**RV-300** RealVision™ 3D plastic 0° transducer
T70320: A80471 A80472	**RV-312P** / **RV-312S** RealVision™ 3D plastic 12° split-pair transducers
T70321: A90473 A80474	**RV-320P** / **RV-320S** RealVision™ 3D plastic 20° split-pair transducers
A80615	**RV-400** RealVision™ 3D stainless steel 0° transducer
T70450: A80616 A80617	**RV-412P** / **RV-412S** RealVision™ 3D stainless steel 12° split-pair transducers
T70451: A80618 A80619	**RV-420P** / **RV-420S** RealVision™ 3D stainless steel 20° split-pair transducers

SideVision™ transducers

SideVision™ transducers require an adapter cable (part number: A80490), and connect to the 25-pin RV/RVM transducer connector.

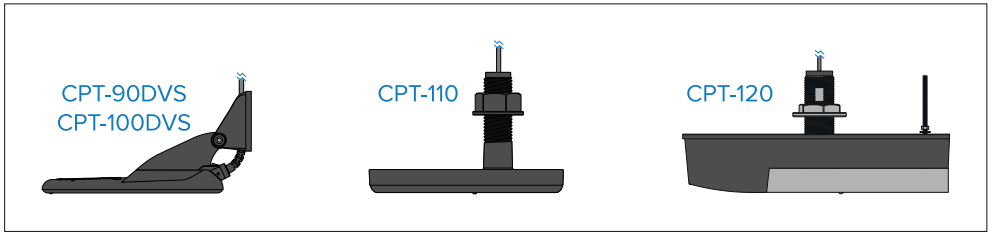


Transom mount transducers

Part number	Transducer description
A80281	**CPT-200** SideVision™ stainless steel transducer

DownVision™ transducers

DownVision™ transducers require an adapter cable (part number: A80490), and connect to the 25-pin RV/RVM transducer connector.



Transom mount transducers

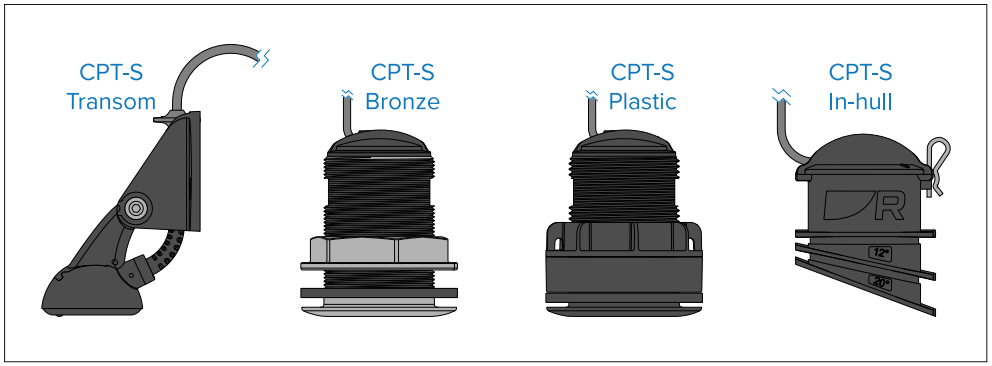
Part number	Transducer description
A80507	**CPT-90DVS** DownVision™ plastic transducer
A80351	**CPT-100DVS** DownVision™ plastic transducer

Thru-hull mount transducers

Part number	Transducer description
A80277	**CPT-110** plastic transducer
A80350	**CPT-120** bronze transducer

CPT-S conical beam transducers

- CPT-S transducers require an adapter cable (part number: A80490), and connect to the 25-pin RV/RVM transducer connector.
- CPT-S transducers do **NOT** offer DownVision™ capabilities.



Transom mount transducers

Part number	Transducer description
E70342	**CPT-S** plastic transducer

Thru-hull mount transducers

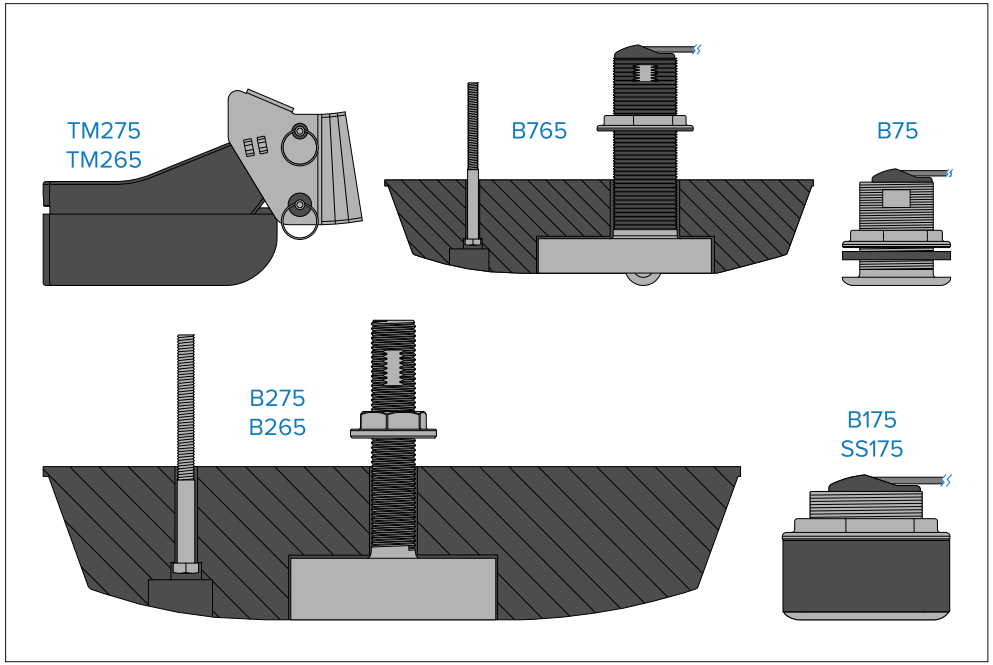
Part number	Transducer description
E70339	**CPT-S 0°** Angled element plastic transducer
A80448	**CPT-S 12°** Angled element plastic transducer
A80447	**CPT-S 20°** Angled element plastic transducer
A80446	**CPT-S 0°** Angled element bronze transducer
E70340	**CPT-S 12°** Angled element bronze transducer
E70341	**CPT-S 20°** Angled element bronze transducer

In-hull mount transducers

Part number	Transducer description
A80691	**CPT-S** plastic transducer

CHIRP transducers

- CHIRP transducers connect directly to the 11-pin 1kW transducer connector.
- CHIRP split-pair transducers require a Y-cable (part number: A102146).
- B75 & B175 transducers require an operation cable (part number: A80328).

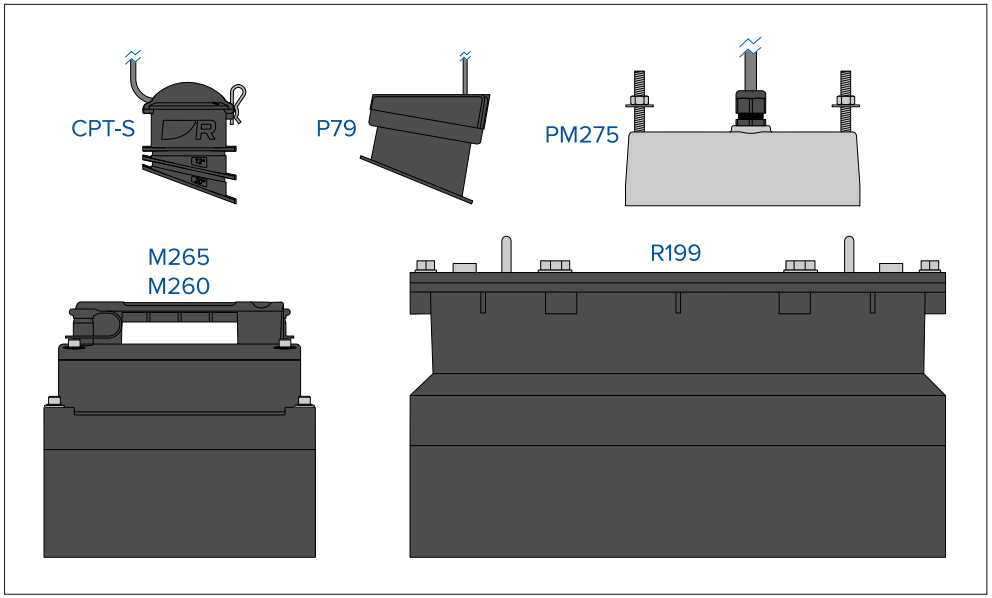


Transom mount transducers

Part number	Transducer description
A80318	**TM275LH-W** plastic transducer
A80013	**TM265LH** plastic transducer
A80041	**TM265LM** plastic transducer

Thru-hull mount transducers

Part number	Transducer description
A80319	**B175H-W 0°** angled element bronze transducer
A80320	**B175H-W 12°** angled element bronze transducer
A80321	**B175H-W 20°** angled element bronze transducer
A80506	**SS175H-W 20°** angled element stainless steel transducer
A80322	**B275LH-W 20°** bronze thru-hull mount transducer
A80016	**B75L 0°** angled element bronze transducer
A80017	**B75M 0°** angled element bronze transducer
A80018	**B75H 0°** angled element bronze transducer
T70060	**B75LH 0°** angled element bronze split-pair transducers
T70061	**B75LM 0°** angled element bronze split-pair transducers
T70062	**B75MH 0°** angled element bronze split-pair transducers
A80033	**B75L 12°** angled element bronze transducer
A80034	**B75M 12°** angled element bronze transducer
A80035	**B75H 12°** angled element bronze transducer
T70063	**B75LH 12°** angled element bronze split pair transducers
T70064	**B75LM 12°** angled element bronze split pair transducers
T70065	**B75MH 12°** angled element bronze split pair transducers
A80036	**B75M 20°** angled element bronze transducer
A80037	**B75H 20°** angled element bronze transducer
T70068	**B75MH 20°** angled element bronze split pair transducers
A80042	**B175L 0°** angled element bronze transducer
A80043	**B175M 0°** angled element bronze transducer
A80044	**B175H 0°** angled element bronze transducer
T70069	**B175LH 0°** angled element bronze split-pair transducers
T70070	**B175LM 0°** angled element bronze split-pair transducers
T70071	**B175MH 0°** angled element bronze split-pair transducers
A80045	**B175L 12°** angled element bronze transducer
A80046	**B175M 12°** angled element bronze transducer
A80047	**B175H 12°** angled element bronze transducer
T70072	**B175LH 12°** angled element bronze split-pair transducers
T70073	**B175LM 12°** angled element bronze split-pair transducers
T70074	**B175MH 12°** angled element bronze split-pair transducers
A80048	**B175L 20°** angled element bronze transducer
A80049	**B175M 20°** angled element bronze transducer
A80050	**B175H 20°** angled element bronze transducer
T70075	**B175LH 20°** angled element bronze split-pair transducers
T70076	**B175LM 20°** angled element bronze split-pair transducers
T70077	**B175MH 20°** angled element bronze split-pair transducers
A80504	**SS175L 20°** angled element stainless steel transducer
A80505	**SS175M 20°** angled element stainless steel transducer
A80014	**B765LH** bronze transducer
A80015	**B765LM** bronze transducer
A80010	**B265LH** bronze transducer
A80011	**B265LM** bronze transducer



In-hull mount transducers

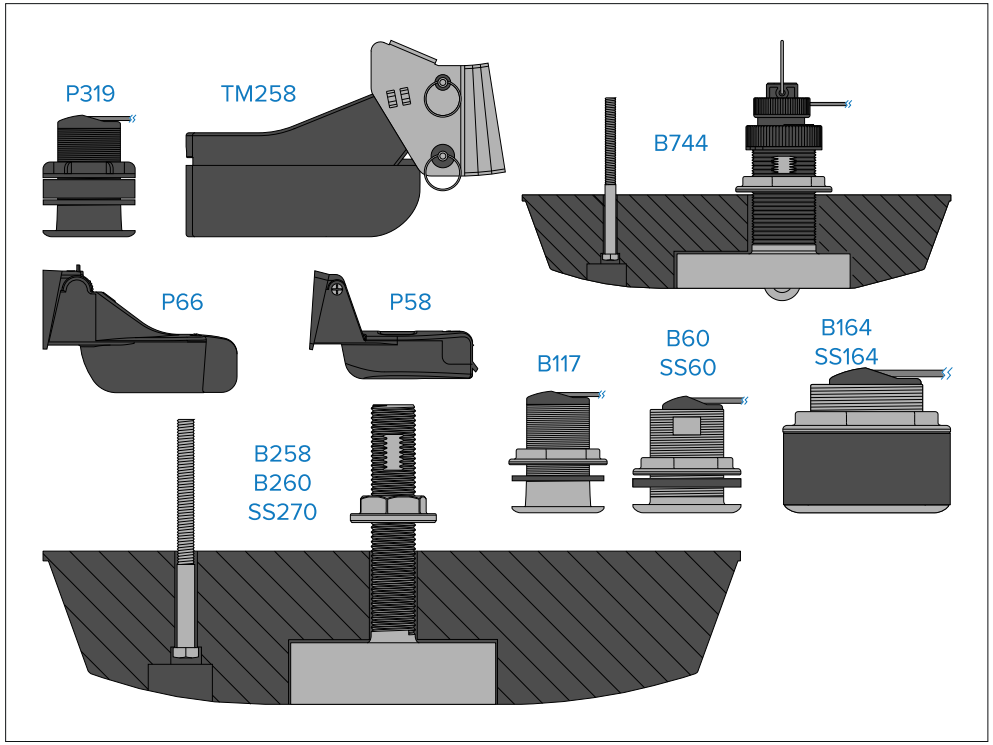
Part number	Transducer description
A80012	**M265LH** plastic transducer
A80038	**M265LM** plastic transducer

Pocket / keel mount transducers

Part number	Transducer description
A80325	**PM275LH-W** bronze transducer

Traditional transducers

Traditional transducers require an adapter cable (part number: A80496) and connect to the 11-pin 1kW transducer connector.



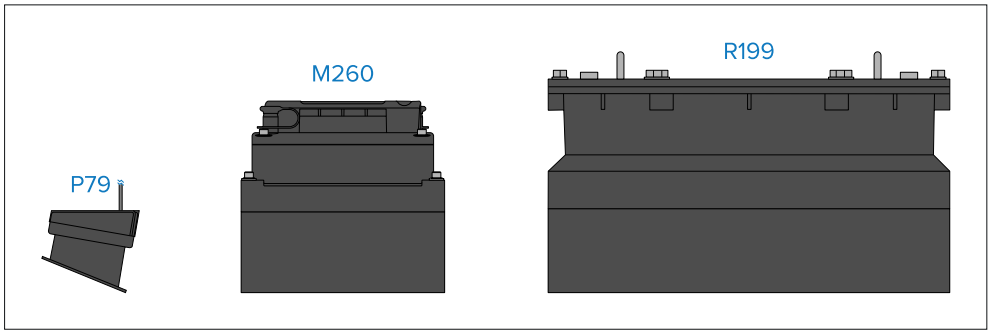
Transom mount transducers

Part number	Transducer description
E66084	**TM258** plastic transducer
A80566	**P58** plastic transducer
E66054	**P66** plastic transducer

Thru-hull mount transducers

Part number	Transducer description
E66013	**P319** plastic transducer
E66014	**B117** bronze transducer
E66086	**B60 12°** angled element bronze transducer
E66085	**B60 20°** angled element bronze transducer
A80568	**SS60 0°** angled element stainless steel transducer

Part number	Transducer description
A80569	**SS60 12°** angled element stainless steel transducer
A80570	**SS60 20°** angled element stainless steel transducer
A102137	**B164 0°** angled element bronze transducer
A102112	**B164 12°** angled element bronze transducer
A102113	**B164 20°** angled element bronze transducer
A80451	**SS164 0°** angled element stainless steel transducer
A66098	**SS164 12°** angled element stainless steel transducer
A66099	**SS164 20°** angled element stainless steel transducer
A66091	**B744V** bronze transducer
A66092	**B744VL** bronze transducer
E66082	**B258** bronze transducer
A102121	**SS270W** bronze transducer
E66079	**B260** bronze transducer



In-hull mount transducers

Part number	Transducer description
E66008	**P79** plastic transducer
A66089	**M260** plastic transducer
E66076	**R199** plastic transducer

CHAPTER 7: LOCATION REQUIREMENTS

CHAPTER CONTENTS

- 7.1 Warnings and cautions — page 34
- 7.2 General location requirements — page 34
- 7.3 Ignition Protection — page 34
- 7.4 Cable routing requirements — page 34
- 7.5 EMC installation guidelines — page 34
- 7.6 Suppression ferrites — page 35
- 7.7 Connections to other equipment — page 35
- 7.8 Compass safe distance — page 35

7.1 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.8 — Important information

7.2 General location requirements

When selecting a location for your product it is important to consider a number of factors.

Key factors which can affect product performance are:

- **Ventilation** — To ensure adequate airflow:
  - Ensure that product is mounted in a compartment of suitable size.
  - Ensure that ventilation holes are not obstructed. Allow adequate separation of all equipment.

  Any specific requirements for each system component are provided later in this chapter.
- **Mounting surface** — Ensure product is adequately supported on a secure surface. Do not mount units or cut holes in places which may damage the structure of the vessel.
- **Cabling** — Ensure the product is mounted in a location which allows proper routing, support and connection of cables:
  - Minimum bend radius of 100 mm (3.94 in) unless otherwise stated.
  - Use cable clips to prevent stress on connectors.
  - If your installation requires multiple ferrites to be added to a cable then additional cable clips should be used to ensure the extra weight of the cable is supported.
- **Water ingress** — The product is suitable for mounting both above and below decks. Although the unit is waterproof, it is good practice to locate it in a protected area away from prolonged and direct exposure to rain and salt spray.
- **Electrical interference** — Select a location that is far enough away from devices that may cause interference, such as motors, generators and radio transmitters / receivers.
- **Power supply** — Select a location that is as close as possible to the vessel's DC power source. This will help to keep cable runs to a minimum.

7.3 Ignition Protection

This product is certified to the EN ISO 8846:2017 Ignition Protection standard.

7.4 Cable routing requirements

Consider the following before installing the system cables:

- You will need to attach power, transducer and network cables to the unit.
- The transducer cable should only be extended where the sonar module cannot be installed close enough to the transducer to allow a direct connection.
- All cables should be adequately secured, protected from physical damage and protected from exposure to heat.
- Avoid sharp bends in cables.
- Use a watertight feed-through wherever a cable passes through an exposed bulkhead or deckhead.
- Secure cables in place using tie-wraps or lacing twine. Coil any extra cable and tie it out of the way.
- Do NOT run cables through bilges or doorways.
- Do NOT run cables near to moving or hot objects.
- Do NOT run cables near to engines or fluorescent lights.

Always route data cables as far away as possible from:

- Other equipment and cables.
- High current carrying AC and DC power lines.
- Antennas.

7.5 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.

7.6 Suppression ferrites

- Raymarine® cables may be pre-fitted or supplied with suppression ferrites. These are important for correct EMC performance. If ferrites are supplied separately to the cables (i.e. not pre-fitted), you must fit the supplied ferrites, using the supplied instructions.
- If a ferrite has to be removed for any purpose (e.g. installation or maintenance), it must be replaced in the original position before the product is used.
- Use only ferrites of the correct type, supplied by Raymarine® or its authorized dealers.
- Where an installation requires multiple ferrites to be added to a cable, additional cable clips should be used to prevent stress on the connectors due to the extra weight of the cable.

7.7 Connections to other equipment

Requirement for ferrites on non-Raymarine cables:

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

7.8 Compass safe distance

To prevent potential interference with the vessel's magnetic compasses, ensure an adequate distance is maintained from the product.

When choosing a suitable location for the product you should aim to maintain the maximum possible distance from any compasses. Typically this distance should be at least 1 m (3.3 ft) in all directions. However for some smaller vessels it may not be possible to locate the product this far away from a compass. In this situation, when choosing the installation location for your product, ensure that the compass is not affected by the product when it is in a powered state.

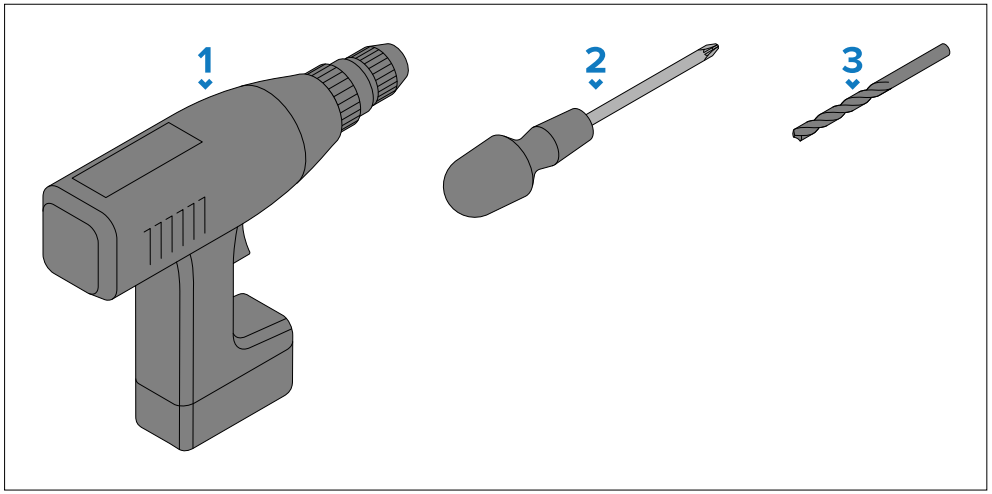
CHAPTER 8: MOUNTING

CHAPTER CONTENTS

- 8.1 Tools required — page 37
- 8.2 Fixing screw suitability — page 37
- 8.3 Mounting the unit — page 37

8.1 Tools required

Product installation requires the following tools:



1. Power drill
2. Pozidrive screwdriver
3. Drill bit

Note:

The appropriate drill bit size is dependent on the thickness and material of the mounting surface.

8.2 Fixing screw suitability

Important:

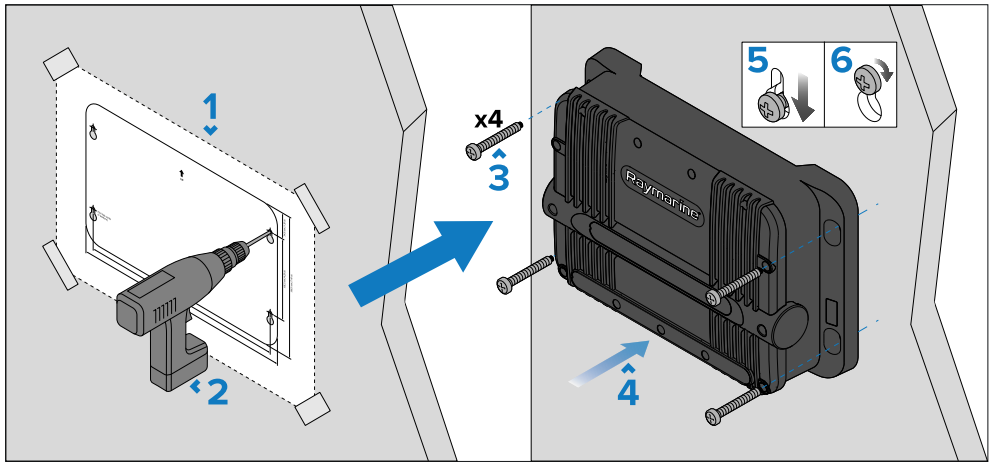
The fixing screws supplied may not be suitable for your mounting surface. Please check the security and integrity of the mounted product before finalizing your installation. If necessary, obtain replacement or additional mounting screws to ensure a secure installation.

8.3 Mounting the unit

Having chosen a suitable location, install the unit as follows:

Note:

It is recommended that the unit is mounted vertically.



1. Secure the mounting template in the required location using adhesive tape.
2. Drill 4 holes at the marked location on the template, and then remove the mounting template.
3. Screw the 4 fixing screws approximately half way into the holes.
4. Align the unit's mounting lugs with the screws, and then carefully place the unit onto the fixing screws.
5. Push the unit down to engage the key slots in the unit.
6. Fully tighten the 4 fixing screws.

Note:

Drill bit, tap size and tightening torque are dependent on the thickness and type of material the unit is to be mounted on.

CHAPTER 9: CABLES AND CONNECTIONS — GENERAL INFORMATION

CHAPTER CONTENTS

- 9.1 General cabling guidance — page 39
- 9.2 Typical system — page 40
- 9.3 Expanded system — page 41
- 9.4 Connections overview — page 42

9.1 General cabling guidance

Cable types and length

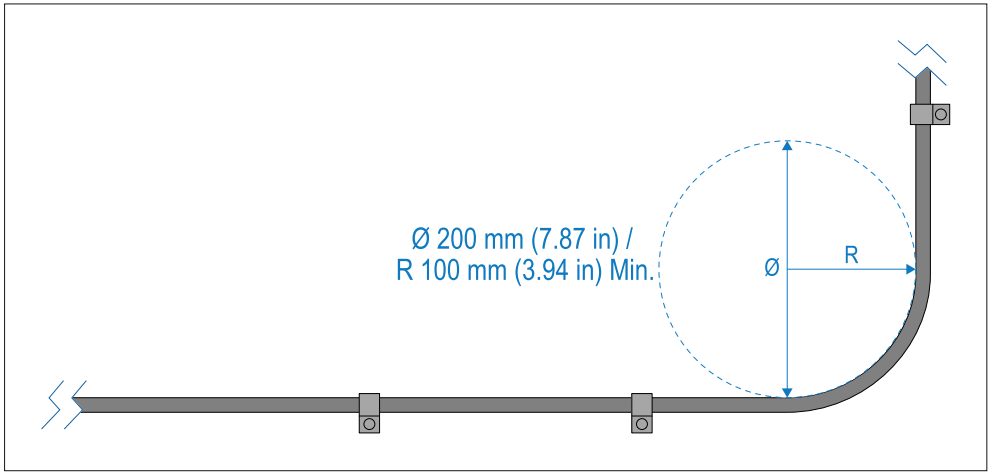
It is important to use cables of the appropriate type and length.

- 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).

Cable routing

Cables must be routed correctly, to maximize performance and prolong cable life.

- Do NOT bend cables excessively. Wherever possible, ensure a minimum bend diameter (Ø) of 200 mm (7.87 in) / minimum bend radius (R) of 100 mm (3.94 in).



- Protect all cables from physical damage and exposure to heat. Use trunking or conduit where possible. Do NOT run cables through bilges or doorways, or close to moving or hot objects.
- Secure cables in place using cable clips or cable ties. Coil any excess cable and tie it out of the way.
- Where a cable passes through an exposed bulkhead or deckhead, use a suitable watertight feed-through.
- Do NOT run cables near to engines or fluorescent lights.
- Always route data cables as far away as possible from:
  - Other equipment and cables.
  - High current carrying AC and DC power lines.
  - Antennas.

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.

Circuit isolation

Appropriate circuit isolation is required for installations using both AC and DC current:

- Always use isolating transformers or a separate power-inverter to run PC's, processors, displays and other sensitive electronic instruments or devices.
- Always use an isolating transformer with Weather FAX audio cables.
- Always use an isolated power supply when using a 3rd party audio amplifier.
- Always use an RS232/NMEA converter with optical isolation on the signal lines.
- Always make sure that PC's or other sensitive electronic devices have a dedicated power circuit.

Cable shielding

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

Suppression ferrites

- Raymarine® cables may be pre-fitted or supplied with suppression ferrites. These are important for correct EMC performance. If ferrites are supplied separately to the cables (i.e. not pre-fitted), you must fit the supplied ferrites, using the supplied instructions.
- If a ferrite has to be removed for any purpose (e.g. installation or maintenance), it must be replaced in the original position before the product is used.

- Use only ferrites of the correct type, supplied by Raymarine® or its authorized dealers.
- Where an installation requires multiple ferrites to be added to a cable, additional cable clips should be used to prevent stress on the connectors due to the extra weight of the cable.

Connections to other equipment

Requirement for ferrites on non-Raymarine cables:

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

Warning: Positive ground systems

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

Connecting cables

Follow the steps below to connect the cable(s) to your product.

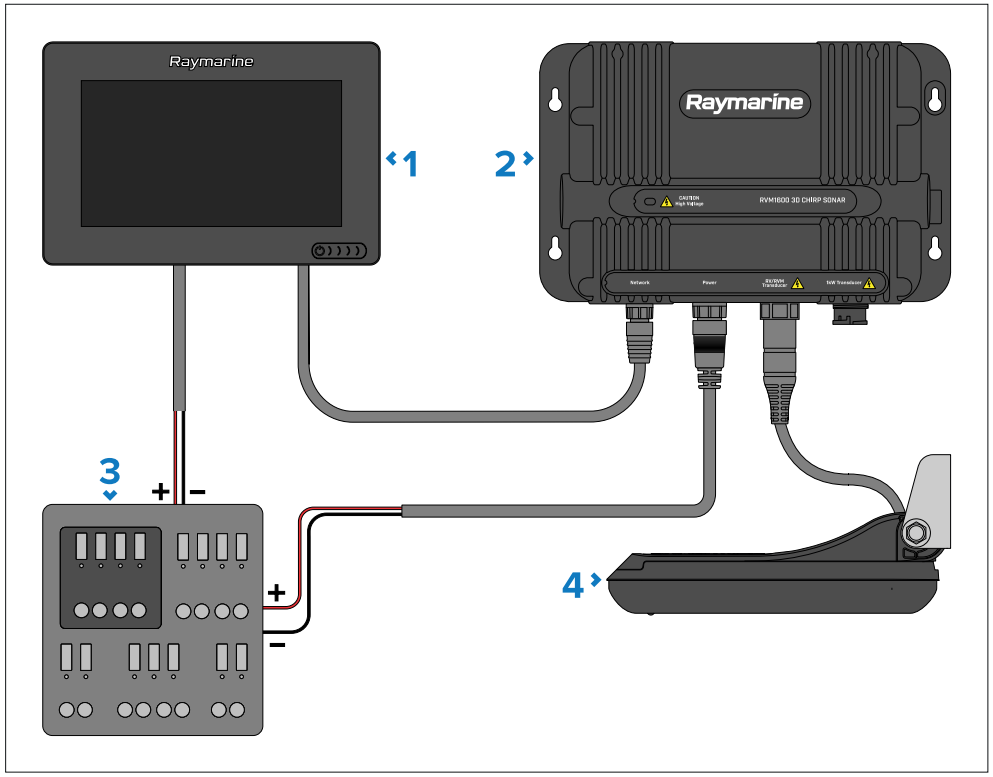
1. Ensure that the vessel's power supply is switched off.
2. Ensure that the device being connected has been installed in accordance with the installation instructions supplied with that device.
3. Ensuring correct orientation, push cable connectors fully onto the corresponding connectors.
4. Engage any locking mechanism to ensure a secure connection (e.g.: turn locking collars clockwise until tight, or in the locked position).
5. Ensure any bare ended wire connections are suitably insulated to prevent shorting and corrosion due to water ingress.

9.2 Typical system

The following illustration provides an example of a typical system, including the available connections and types of devices that can be connected to your sonar module.

Note:

This system configuration is shown as an example only and may differ from your planned installation.



Note:

Grounding connections and fuses are not shown in the illustration above, but MUST be implemented. Refer to the *Power Connections* section for more information on the correct implementation.

1. Compatible Raymarine® multifunction display.

2. Sonar module.
3. Power supply for the RVM1600 (12 or 24 V dc), and multifunction display (refer to your MFD Installation instructions for the specific voltage requirements).
4. Transducer (RVM-100 illustrated).

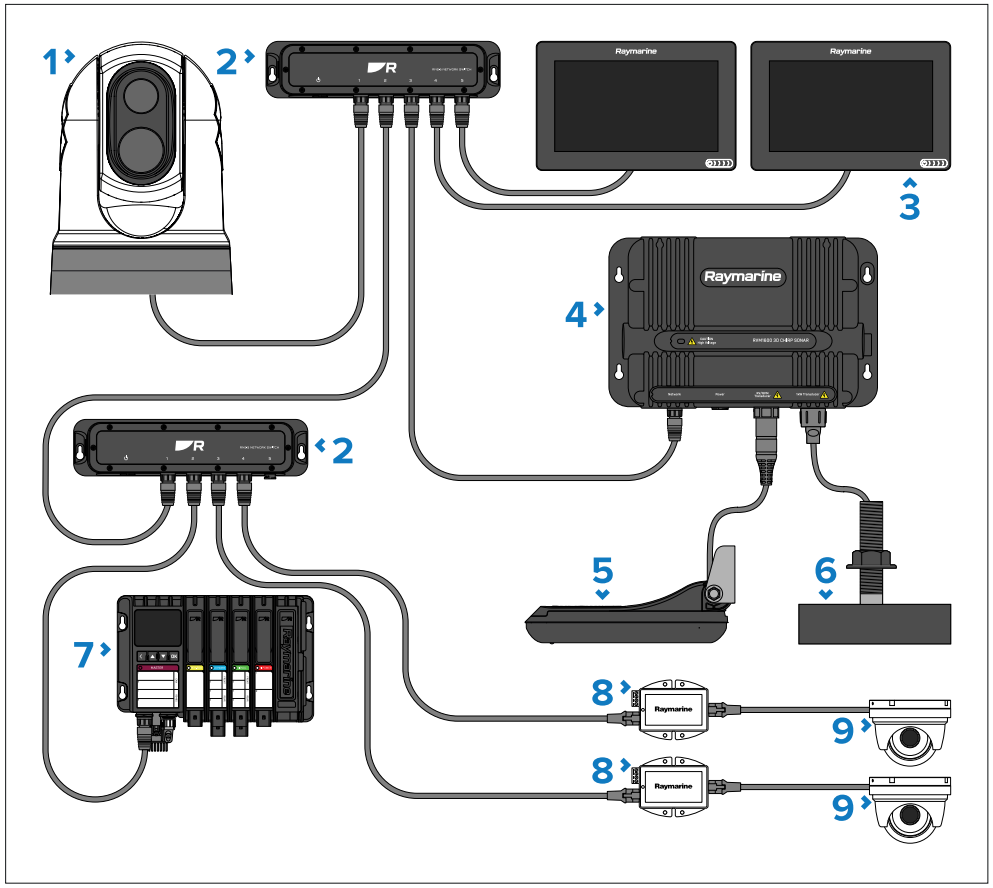
Note:

For information on how to connect your products, refer to the following sections:

- **p.43 — Network connections**
- **p.46 — Power connections**
- **p.51 — Transducer connections**

For information on available cables and accessories, refer to the following section: **p.74 — Spares and accessories**

9.3 Expanded system



Note:

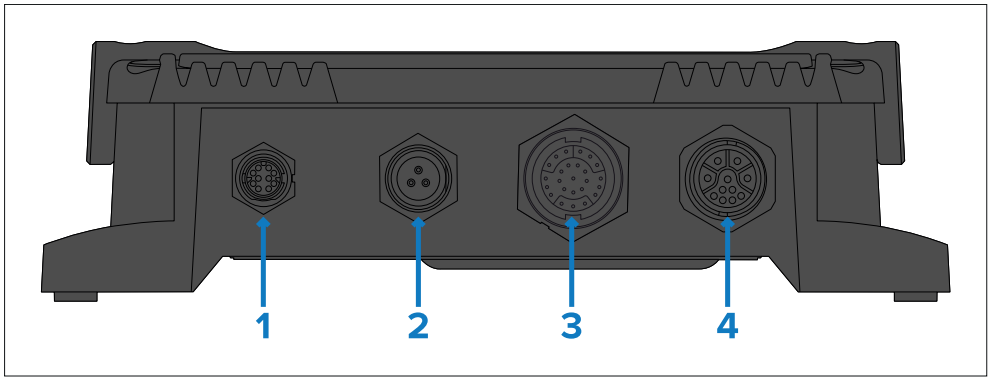
Power connections are not shown in this illustration. For more information on the correct implementation, refer to the *Power Connections* section of the Installation instructions for each respective product.

1. Thermal camera.
2. RayNet network switch.
3. Compatible Raymarine® multifunction display.
4. Sonar module.
5. Raymarine® RealVision Transducer (RVM-100 illustrated).

6. CHIRP transducer.
7. Raymarine® Digital Switching system.
8. PoE injectors, providing power to the IP cameras.
9. IP camera.

9.4 Connections overview

The cable connectors for your sonar module are shown below:



Note:

A dust cap is provided for each transducer connector. Ensure that you fit the dust cap over any unused transducer connector.

1. RayNet network connection.
2. 12 / 24 V dc power connection.
3. 25-pin RealVision™ Max 3D / RealVision™ 3D transducer connection (supports DownVision™, SideVision™ and CPT-S CHIRP conical beam transducers via the use of an adapter cables).
4. 11-pin CHIRP / Traditional (up to 1kW) transducer connection.

Note:

For further network, power or transducer connection information, refer to the following sections:

- **p.43 — Network connections**
- **p.46 — Power connections**
- **p.51 — Transducer connections**

CHAPTER 10: NETWORK CONNECTIONS

CHAPTER CONTENTS

- 10.1 Network connection — page 44

10.1 Network connection

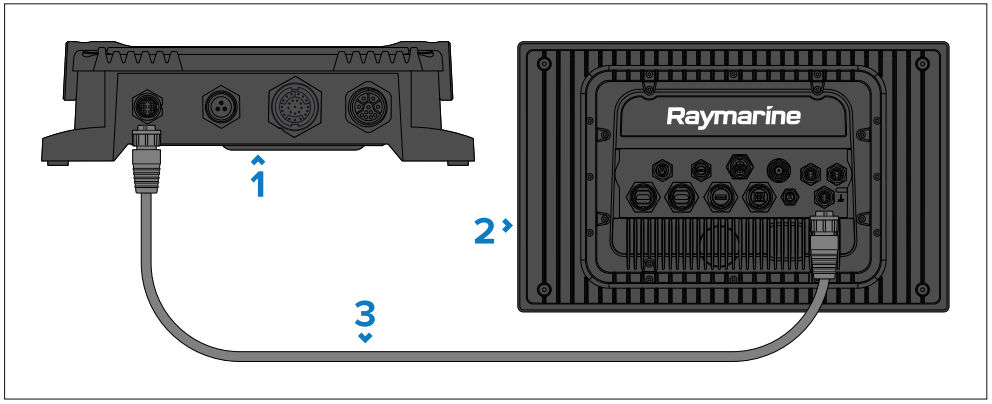
The sonar module must be connected to a compatible Raymarine® multifunction display to enable echo sounder data to be viewed.

The following section will provide three different scenarios that may be applicable when connecting your sonar module to a compatible Raymarine® multifunction display:

1. p.44 — Multifunction display connection
2. p.44 — Multifunction display connection (extended cables)
3. p.45 — Multiple multifunction display connections

Multifunction display network connection

The sonar module is connected to a multifunction display via a RayNet network cable.



Note:

The connection panel on your multifunction display may differ from that shown, depending on the hardware variant. However, the network connection method remains the same for all products featuring RayNet connectors.

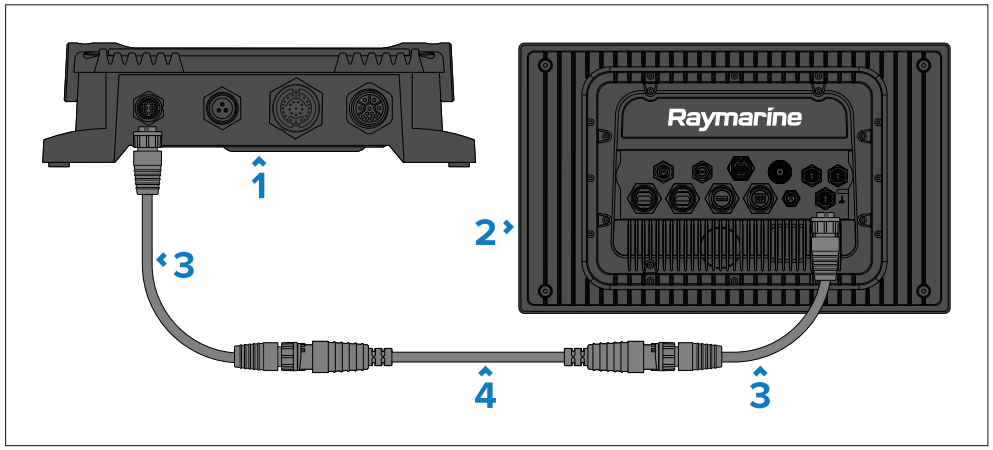
1. Sonar module.
2. Compatible Raymarine® multifunction display.
3. RayNet (female) to RayNet (female) cable.

Note:

For a list of compatible multifunction displays, refer to:
p.17 — Compatible MFDs

Multifunction display network connection (extended cables)

When the required length of a single network cable run is greater than the longest available RayNet cable (20 m (65.6 ft)), a RayNet (male) to (male) adapter cable (A80162) should be used to join the RayNet cables together, to extend the total network cable length.



Note:

The connection panel on your multifunction display may differ from that shown, depending on the hardware variant. However, the network connection method remains the same for all products featuring RayNet connectors.

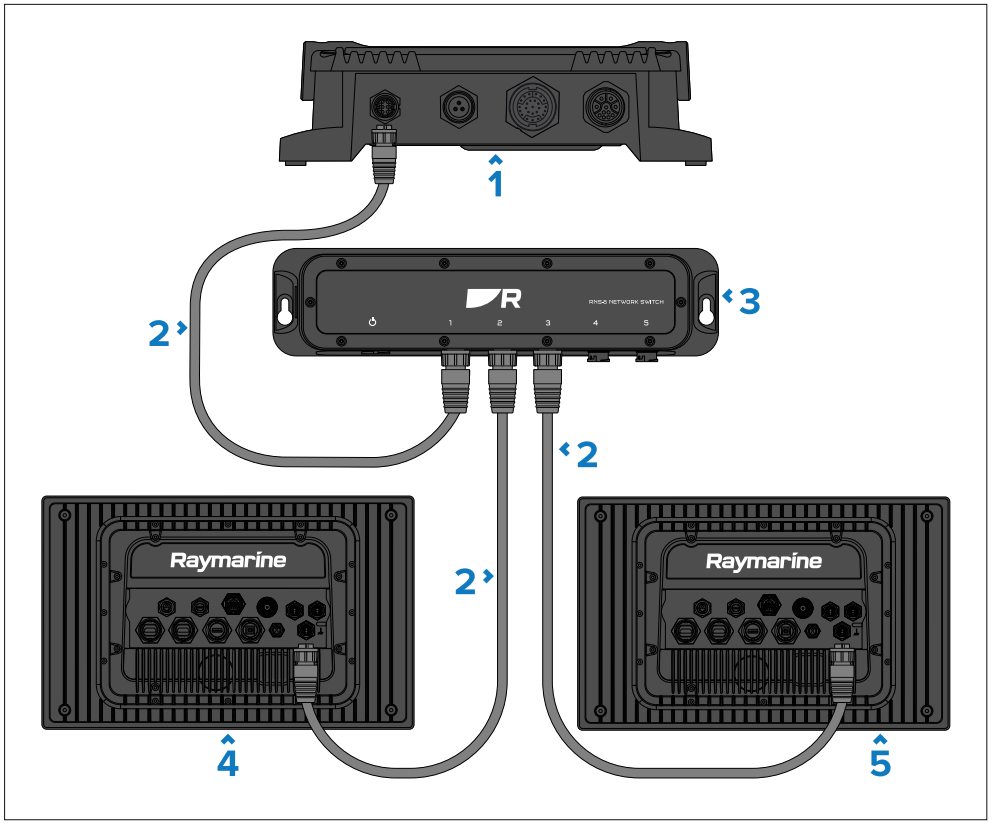
1. Sonar module.
2. Compatible Raymarine® multifunction display.
3. RayNet (female) to RayNet (female) cable.
4. RayNet (male) to RayNet (male) adapter cable (A80162) (100 mm (3.94 in)).

Note:

For a list of compatible multifunction displays, refer to:
p.17 — Compatible MFDs

Multiple multifunction display network connections

The sonar module can be connected to multiple multifunction displays via a network switch and RayNet network cables. The sonar image can then be shared between multiple multifunction displays on the same network (providing that all displays are running compatible software).



Note:

The connection panel on your multifunction display may differ from that shown depending on the hardware variant. However, the network connection method remains the same for all products featuring RayNet connectors.

1. Sonar module.
2. RayNet (female) to RayNet (female) cable.
3. Raymarine® network switch.
4. Compatible Raymarine® multifunction display.
5. Additional compatible Raymarine® multifunction display.

Note:

For a list of compatible multifunction displays, refer to:
p.17 — Compatible MFDs

CHAPTER 11: POWER CONNECTIONS

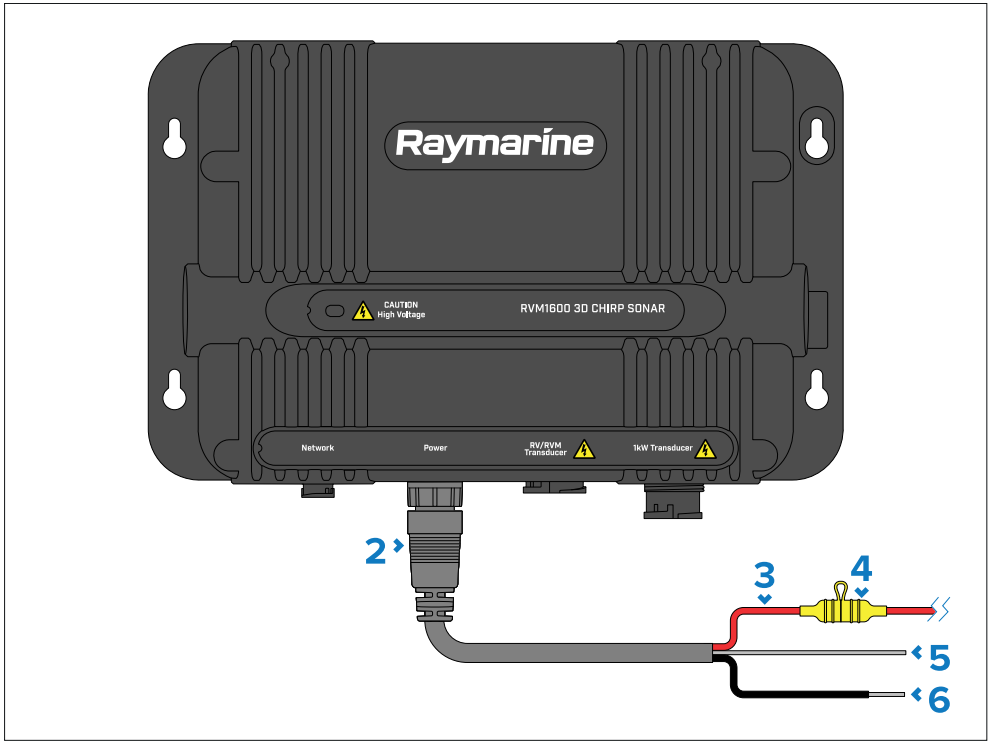
CHAPTER CONTENTS

- 11.1 Power connection — page 47
- 11.2 Power distribution — page 47
- 11.3 Power cable extension (12 / 24 V systems) — page 49
- 11.4 Power cable drain wire connection — page 50

11.1 Power connection

The power for the sonar module is provided directly by a 12 V dc or 24 V dc power source.

The sonar module is supplied with a power cable which contains bare stripped wires, suitable for direct connection to a 12 V or 24 V power supply:



1. RVM1600.
2. 1.5 m (4.9 ft) Power cable (supplied).
3. Red wire (positive) — connects to the power supply's positive terminal.
4. Waterproof fuse holder containing a suitably-rated inline fuse (**not supplied**), which must be fitted to the red positive wire — refer to the fuse ratings below.
5. Gray wire (drain) — connects to the vessel RF ground (if available), or the negative battery terminal.
6. Black wire (negative) — connects to the power supply's negative terminal.

Inline fuse and thermal breaker ratings

The following inline fuse and thermal breaker ratings apply to your product:

Inline fuse rating	Thermal breaker rating
5 A	5 A

Important:

The suitable fuse rating for the thermal breaker is dependent on the number of devices you are connecting. If in doubt consult an authorized Raymarine® dealer.

11.2 Power distribution

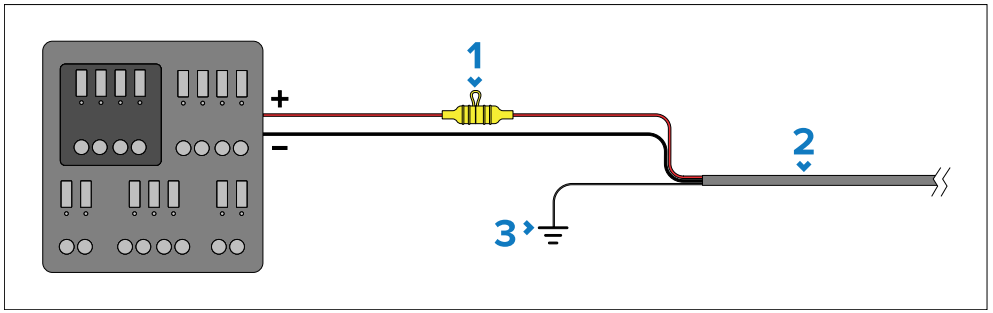
Recommendations and best practice for the power connection of products supplied with a drain wire as part of the supplied power cable.

- The product is supplied with a power cable, either as a separate item or a captive cable permanently attached to the product. Only use the power cable supplied with the product. Do NOT use a power cable designed for, or supplied with, a different product.
- Refer to the *Power connection* section for more information on how to identify the wires in your product's power cable, and where to connect them.
- See below for more information on implementation for some common power distribution scenarios:

Important:

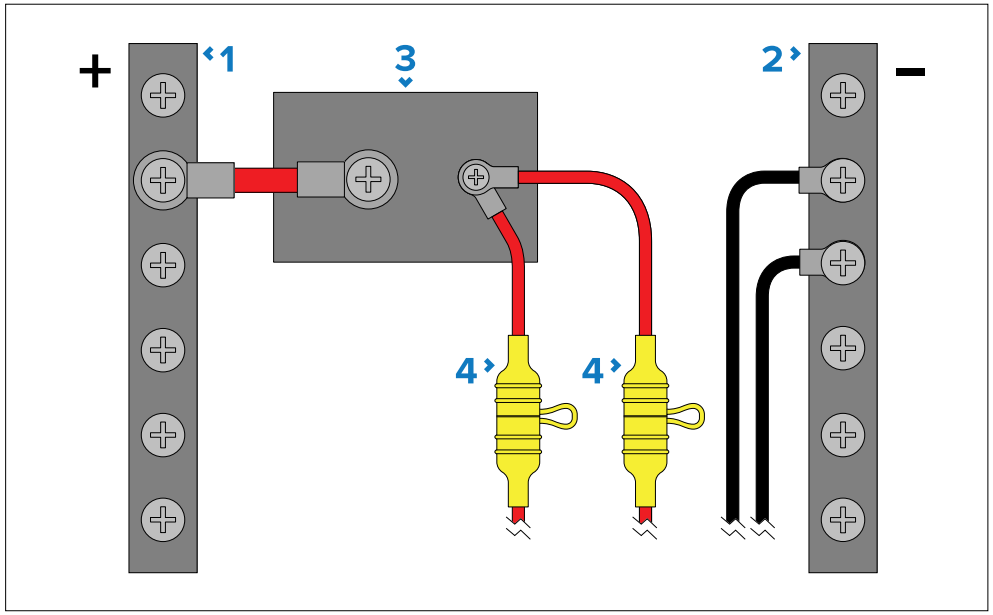
- When planning and wiring, take into consideration other products in your system, some of which (e.g. sonar modules) may place large power demand peaks on the vessel's electrical system, which may impact the voltage available to other products during the peaks.
- The information provided below is for guidance only, to help protect your product. It covers common vessel power arrangements, but does NOT cover every scenario. If you are unsure how to provide the correct level of protection, please consult an authorized dealer or a suitably qualified professional marine electrician.

Implementation — connection to distribution panel (Recommended)



Item	Description
1	Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: *Inline fuse and thermal breaker ratings*.
2	Product power cable.
3	Drain wire connection point.

- It is recommended that the supplied power cable is connected to a suitable breaker or switch on the vessel's distribution panel or factory-fitted power distribution point.
- The distribution point should be fed from the vessel's primary power source by 8 AWG (8.36 mm²) cable.
- Ideally, all equipment should be wired to individual suitably-rated thermal breakers or fuses, with appropriate circuit protection. Where this is not possible and more than 1 item of equipment shares a breaker, use individual inline fuses for each power circuit to provide the necessary protection.
- The power cable supplied with your product includes a drain wire, which must be connected to the vessel's common RF ground.



Item	Description
1	Positive (+) bar
2	Negative (-) bar
3	Circuit breaker
4	Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: *Inline fuse and thermal breaker ratings*.

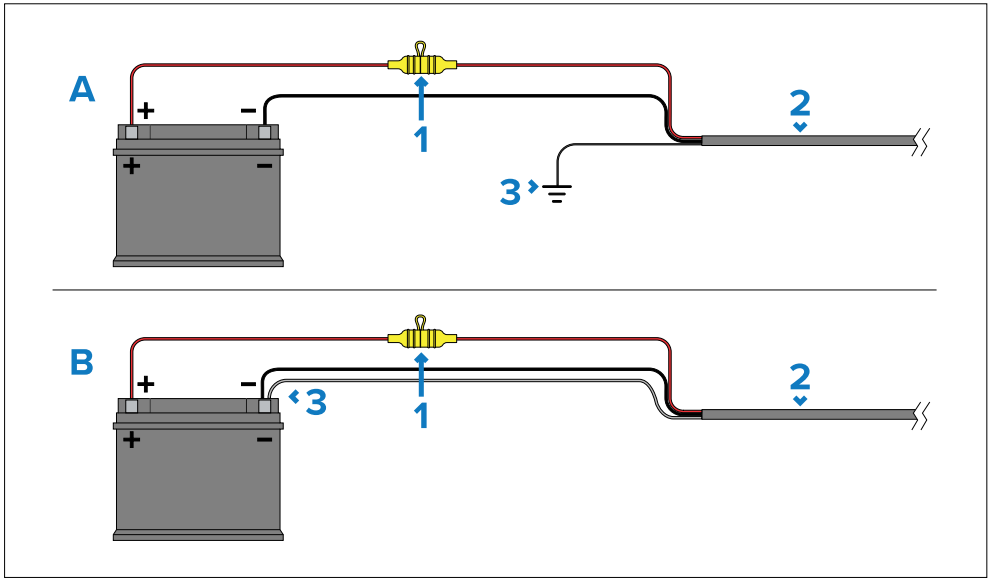
Important:

Observe the recommended fuse / breaker ratings provided in the product's documentation, however be aware that the suitable fuse / breaker rating is dependent on the number of devices being connected.

Implementation — direct connection to battery

- Where connection to a power distribution panel is not possible, the power cable supplied with your product may be connected directly to the vessel's battery, via a suitably rated fuse or breaker.

- If the power cable is NOT supplied with a fitted inline fuse, you MUST fit a suitably rated fuse or breaker between the red wire and the battery's positive terminal.
- Refer to the inline fuse ratings provided in the product's documentation.
- If you need to extend the length of the power cable supplied with your product, ensure you observe the dedicated *Power cable extensions* advice provided in the product's documentation.



Item	Description
1	Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: *Inline fuse and thermal breaker ratings*.
2	Product power cable.
3	Drain wire connection point.

Battery connection scenario A:

Suitable for a vessel with a common RF ground point. In this scenario, the power cable's drain wire should be connected to the vessel's common ground point.

Battery connection scenario B:

Suitable for a vessel without a common grounding point. In this case, the power cable's drain wire should be connected directly to the battery's negative terminal.

Grounding

Ensure that you observe any additional grounding advice provided in the product's documentation.

More information

It is recommended that best practice is observed in all vessel electrical installations, as detailed in the following standards:

- BMEA Code of Practice for Electrical and Electronic Installations in Boats
- NMEA 0400 Installation Standard
- ABYC E-11 AC & DC Electrical Systems on Boats
- ABYC A-31 Battery chargers and Inverters
- ABYC TE-4 Lightning Protection

11.3 Power cable extension (12 / 24 V systems)

If you need to extend the length of the power cable supplied with your product, ensure you observe the following advice:

- The power cable for each unit in your system should be run as a separate, single length of 2-wire cable from the unit to the vessel's battery or distribution panel.
- Ensure that the extension cable is of a sufficient gauge for the supply voltage and the total load of the device and the length of the cable run. Refer to the following table for typical **minimum** power cable wire gauges:

Cable length in meters (feet)	Wire gauge in AWG (mm^2) for 12 V supply	Wire gauge in AWG (mm^2) for 24 V supply
<8 (<25)	16 (1.31 mm^2)	18 (0.82 mm^2)
16 (50)	14 (2.08 mm^2)	18 (0.82 mm^2)
24 (75)	14 (2.08 mm^2)	16 (1.31 mm^2)
>32 (>100)	14 (2.08 mm^2)	16 (1.31 mm^2)

Important:

Be aware that some products in your system (such as sonar modules) can create voltage peaks at certain times, which may impact the voltage available to other products during the peaks.

Important:

To ensure power cables (including any extension) are of a sufficient gauge, ensure that there is a continuous **minimum** voltage of **10.8 V dc** at the end of the cable where it enters the product's power connector, even with a fully flat battery at 11 V dc. (Do not assume that a flat battery is at 0 V dc. Due to the discharge profile and internal chemistry of batteries, the current drops much faster than the voltage. A "fully flat" battery still shows a positive voltage, even if it doesn't have enough current to power your device.)

11.4 Power cable drain wire connection

The power cable supplied with this product includes a dedicated drain wire for connection to a vessel's Radio Frequency (RF) ground point (if available), or the negative battery terminal.

It is important that an effective RF ground is connected to the system. A single common ground point should be used for all equipment. If several items require grounding, each item of equipment can be grounded by connecting the drain wire of the power cable first to a single local point (e.g. within a distribution panel), and then this point connected via an appropriately-rated conductor to the vessel's RF common ground point. An RF ground point is typically a circuit with a very low-impedance signal at RF, connected to the sea via an electrode immersed in the sea or bonded to the inner side of the hull in an area that is underwater.

On vessels without an RF ground system, the drain wires of all equipment should be connected directly to the vessel's negative battery terminal.

The dc power system should be either:

- Negative grounded ("bonded"), with the negative battery terminal connected to the vessel's RF ground.
- Floating, with neither battery terminal connected to the vessel's ground.

The preferred minimum requirement for the path to ground (bonded or non-bonded) is via a flat tinned copper braid, with a 30 A rating or greater. If this is not possible, an equivalent stranded wire conductor may be used, rated as follows:

- for runs of <1 m (3.3 ft), use 6 mm2 (10 AWG) or greater.
- for runs of >1 m (3.3 ft), use 8 mm2 (8 AWG) or greater.

In any grounding system, always keep the length of connecting braid or wires as short as possible.

CHAPTER 12: TRANSDUCER CONNECTIONS

CHAPTER CONTENTS

- 12.1 Transducer connections — page 52

12.1 Transducer connections

The RVM1600 is designed for use with a variety of transducers.

Transducers must be installed in accordance with the instructions provided with the transducer.

Note:

Transducers without Transducer ID® are not supported.

For a list of compatible transducers, refer to the following section:
p.26 — Compatible transducers

For a list of applicable transducer cables, refer to the following section:
p.74 — Spares and accessories

The following section will provide seven different scenarios that may be applicable when connecting your transducer to the sonar module:

1. **p.53 — RealVision™ Max 3D / RealVision™ transducer connections**
2. **p.53 — Split-pair RealVision™ Max 3D / RealVision™ 3D transducer connections**
3. **p.54 — DownVision™ / SideVision™ transducer connections**
4. **p.54 — CPT-S conical beam transducer connections**
5. **p.55 — CHIRP transducer connections**
6. **p.55 — Traditional transducer connections**
7. **p.56 — Simultaneous RealVision™ Max 3D / RealVision™ 3D transducer and traditional transducer connections**

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.

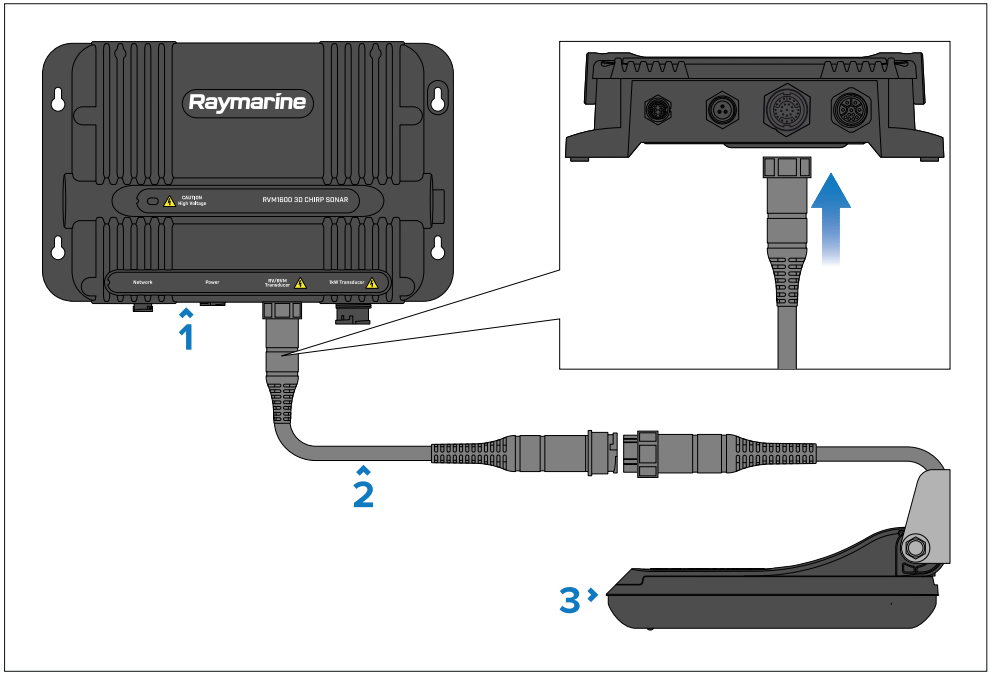
Warning: Maximum transducer cable length

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.

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.

RealVision™ Max 3D / RealVision™ transducer connection



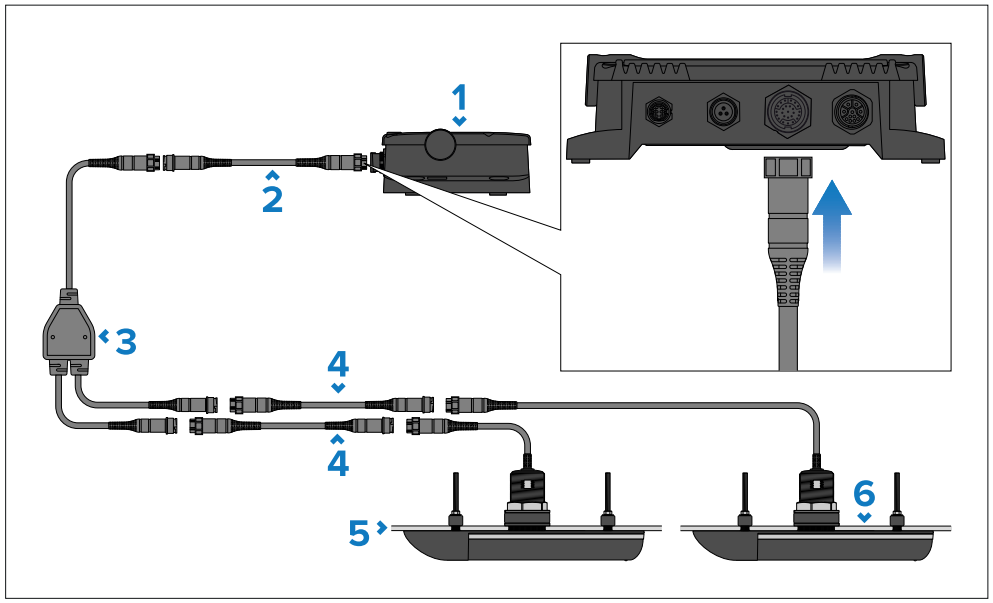
1. Sonar module.
2. Extension cable (optional).
3. RealVision™ Max 3D / RealVision™ 3D transducer (including supplied fitted cable).

Note:

For a list of compatible transducers, refer to the following section: **p.26 — Compatible transducers**

For a list of applicable transducer extension cables, refer to the following section: **p.74 — Spares and accessories**

Split-pair RealVision™ Max 3D / RealVision™ 3D transducer connections



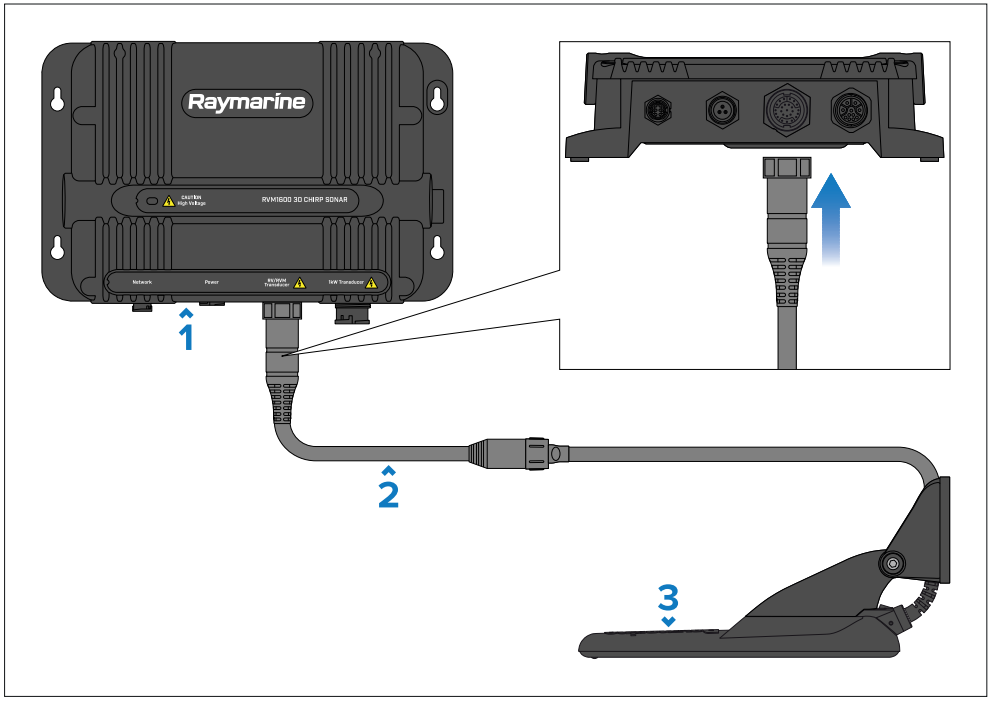
1. Sonar module.
2. 8 m (26.2 ft) extension cable (supplied).
3. 'Y' cable (supplied).
4. Optional extension cables can be fitted between the transducer and 'Y' cable if required, or between supplied extension cable and MFD or sonar module.
5. Transducer, e.g.: RVM-412 Port.
6. Transducer, e.g.: RVM-412 Starboard.

Note:

For a list of compatible transducers, refer to the following section: **p.26 — Compatible transducers**

For a list of applicable transducer extension cables, refer to the following section: **p.74 — Spares and accessories**

DownVision™ / SideVision™ transducer connections



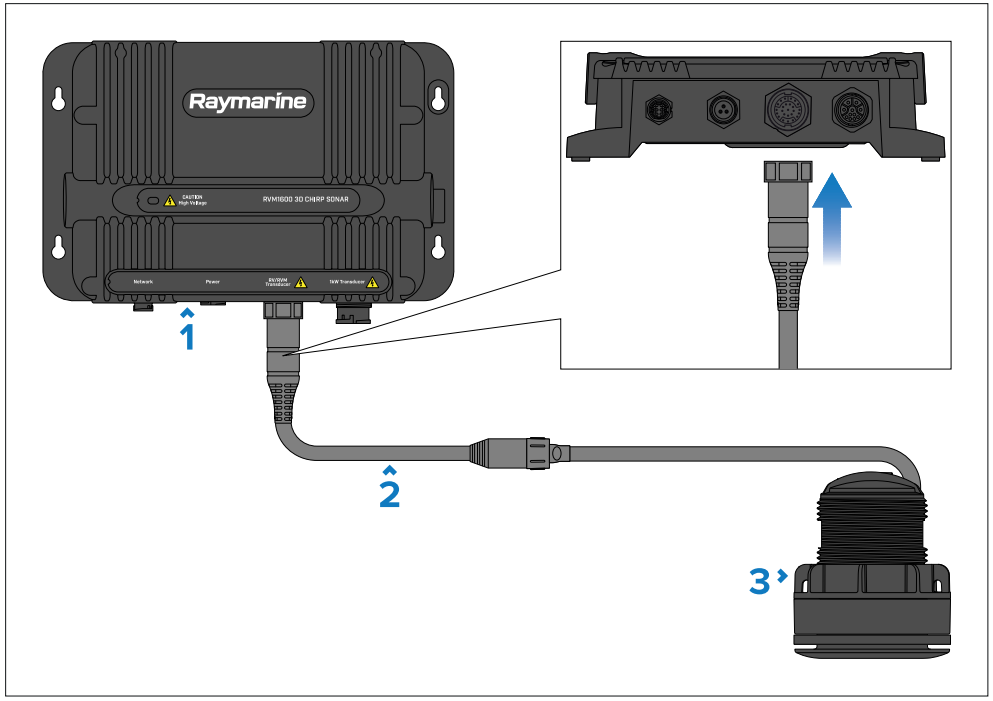
1. Sonar module.
2. 25-pin to 9-pin adapter cable (A80490).
3. DownVision™ (illustrated) / SideVision™ transducer.

Note:

For a list of compatible transducers, refer to the following section:
p.26 — Compatible transducers

For a list of applicable transducer extension cables, refer to the following section: **p.74 — Spares and accessories**

CPT-S conical beam transducer connections



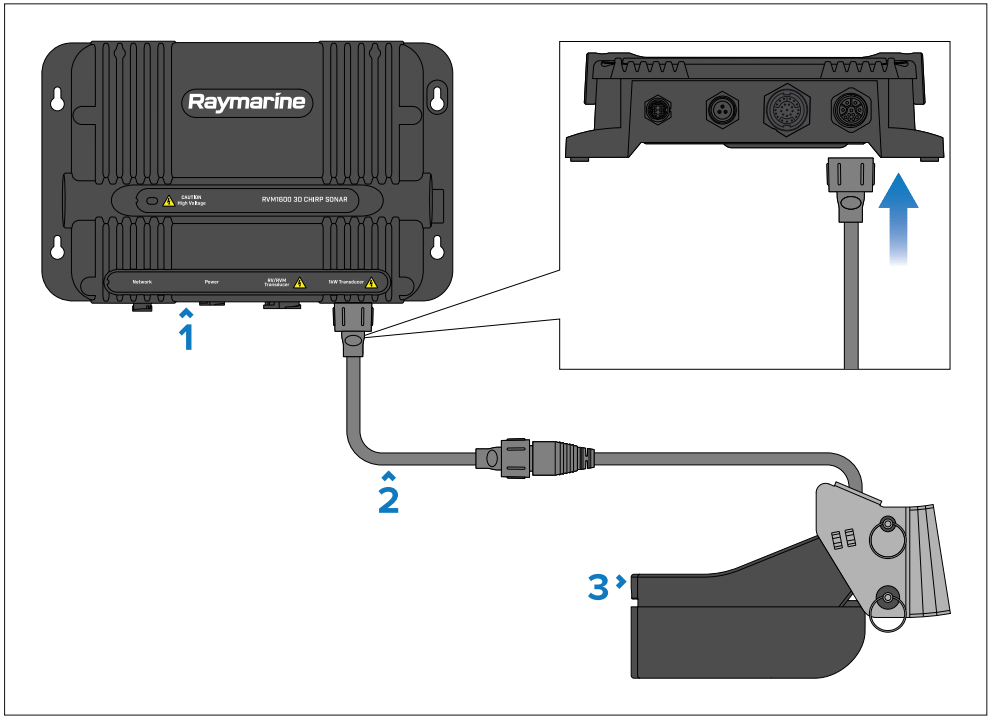
1. Sonar module.
2. 25-pin to 9-pin adapter cable (A80490).
3. CPT-S CHIRP conical beam transducer.

Note:

For a list of compatible transducers, refer to the following section:
p.26 — Compatible transducers

For a list of applicable transducer extension cables, refer to the following section: **p.74 — Spares and accessories**

CHIRP transducer connections



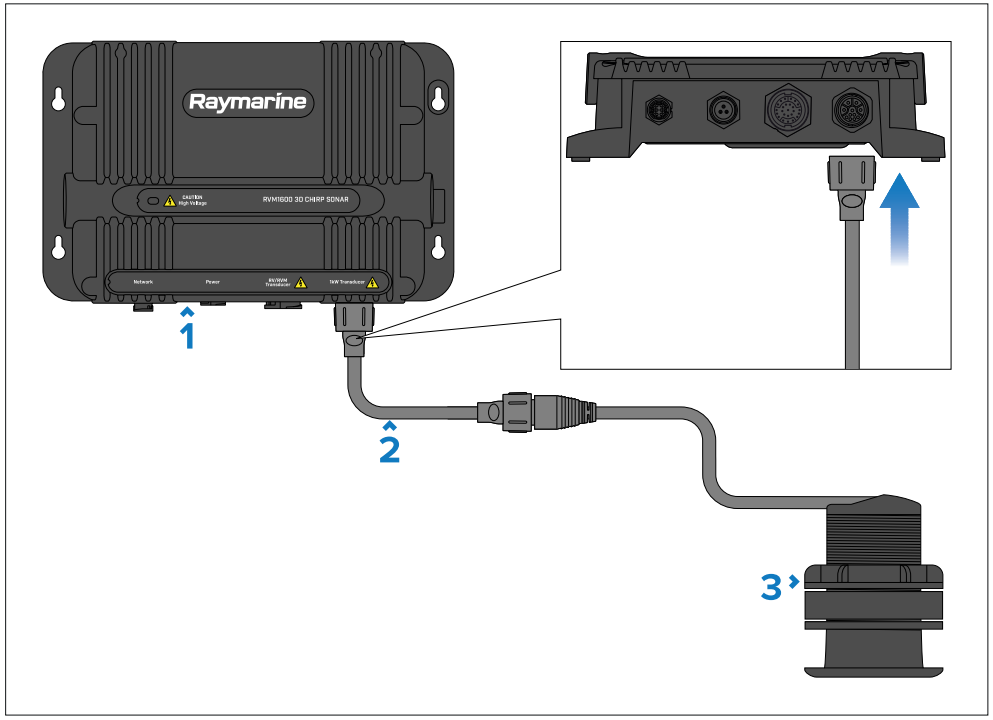
1. Sonar module.
2. Extension cable (optional).
3. CHIRP transducer.

Note:

For a list of compatible transducers, refer to the following section:
p.26 — Compatible transducers

For a list of applicable transducer extension cables, refer to the following section: **p.74 — Spares and accessories**

Traditional transducer connections



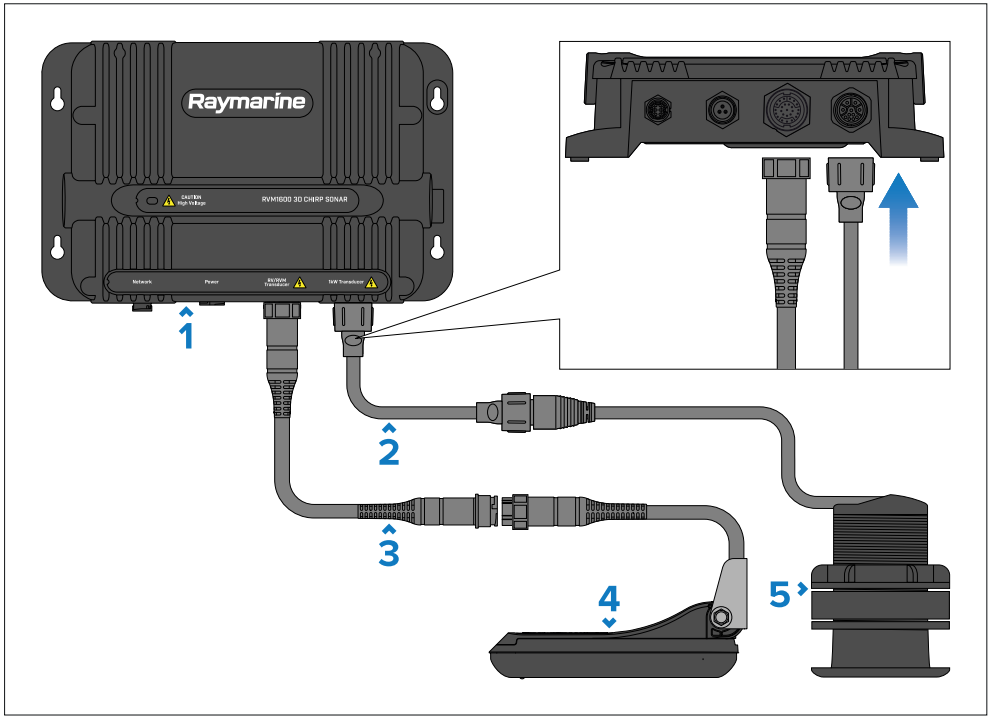
1. Sonar module.
2. 11-pin to 8-pin adapter cable (A80496).
3. Traditional transducer.

Note:

For a list of compatible transducers, refer to the following section:
p.26 — Compatible transducers

For a list of applicable transducer extension cables, refer to the following section: **p.74 — Spares and accessories**

Simultaneous RealVision™ Max 3D / RealVision™ 3D transducer and traditional transducer connections



1. Sonar module.
2. 11-pin to 8-pin adapter cable (A80496).
3. Extension cable (optional).
4. RealVision™ Max 3D / RealVision™ 3D transducer (including supplied fitted cable).
5. Traditional transducer.

Note:

For a list of compatible transducers, refer to the following section: **p.26 — Compatible transducers**

For a list of applicable transducer extension cables, refer to the following section: **p.74 — Spares and accessories**

Transducer cable extension

For best performance, cable runs should be kept to a minimum. However, for some installations (including all split-pair transducer installations) it may be necessary to extend the transducer cable.

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).

For information on the full range of transducer extension cables that are available, refer to the following section: **p.74 — Spares and accessories**

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 13: OPERATION

CHAPTER CONTENTS

- 13.1 LightHouse™ 4 operation instructions — page 58

13.1 LightHouse™ 4 operation instructions

Please refer to the LightHouse™ 4 operation instructions for information on how to operate your product.

The LightHouse™ 4 operation Instructions (document number **81406**) can be downloaded from the Raymarine® website: www.raymarine.com/manuals.
Please check the website to ensure you have the latest documentation.

Multifunction display software version

To ensure optimum performance and compatibility with external devices, your multifunction display must be using the latest software version.

Visit www.raymarine.com/software to download the latest software.

CHAPTER 14: SYSTEM CHECKS AND TROUBLESHOOTING

CHAPTER CONTENTS

- 14.1 Initial power-on test — page 60
- 14.2 Troubleshooting — page 60

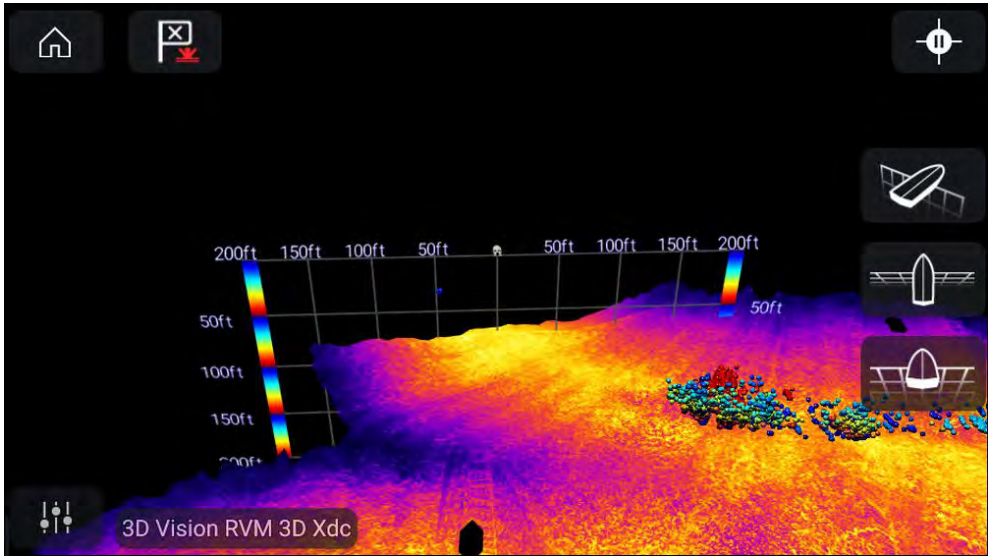
14.1 Initial power-on test

Once the unit has been correctly installed, check that it is operating as intended.

The unit takes less than 1 minute to start up after being powered on. As the unit transitions from a state of powering on through to normal operation, the LED status indicator changes from solid to blinking green. If the LED status indicator is not blinking green, then refer to the troubleshooting section of this handbook.

Open the Fishfinder application on your connected multifunction display and ensure that it is operating correctly.

The following screenshot shows a typical 3D sonar view, with the sonar module operating normally:



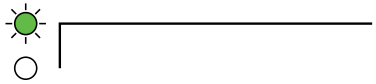
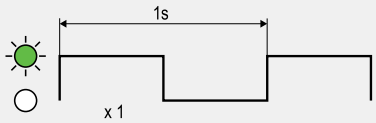
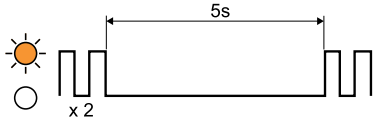
14.2 Troubleshooting

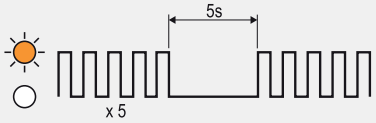
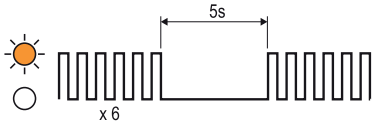
The troubleshooting section provides possible causes and the corrective action required for common problems that are associated with the installation and operation of your product.

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.

LED Diagnostics

LED Indication	LED status and user actions
	(Green) Power ON • No user action is required.
	(Green) Normal operation • No user action is required.
	(Amber) No network detected • Ensure the network is powered. • Ensure the network cable and connections are secure and free from damage. • If the problem continues to persist, contact Raymarine® technical support.

LED Indication	LED status and user actions
	(Amber) Under voltage (<10.2V) • Ensure the power cable and connections are secure and free from damage. • Ensure the power supply cabling is consistent with recommendations. • If the problem continues to persist, contact Raymarine® technical support.
	(Amber) Over voltage (>34.2V) • Ensure the power supply levels are consistent with recommendations. • If the problem continues to persist, contact Raymarine® technical support.

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.

Possible causes	Possible solutions
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.
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.
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.

Diagnostic product information

Diagnostic product information can be viewed and exported from a Raymarine® LightHouse multifunction display, for supported products networked using RayNet, RJ45, or SeaTalkng ® / NMEA 2000 cables.

Diagnostic product information includes technical data related to the connected product, such as serial numbers, network addresses, firmware version numbers, and so on. It is useful for 2 main purposes:

1. Sending detailed product information to the Raymarine® product support team, in the event of a problem or fault with your product. The information can be exported to a MicroSD card, and you can then copy the file for the purposes of emailing it to the product support team. For contact details, refer to: **p.68 — Technical support**
2. Maintaining detailed off-boat records. This is particularly useful for vessels that have multiple Raymarine® products installed.

To view or export diagnostic product information, access the *[Diagnostics]* menu. For instructions on how to access this menu, refer to the relevant operation instructions for your multifunction display.

Resetting the sonar (LightHouse™ 4 / LightHouse™ 3)

The reset function restores the unit to its factory default values.

Note:

Performing a factory reset will clear speed and temperature calibration settings and the depth offset.

1. Using a compatible Raymarine® multifunction display, open the Sonar app.
2. Open the *[Settings]* page.
3. Select the *[Sounder]* tab.
4. Select *[Reset sounder]*.
5. Select *[Yes]* to confirm.

The unit will now be reset to factory default settings.

CHAPTER 15: MAINTENANCE

CHAPTER CONTENTS

- 15.1 Routine checks — page 66
- 15.2 Unit cleaning instructions — page 66

15.1 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.

15.2 Unit cleaning instructions

The unit does not require regular cleaning. However, if you find it necessary to clean the unit, please follow the steps below:

1. Ensure power is switched off.
2. Wipe unit clean with a damp cloth.
3. If necessary, use a mild detergent solution to remove grease marks.

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.

To prevent the build up of sea growth, coat the transducer with a thin layer of water based antifouling paint, available from your local marine dealer. Reapply paint every 6 months or at the beginning of each boating season. Certain smart transducers have restrictions on where antifouling paint is applied. Please consult your dealer.

Note:

- Transducers with a temperature sensor may not work properly if painted.
- Never use ketone based paint. Ketones can attack many plastics possibly damaging the sensor.
- Never use spray paint on your transducer. Spraying incorporates tiny air bubbles, and a marine transducer cannot transmit properly through air.

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. Be careful to avoid scratching the transducers face.
- If your transducer has a paddlewheel you can wet sand with fine grade wet/dry paper.
- Harsh cleaning solvents such as acetone may damage the transducer.

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 16: TECHNICAL SUPPORT

CHAPTER CONTENTS

- 16.1 Raymarine product support and servicing — page 69
- 16.2 Learning resources — page 70

16.1 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):

- E-Mail: support.nl@raymarine.com
- Tel: +31 (0)26 3614 905

Sweden (Raymarine subsidiary):

- E-Mail: support.se@raymarine.com
- Tel: +46 (0)317 633 670

Finland (Raymarine subsidiary):

- E-Mail: support.fi@raymarine.com
- Tel: +358 (0)207 619 937

Norway (Raymarine subsidiary):

- E-Mail: support.no@raymarine.com
- 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

Diagnostic product information

Diagnostic product information can be viewed and exported from a Raymarine® LightHouse multifunction display, for supported products networked using RayNet, RJ45, or SeaTalkng ® / NMEA 2000 cables.

Diagnostic product information includes technical data related to the connected product, such as serial numbers, network addresses, firmware version numbers, and so on. It is useful for 2 main purposes:

1. Sending detailed product information to the Raymarine® product support team, in the event of a problem or fault with your product. The information can be exported to a MicroSD card, and you can then copy the file for the purposes of emailing it to the product support team. For contact details, refer to: **p.68 — Technical support**
2. Maintaining detailed off-boat records. This is particularly useful for vessels that have multiple Raymarine® products installed.

To view or export diagnostic product information, access the *[Diagnostics]* menu. For instructions on how to access this menu, refer to the relevant operation instructions for your multifunction display.

Remote Support via AnyDesk

The AnyDesk remote desktop app is available on your Raymarine multifunction display from the app launcher: *[Homescreen > Apps]*.

The AnyDesk app enables a Raymarine Product Support representative to remotely connect to and control your MFD over an Internet connection, for the purposes of technical support and troubleshooting.

To get started, you will first need to contact Raymarine Product Support. If the representative considers that your support case would benefit from a remote session, you need to first ensure that your MFD has an active Internet connection via Wi-Fi. Next, launch the AnyDesk app from your MFD's homescreen, and then provide the displayed unique ID to the Raymarine Product Support representative. Then follow any further instructions provided to you by the representative.

Attention

- **AnyDesk is provided for troubleshooting and support purposes only, and is NOT intended to perform remote functions on your vessel. Raymarine will NOT be held liable for damage or injury to equipment or persons caused by the use of a remote connection to your MFD.**
- **Do not disclose your AnyDesk ID to anyone other than authorised Raymarine Product Support personnel.**
- **Do not use the AnyDesk app to remotely activate connected devices such as Autopilot, Radar or Sonar hardware.**

16.2 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 17: TECHNICAL SPECIFICATION

CHAPTER CONTENTS

- 17.1 Physical specification — page 72
- 17.2 Power specification — page 72
- 17.3 Environmental specification — page 72
- 17.4 Sonar specification — page 72
- 17.5 Conformance specification — page 73

17.1 Physical specification

Specification	
Width:	299.4 mm (11.79 in)
Height:	188.0 mm (7.40 in)
Height (including connectors):	205.6 mm (8.09 in)
Height (including cable bend radius):	285.6 mm (11.24 in)
Depth:	84.4 mm (3.32 in)
Weight:	1.585 kg (3.49 lbs)

17.2 Power specification

Specification	
Nominal supply voltage:	12 V / 24 V dc
Operating voltage range:	10.8 V to 31.2 V dc
Power consumption:	10.4 W (Maximum)
Current:	2.4 A Peak; 1.2 A RMS (Maximum) @ 12 V dc
Inline fuse rating:	5 A
Thermal breaker rating:	5 A

17.3 Environmental specification

Specification	
Operating temperature:	–25 °C (–13 °F) to +55 °C (131 °F)
Non-operating temperature:	–30 °C (–22 °F) to +70 °C (158 °F)
Relative humidity:	up to 93% @ 40 °C (104 °F)
Waterproof rating:	IPx6 & IPx7

17.4 Sonar specification

Specification	
Power output:	Up to 1kW RMS
Connections:	• 1x 3–pin Male power connector • 1x 10–pin RayNet network connector • 1x 25–pin RealVision Max™ 3D / RealVision™ 3D transducer connector • 1x 11–pin 1kW transducer connector

Sonar channels

Your product supports the following sonar channels:

RV / RVM transducer connection

CHIRP sonar channels	
3D Vision (RealVision™)	DownVision™
SideVision™	High CHIRP
Sonar (CPT-S transducer)	

1 kW transducer connection

CHIRP / traditional sonar channels	
High CHIRP	Medium CHIRP
Low CHIRP	Low frequency
Conical sonar	Medium frequency
High frequency	

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)

Traditional sonar range

The following ranges apply to Traditional sonar channels:

Sonar channel	Range
Traditional sonar:	0.9 m (3 ft) to 1,524 m (5,000 ft) (in optimum conditions, using a 1 kW transducer)

17.5 Conformance specification

Specification	
Standards:	• EMC Directive 2014/30/EU • RoHS II 2011/65/EU • Worldwide Safety EN/IEC 62368-1 • Europe, UK, Australia, New Zealand: EN/IEC 60945:2002 • Australia and New Zealand: C-Tick, Compliance Level 2 • Canada: ICES-003 (exempt when **factory** installed in a transport vehicle) • USA: CFR47 Part 15b (SDoC exempt, installed in transport vehicle) • Japan / China: ABS/CCS IEC 60945:2002 • FCC Part 15.19 • FCC Part 15.105 (b) • ISEDC ICES-003 • EN ISO 8846:2017
Product markings:	• UKCA • CE • Australian RCM C-Tick • RoHS • WEEE Directive

CHAPTER 18: SPARES AND ACCESSORIES

CHAPTER CONTENTS

- 18.1 Compatible transducers — page 75
- 18.2 Spares and accessories — page 75
- 18.3 RayNet to RayNet cables and connectors — page 76
- 18.4 RayNet to RJ45, and RJ45 (SeaTalkhs) adapter cables — page 77

18.1 Compatible transducers

For a list of transducers that are compatible with your sonar module, refer to the following section: **p.26 — Compatible transducers**.

In addition, the following speed/temp sensing transducers are also compatible with your sonar module:

Item description and part numbers

- ST800–P120 Plastic low-profile speed/temp sensor — **E66071**
- ST800–B120 Bronze low-profile speed/temp sensor — **E66072**

18.2 Spares and accessories

The following spare parts and accessories are available for your product.

Item description and part numbers

Power cable(s):

- 1.5 m (4.9 ft) 12 / 24 V Power cable — **A80346**

RealVision™ Max 3D / RealVision™ 3D transducer extension cable(s):

- 3 m (9.8 ft) RealVision™ transducer extension cable — **A80475**
- 5 m (16.4 ft) RealVision™ transducer extension cable — **A80476**
- 8 m (26.2 ft) RealVision™ transducer extension cable — **A80477**
- 0.3 m (1 ft) RealVision™ 90-degree adapter cable — **A80515**
- Paired RealVision™ transducer Y-cable — **A80478**

DownVision™ / SideVision™ / CPT-S CHIRP conical beam transducer extension cable(s):

- 25-pin to 9-pin DownVision™ transducer adapter cable — **A80490**

CHIRP / Traditional transducer extension cable(s):

- 11-pin to 8-pin CP370-style transducer adapter cable — **A80496**
- 5 m (16.4 ft) traditional transducer extension cable — **E66010**
- 3 m (10 ft) CHIRP transducer extension cable — **A102148**
- 5 m (16.4 ft) CHIRP transducer extension cable — **A102150**
- 10 m (32.8 ft) CHIRP transducer extension cable — **A80327**
- Paired CHIRP transducer Y-cable — **A102146**
- Dual Speed and Temperature CHIRP transducer cable — **A80345**

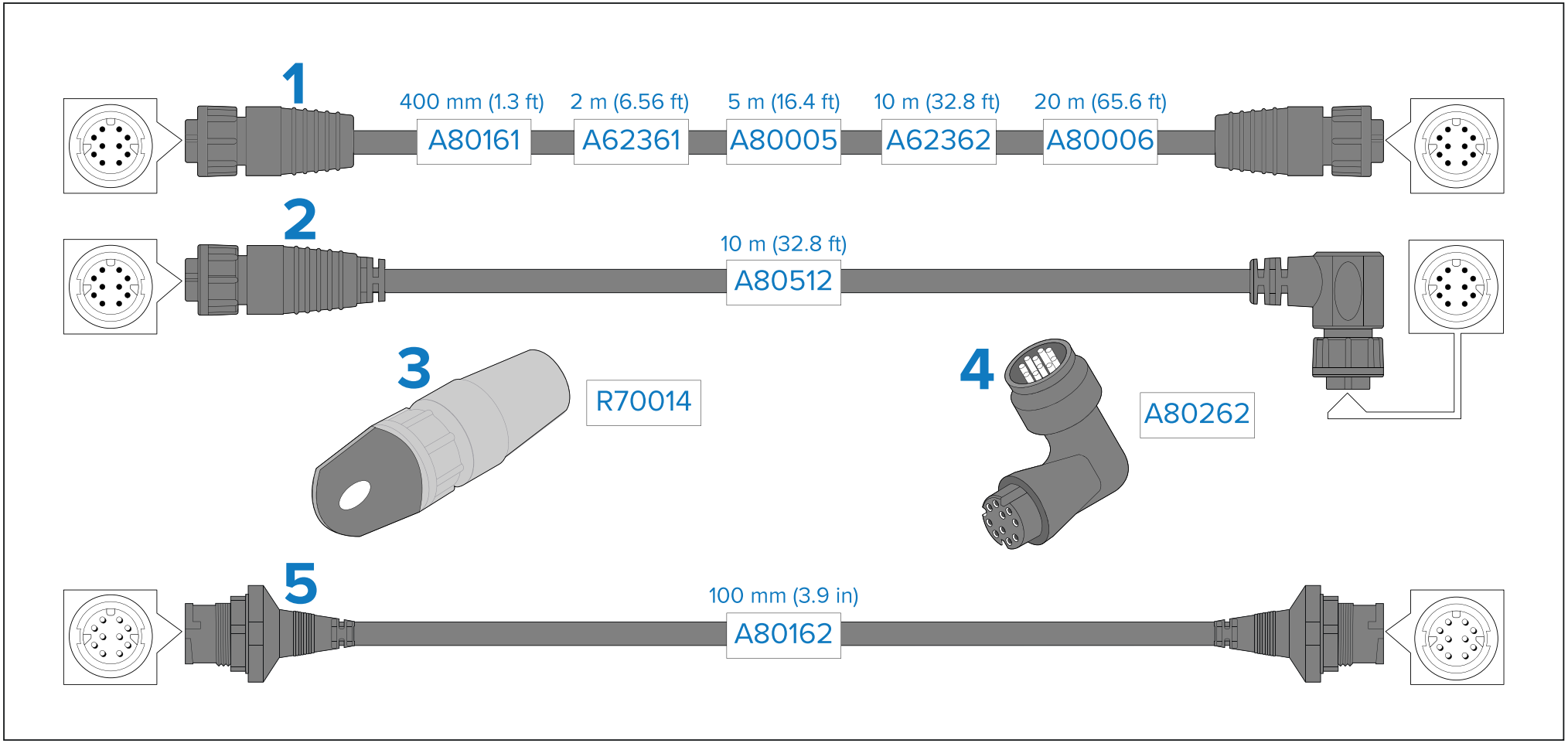
Operation cable(s):

- Single B75/B175 operation cable — **A80328**

Warning: Maximum transducer cable length

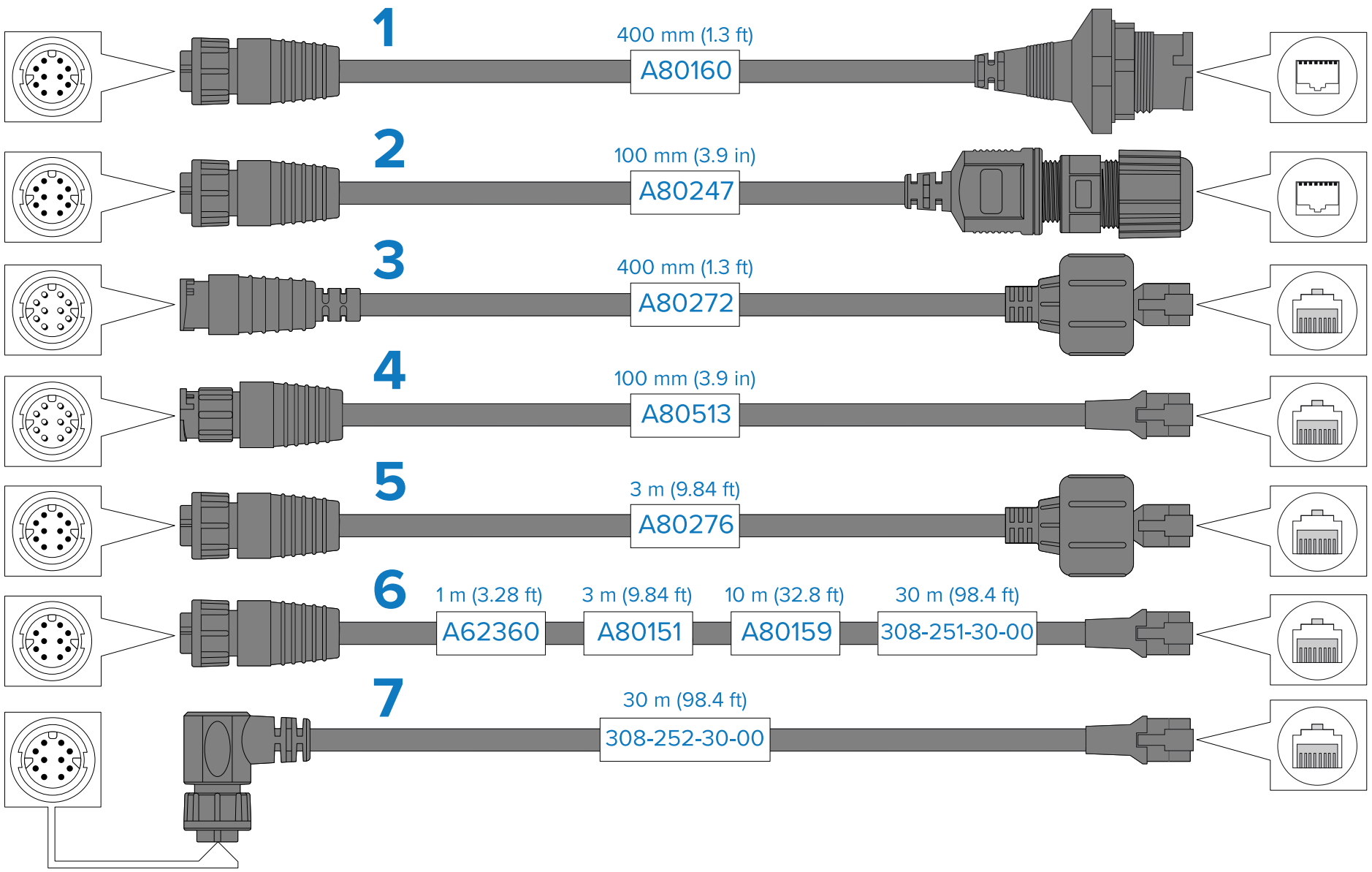
The maximum length of cable between a RealVision™ Max 3D transducer and a MFD/sonar module (including the transducer's captive cable) must NOT exceed 18 m (59 ft). Cable lengths greater than this may cause damage to the RealVision™ Max 3D transducer and MFD/sonar module.

18.3 RayNet to RayNet cables and connectors



1. Standard RayNet connection cable with a RayNet (female) socket on both ends.
2. Right-angle RayNet connection cable with a straight RayNet (female) socket on one end, and a right-angle RayNet (female) socket on the other end. Suitable for connecting at 90° (right angle) to a device, for installations where space is limited.
3. RayNet cable puller (5 pack).
4. RayNet to RayNet right-angle coupler / adapter. Suitable for connecting RayNet cables at 90° (right angle) to devices, for installations where space is limited.
5. Adapter cable with a RayNet (male) plug on both ends. Suitable for joining (female) RayNet cables together for longer cable runs.

18.4 RayNet to RJ45, and RJ45 (SeaTalkhs) adapter cables



1. Adapter cable with a RayNet (female) socket on one end, and a waterproof (female) RJ45 (SeaTalkhs ®) socket on the other end, accepting the following cables with an RJ45 (SeaTalkhs ®) waterproof locking (male) plug:
   - A62245 (1.5 m).
   - A62246 (15 m).
2. Adapter cable with a RayNet (female) socket on one end, and a waterproof (female) RJ45 (SeaTalkhs ®) socket on the other end, along with a locking gland for a watertight fit.
3. Adapter cable with a RayNet (male) plug on one end, and an RJ45 (SeaTalkhs ®) waterproof (male) plug on the other end.
4. Adapter cable with a RayNet (male) plug on one end, and an RJ45 (male) plug on the other end.
5. Adapter cable with a RayNet (female) socket on one end, and an RJ45 (SeaTalkhs ®) waterproof (male) plug on the other end.
6. Adapter cable with a RayNet (female) socket on one end, and an RJ45 (male) plug on the other end.
7. Adapter cable with a right-angled RayNet (female) socket on one end, and an RJ45 (male) plug on the other end.

Index

A

Accessories 75
  Network adapter cables 77
  Network cables 76
  RayNet cables 76
Anti-fouling 66
Applicable products 12

C

Cable
  Bend radius 39
  Protection 39
  Routing 39
  Security 39
  Strain relief 39
CHIRP
  DownVision™ overview 20
  RealVision™ 3D overview 19
  RealVision™ Max 3D overview 19
  SideVision™ overview 20
  Sonar overview 21
  Technology 18
Cleaning 66
Compass safe distance 35
Compatible MFDs 17
Connecting cables 40
Connection
  Extension cables 53
  Y cable 53
Connections 15, 40–41
  Battery 48
  Distribution panel 48
  Grounding 50
  Network 44
    Multifunction display 44
    Multifunction display (extended cables) 44
    Multiple multifunction display connections 45
  Overview 42
  Power 47
  Transducers 52
    CHIRP 55
    CHIRP conical beam 54
    DownVision™SideVision™ 54
    RealVision™ Max 3D / RealVision™ 3D 53
    Simultaneous RealVision™ and traditional transducer connections 56
    Split-pair RealVision™ Max 3D / RealVision™ 3D 53
    Traditional 55
  Typical system 15, 40
Contact details 69

D

Declaration of Conformity 9
Diagnostics 64, 70
  Exporting product information 64, 70
  Viewing product information 64, 70
Dimensions 25
Documentation
  Installation instructions 12
  Installation sheet 12
  Mounting template 12
  Operation instructions 12

E

Electromagnetic Compatibility 34
EMC, *See* Electromagnetic Compatibility

F

Fuse rating 23, 47
Fuse requirement 23

I

Ignition Protection 34
Installation
  Best practice 49
  Mounting 36–37

Interference 35
See also Compass safe distance

L

LightHouse 4
Compatible MFDs 17
Location requirements
General 34

M

Maintenance 9, 66
Mounting 36–37

N

Network
cables 77
Multifunction display 44
Multifunction display (extended cables) 44
Multiple multifunction display connections 45

O

Operation instructions
LightHouse 4 ..... 12, 58

P

Parts supplied 23
Power
Battery connection 48
Cable extension 49
Connections 47
Distribution 47
Distribution panel 48
Fuses 23
Grounding 49
Initial test 60
Sharing a breaker 48
Power cable extension 49
Product overview 14
Product recycling (WEEE) 9
Product support 69

R

RayNet
cables 76–77
Rear panel 42
Required additional components 15
RJ45
cables 77
Routine checks 66

S

SeaTalkhs
cables 77
Service Center 69
Servicing 9
Software updates 17
Sonar range 15, 72–73
Spares 75
Support forum 70
Suppression ferrites 35, 39
See also EMC
System diagram 15, 40–41

T

Technical specification 71
Conformance specification 73
Environmental specification 72
Physical specification 72
Power specification 72
Sonar specification 72
Technical support 69–70
Thermal breaker rating 23, 47
Tools required 37
Traditional sonar 18
Training courses 70
Transducers, compatibility 75

Troubleshooting 60, 64, 70
LED Diagnostics 60
Sonar 61
Typical system 15, 40

U

Upgrading, *See* Software updates

V

Ventilation 34

W

Warranty 9, 69
WEEE Directive 9

Raymarine (UK / EU)
Marine House, Cartwright Drive,
Fareham, Hampshire.
PO15 5RJ.
United Kingdom.

Tel: (+44) (0)1329 246 700

www.raymarine.co.uk

Raymarine (US)
110 Lowell Road,
Hudson, NH 03051.
United States of America.

Tel: (+1) 603-324-7900

www.raymarine.com

CE UKCA

Raymarine®