

Raymarine®



AXIOM+

Installation instructions

English (en-US)

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Software updates



Check the Raymarine website for the latest software releases for your product.
www.raymarine.com/software

Product documentation



The latest versions of all English and translated documents are available to download in PDF format from the website: www.raymarine.com/manuals.
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Chapter 1: Important information



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.

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.

Electronic chart data

Raymarine does not warrant the accuracy of such information, and is not responsible for damages or injuries caused by errors in chart data or information utilized by the product and supplied by third parties. Use of electronic charts provided by third parties is subject to the supplier's End-User License Agreement (EULA).

RF exposure

This equipment complies with FCC / ISED RF exposure limits for general population / uncontrolled exposure. The wireless LAN / Bluetooth antenna is mounted behind the front facia of the display. This equipment should be installed and operated with a minimum distance of 1 cm (0.39 in) between the device and the body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures.

Compliance Statement (Part 15.19)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

FCC Interference Statement (Part 15.105 (b))

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to

radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio / TV technician for help.

Innovation, Science and Economic Development Canada (ISED)

This device complies with License-exempt RSS standard(s).

Operation is subject to the following two conditions:

1. This device may not cause interference; and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

This Class B digital apparatus complies with Canadian ICES-003.

Innovation, Sciences et Développement économique Canada (Français)

Cet appareil est conforme aux normes d'exemption de licence RSS.

Son fonctionnement est soumis aux deux conditions suivantes:

1. cet appareil ne doit pas causer d'interférence, et
2. cet appareil doit accepter toute interférence, notamment les interférences qui peuvent affecter son fonctionnement.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Japanese approvals

In the frequency band used for this device, campus radio stations (radio stations that require a license) and specified low power radio stations (radio stations that do not require license) for mobile identification and amateur radio stations (radio stations that require license) used in industries such as microwave ovens, scientific, medical equipment devices and production line of other factories are also being operated.

1. Before using this device, please make sure that campus radio stations and specified low power radio stations for mobile identification and amateur radio stations are not being operated nearby.
2. In case there is any case of harmful interference to campus radio stations for mobile identification caused by this device, please immediately change the frequency used or stop the transmission of radio waves and then consult about the measures to avoid interference (for example, the installation of partitions) through the contact information below.
3. Besides, when in trouble, such as when there is any case of harmful interference to specified low power radio stations for mobile identification or amateur radio stations caused by this device, please consult through the following contact information.

Contact information: Please contact your local authorized Raymarine dealer.

MSIP Warning Statement for Radio Devices (Korea only)

- 제작자 및 설치자는 해당 무선설비가 전파혼신 가능성이 있으므로 안전 인명과 관련된
- 서비스는 할 수 없음을 사용자 설명서 등을 통하여 운전자 및 사용자에게 충분히 알릴 것

- 법에 의해 전 방향 전파 발사 및 동일한 정보를 동시에 여러 곳으로 송신하는 점-대-다지점 서비스에의 사용은 금지되어 있습니다.

Declaration of Conformity

FLIR Belgium BVBA declares that the products listed below are in compliance with the EMC Directive 2014/53/EU:

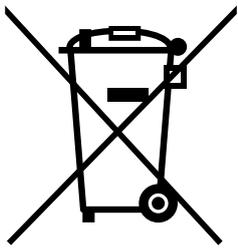
- Axiom™7+, part numbers E70634 and E70634–DISP
- Axiom™7+ RV, part numbers E70635, E70635–03 and E70635–DISP
- Axiom™9+, part numbers E70636 and E70636–DISP
- Axiom™9+ RV, part numbers E70637, E70637–03 and E70637–DISP
- Axiom™12+, part numbers E70638 and E70638–DISP
- Axiom™12+ RV, part numbers E70639, E70639–03 and E70639–DISP

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.

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.

Chapter 2: Document information

Chapter contents

- [2.1 Product documentation on page 14](#)
- [2.2 Applicable products on page 14](#)

2.1 Product documentation

The following documentation is applicable to your product:

All documents are available to download as PDFs from www.raymarine.com

Documentation

Description	Part number
Installation instructions (This document)	87414
Surface/Flush mounting template	<ul style="list-style-type: none">• 7" – 87295• 9" – 87296• 12" – 87297
Front installation kit Installation instructions	87304
Legacy MFD to Axiom adaptor plates installation instructions	87316
RCR-SDUSB Installation instructions	87317
LightHouse™ 3 Basic operation instructions	81369
LightHouse™ 3 Advanced operation instructions	81370

LightHouse™ 3 MFD Operation instructions

For operation instructions for your product please refer to the LightHouse™ 3 MFD Operation instructions.



The Basic (81369) and Advanced (81370) LightHouse™ 3 Operation Instructions can be downloaded from the Raymarine website: www.raymarine.com/manuals. Please check the website to ensure you have the latest documentation.

2.2 Applicable products

This document is applicable to the following products:

Axiom™ +



Axiom™ + Multifunction Displays

Product number	Name	Description
E70634	Axiom™ 7+	7" MFD Chartplotter.
E70634-DISP	Axiom™ 7+	7" MFD Chartplotter (supplied with Rear mount kit only).
E70635	Axiom™ 7+ RV 3D	7" MFD with built-in RealVision™ 3D sonar module.
E70635-03	Axiom™ 7+ RV 3D (including RV-100 transom transducer)	7" MFD with built-in RealVision™ 3D sonar module.
E70635-DISP	Axiom™ 7+ RV 3D	7" MFD with built-in RealVision™ 3D sonar module (supplied with Rear mount kit only).
E70636	Axiom™ 9+	9" MFD Chartplotter.
E70636-DISP	Axiom™ 9+	9" MFD Chartplotter (supplied with Rear mount kit only).
E70637	Axiom™ 9+ RV 3D	9" MFD with built-in RealVision™ 3D sonar module.
E70637-03	Axiom™ 9+ RV 3D (including RV-100 transom transducer)	9" MFD with built-in RealVision™ 3D sonar module.
E70637-DISP	Axiom™ 9+ RV 3D	9" MFD with built-in RealVision™ 3D sonar module (supplied with Rear mount kit only).
E70638	Axiom™ 12+	12" MFD Chartplotter.
E70638-DISP	Axiom™ 12+	12" MFD Chartplotter (supplied with Rear mount kit only).
E70639	Axiom™ 12+ RV 3D	12" MFD with built-in RealVision™ 3D sonar module.
E70639-03	Axiom™ 12+ RV 3D (including RV-100 transom transducer)	12" MFD with built-in RealVision™ 3D sonar module.
E70639-DISP	Axiom™ 12+ RV 3D	12" MFD with built-in RealVision™ 3D sonar module (supplied with Rear mount kit only).

Chapter 3: Compatible transducers

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- [3.1 Compatible transducers for Axiom™+ RV Multifunction displays on page 18](#)

3.1 Compatible transducers for Axiom™+ RV Multifunction displays

Axiom™+RV variant Multifunction Displays (MFDs) include a built-in sonar module and can be connected directly to compatible transducers using the 25-pin transducer connector on the rear of the display.

Compatible transducers:

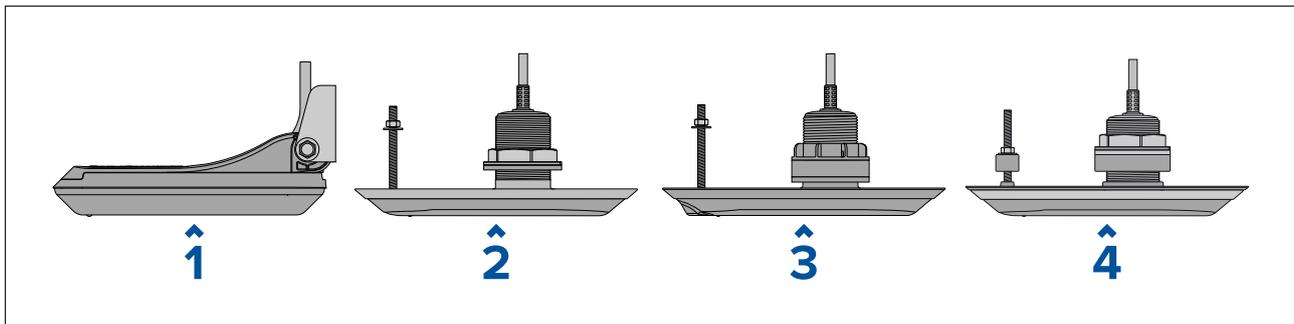
- RealVision™ 3D transducers
- DownVision™ transducers using available adaptor cables. Refer to [Chapter 14 Spares and accessories](#) for a list of available adaptor cables.
- CHIRP conical beam transducers using available adaptor cables. Refer to [Chapter 14 Spares and accessories](#) for a list of available adaptor cables.
- Non-CHIRP transducer can be connected using available adaptor cables. Refer to [Chapter 14 Spares and accessories](#) for a list of available adaptor cables. Refer to the Raymarine® website for compatible transducers: www.raymarine.com/transducers.

Note:

Chartplotter only variant Axiom™+ MFDs require a networked sonar module to enable sonar features.

RealVision transducers

The transducers listed below can be connected directly to RealVision™ 3D variant MFDs.

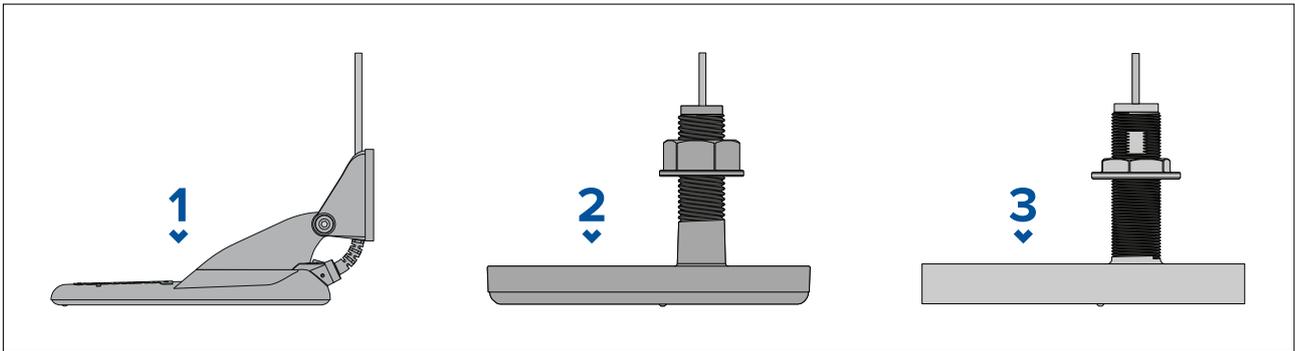


1	<ul style="list-style-type: none"> • RV-100 RealVision™ 3D plastic transom mount transducer (A80464)
2	<ul style="list-style-type: none"> • RV-200 RealVision™ 3D bronze 0° thru-hull all-in-one transducer (A80465) • RV-212P and RV-212S RealVision™ 3D bronze 12° thru-hull split-pair transducers (T70318) <ul style="list-style-type: none"> – RV-212P port transducer (A80466) – RV-212S starboard transducer (A80467) • RV-220P and RV-220S RealVision™ 3D bronze 20° thru-hull split-pair transducers (T70319) <ul style="list-style-type: none"> – RV-220P port transducer (A80468) – RV-220S starboard transducer (A80469)
3	<ul style="list-style-type: none"> • RV-300 RealVision™ 3D plastic 0° thru-hull all-in-one transducer (A80470) • RV-312P and RV-312S RealVision™ 3D plastic 12° thru-hull split-pair transducers (T70320) <ul style="list-style-type: none"> – RV-312P port transducer (A80471) – RV-312S starboard transducer (A80472) • RV-320P and RV-320S RealVision™ 3D plastic 20° thru-hull split-pair transducers (T70321) <ul style="list-style-type: none"> – RV-320P port transducer (A80473)

	<ul style="list-style-type: none"> – RV-320S starboard transducer (A80474)
4	<ul style="list-style-type: none"> • RV-400 RealVision™ 3D stainless steel 0° thru-hull all-in-one transducer (A80615) • RV-412P and RV-412S RealVision™ 3D stainless steel 12° thru-hull split-pair transducers (T70450) <ul style="list-style-type: none"> – RV-412P port transducer (A80616) – RV-412S starboard transducer (A80617) • RV-420P and RV-420S RealVision™ 3D stainless steel 20° thru-hull split-pair transducer (T70451) <ul style="list-style-type: none"> – RV-420P port transducer (A80618) – RV-420S starboard transducer (A80619)

DownVision™ transducers

The DownVision™ transducers shown below can be connected using adaptor cable A80490.



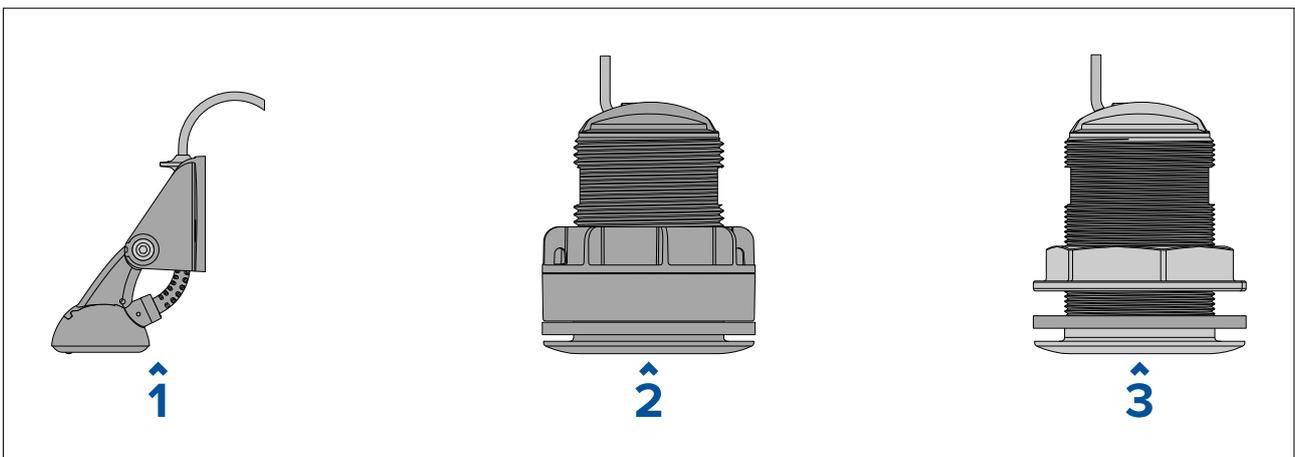
1	CPT-100DVS plastic transom mount transducer (A80351) (replaces CPT-100 A80270)
2	CPT-110 plastic thru-hull transducer (A80277)
3	CPT-120 bronze thru-hull transducer (A80271)

CHIRP conical beam transducers (using DownVision™ type connector)

The transducers shown below can be connected using adaptor cable A80490.

CPT-S transducers use CHIRP sonar technology to produce a conical-shaped sonar beam.

Note: CPT-S transducers do NOT offer DownVision™ or RealVision™ channels.



1	<ul style="list-style-type: none"> • CPT-S plastic transom transducer (E70342)
2	<ul style="list-style-type: none"> • CPT-S plastic thru-hull 0° angled element (E70339) • CPT-S plastic thru-hull 12° angled element (A80448) • CPT-S plastic thru-hull 20° angled element (A80447)
3	<ul style="list-style-type: none"> • CPT-S bronze thru-hull 0° angled element (A80446) • CPT-S bronze thru-hull 12° angled element (E70340) • CPT-S bronze thru-hull 20° angled element (E70341)

Chapter 4: Parts supplied

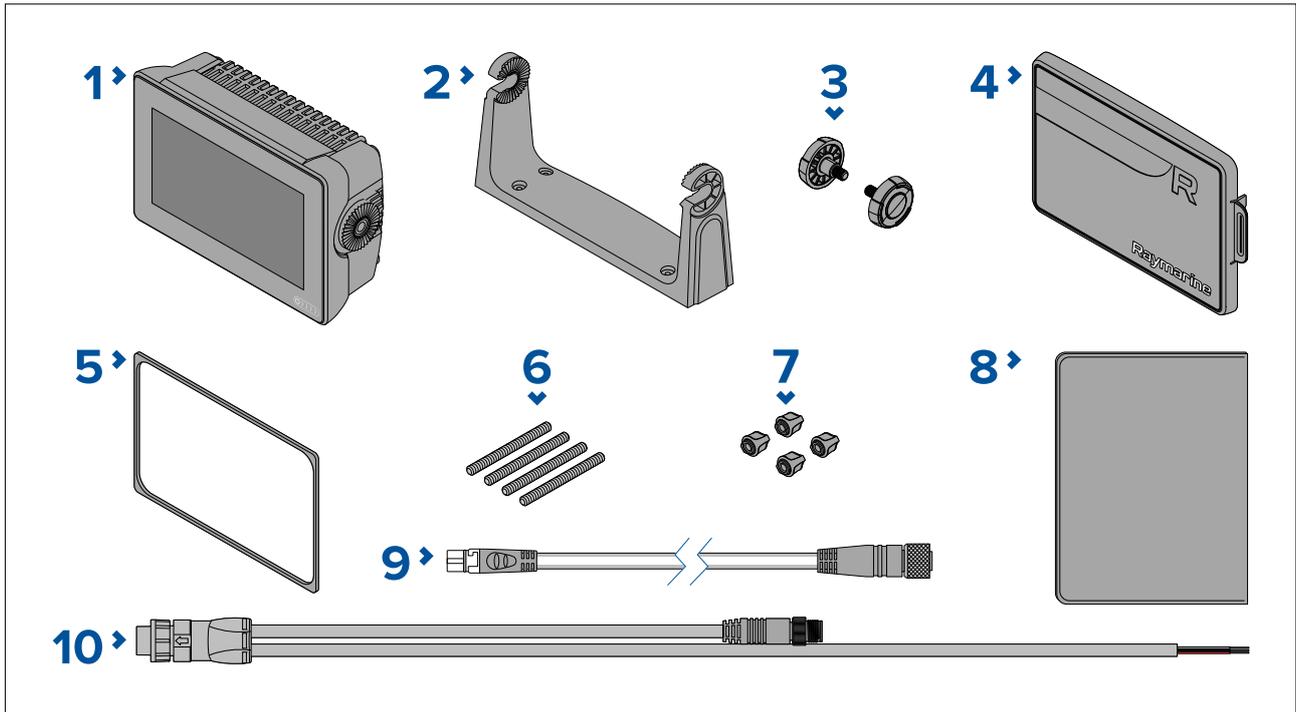
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- 4.2 Parts Supplied - Axiom™ 7+ (DISP) on page 22
- 4.3 Parts supplied - Axiom™ 9+ and Axiom™ 12+ on page 23
- 4.4 Parts supplied - Axiom™ 9+ (DISP) and Axiom™ 12+ (DISP) on page 24

4.1 Parts supplied - Axiom™ 7+

The parts listed are supplied with the following product numbers: E70634 and E70635.

Unpack your product carefully to prevent damage or loss of parts. Check the box contents against the list below. Retain the packaging and documentation for future reference.

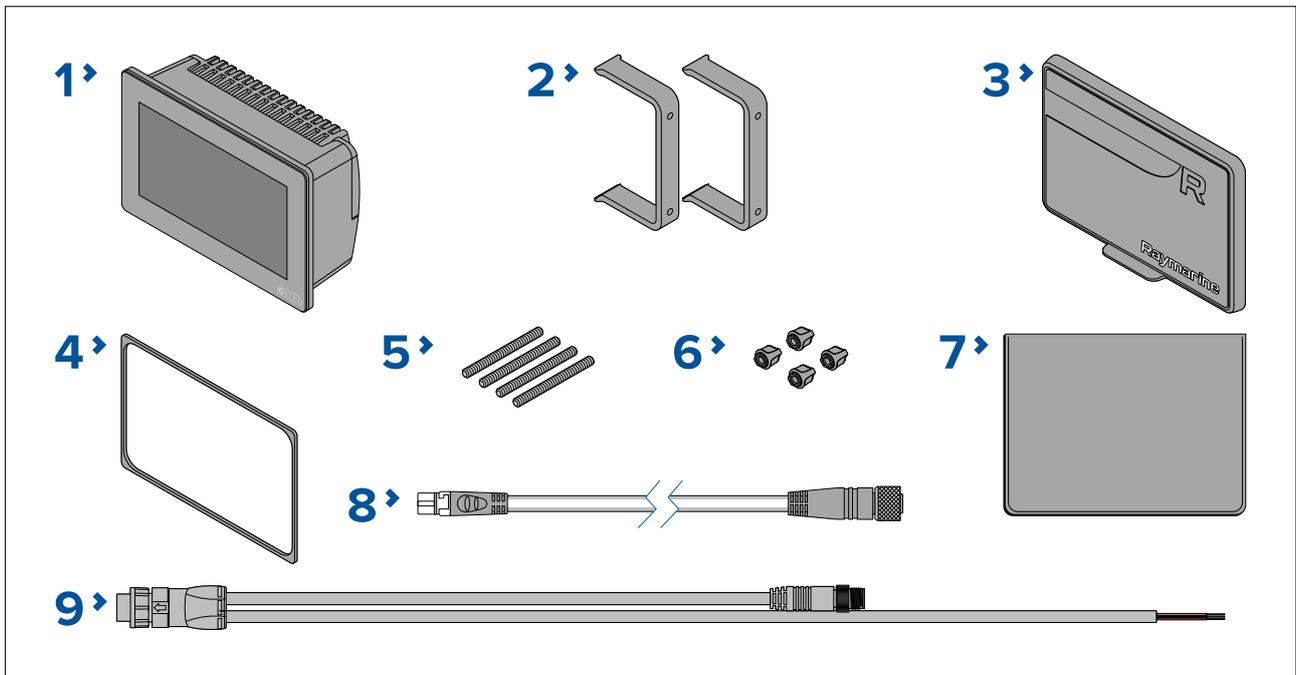


1. MFD (supplied with Trunnion adaptor fitted)
 2. Trunnion bracket
 3. Trunnion knobs x 2
 4. Suncover — Trunnion mount
 5. Panel mount gasket for surface/flush mounting
 6. M5x58 Threaded studs x 4
 7. M5 Thumb nuts x 4
 8. Documentation pack
 9. DeviceNet to SeaTalkng® adaptor cable 120 mm (4.7 in)
 10. Power/NMEA 2000 cable (with 1.5 m (4.92 ft) power lead and 0.5 m (1.64 ft) NMEA 2000 lead).
- E70635–03 is also supplied with a RealVision™ 3D RV-100 transducer and associated fittings.

4.2 Parts Supplied - Axiom™ 7+ (DISP)

The parts listed are supplied with the following product numbers: E70634–DISP and E70635–DISP.

Unpack your product carefully to prevent damage or loss of parts. Check the box contents against the list below. Retain the packaging and documentation for future reference.

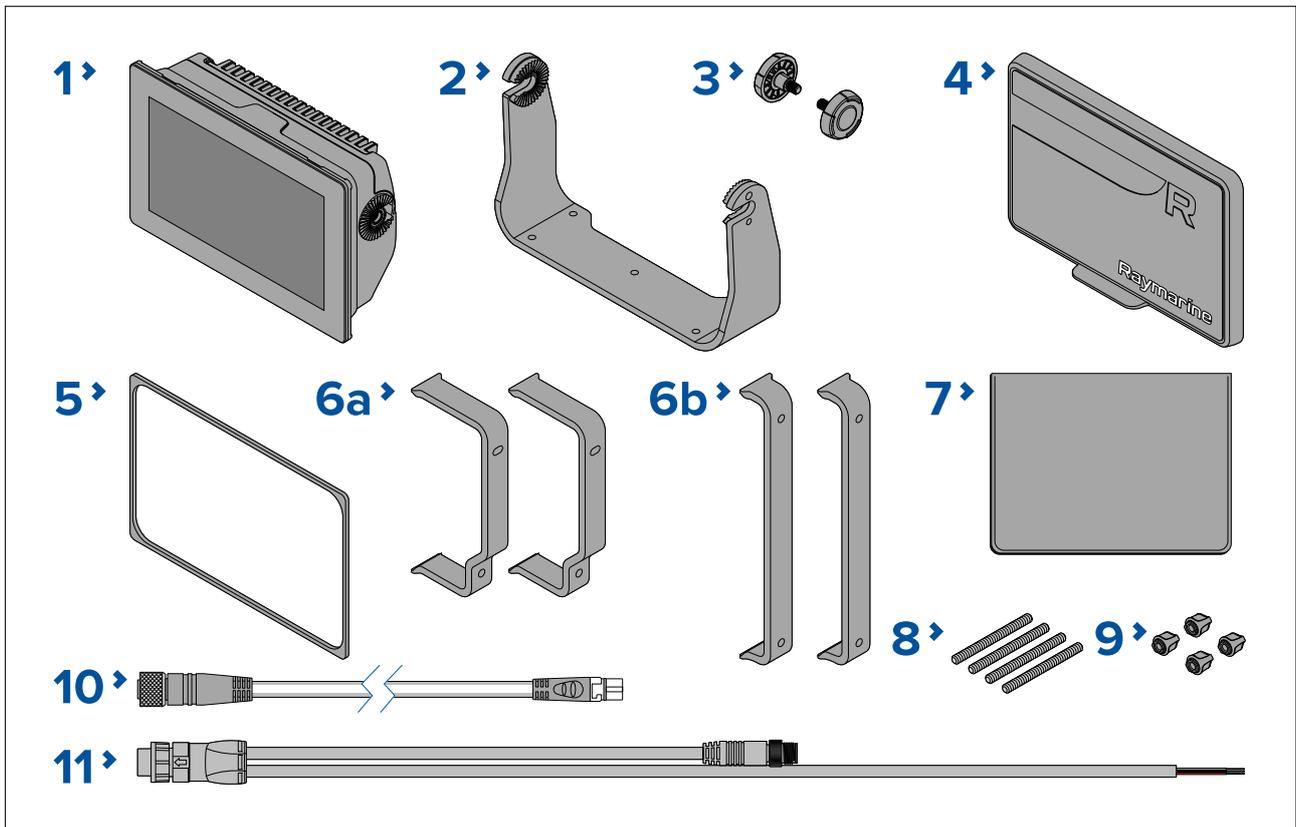


1. MFD
2. Rear mount brackets x 2
3. Suncover — Surface mount
4. Panel mount gasket for surface/flush mounting
5. M5x58 Threaded studs x 4
6. M5 Thumb nuts x 4
7. Documentation pack
8. DeviceNet to SeaTalkng[®] adaptor cable 120 mm (4.7 in)
9. Power/NMEA 2000 cable (with 1.5 m (4.92 ft) power lead and 0.5 m (1.64 ft) NMEA 2000 lead).

4.3 Parts supplied - Axiom[™] 9+ and Axiom[™] 12+

The parts listed are supplied with the following product numbers: E70636, E70637, E70638 and E70639.

Unpack your product carefully to prevent damage or loss of parts. Check the box contents against the list below. Retain the packaging and documentation for future reference.



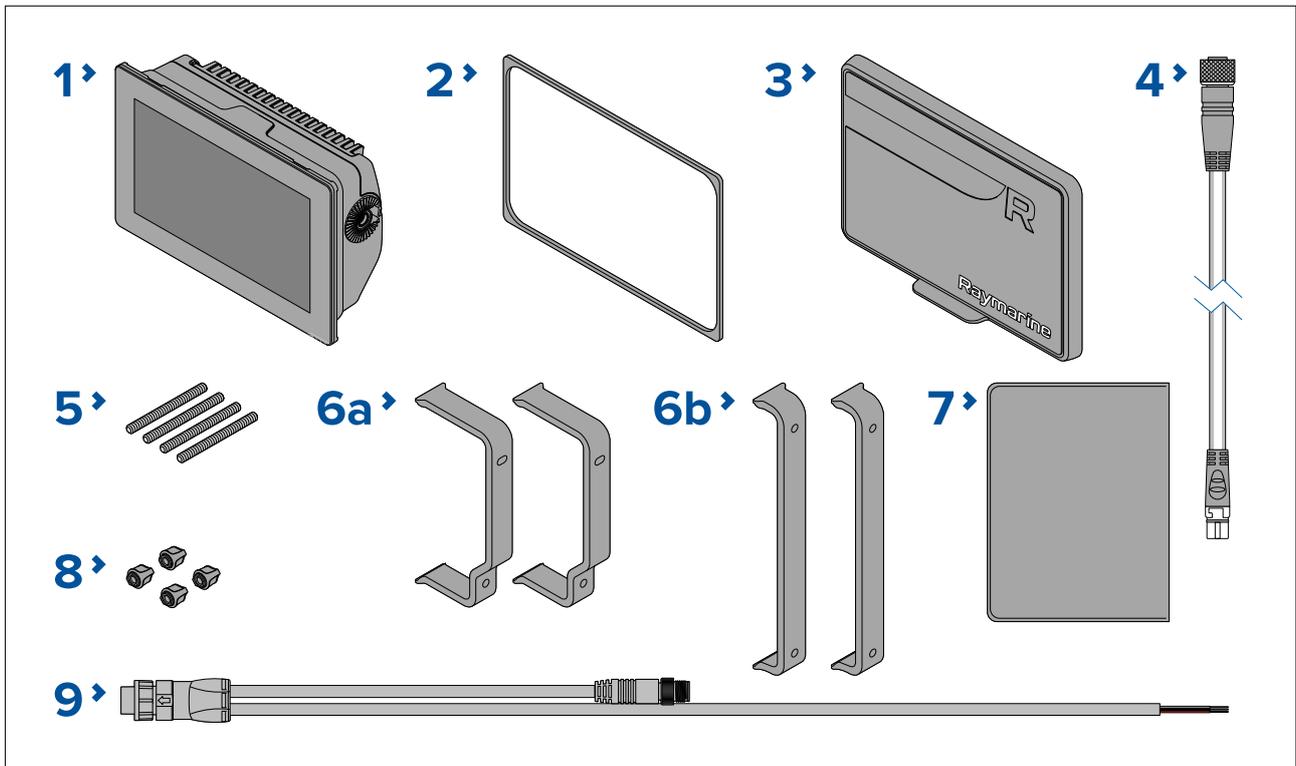
1. MFD
2. Trunnion bracket
3. Trunnion knobs x 2
4. Suncover
5. Panel mount gasket for surface/flush mounting
6. Rear mounting brackets:
 - a. supplied with 9" MFD
 - b. supplied with 12" MFD
7. Documentation pack
8. M5x58 Threaded studs x 4
9. M5 Thumb nuts x 4
10. DeviceNet to SeaTalkng[®] adaptor cable 120 mm (4.7 in)
11. Power/NMEA 2000 cable (with 1.5 m (4.92 ft) power lead and 0.5 m (1.64 ft) NMEA 2000 lead).

E70637-03 is also supplied with a RealVision™ 3D RV-100 transducer and associated fittings.
 E70639-03 is also supplied with a RealVision™ 3D RV-100 transducer and associated fittings.

4.4 Parts supplied - Axiom™ 9+ (DISP) and Axiom™ 12+ (DISP)

The parts listed are supplied with the following product numbers: E70636-DISP, E70637-DISP, E70638-DISP and E70639-DISP.

Unpack your product carefully to prevent damage or loss of parts. Check the box contents against the list below. Retain the packaging and documentation for future reference.



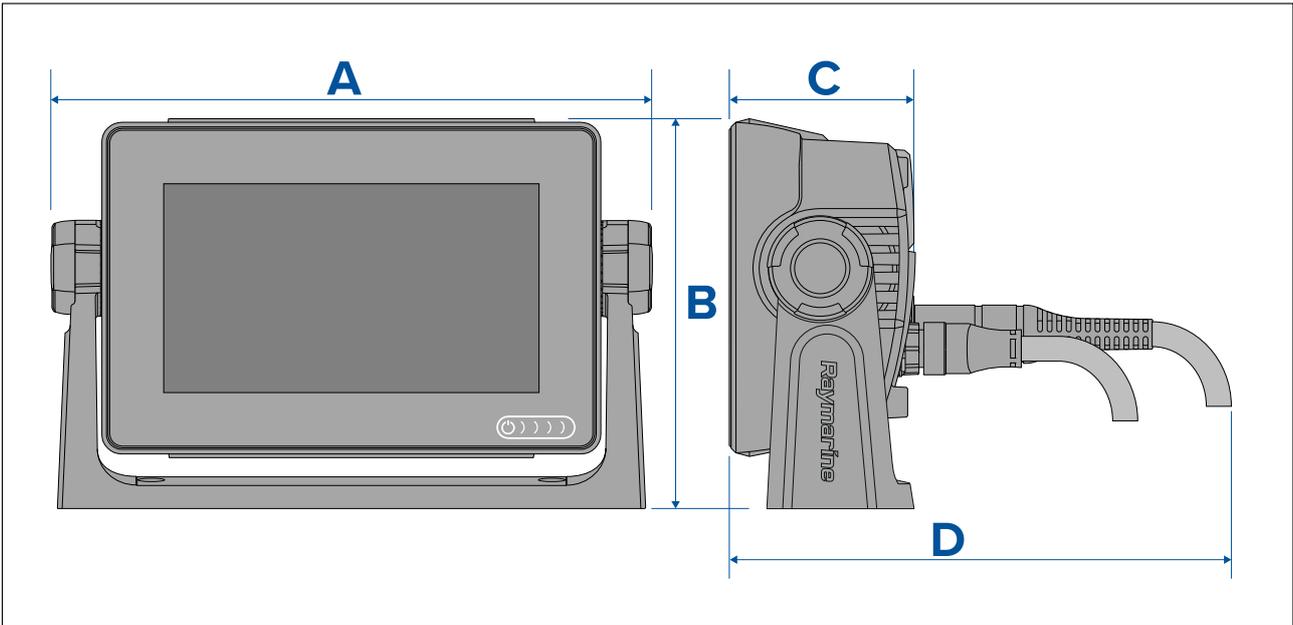
1. MFD
2. Panel mount gasket for surface/flush mounting
3. Suncover
4. DeviceNet to SeaTalkng[®] adaptor cable 120 mm (4.7 in)
5. M5x58 Threaded studs x 4
6. Rear mounting brackets:
 - a. supplied with 9" MFD
 - b. supplied with 12" MFD
7. Documentation pack
8. M5 Thumb nuts x 4
9. Power/NMEA 2000 cable (with 1.5 m (4.92 ft) power lead and 0.5 m (1.64 ft) NMEA 2000 lead).

Chapter 5: Product dimensions

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- [5.4 Axiom 9 and 12 surface and flush mount dimensions on page 30](#)

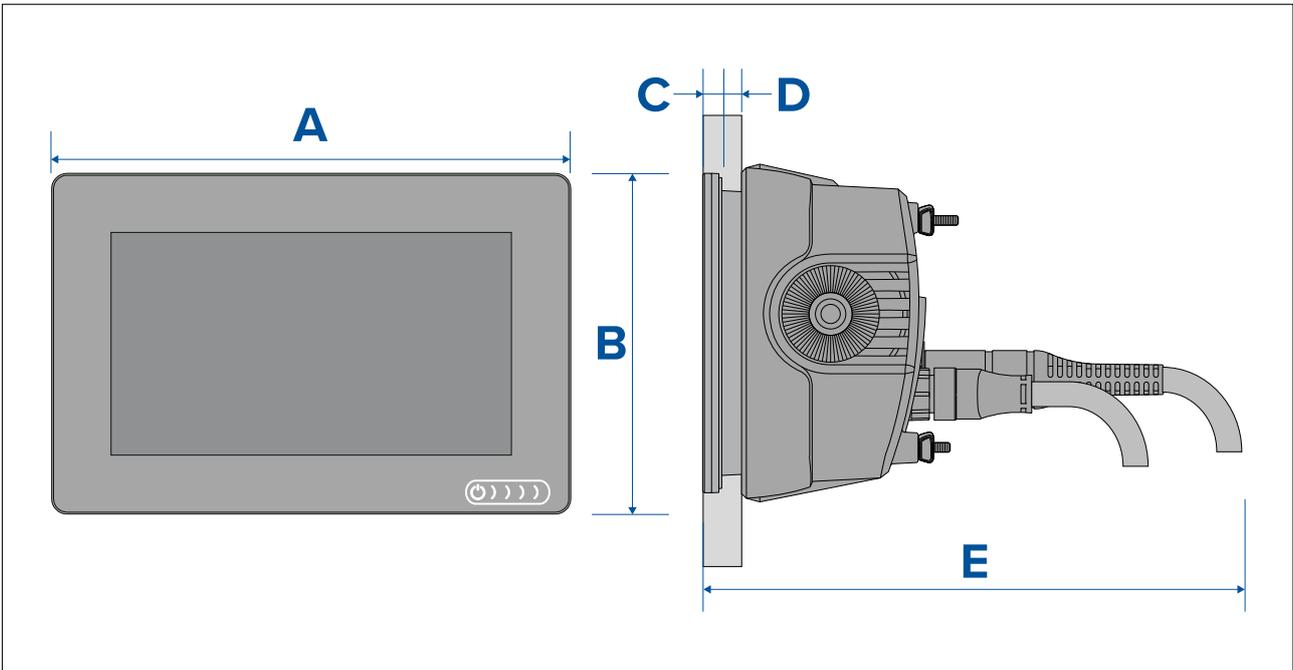
5.1 Axiom 7 trunnion mount dimensions



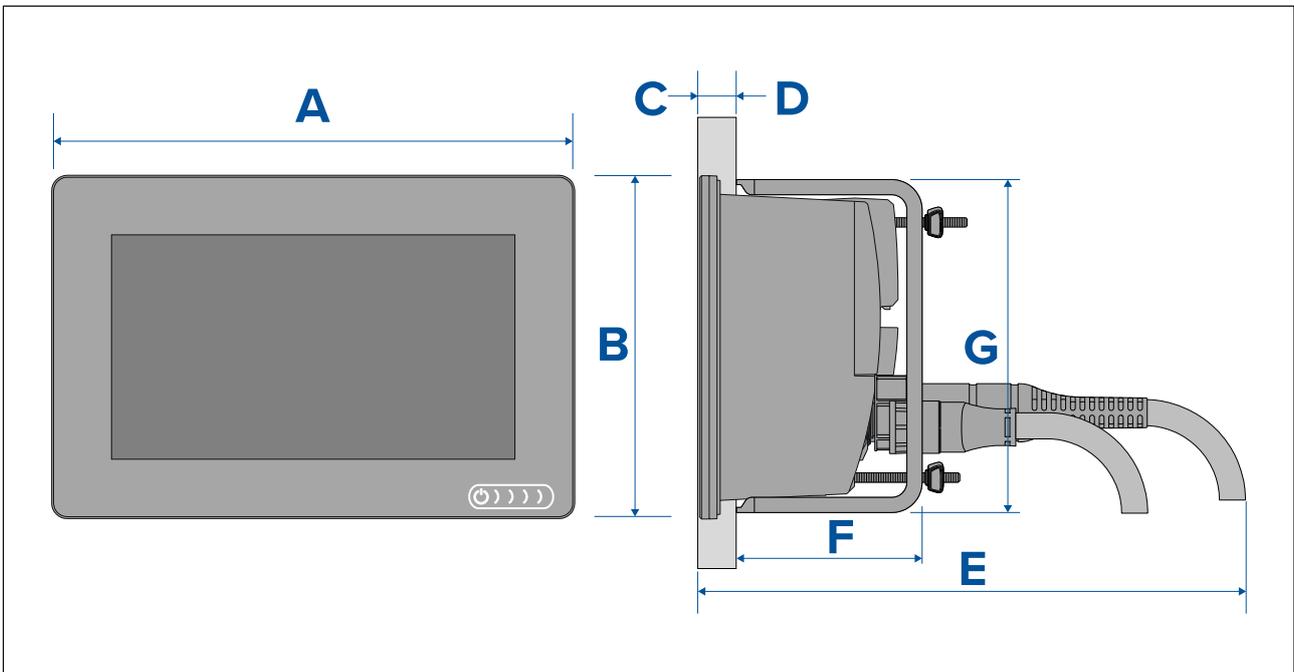
A	250.4 mm (9.86 in)
B	162.5 mm (6.4 in)
C	76.4 mm (3 in)
D	<ul style="list-style-type: none"> • Straight connectors = 218 mm (8.58 in) • Right-angled connectors = 198 mm (7.79 in)

5.2 Axiom 7 surface and flush mount dimensions

Using adaptor bracket

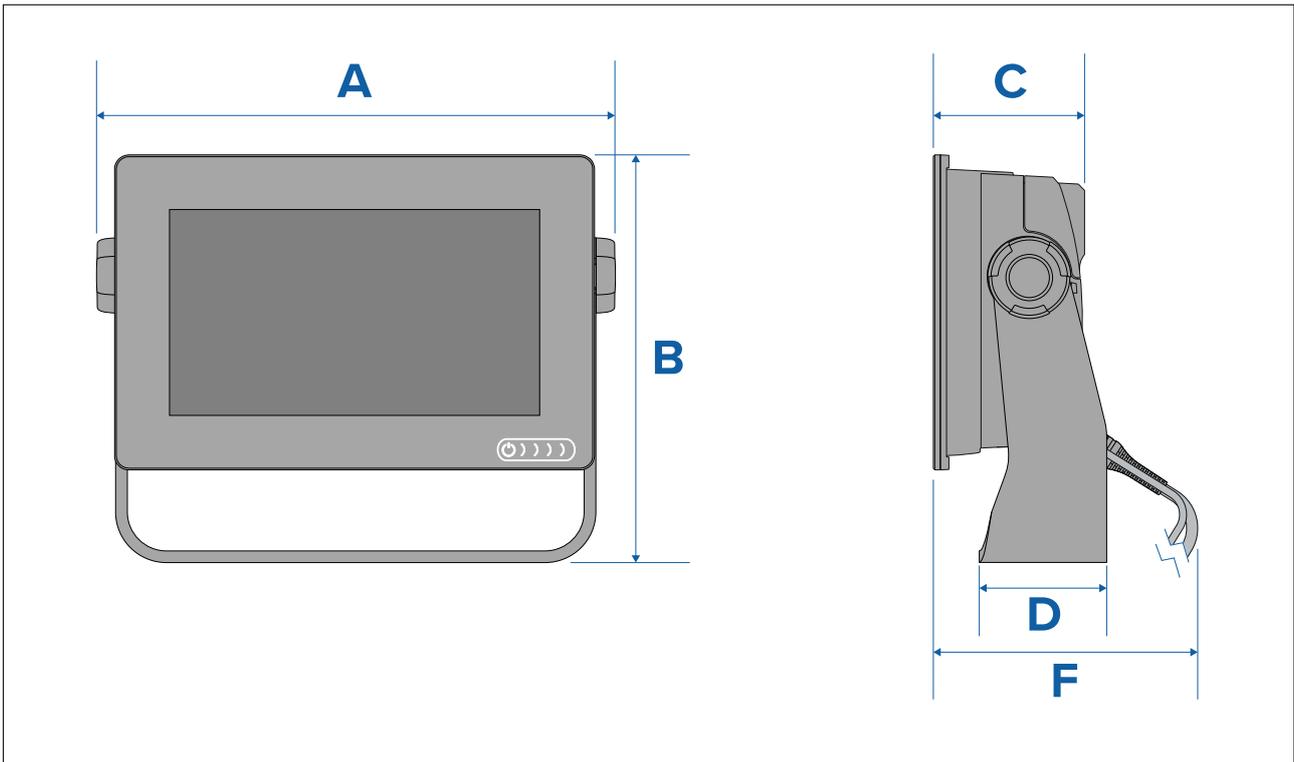


Using Rear mount kit



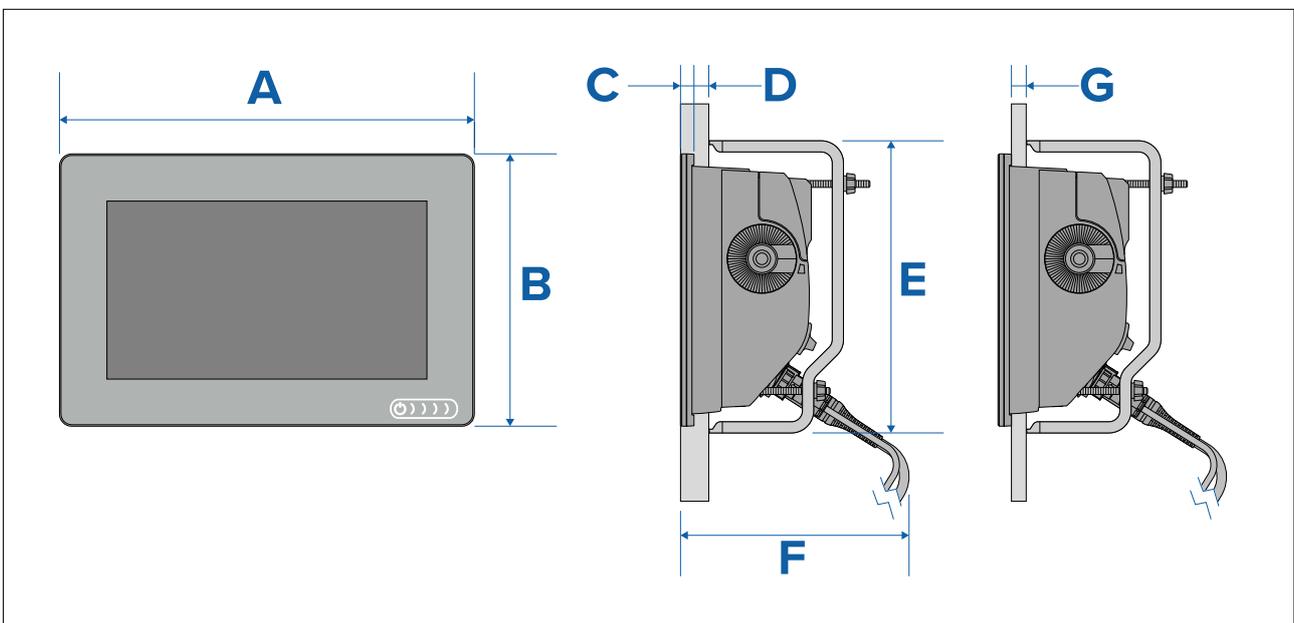
A	201.1 mm (7.92 in)
B	133 mm (5.24 in)
C	8 mm (0.32 in)
D	<ul style="list-style-type: none"> • Surface mounting = 19.05 mm (0.75 in) Maximum • Flush mounting = 27.05 mm (1.06 in) Maximum
E	<ul style="list-style-type: none"> • Straight connectors = 218 mm (8.58 in) • Right-angled connectors = 198 mm (7.79 in)
F	73 mm (2.87 in)
G	132 mm (5.2 in)

5.3 Axiom 9 and 12 trunnion mount dimensions



	Axiom™ 9	Axiom™ 12
A	265.03 mm (10.43 in)	314 mm (12.36 in)
B	187.81 (7.39 in)	226.72 mm (8.93 in)
C	76.71 mm (3.02 in)	76.2 mm (3 in)
D	65 mm (2.56 in)	65 mm (2.56 in)
E	<ul style="list-style-type: none"> • Straight connectors = 178 mm (7.01 in) • Right-angled connectors = 158 mm (6.22 in) 	<ul style="list-style-type: none"> • Straight connectors = 178 mm (7.01 in) • Right-angled connectors = 158 mm (6.22 in)

5.4 Axiom 9 and 12 surface and flush mount dimensions



	Axiom™ 9	Axiom™ 12
A	244.08 mm (9.64 in)	314 mm (12.36 in)
B	157.78 mm (6.21 in)	217 mm (8.54 in)
C	8 mm (0.31 in)	
D	27.05 mm (1.06 in) Maximum	
E	157 mm 6.18 in)	222 mm (8.74 in)
F	178 mm (7.01 in)	
G	19.05 mm (0.75 in) Maximum	

Note:

The rear mount brackets shown in the illustration are supplied with the Axiom™ 9, The brackets supplied with the Axiom™ 12 look different.

Chapter 6: Location requirements

Chapter contents

- 6.1 Product weight on page 34
- 6.2 Switch off power supply on page 34
- 6.3 Potential ignition source on page 34
- 6.4 General location requirements on page 34
- 6.5 EMC installation guidelines on page 34
- 6.6 RF interference on page 35
- 6.7 Compass safe distance on page 35
- 6.8 GNSS (GPS) location requirements on page 35
- 6.9 Touchscreen location requirements on page 37
- 6.10 Wireless location requirements on page 37
- 6.11 Viewing angle considerations on page 37

6.1 Product weight

Short desc is not printed, but is used in searches

- Refer to the technical specification for your product to ensure the intended mounting surface is suitable to bear its weight.
- 2 people may be required for installation of larger / heavier products.

6.2 Switch off power supply

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

6.3 Potential ignition source

This product is NOT approved for use in hazardous/flammable atmospheres. Do NOT install in a hazardous/flammable atmosphere (such as in an engine room or near fuel tanks).

6.4 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.

6.5 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.

6.6 RF interference

Certain third-party external electrical equipment can cause Radio Frequency (RF) interference with GNSS (GPS), AIS or VHF devices, if the external equipment is not adequately insulated and emits excessive levels of electromagnetic interference (EMI).

Some common examples of such external equipment include LED lighting (e.g.: navigation lights, searchlights and floodlights, interior and exterior lights) and terrestrial TV tuners.

To minimize interference from such equipment:

- Keep it as far away from GNSS (GPS), AIS or VHF products and their antennas as possible.
- Ensure that any power cables for external equipment are not entangled with the power or data cables for these devices.
- Consider fitting one or more high frequency suppression ferrites to the EMI-emitting device. The ferrite(s) should be rated to be effective in the range 100 MHz to 2.5 GHz, and should be fitted to the power cable and any other cables exiting the EMI-emitting device, as close as possible to the position where the cable exits the device.

6.7 Compass safe distance

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

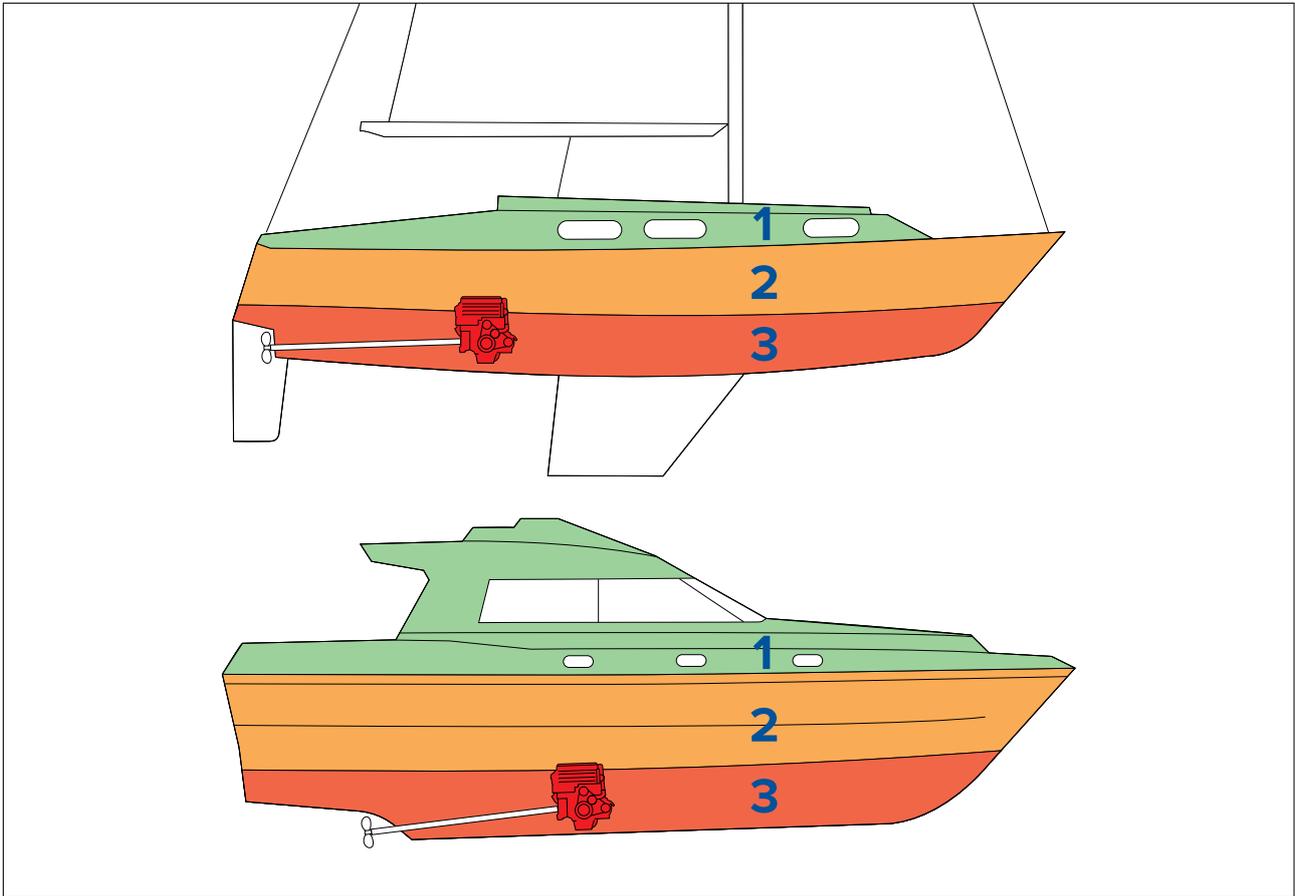
When choosing a suitable location for the product you should aim to maintain the maximum possible distance from any compasses. Typically this distance should be at least 1 m (3.3 ft) in all directions. However for some smaller vessels it may not be possible to locate the product this far away from a 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.

6.8 GNSS (GPS) location requirements

In addition to general guidelines concerning the location of marine electronics, there are a number of environmental factors to consider when installing equipment with an internal GNSS receiver.

Mounting location

- Above Decks (e.g. open air) mounting: Provides optimal performance. (For equipment with appropriate waterproof rating.)
- Below Decks (e.g. enclosed space) mounting: Performance may be less effective and may require an external antenna or receiver mounted above decks.



1		This location provides optimal performance (above decks).
2		In this location, performance may be less effective.
3		This location is NOT recommended.

Vessel construction

The construction of your vessel can have an impact on performance. For example, the proximity of heavy structures such as a structural bulkhead, or the interior of larger vessels may result in a reduced signal. The construction materials can also have an impact. In particular, steel, aluminium or carbon surfaces can impact performance. Before locating equipment with an internal antenna below decks, or on a steel, aluminium or carbon construction vessel or surface, seek professional assistance.

Prevailing conditions

The weather and location of the vessel can affect performance. Typically calm clear conditions provide a more accurate position fix. Vessels at extreme northerly or southerly latitudes may also receive a weaker signal. An antenna mounted below decks will be more susceptible to performance issues related to the prevailing conditions.

6.9 Touchscreen location requirements

Note:

Touchscreen performance can be affected by the installation environment, specifically Touchscreen displays installed above decks, where it will be open to the elements may exhibit the following:

- Hot Touchscreen temperature — If the display is mounted where it will be exposed to prolonged periods of direct sunlight, the touchscreen may become hot.
- Erroneous Touchscreen performance — Exposure to prolonged rain and / or water wash over may cause the display to respond to 'false touches', caused by the rain/water hitting the screen.

If, due to the required installation location, exposure to these elements is anticipated then it is recommended that you consider:

- Installing a remote keypad such as the RMK-10 and operating the display remotely — Touch-only displays.
- Locking the Touchscreen and using the physical buttons instead — HybridTouch displays.
- Attaching a third-party 'display hood accessory' to reduce direct sunlight exposure and the volume of water that the display is exposed to.

6.10 Wireless location requirements

A number of factors can influence wireless performance. It is important to ensure you test the connection performance at the desired location before installing wireless-enabled products.

Distance

The distance between wireless products should always be kept to a minimum. Do not exceed the maximum stated range of your wireless product (maximum range will vary for each device).

Wireless performance degrades over distance, so products farther away will receive less network bandwidth. Products installed close to their maximum wireless range may experience slow connection speeds, signal dropouts, or not being able to connect at all.

Line of sight

For best results the wireless product should have a clear, direct line of sight to the product it will be connected to. Any physical obstructions can degrade or even block the wireless signal.

The construction of your vessel can also have an impact on wireless performance. For example, metal structural bulkheads and roofing will reduce — and in certain situations — block the wireless signal.

If the wireless signal passes through a bulkhead containing power cables this can also degrade wireless performance.

Reflective surfaces such as metal surfaces, some types of glass and even mirrors can drastically affect performance or even block the wireless signal.

Interference and other equipment

Wireless products should be installed at least 1m (3 ft) away from:

- Other wireless-enabled products.
- Transmitting products that send wireless signals in the same frequency range.
- Other electrical, electronic or electromagnetic equipment that may generate interference.

Interference from other people's wireless devices can also cause interference with your products. You can use a third-party wireless analyzer tool / smartphone app to assess the best wireless channel to use (e.g. a channel not in use or one used by the least number of devices).

6.11 Viewing angle considerations

As display contrast and color are affected by the viewing angle, It is recommended that you temporarily power up the display, prior to installation, to enable you to best judge which location provides the optimum viewing angle.

For the viewing angles for your product refer to [p.83 — Technical specification](#)

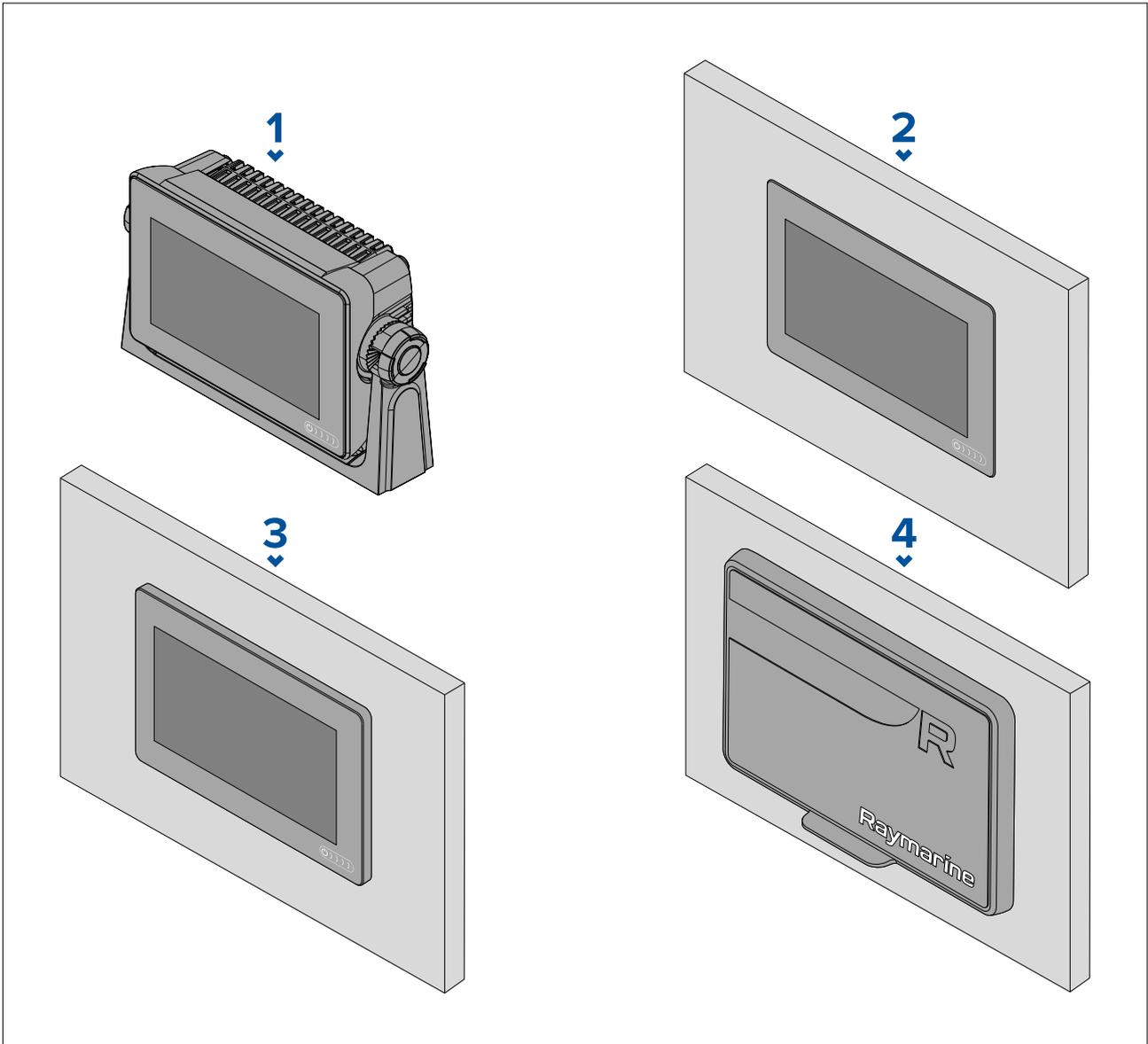
Chapter 7: Installation

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- 7.1 Mounting options on page 40
- 7.2 Bracket (Trunnion) mounting on page 40
- 7.3 Axiom 7 flush and surface mounting on page 42
- 7.4 Surface or flush mounting using the Rear Mount Kit on page 44

7.1 Mounting options

Your product can be mounted in various ways to suit any installation requirements.



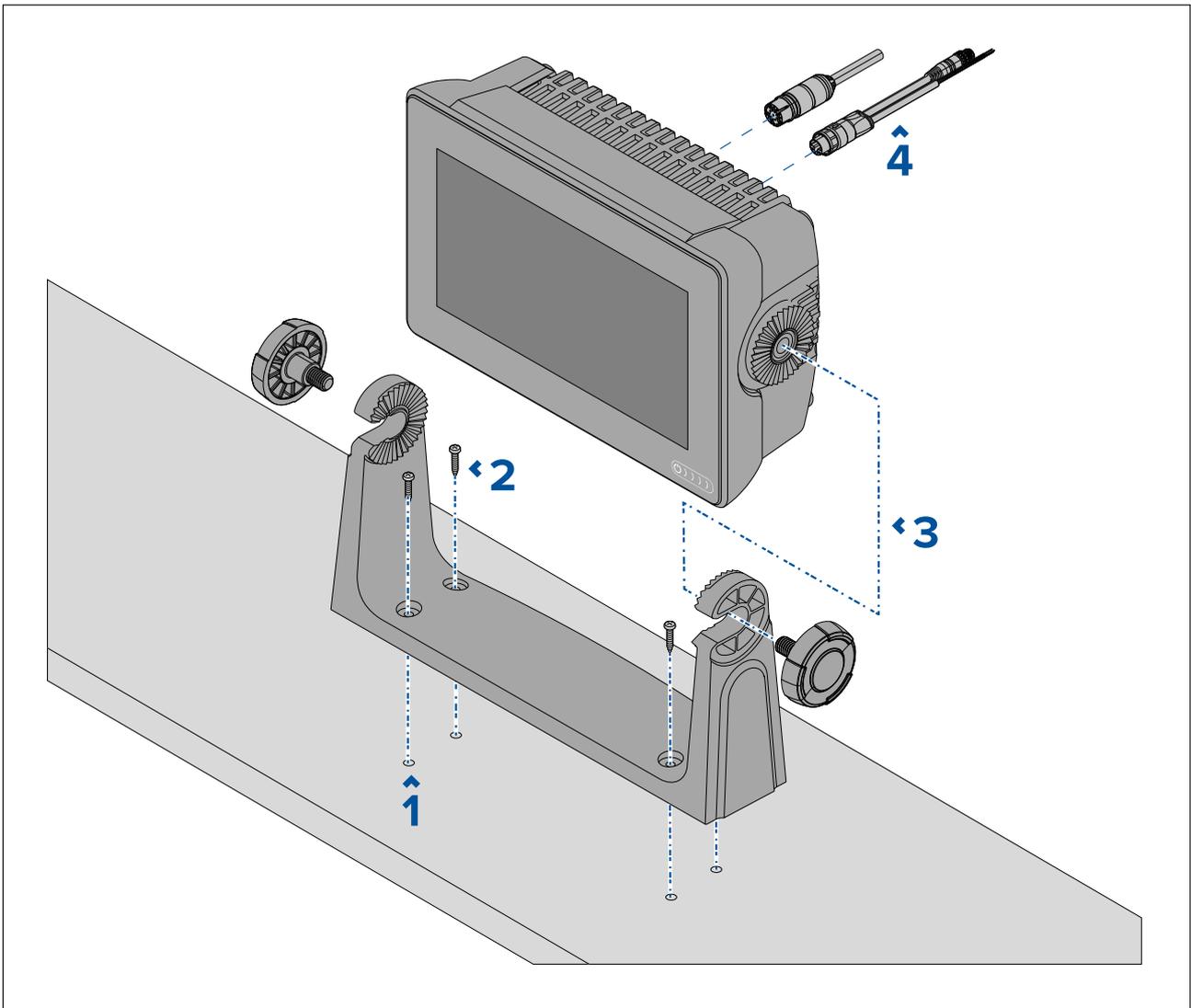
1. Trunnion mount
2. Flush mount (Mounting surface and MFD screen a level)
3. Surface mount (MFD screen protrudes slightly from mounting surface)
4. Front mount (using the Front Installation Kit accessory: 7": A80498, 9": A80500, 12": A80502)

Legacy MFD adaptor plates are also available to enable you to easily swap out older MFDs for new Axiom MFDs, please refer to [Chapter 14 Spares and accessories](#) for a list of available adaptors.

7.2 Bracket (Trunnion) mounting

The bracket can be used to mount your MFD on a horizontal surface, the bracket can also be used to mount the MFD in an above head installation.

Ensure you have chosen a suitable mounting location for your MFD, with sufficient head room to allow the MFD's angle to be adjusted or the MFD to be removed if necessary. If installing 'above head' take extra care to ensure the knobs are tightened sufficiently to prevent them coming undone due to vibration when underway.



Note: The illustration depicts an Axiom™ 7 being mounted on a plastic trunnion bracket. The trunnion bracket supplied with the Axiom™ 9 and Axiom™ 12 are made from metal and so look different than the trunnion shown. A metal trunnion bracket is also available for the Axiom™ 7 as an accessory; Part number: R70524.

1. Using the Bracket as a template, Mark and drill 4 x pilot holes on the mounting surface.
2. Use self tapping screws to secure the trunnion bracket to the mounting surface.

If the mounting surface is too thin for the screws provided, use stainless steel machine screws, washers and locking nuts, alternatively reinforce the rear of the mounting surface.

3. Using the bracket knobs, secure the MFD to the Bracket, ensuring the ratchet teeth are correctly engaged.

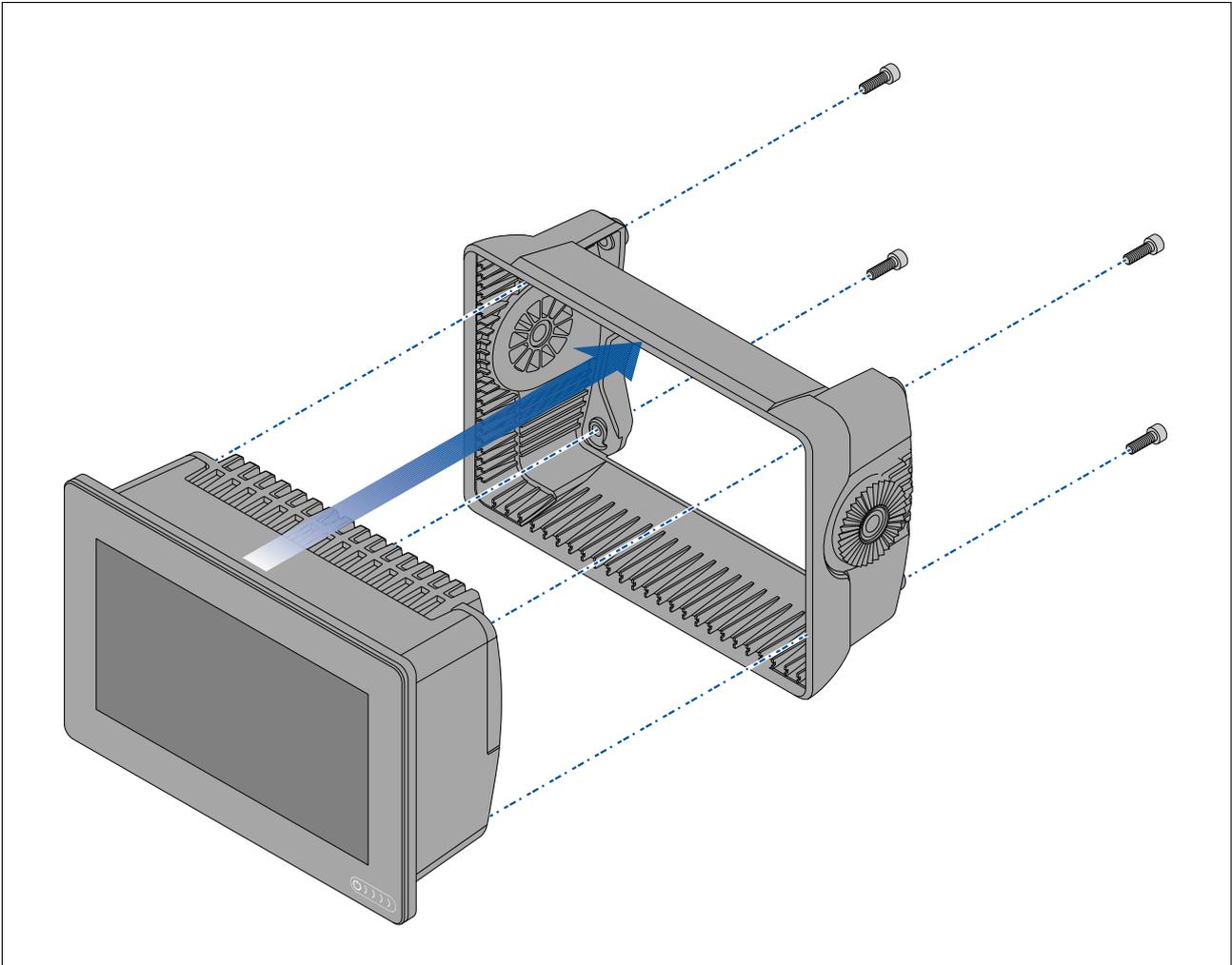
The knobs should be tightened by hand, sufficiently to prevent the MFD from moving whilst your vessel is underway.

4. Route and connect necessary cables.

7.3 Axiom 7 flush and surface mounting

Removing the trunnion adaptor Axiom™ 7

The trunnion adaptor supplied fitted to the Axiom™ 7 can be removed to enable the adaptor to be used as a clamp for surface and flush mount installations, the adaptor must also be removed before installation the unit using the Rear mount brackets or Front Installation kit.

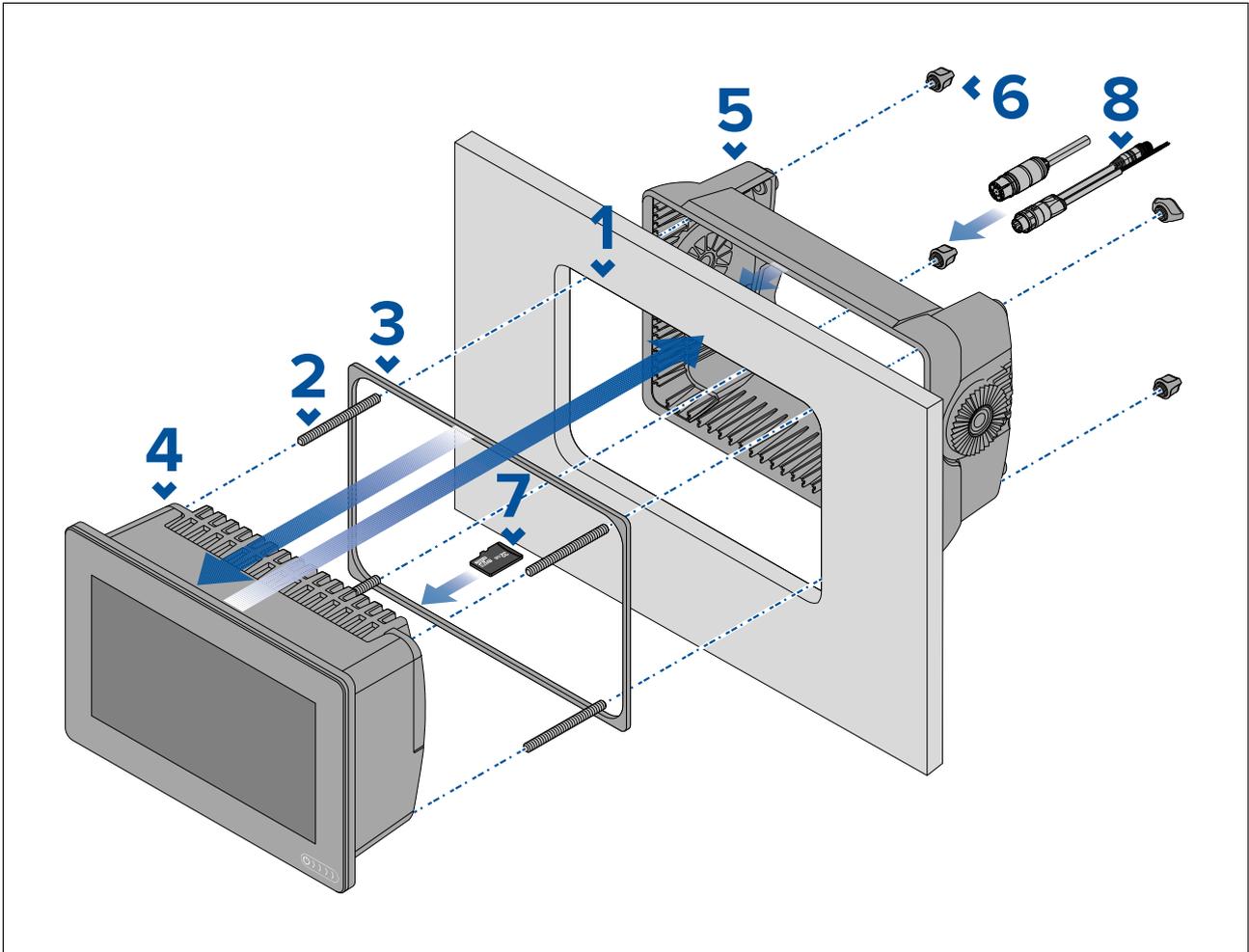


1. Unscrew the 4 x M5x16 screws using a 4 mm hex wrench (Allen key).
2. Pull the trunnion adaptor away from the MFD.

Surface or Flush mounting Axiom™ 7 only

When suitable access is available behind the desired mounting surface, the MFD can be surface or flush mounted.

First, ensure you have removed the Trunnion adaptor from the rear of the MFD.



1. Using the Surface/Flush mounting template as a guide, cut the relevant cut out hole in the mounting surface, if you are Flush mounting the MFD, also follow the rebate information on the mounting template.
2. Screw the 4 x studs into the rear of the MFD.
3. Remove the backing from the gasket and attach it to the rear of the MFD, ensuring that the black, soft side is against the rear of the MFD.
4. Insert the MFD into the cut out hole.

Important: In above decks, flush mount installations, marine grade silicone should be used to seal the gap between the edge of the mounting surface and the edge of the MFD.

5. Place the Trunion adaptor over the back of the MFD.
6. Secure the MFD in position by hand-tightening the thumb nuts onto the studs.

Important: To prevent potential damage to the unit, do NOT overtighten the thumb nuts. Hand tighten only.

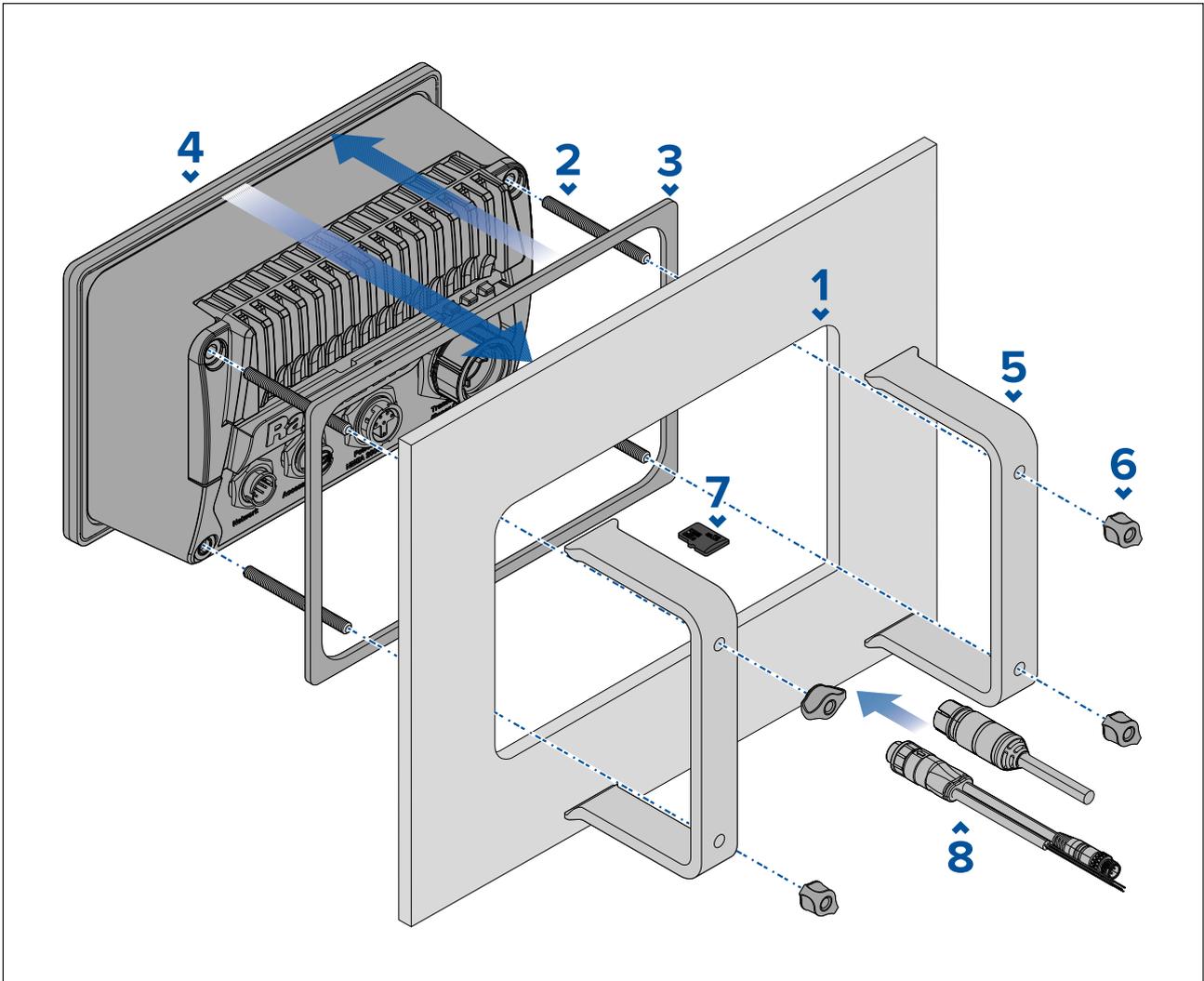
7. If required insert your MicroSD card into the MFD card reader, located behind the rubber bung on the rear of the MFD.
8. Route and connect necessary cables.

Note: The suncover provided in the box is for use in Trunion bracket installations, when Surface mounting the product accessory suncover R70527 is required. No suncover is available for Flush mount installations.

7.4 Surface or flush mounting using the Rear Mount Kit

When suitable access is available behind the desired mounting surface then the MFD can be surface or flush mounted using the Rear Mount Kit.

For Axiom™ 7 MFD, supplied with the trunnion adaptor fitted, first remove the Trunnion adaptor from the rear of the MFD.



1. Using the Surface/Flush mounting template as a guide, cut the relevant cut out hole in the mounting surface, if you are Flush mounting the MFD, also follow the rebate information on the mounting template.
2. Screw the 4 x studs into the rear of the MFD.
3. Remove the backing from the gasket and attach it to the rear of the MFD, ensuring that the black, soft side is against the rear of the MFD.
4. Insert the MFD into the cut out hole.

Important: In above decks, flush mount installations, marine grade silicone should be used to seal the gap between the edge of the mounting surface and the edge of the MFD.

5. Place the Rear Mount Brackets over the studs.

Depending on the size of your MFD, the brackets will look different, however the installation procedure remains the same.



6. Secure the MFD in position by hand-tightening the thumb nuts onto the studs.

Important: To prevent potential damage to the unit, do NOT overtighten the thumb nuts. Hand tighten only.

7. If required insert your MicroSD card into the MFD card reader located behind the rubber bung on the rear of the MFD.
8. Route and connect necessary cables.

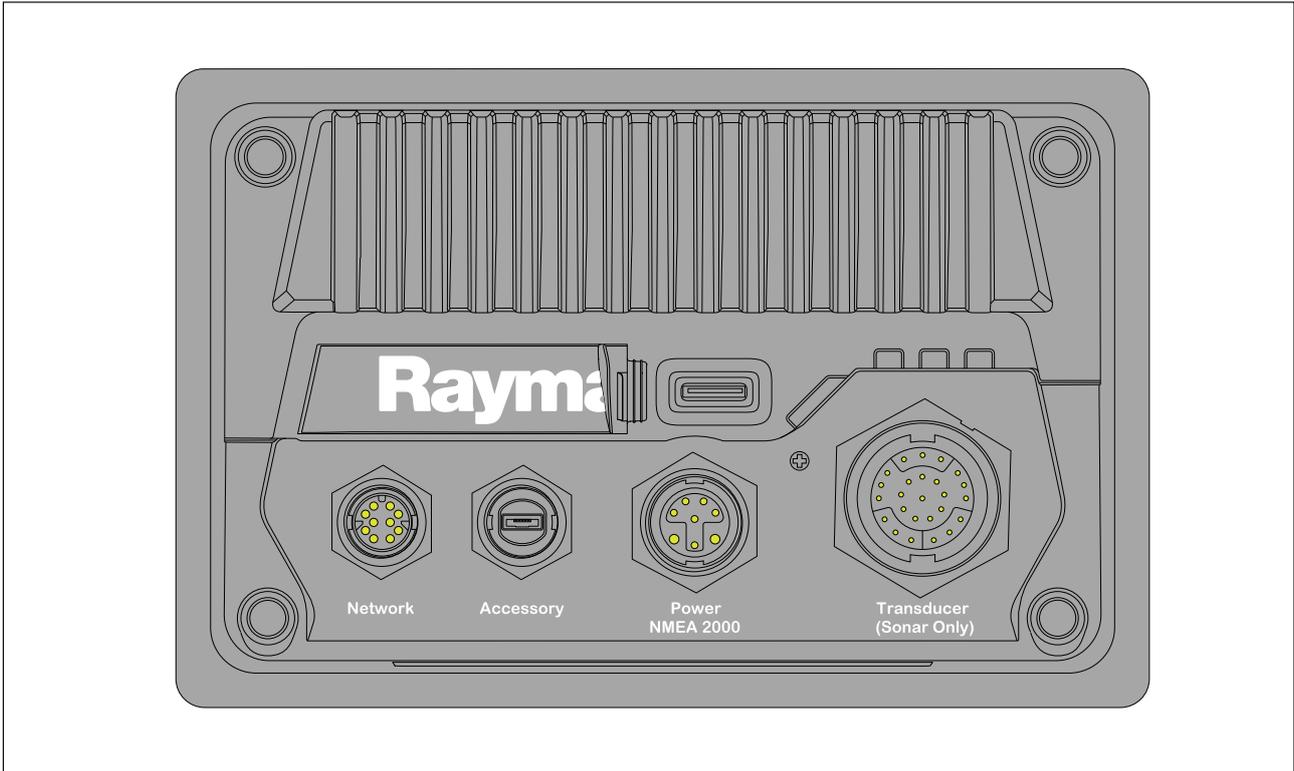
Chapter 8: Connections

Chapter contents

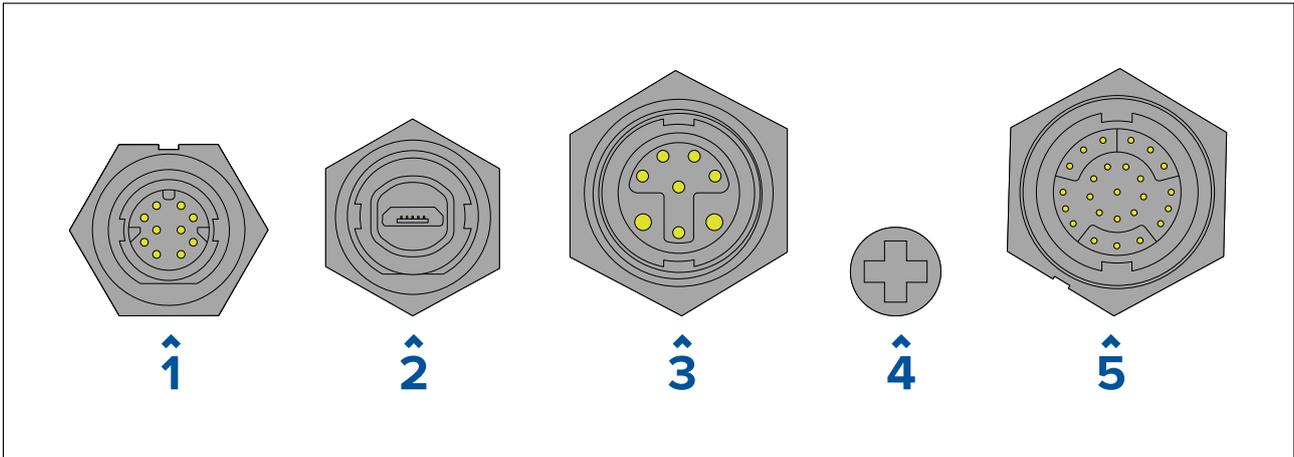
- [8.1 Connections overview on page 48](#)
- [8.2 Axiom power connection on page 49](#)
- [8.3 NMEA 2000 \(SeaTalkng[®]\) connection on page 55](#)
- [8.4 Axiom+ transducer connection on page 55](#)
- [8.5 Network connection on page 57](#)
- [8.6 Accessory connection on page 57](#)

8.1 Connections overview

Axiom™+ rear view



Axiom™+ connectors



1. Network connection — Connects to RayNet network or device. Refer to [p.87 — Spares and Accessories](#) for available cables.
2. Accessory connection — Connects to Remote Card Reader (RCR) accessory.
3. Power / NMEA 2000 connection — Connects to 12 V DC power supply / NMEA 2000 or SeaTalkng® backbone.
4. Optional grounding point — Connects to Vessel RF ground, or negative battery terminal. Refer to [p.54 — Grounding — optional dedicated drain wire](#) section for details.
5. Transducer connection — Connects directly to RealVision™ 3D transducers or other transducers via adaptor cables.

Note: Chartplotter only variant Axiom™+ MFDs require a networked sonar module to enable sonar features.

Connecting cables

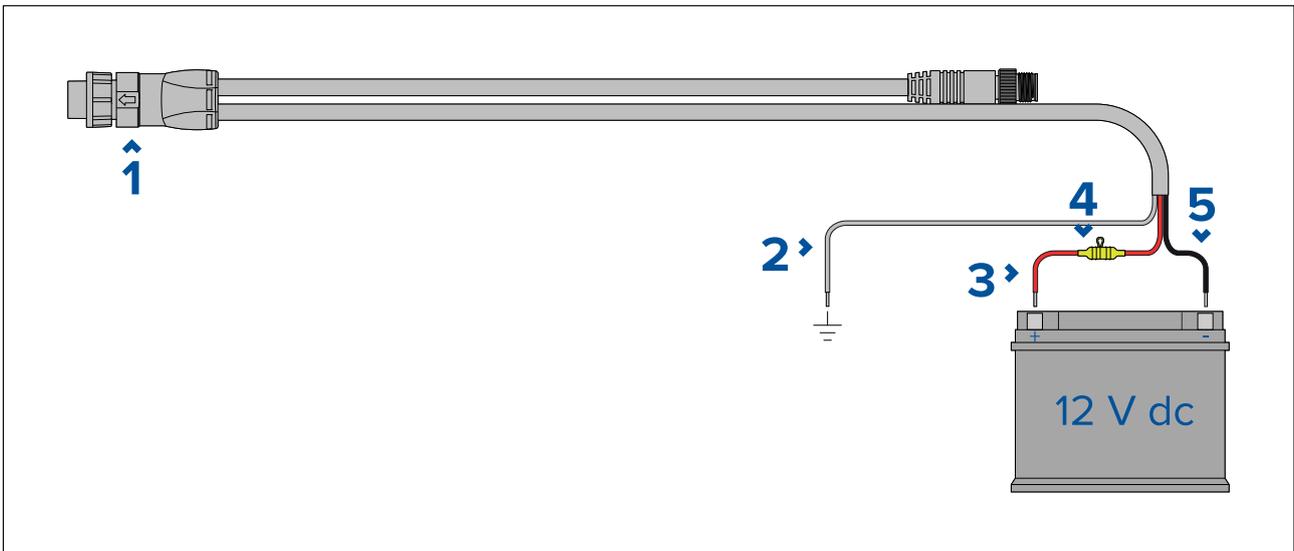
Follow the steps below to connect the cable(s) to your product.

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.

8.2 Axiom power connection

The power cable must be connected to a 12 V dc power supply, this can be achieved by connecting directly to a battery, or via the distribution panel. For 24 V vessels a suitable voltage converter is required. The product is protected against reverse polarity.



1. Power/NMEA 2000 cable connects to the rear of the display.
2. Ground wire connects to RF ground point, if no ground point is available connect to the battery negative (-) terminal.
3. Positive (Red) wire connects to battery positive (+) terminal.
4. Waterproof fuse holder with 7 A fuse must be fitted (not supplied)
5. Negative wire connects to battery negative (-) terminal.

In-line fuse and thermal breaker ratings

The following in-line fuse and thermal breaker ratings apply to your product:

In-line fuse rating	Thermal breaker rating
7 A	7 A

Note:

- 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.
- Your product's power cable may have an in-line fuse fitted, if not then you must add an in-line fuse / breaker to the positive wire of your product's power connection.

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.

Power distribution

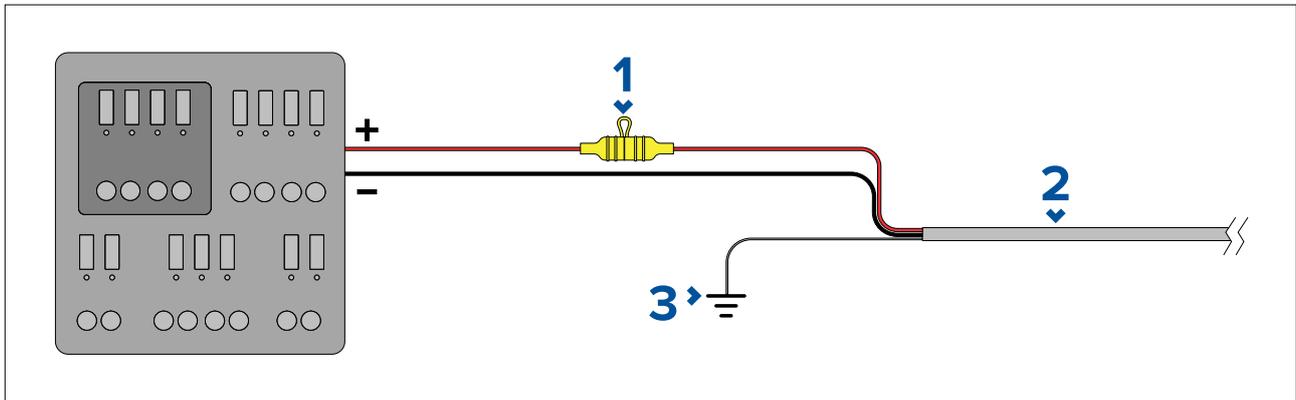
Recommendations and best practice.

- 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:

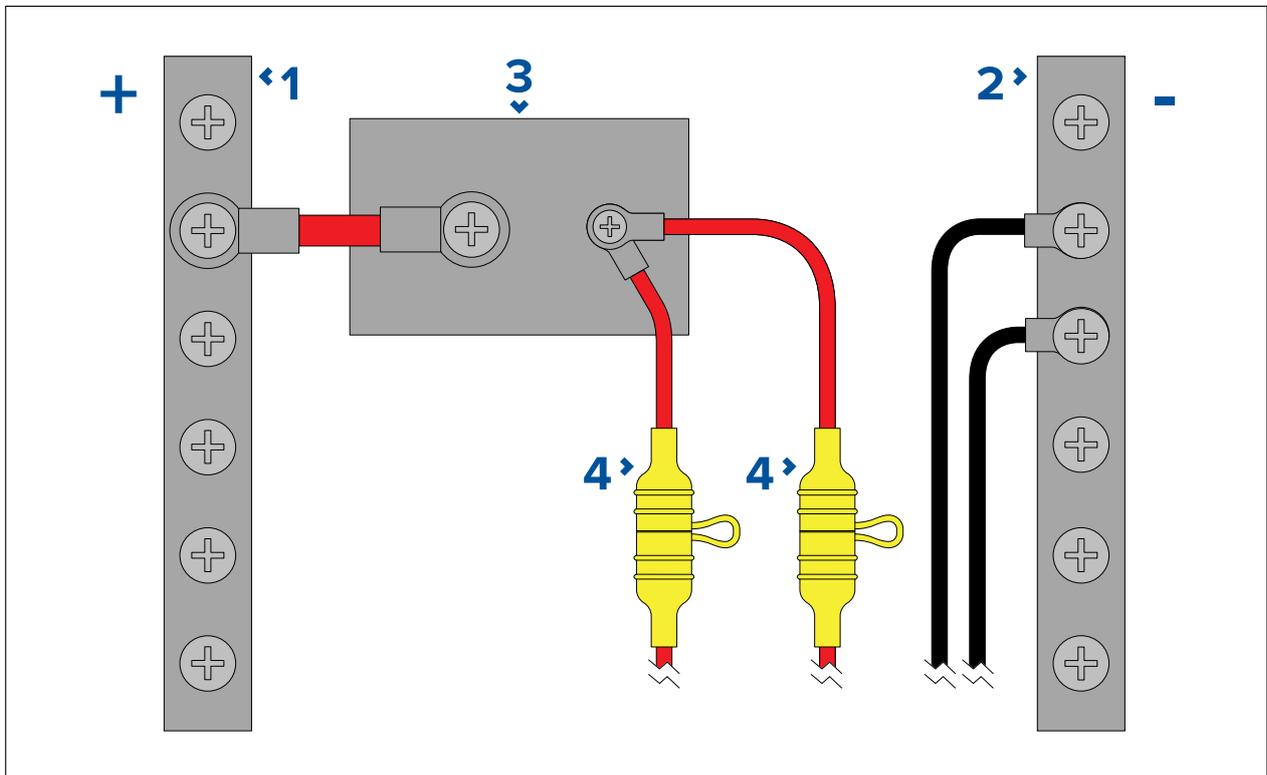
- When planning and wiring, take into consideration other products in your system, some of which (e.g. sonar modules) may place large power demand peaks on the vessel's electrical system, which may impact the voltage available to other products during the peaks.
- The information provided below is for 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)



1	Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: <i>In-line fuse and thermal breaker ratings</i> .
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 in-line fuses for each power circuit to provide the necessary protection.



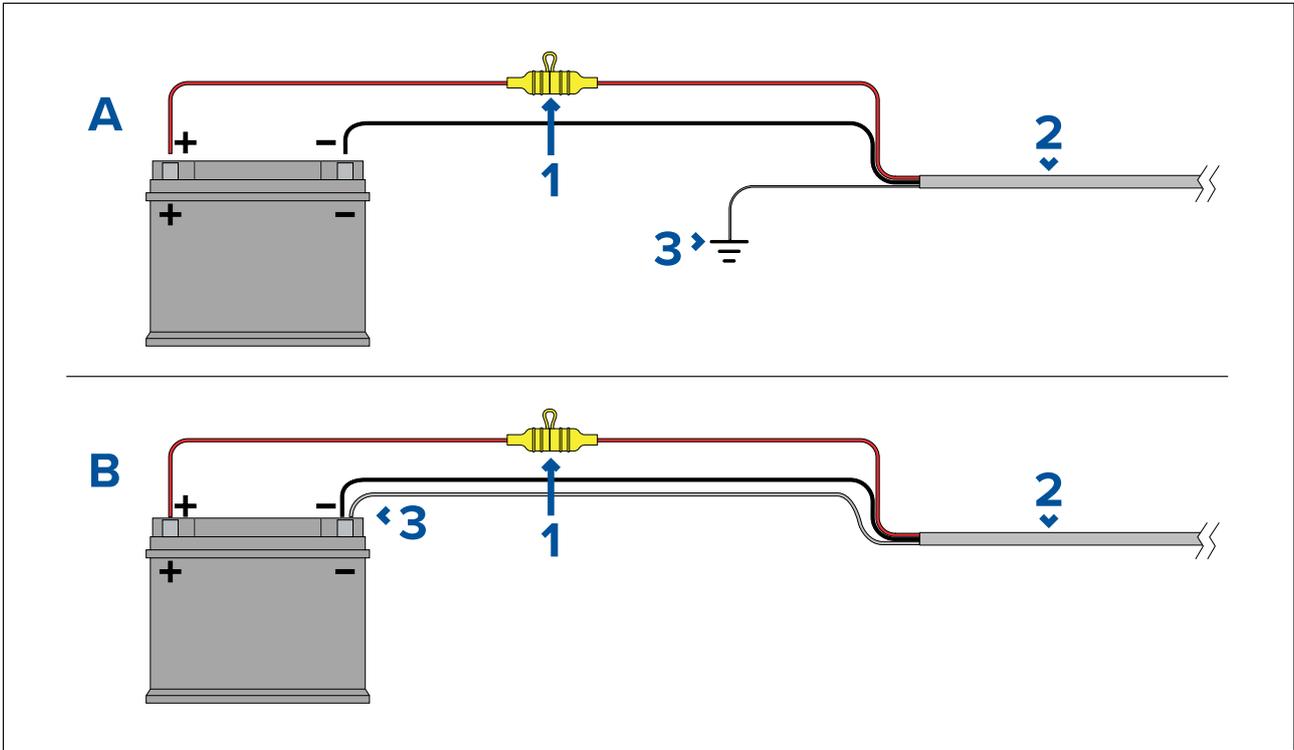
1	Positive (+) bar
2	Negative (-) bar
3	Circuit breaker
4	Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: <i>In-line fuse and thermal breaker ratings</i> .

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.
- The power cable supplied with your product may NOT include a separate drain wire. If this is the case, only the power cable's red and black wires need to be connected.
- 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.



1	Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: <i>In-line fuse and thermal breaker ratings</i> .
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, if your product’s power cable is supplied with a separate drain wire then it 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, if your product’s power cable is supplied with a separate drain wire then it should be connected directly to the battery’s negative terminal.

Power cable extension

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)	12 (3.31 mm ²)	16 (1.31 mm ²)
>32 (>100)	10 (5.26 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.)

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



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

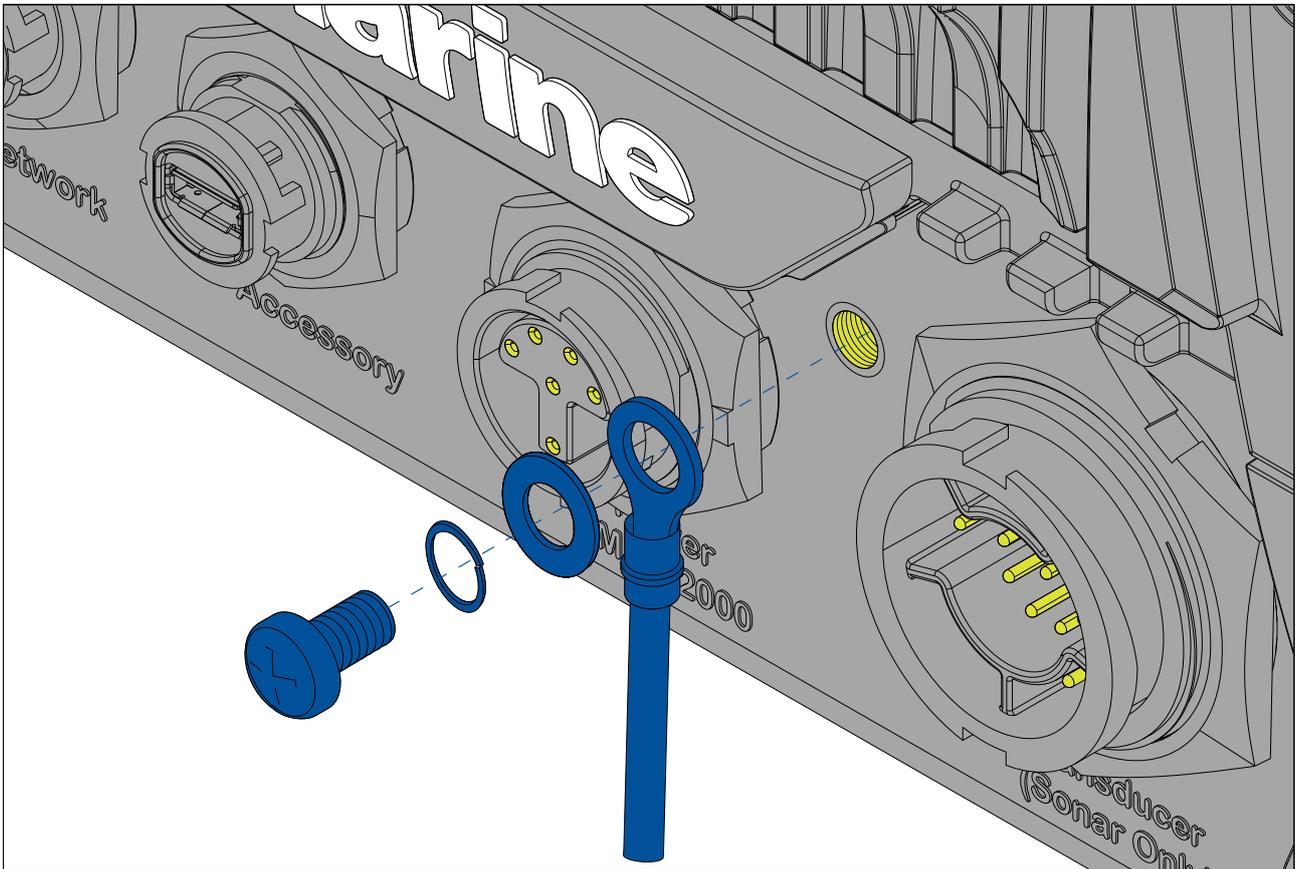
Do not connect this unit to a system which has positive grounding.

Grounding — optional dedicated drain wire

Frequencies emitted from equipment such as switched mode power supplies or MF/HF transmitters etc. can cause interference with your MFD's touchscreen or power swipe. If you experience issues with touchscreen performance or the power swipe, fitting an additional dedicated drain wire can resolve the issue.

Note:

The additional wire is required in addition to the drain wire (shield) that is part of the product's power cable, but should **ONLY** be used when touchscreen or power swipe interference is observed.



Connect one end of the additional drain wire (not supplied) to your product.

Connect the other end of the additional drain wire to the same point as the power cable drain wire (shield). This will be either the vessel's RF ground point, or on vessels without an RF ground system, the negative battery terminal.

The dc power system should be either:

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

If several items require grounding, they may first be connected to a single local point (e.g. within a switch panel), with this point connected via a single, appropriately-rated conductor, to the vessel's common RF ground point.

Implementation

The preferred minimum requirement for the path to ground is via a flat tinned copper braid, with a 30 A rating (1/4 inch) or greater. If this is not possible, an equivalent stranded wire conductor may be used, rated as follows:

- for runs of <1 m (3 ft), use 6 mm² (#10 AWG) or greater.
- for runs of >1 m (3 ft), use 8 mm² (#8 AWG) or greater.

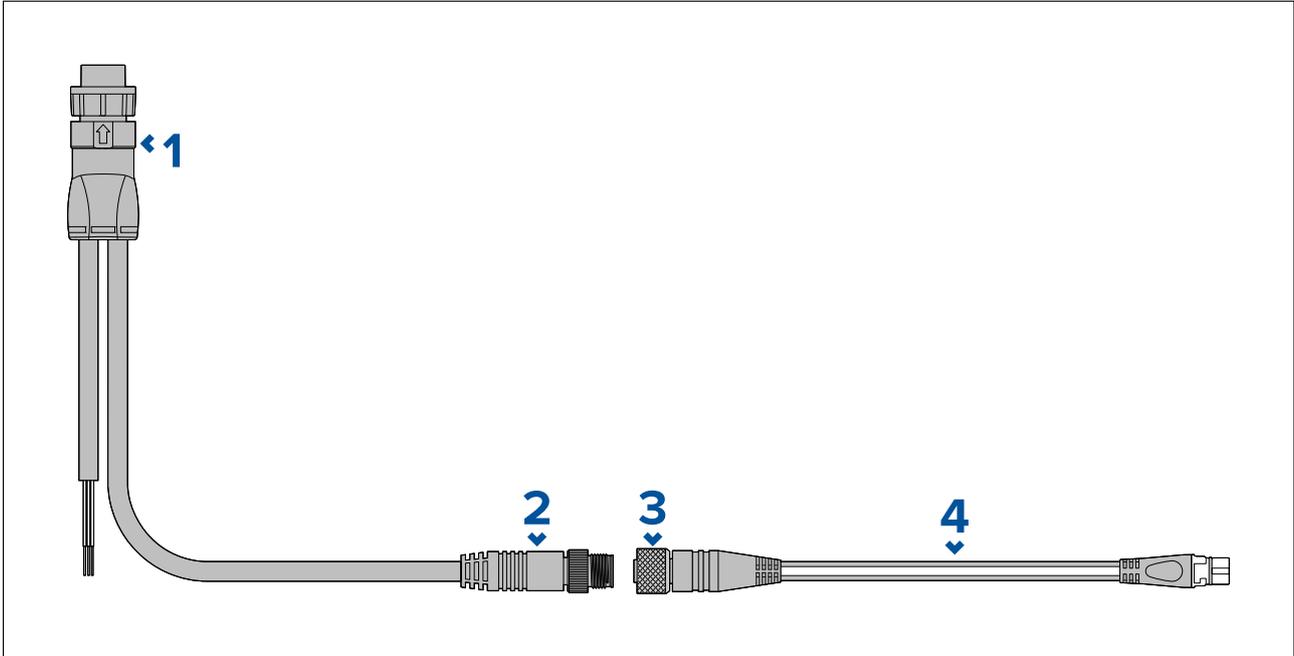
In any grounding system, always keep the length of connecting braid or wires as short as possible.

References

- ISO10133/13297
- BMEA code of practice

8.3 NMEA 2000 (SeaTalkng®) connection

The MFD can transmit and receive data from devices connected on a compliant CAN bus network that the MFD is also connected to. The MFD is connected to the backbone using the DeviceNet connector on the Power/NMEA 2000 cable.



1. Power/NMEA 2000 cable connects to the rear of the MFD.
2. DeviceNet (Micro-C 5 pin male) connector connects to NMEA 2000 network or SeaTalkng® via adaptor cable.
3. DeviceNet (5 pin female) connector.
4. Adaptor cable connects to SeaTalkng® backbone or DeviceNet spur cable connects to NMEA 2000 network. Available cables
 - A06045 — Female DeviceNet to SeaTalkng® cable, shown.
 - E05026 — Female DeviceNet to bare end wires.

Note:

1. SeaTalkng® and NMEA 2000 devices must be connected to a correctly terminated backbone that the MFD is also connected to. Devices cannot be connected directly to the MFD.
2. Refer to the instructions supplied with your SeaTalkng® / NMEA 2000 device for details on creating a backbone.

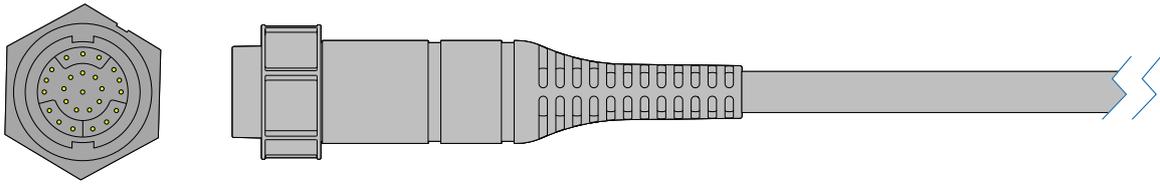
8.4 Axiom+ transducer connection

If your MFD includes a built-in sonar module then you can connect a transducer to your MFD.

Note:

RealVision™ transducers connect directly, all other transducer type require an adaptor cable.

RV = 25 pin



Note:

1. Refer to [3.1 Compatible transducers for Axiom™+ RV Multifunction displays](#) for more information on compatible transducers for your MFD variant.
2. Transducer extension cables are available.
3. MFDs that do not have a built-in sonar module can be connected to a transducer via an networked sonar module.

RealVision™ 3D transducer extension cable

For best performance, cable runs should be kept to a minimum. However, for some installations it may be necessary to extend the transducer cable.

- 3 m (9.8 ft), 5 m (16.4 ft), and 8 m (26.2 ft) transducer extension cables are available (part numbers: 3 m - A80475, 5 m - A80476, 8 m - A80477).
- It is recommended that a maximum of two cable extensions are used, with the total cable length not exceeding 18 m (59 ft).

DownVision™ transducer extension cable

For best performance, cable runs should be kept to a minimum. However, for some installations it may be necessary to extend the transducer cable.

- A 4 m (13.1 ft.) Transducer extension cable (A80273) is available.
- It is recommended that only one cable extension is used.

Axiom+ transducer adaptor cables

The following adaptor cables are available to enable connection of a wider selection of transducers.

A80488	Axiom RV to 7-pin Embedded Transducer Adapter
A80489	Axiom RV to 7-pin CP370 Transducer Adapter
A80490	Axiom RV to 9-pin DV Transducer Adapter
A80491	Axiom RV to 25-pin RV & 7-pin Embedded Transducers Y-Cable
A80492	Axiom RV to 25-pin RV & 7-pin CP370 Transducers Y-Cable
A80493	Axiom RV to 7-pin Embedded & 9-pin DV Transducers Y-Cable
A80494	Axiom RV to 7-pin CP370 & 9-pin DV Transducers Y-Cable

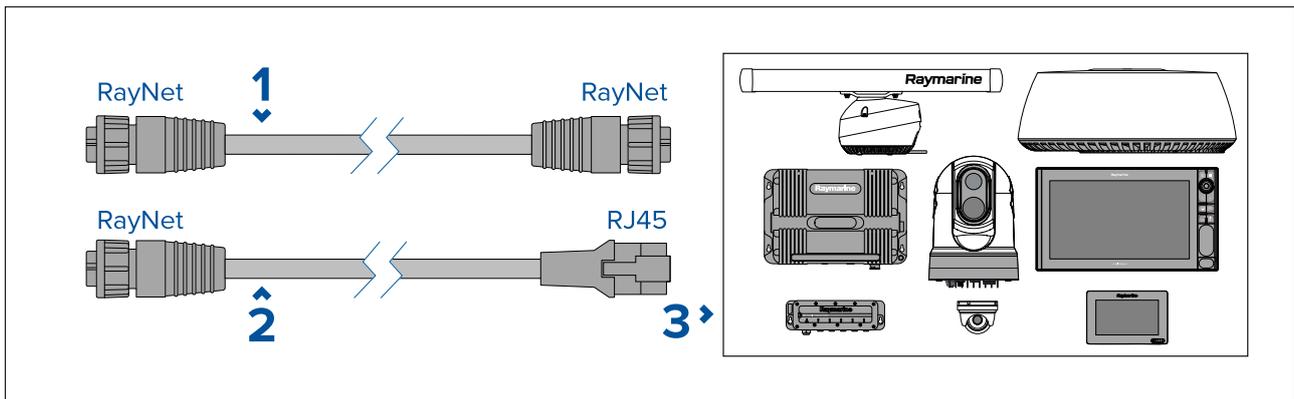
Caution: Transducer cable

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

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

8.5 Network connection

Your MFD can be directly connected to compatible products using the RayNet connections. Your MFD can also be connected to a SeaTalkhs[®] network when using a suitable network switch.



1. RayNet to RayNet cable — Connect one end of the RayNet cable to your MFD and the opposite end to a RayNet device or RayNet network switch.
2. RayNet to RJ45 cable — Connect the RayNet end of the cable to your MFD and the opposite end to an RJ45 device or RJ45 network switch or coupler.
3. Compatible network devices, such as a Network switch, Radar scanner, Sonar module, Thermal camera etc.

Note:

- Refer to the instructions supplied with your network product for specific connection information.
- Refer to [Chapter 14 Spares and accessories](#) for a list of available network cables.

8.6 Accessory connection

The RCR-SDUSB, RCR-1, Micro USB Extension Cable, or RCR-2 (available separately) can be connected to your MFD using the Accessory connection.

RCR connection

The following functions require a card reader attached to the MFD:

- use of electronic cartography — alternatively cartography can be shared from a networked MFD that does have a card reader attached.
- updating product software — alternatively if your MFD has a connection to the internet you can check online for software updates.
- import and export user data (waypoints, routes and tracks) — alternatively user data can be imported and exported from a networked MFD that does have a card reader attached.
- backup and restore settings — alternatively settings can be backed up and restored from a networked MFD that does have a card reader attached.
- viewing pdf files
- ⁽¹⁾ capturing and viewing screenshots or images (.png, .jpg files)
- ⁽²⁾ recording and viewing video files (.mov files)
- installation of third-party LightHouse app (.apk files) (for installation only; apps cannot be run directly from storage device).

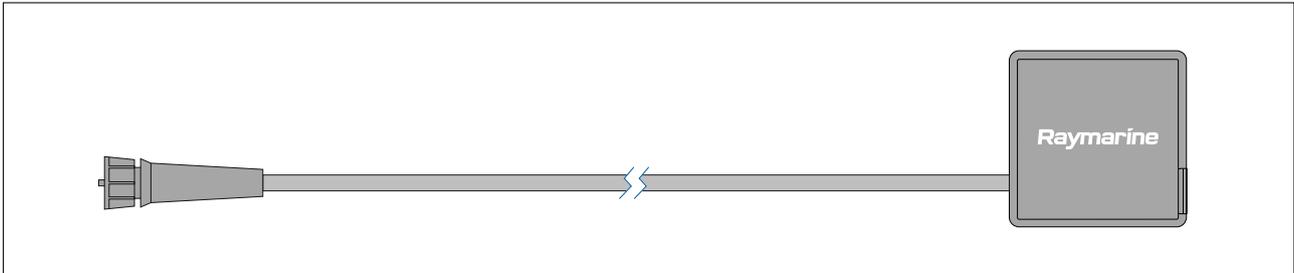
The following additional function requires a DJI Drone Extension Cable (A80630) attached to the MFD:

- connection of a compatible UAV (drone), for use with MFD's UAV app.

Important:

1. To store images (.png, .jpg files), **External SD** or **External USB** must be selected as the **Screenshot File** location on the **This display** tab in the main MFD settings menu (accessible from Homescreen).
2. To store video (.mov files), **External SD** or **External USB** must be selected as the **Save Files** location on the **Photo & Video recording** tab in the Video app settings menu.

In addition to the storage uses listed above, the USB slot on the RCR-SDUSB can also supply 0.5A of current to charge mobile devices.



Device	Supported media
RCR-SDUSB (A80440)	1x SD card (or MicroSD card when using an SD card adaptor) 1x USB (Type A connector) (e.g. for connection of an external USB hard drive or pen / flash drive)
RCR-1 (A80585)	1x MicroSD card
RCR-2 (A80218)	2x MicroSD card
Micro USB Extension Cable (A80630)	1x Micro USB (Type Micro A connector) (e.g. for connection of an external USB hard drive or pen / flash drive; an additional adaptor may be required for the connection of some USB devices).

For installation details for these devices, please refer to the instructions provided with your accessory.



Warning: USB device power

Do NOT connect any device to the product's USB connection that requires an external power source.

Chapter 9: Maintenance

Chapter contents

- 9.1 Service and maintenance on page 60
- 9.2 Product cleaning on page 60

9.1 Service and maintenance

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



Warning: 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: FCC Warning (Part 15.21)

Changes or modifications to this equipment not expressly approved in writing by Raymarine Incorporated could violate compliance with FCC rules and void the user's authority to operate the equipment.

Caution: Sun covers

- If your product is supplied with a sun cover, to protect against the damaging effects of ultraviolet (UV) light, always fit the sun cover when the product is not in use.
- To avoid potential loss, sun covers must be removed when travelling at high speed, whether in water or when the vessel is being towed.

Routine equipment checks

It is recommended that you perform the following routine checks, on a regular basis, to ensure the correct and reliable operation of your equipment:

- Examine all cables for signs of damage or wear and tear.
- Check that all cables are securely connected.

9.2 Product cleaning

Best cleaning practices.

When cleaning products:

- Switch off power supply.
- Use a clean damp cloth to wipe clean.
- Do NOT use: abrasive, acidic, ammonia, solvent or other chemical based cleaning products.
- Do NOT use a jet wash.

Cleaning the Axiom+ display screen

The touchscreen has an oleophobic protective coating. The oleophobic coating is a fingerprint resistant, oil repelling coating used to protect your display screen. To remove fingerprints simply wipe the screen gently with a clean, lint-free cloth, such as a microfibre cloth. For more stubborn smears follow the steps below:

Important:

Do NOT use abrasive cloth or abrasive cleaning fluid to clean the screen as this will degrade the protective coating and could scratch the screen.

1. Switch off the power to the display.
2. Clean the screen using a mild detergent solution and a clean, lint free cloth to remove all dirt particles and salt deposits.
3. Rinse the screen with fresh, clean water to remove any remaining detergent.

Important:

Leaving detergent on the glass may deteriorate the protective coating.

4. Allow the screen to dry naturally.
5. If any smears remain, very gently wipe the screen with a fresh, clean, lint-free cloth.

Cleaning the display case

The display is a sealed unit and does not require regular cleaning. If it is necessary to clean the display, follow this basic procedure:

1. Switch off the power to the display.
2. Wipe the case with a clean, lint-free cloth.
3. If necessary, use a mild detergent to remove grease marks.

Disinfecting the display

In installations where MFDs have multiple users (e.g.: on charter boats), the touchscreen and control buttons should be disinfected. You should use a 70% isopropyl alcohol wipe.

Important:

- If wipes are unavailable then you can also spray 70% isopropyl alcohol onto a lint free cloth (such as a microfibre cloth), and wipe the display. Do NOT spray directly onto the touchscreen.
- Do NOT use a stronger concentration of alcohol, as this could strip the protective coating on your screen.
- Do NOT use abrasive cloth or abrasive cleaning fluid to clean the screen, as this will degrade the protective coating and could scratch the screen.

1. Switch off the power to the display.
2. Follow the instructions for cleaning your display screen.
3. Using a 70% isopropyl alcohol wipe, gently wipe all surfaces and control buttons.
4. Using a second 70% isopropyl alcohol, wipe very gently the surface of the touchscreen.
5. Rinse the screen with fresh, clean water to remove all traces of the chemicals used in the wipe.
6. Allow the screen to dry naturally.
7. If any smears remain, very gently wipe the screen with a clean, microfibre cloth.

Cleaning the sun cover

The supplied sun cover features an adhesive surface. In certain conditions unwanted contaminants may stick to this surface. To avoid damaging the monitor display, clean the sun cover regularly following this procedure:

1. Carefully remove the sun cover from the display.
2. Rinse the sun cover with fresh water to remove all dirt particles and salt deposits.
3. Allow the sun cover to dry naturally.

Chapter 10: Operation

Chapter contents

- [10.1 LightHouse™ 3 MFD Operation instructions on page 64](#)

10.1 LightHouse™ 3 MFD Operation instructions

For operation instructions for your product please refer to the LightHouse™ 3 MFD Operation instructions.



The Basic (81369) and Advanced (81370) LightHouse™ 3 Operation Instructions can be downloaded from the Raymarine website: www.raymarine.com/manuals. Please check the website to ensure you have the latest documentation.

Chapter 11: Troubleshooting

Chapter contents

- 11.1 Troubleshooting on page 66
- 11.2 LED Diagnostics on page 66
- 11.3 Power up troubleshooting on page 67
- 11.4 GNSS (GPS) troubleshooting on page 69
- 11.5 Sonar troubleshooting on page 70
- 11.6 Wi-Fi troubleshooting on page 73
- 11.7 Touchscreen troubleshooting on page 76
- 11.8 Miscellaneous troubleshooting on page 77

11.1 Troubleshooting

The troubleshooting information provides possible causes and corrective action required for common problems associated with 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 in order 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.

11.2 LED Diagnostics

The Power swipe area is illuminated using LEDs. The LEDs color and flash sequence will identify the status of the MFD along with any error codes.

Normal states

MFD status	LED color	LED state
On	White	On (Brightness increases with display brightness)
Off	Red	On
Recovery	Blue	On

Error states

Fault	LED color	LED state
Low voltage	Red	Slow flash — one flash per second
High voltage	Red	Fast flash — two flashes per second
High temperature	Red and Blue	Alternating

11.3 Power up troubleshooting

Product does not turn on or keeps turning off

Possible causes	Possible solutions
Blown fuse / tripped breaker.	<ol style="list-style-type: none"> 1. Check condition of relevant fuses and breakers and connections, replace if necessary. (Refer to the <i>Technical Specification</i> section of your product's installation instructions for fuse ratings.) 2. If fuse keeps blowing check for cable damage, broken connector pins or incorrect wiring.
Poor / damaged / insecure power supply cable / connections	<ol style="list-style-type: none"> 1. Check that the power cable connector is correctly orientated and fully inserted into the display connector and locked in position. 2. Check the power supply cable and connectors for signs of damage or corrosion, and replace if necessary. 3. With the display turned on, try flexing the power cable near to the display connector to see if this causes the unit to restart or lose power. Replace if necessary. 4. Check the vessel's battery voltage and 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, and replace if necessary.
Incorrect power connection	The power supply may be wired incorrectly, ensure the installation instructions have been followed.

Product will not start up (restart loop)

Possible causes	Possible solutions
Power supply and connection	See possible solutions from the table above, entitled 'Product does not turn on or keeps turning off'.
Software corruption	<ol style="list-style-type: none"> 1. In the unlikely event that the product's software has become corrupted, try downloading and installing the latest software from the Raymarine website. 2. On display products, as a last resort, attempt to perform a 'Power on Reset'. Be aware that this will delete all settings / presets and user data (such as waypoints and tracks), and revert the unit back to factory defaults.

Performing a power on reset – Axiom™

Important:

- Before performing a power on reset ensure you have backed up your settings and user data (waypoints, routes and tracks) to a memory card.
- You may also want to save any crash logs that are stored on your MFD to memory card for future reference..

1. Switch off power at the breaker to ensure that the MFD is completely powered off, and not in Standby mode. Alternatively, remove the power cable from the display.
2. Power on your MFD, and within approximately 10 seconds, swipe your finger from right to left (opposite direction to powering on) across the **Power** button swipe area 5 times. Recovery options are displayed.
3. Swipe your finger from right to left twice to highlight **Wipe data/factory reset**.
4. Swipe your finger from left to right once to accept.
5. Swipe your finger from right to left once to highlight **Yes**.
6. Swipe your finger from left to right once to restore your MFD to factory default settings.

7. When **Data wipe complete** is displayed, swipe your finger from left to right to restart your MFD.

11.4 GNSS (GPS) troubleshooting

Potential problems with the GNSS (GPS) receiver and possible causes and solutions are described here.

Problem	Possible causes	Possible solutions
“No Fix” GNSS status icon is displayed.	Geographic location or prevailing conditions preventing satellite fix.	Check periodically to see if a fix is obtained in better conditions or another geographic location.
	GNSS (GPS) connection fault.	Ensure that external GNSS connections and cabling are correct and fault free.
	External GNSS (GPS) receiver in poor location. For example: <ul style="list-style-type: none"> • Below decks. • Close proximity to transmitting equipment such as VHF radio. 	Ensure GNSS (GPS) receiver has a clear view of the sky.
	GNSS (GPS) installation problem.	Refer to the installation instructions.
<p>Note: A GNSS Status screen is accessible from the display. This provides satellite signal strength and other relevant information.</p>		

11.5 Sonar troubleshooting

Problems with the sonar and their possible causes and solutions are described here.

Scrolling image is not being displayed

Possible causes	Possible solutions
Sonar disabled	Select Ping Enable from the Sonar app's Sounder menu.
Incorrect transducer selected	Check that the correct transducer is selected in the Sonar app's Transducer menu.
Damaged cables	<ol style="list-style-type: none"> 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/loose 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 Sonar applications to stop scrolling or the unit to reset/turn off), replace if necessary.
Damaged or fouled transducer	Check the condition of the transducer ensuring it is not damaged and is free from debris/fouling, clean or replace as necessary.
Wrong transducer fitted	Ensure the transducer is compatible with your system.
External sonar module: SeaTalkhs™ / RayNet network problem.	<ul style="list-style-type: none"> • Check that the unit is correctly connected to the multifunction display or Raymarine network switch. If a crossover coupler or other coupler cable / adapter is used, check all connections ensuring connections 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 the condition of the transducer ensuring it is not damaged and is free from debris / fouling.

Possible causes	Possible solutions
Damaged cables	<ol style="list-style-type: none"> 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/loose 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 Sonar 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.

Poor / problematic image

Possible causes	Possible solutions
Vessel stationary	Fish arches are not displayed if the vessel is stationary; fish will appear on the display as straight lines.
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	<ol style="list-style-type: none"> 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/loose 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 Sonar applications to stop scrolling or the unit to reset/turn off), replace if necessary.

Possible causes	Possible solutions
Transducer location	<ul style="list-style-type: none"> • 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 the condition of the transducer ensuring it is not damaged and is free from debris / fouling.
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	<ol style="list-style-type: none"> 1. Turn off the transducer causing the interference. 2. Reposition the transducers so they are further 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.

11.6 Wi-Fi troubleshooting

Before troubleshooting problems with your Wi-Fi connection, ensure that you have followed the Wi-Fi location requirements guidance provided in the relevant installation instructions and performed a power cycle/reboot of the devices you are experiencing problems with.

Cannot find network

Possible cause	Possible solutions
Wi-Fi not currently enabled on devices.	Ensure Wi-Fi is enabled on both Wi-Fi devices and rescan available networks.
Some devices may automatically turn off Wi-Fi when not in use to save power.	Power cycle / reboot devices and rescan available networks.
Device not broadcasting.	<ol style="list-style-type: none"> 1. Try to enable broadcasting of the device's network using the Wi-Fi settings on the device you are trying to connect to. 2. You may still be able to connect to the device, when it is not broadcasting, by manually entering the device's Wi-Fi Name / SSID and passphrase in the connection settings of the device you are trying to connect.
Devices out of range or signal being blocked.	Move devices closer together or, if possible remove the obstructions and then rescan available network.

Cannot connect to network

Possible cause	Possible solutions
Some devices may automatically turn off Wi-Fi when not in use to save power.	Power cycle/reboot devices and retry the connection.
Trying to connect to the wrong Wi-Fi network	Ensure you are trying to connect to the correct Wi-Fi network, the Wi-Fi network's name can be found in the Wi-Fi settings on the broadcasting device (the device that you are trying to connect to).
Incorrect network credentials	Ensure you are using the correct passphrase, the Wi-Fi network's passphrase can be found in the Wi-Fi settings on the broadcasting device (the device that you are trying to connect to).
Bulkheads, decks and other heavy structure can degrade and even block the Wi-Fi signal. Depending on the thickness and material used it may not always be possible to pass a Wi-Fi signal through certain structures	<ol style="list-style-type: none"> 1. Try repositioning the devices so the structure is removed from the direct line of sight between the devices, or 2. If possible use a wired connection instead.
Interference being caused by other Wi-Fi enabled or older Bluetooth enabled devices (Bluetooth and Wi-Fi both operate in the 2.4 GHz frequency range, some older bluetooth devices may interfere with Wi-Fi signals.)	<ol style="list-style-type: none"> 1. Change the Wi-Fi Channel of the device you are trying to connect to and retry the connection. You can use free Wi-Fi analyzer apps on your smart device to help you choose a better channel (channel with least traffic). 2. Temporarily disable each wireless device in turn until you have identified the device causing the interference.

Possible cause	Possible solutions
<p>Interference caused by other devices that use the 2.4GHz frequency See list below of some common devices that use the 2.4GHz frequency:</p> <ul style="list-style-type: none"> • Microwave ovens • Fluorescent lighting • Cordless phones / baby monitors • Motion sensors 	<p>Temporarily switch off each device in turn until you have identified the device causing the interference, then remove or reposition the offending device(s).</p>
<p>Interference caused by electrical and electronic devices and associated cabling could generate an electromagnetic field which may interfere with the Wi-Fi signal.</p>	<p>Temporarily switch off each item in turn until you have identified the device causing the interference, then remove or reposition the offending device(s).</p>

Connection extremely slow and or keeps dropping out

Possible cause	Possible solutions
<p>Wi-Fi performance degrades over distance so products farther away will receive less network bandwidth. Products installed close to their maximum Wi-Fi range will experience slow connection speeds, signal drop outs or not being able to connect at all.</p>	<ul style="list-style-type: none"> • Move devices closer together. • For fixed installations such as a Quantum Radar, enable the Wi-Fi connection on an MFD installed closer to the device.
<p>Interference being caused by other Wi-Fi enabled or older Bluetooth enabled devices (Bluetooth and Wi-Fi both operate in the 2.4 GHz frequency range, some older bluetooth devices may interfere with Wi-Fi signals.)</p>	<ol style="list-style-type: none"> 1. Change the Wi-Fi Channel of the device you are trying to connect to and retry the connection. You can use free Wi-Fi analyzer apps on your smart device to help you choose a better channel (channel with least traffic). 2. Temporarily switch off each device in turn until you have identified the device causing the interference, then remove or reposition the offending device(s).
<p>Interference from devices on other vessels. When in close proximity to other vessels, for example, when moored up in a marina, many other Wi-Fi signals may be present.</p>	<ol style="list-style-type: none"> 1. Change the Wi-Fi Channel of the device you are trying to connect to and retry the connection. You can use free Wi-Fi analyzer apps on your smart device to help you choose a better channel (channel with least traffic). 2. If possible, move your vessel to a location with less Wi-Fi traffic.

Network connection established but no data

Possible cause	Possible solutions
<p>Connected to the wrong network.</p>	<p>Ensure that your devices is connected to the correct network.</p>
<p>Device software incompatibility</p>	<p>Ensure both devices are running the latest available software.</p>
<p>It may be possible that the device has become defective</p>	<ol style="list-style-type: none"> 1. Try updating software to a later version, or 2. try reinstalling the software. 3. Obtain new replacement device.

Mobile application running slowly or not at all

Possible cause	Possible solutions
Raymarine app not installed	Install mobile app from relevant app store.
Raymarine app version not compatible with MFD software	Ensure mobile app and MFD software are latest available versions.
Mobile apps not enabled on MFD	Enable “Viewing only” or “Remote Control” as required in the Mobile Apps setting on your MFD.

11.7 Touchscreen troubleshooting

Problems with the touchscreen and their possible causes and solutions are described here.

Problem	Possible causes	Possible solutions
Touchscreen does not operate as expected.	TouchLock is enabled.	Swipe your finger from left to right across the Power button swipe area to de-activate the TouchLock.
	Screen is not being operated with bare fingers, for example gloves are being worn.	Bare fingers must make contact with the screen for correct operation. Alternatively you may use conductive gloves.
	Water deposits on the screen.	Carefully clean and dry the screen in accordance with the instructions provided.

11.8 Miscellaneous troubleshooting

Miscellaneous problems and their possible causes and solutions are described here.

Problem	Possible causes	Possible solutions
Display behaves erratically: <ul style="list-style-type: none"> • Frequent unexpected resets. • System crashes or other erratic behavior. 	Intermittent problem with power to the display.	Check relevant fuses and breakers.
		Check that the power supply cable is sound and that all connections are tight and free from corrosion.
		Check that the power source is of the correct voltage and sufficient current.
	Software mismatch on system (upgrade required).	Go to www.raymarine.com and click on support for the latest software downloads.
	Corrupt data / other unknown issue.	Perform a factory reset. <div style="background-color: #f0f0f0; padding: 5px; margin-top: 5px;"> <p>Important: This will result in the loss of any settings and data (such as waypoints) stored on the product. Save any important data to a memory card before resetting.</p> </div>

Chapter 12: Technical support

Chapter contents

- 12.1 Raymarine product support and servicing on page 80
- 12.2 Learning resources on page 82

12.1 Raymarine product support and servicing

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

Product information

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

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

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

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** — <http://forum.raymarine.com>
- **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):

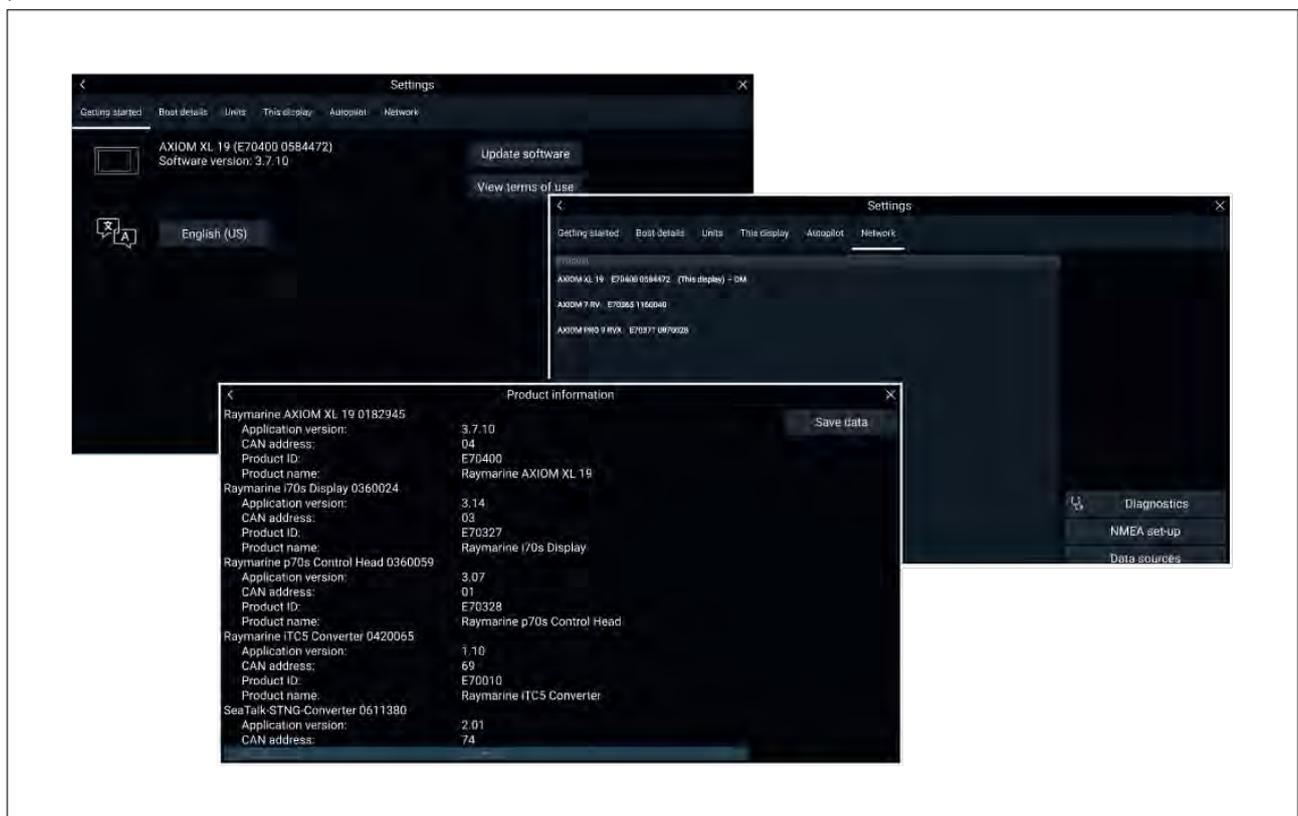
- E-Mail: support.dk@raymarine.com
- Tel: +45 437 164 64

Russia (Authorized Raymarine distributor):

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

Viewing product information (LightHouse™ 3)

Use the **Settings** menu to view hardware and software information about your MFD, and connected products.



1. Select **Settings**, from the Homescreen.

The **Getting started** menu contains hardware and software information for your MFD.

2. You can view further information about your MFD, or view information about products networked using SeaTalkhs® and SeaTalkng® / NMEA 2000, by selecting the **Network** tab, then:
 - i. to display detailed software information and your MFD's network IP address, select your MFD from the list.

- ii. to display detailed diagnostics information for all products, select **Product info** from the **Diagnostics** pop over menu.

Remote Support via AnyDesk

LightHouse 3 software versions v3.13 or later support remote support functions via the preloaded AnyDesk app.

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.**

12.2 Learning resources

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

Video tutorials

Raymarine official channel on YouTube:

- [YouTube](#)

Training courses

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

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

Technical support forum

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

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

Chapter 13: Technical specification

Chapter contents

- [13.1 Axiom+ technical specification on page 84](#)
- [13.2 RealVision™ 3D sonar specification on page 85](#)
- [13.3 Internal GNSS \(GPS / GLONASS\) receiver specification on page 85](#)
- [13.4 NMEA 2000 PGNs on page 86](#)

13.1 Axiom+ technical specification

Power

	Axiom™ 7+	Axiom™ 9+	Axiom™ 12+
Nominal supply voltage:	12 V dc		
Operating voltage range:	8 V dc to 16 V dc		
Fuse requirements:	<ul style="list-style-type: none"> • Inline fuse = 7 Amp, or • Thermal breaker = 7 Amp 		
Power consumption: (Maximum @ 12 V dc)	<ul style="list-style-type: none"> • Chartplotter — 7.34 Watts • RV — 9.84 Watts 	<ul style="list-style-type: none"> • Chartplotter — 8.95 Watts • RV — 11.98 Watts 	<ul style="list-style-type: none"> • Chartplotter — 15.48 Watts • RV — 18.96 Watts

Note:

Power consumption figures for RV variant displays were taken with an RV-100 transducer connected.

Environmental

	Axiom™ 7	Axiom™ 9	Axiom™ 12
Operating temperature range:	-25°C to + 55°C		
Storage temperature range:	-30°C to + 70°C		
Humidity:	up to 93% @ 40°C		
Water ingress protection:	IPx6 and IPx7		

LCD specification

	Axiom™ 7+	Axiom™ 9+	Axiom™ 12+
Size (diagonal):	7.0"	9.0"	12.1"
Type:	IPS (In-Plane Switching)		
Color depth:	24 bit		
Resolution:	WSVGA 1024 x 600	Widescreen HD 1080 x 720	WXGA 1280 x 800
Ratio:	15.4:9	16:9	16:10
Illumination:	1500 nits / 1500 cd/m ²		1800 nits / 1800 cd/m ²
Protective coating	Oleophobic		
Viewing angle:	Top 85/ Bottom 85 / Left 85 / Right 85		Top 88 / Bottom 88 / Left 88 / Right 88
Number of simultaneous touches:	2		1 to 16

Data connections

	Axiom™ 7+	Axiom™ 9+	Axiom™ 12+
Transducer:	25 pin RealVision™ type connector		
NMEA 2000:	1 x DeviceNet (male connector built into power cable.)		
Accessory connection:	1 x USB Micro B		
Network:	1 x RayNet type SeaTalkhs™ connector (10/100 Mbits/s)		

	Axiom™ 7+	Axiom™ 9+	Axiom™ 12+
Wi-Fi:	1 x 802.11/b/g/n		
Bluetooth:	1 x Bluetooth V4.0		
LEN (Load Equivalency Number):	1		

Storage

	Axiom™ 7	Axiom™ 9	Axiom™ 12
Internal:	16 GB Solid State		
External microSD card:	1 x MicroSDXC card slot		
External (via RCR-SDUSB accessory):	<ul style="list-style-type: none"> • 1 x SD card slot • 1 x USB A 		
External (via RCR-2 accessory)	2 x MicroSDHC card slots		

13.2 RealVision™ 3D sonar specification

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

- **Channels:**
 - 1 x CHIRP sonar
 - 1 x DownVision™
 - 1 x SideVision™
 - 1 x RealVision™ 3D
- **Range:**
 - CHIRP sonar = 0.6 M (2 ft) to 274 m (900 ft)
 - DownVision™ = 0.6 M (2 ft) to 183 m (600 ft)
 - SideVision™ = 0.6 M (2 ft) to 91 m (300 ft)
 - RealVision™ 3D = 0.6 M (2 ft) to 91 m (300 ft)

13.3 Internal GNSS (GPS / GLONASS) receiver specification

Channels:	Multiple — ability to simultaneously track up to 28 satellites
Cold start:	<2 minutes
Receiver IC Sensitivity:	<ul style="list-style-type: none"> • 165 dBm (Tracking) • 160 dBm (Acquisition) • 148 dBm (Cold start)
GNSS compatibility:	<ul style="list-style-type: none"> • GPS • GLONASS • Beidou* • Galileo*

SBAS compatibility:	<ul style="list-style-type: none"> • EGNOS • GAGAN • MSAS • QZSS • WAAS
Operating frequency:	1574 MHz to 1605 MHz
Signal Acquisition:	Automatic
Almanac Update:	Automatic
Geodetic Datum:	WGS-84 (alternatives can be selected on the MFD)
Refresh Rate:	10 Hz (10 times per second)
Antenna:	<ul style="list-style-type: none"> • Internal — Ceramic chip mounted near top of unit
Position Accuracy:	<ul style="list-style-type: none"> • Without SBAS: <= 15 metres 95% of the time • With SBAS: <= 5 metres 95% of the time

Note:
* Supported in future software update.

13.4 NMEA 2000 PGNS

For a list of supported NMEA 2000 PGNS, please refer to the LightHouse 3 Advanced Operations manual.

To obtain the latest version of the manual, visit: www.raymarine.com/manuals

Chapter 14: Spares and accessories

Chapter contents

- [14.1 AXIOM accessories on page 88](#)
- [14.2 AXIOM spares on page 89](#)
- [14.3 RayNet to RayNet cables and connectors on page 90](#)
- [14.4 SeaTalkng[®] cables and accessories on page 92](#)

14.1 AXIOM accessories

Part number	Name	Details
A80440	RCR-SDUSB	External MicroSD and USB reader
A80515	Right angled RV transducer adaptor cable	
A80498	7" Front installation kit	Includes : <ul style="list-style-type: none"> • Front mount adaptor • 2 x bezel pieces • 4 x self-tapping screws • Front mount suncover
A80499	7" Front mount suncover	
A80500	9" Front installation kit	Includes : <ul style="list-style-type: none"> • Front mount adaptor • 2 x bezel pieces • 4 x self-tapping screws • Front mount suncover
A80501	9" Front mount suncover	
A80502	12" Front installation kit	Includes : <ul style="list-style-type: none"> • Front mount adaptor • 2 x bezel pieces • 4 x self-tapping screws • Front mount suncover
A80503	12" Front mount suncover	

Axiom+ transducer adaptor cables

The following adaptor cables are available to enable connection of a wider selection of transducers.

A80488	Axiom RV to 7-pin Embedded Transducer Adapter
A80489	Axiom RV to 7-pin CP370 Transducer Adapter
A80490	Axiom RV to 9-pin DV Transducer Adapter
A80491	Axiom RV to 25-pin RV & 7-pin Embedded Transducers Y-Cable
A80492	Axiom RV to 25-pin RV & 7-pin CP370 Transducers Y-Cable
A80493	Axiom RV to 7-pin Embedded & 9-pin DV Transducers Y-Cable
A80494	Axiom RV to 7-pin CP370 & 9-pin DV Transducers Y-Cable

Legacy MFD adaptor plates

Adaptor plates are available to enable installation of Axiom MFDs in the place of a Legacy MFD.

Existing legacy MFD	Adaptor part number	New MFD	Fixing holes
a9x	A80526	Axiom 9"	Existing
a12x	A80527	Axiom 12"	New
c12x / e12x	A80528	Axiom 12"	Existing
C70 Classic	A80525	Axiom 9"	New

Existing legacy MFD	Adaptor part number	New MFD	Fixing holes
C80 / E80 Classic	A80564	Axiom 9"	Existing
C120 / E120 Classic	A80529	Axiom 12"	Existing
e7 / e7D	A80524	Axiom 7"	Existing

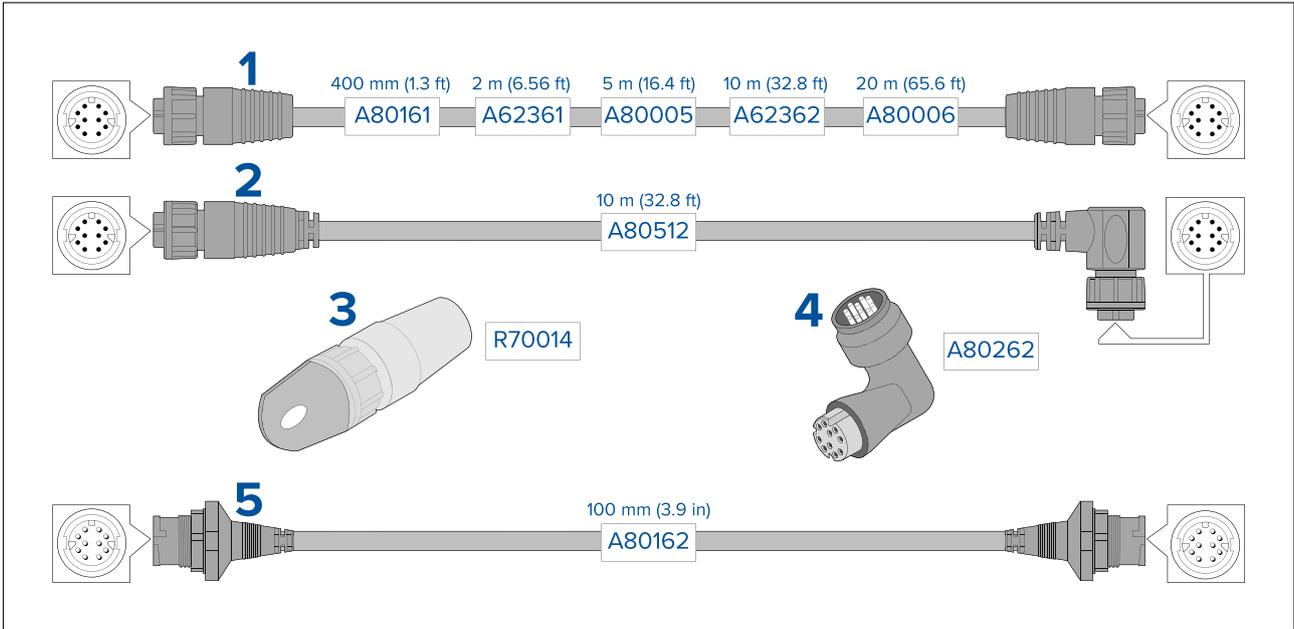
Note:

The adaptor plates have been designed to utilize your legacy MFD's existing cut out and fixing holes. Where it is not possible to reuse existing fixing holes then a mounting template is supplied, which provides the location for the new fixing holes.

14.2 AXIOM spares

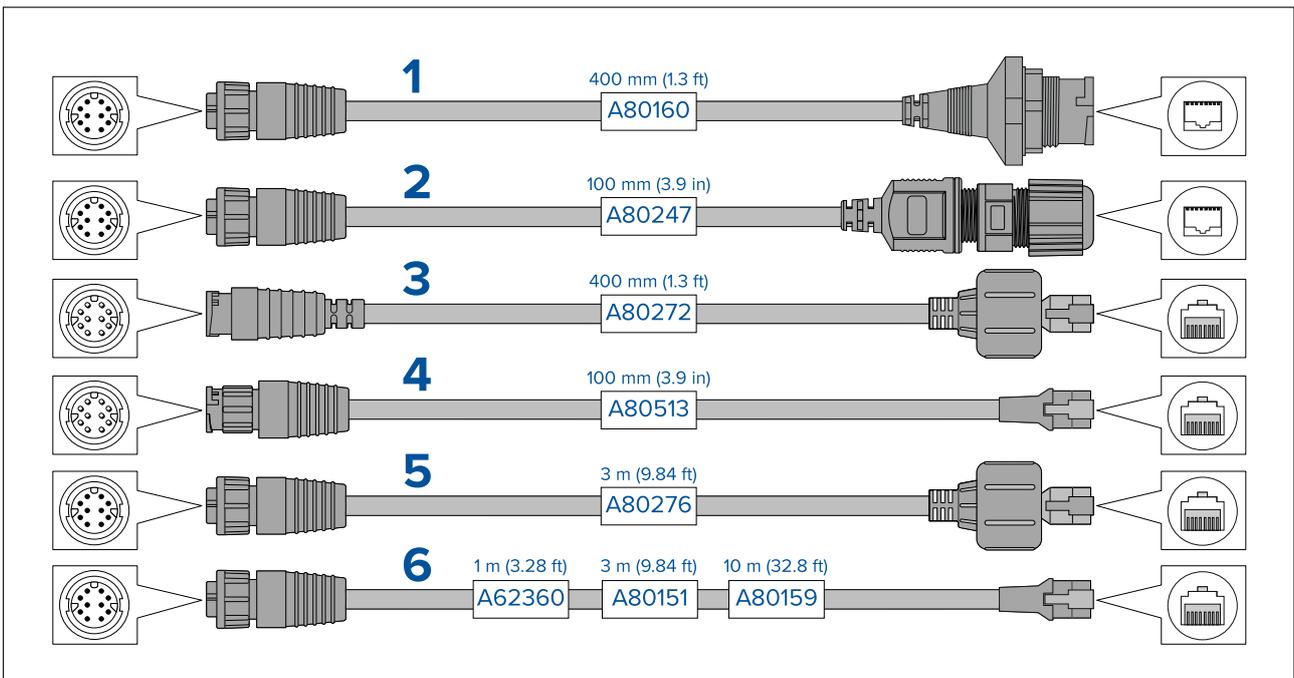
Part number	Name	Details
R70523	Power/DeviceNet combined cable 1.5m (4.92 ft)	
R70561	Right angled Power/DeviceNet combined cable 1.5m (4.92 ft)	
R70525	7" Trunnion mount suncover	
R70526	7" Rear cover	For trunnion and rear installation
R70527	7" Surface mount suncover	
R70528	7" Rear mounting kit	Includes 2 x metal brackets, 4 x studs and 4 x thumb nuts
R70524	7" Metal trunnion mounting kit	Includes trunnion and 2 knobs
R70529	9" Metal trunnion mounting kit	Includes trunnion and 2 knobs
R70530	9" Trunnion mount suncover	
R70531	9" Rear mounting kit	Includes 2 x metal brackets, 4 x studs and 4 x thumb nuts
R70532	12" Metal trunnion mounting kit	Includes trunnion and 2 knobs
R70533	12" Trunnion mount suncover	
R70534	12" Rear mounting kit	Includes 2 x metal brackets, 4 x studs and 4 x thumb nuts

14.3 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.

RayNet to RJ45 adapter cables



	Description
1	<p>Adapter cable with a RayNet (female) socket on one end, and a waterproof (female) socket on the other end accepting the following cables with an RJ45 SeaTalkhs[®] waterproof locking (male) plug:</p> <ul style="list-style-type: none"> • A62245 (1.5 m). • A62246 (15 m).
2	Adapter cable with a RayNet (female) socket on one end, and a waterproof (female) RJ45 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 SeaTalkhs [®] (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 SeaTalkhs [®] (male) socket on the other end.

14.4 SeaTalkng[®] cables and accessories

SeaTalkng[®] cables and accessories for use with compatible products.

Part Number	Description	Details
T70134	Starter kit	Includes: <ul style="list-style-type: none"> • 1 x 5 Way connector (A06064) • 2 x Backbone terminator (A06031) • 1 x 3 m (9.8 ft) spur cable (A06040) • 1 x Power cable (A06049)
A25062	Backbone Kit	Includes: <ul style="list-style-type: none"> • 2 x 5 m (16.4 ft) Backbone cable (A06036) • 1 x 20 m (65.6 ft) Backbone cable (A06037) • 4 x T-piece (A06028) • 2 x Backbone terminator (A06031) • 1 x Power cable (A06049)
A06038	Spur cable 0.4 m (1.3 ft)	
A06039	Spur cable 1 m (3.3 ft)	
A06040	Spur cable 3 m (9.8 ft)	
A06041	Spur cable 5 m (16.4 ft)	
A06042	Elbow spur cable 0.4 m (1.3 ft)	
A06033	Backbone cable 0.4 m (1.3 ft)	
A06034	Backbone cable 1 m (3.3 ft)	
A06035	Backbone cable 3 m (9.8 ft)	
A06036	Backbone cable 5 m (16.4 ft)	
A06068	Backbone cable 9 m (29.5 ft)	
A06037	Backbone cable 20 m (65.6 ft)	
A06043	SeaTalkng [®] to bare wire spur cable 1 m (3.3 ft)	
A06044	SeaTalkng [®] to bare wire spur cable 3 m (9.8 ft)	
A06049	Power cable 1 m (3.3 ft)	
A06077	Right angled connector	90° right angle spur connector.
A06031	Terminator	
A06028	T-piece	Provides 1 x spur connection
A06064	5-way connector block	Provides 3 x spur connections
A06030	Backbone extender	
E22158	SeaTalk to SeaTalkng [®] converter kit	Allows the connection of SeaTalk devices to a SeaTalkng [®] system.
A80001	Inline terminator	Provides direct connection of a spur cable to the end of a backbone cable. No T-piece required.
A06032	Spur blanking plug	
R12112	ACU / SPX SeaTalkng [®] spur cable 0.3 m (1.0 ft)	Connects an SPX course computer or an ACU to a SeaTalkng [®] backbone.

Part Number	Description	Details
A06047	SeaTalk (3 pin) to SeaTalkng [®] adaptor cable 0.4 m (1.3 ft)	
A22164	SeaTalk to SeaTalkng [®] spur cable 1 m (3.3 ft)	
A06048	SeaTalk2 (5 pin) to SeaTalkng [®] adaptor cable 0.4 m (1.3 ft)	
A06045	SeaTalkng [®] to DeviceNet (Female) adaptor cable 0.4 m (1.3 ft)	Allows the connection of NMEA 2000 devices to a SeaTalkng [®] system.
A06075	SeaTalkng [®] to DeviceNet (Female) adaptor cable 1 m (3.3 ft)	Allows the connection of NMEA 2000 devices to a SeaTalkng [®] system.
A06046	SeaTalkng [®] to DeviceNet (Male) adaptor cable 1.5 m (4.92 ft)	Allows the connection of NMEA 2000 devices to a SeaTalkng [®] system.
A06076	SeaTalkng [®] to DeviceNet (Male) adaptor cable 1 m (3.3 ft)	Allows the connection of NMEA 2000 devices to a SeaTalkng [®] system.
A06078	SeaTalkng [®] to DeviceNet (Male) adaptor cable 0.1 m (0.33 ft)	Allows the connection of NMEA 2000 devices to a SeaTalkng [®] system.
E05026	DeviceNet (Female) to bare wires adaptor cable (0.4 m (1.3 ft)	Allows the connection of NMEA 2000 devices to a SeaTalkng [®] system.
E05027	DeviceNet (Male) to bare wires adaptor cable (0.4 m (1.3 ft)	Allows the connection of NMEA 2000 devices to a SeaTalkng [®] system.

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www.raymarine.com

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Quantum Radome

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Check the Raymarine website for the latest software releases for your product.
www.raymarine.com/software

Product documentation



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Chapter 1: Important information

Certified Installation

Raymarine recommends certified installation by a Raymarine approved installer. A certified installation qualifies for enhanced product warranty benefits. Contact your Raymarine dealer for further details, and refer to the separate warranty document packed with your product.



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 recommends certified installation by a Raymarine approved installer. A certified installation qualifies for enhanced product warranty benefits. Contact your Raymarine dealer for further details, and refer to the separate warranty document packed with your product.



Warning: Potential ignition source

This product is NOT approved for use in hazardous/flammable atmospheres. Do NOT install in a hazardous/flammable atmosphere (such as in an engine room or near fuel tanks).



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 *Technical specification* section for voltage rating.



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.

Caution: Power supply protection

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



Warning: High voltage

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



Warning: Radio frequency radiation hazard

The radar scanner transmits electromagnetic energy at microwave frequencies which can be harmful, particularly to the eyes. Do NOT look at the scanner from close range. Ensure personnel are clear of the scanner when it is powered on.

For safety reasons, the radar must be installed above head height, out of range of personnel.



Warning: Quantum Wi-Fi connection

During installation there will usually be structure that affects the Wi-Fi signal. Before using the Radar for navigation, ensure you test the reliability of your Wi-Fi connection in open waters and away from any other vessels or structure.

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.

Transmitted power density levels

- A power density level of 10 W/m² does not occur at any point.
- A power density level of 100 W/m² does not occur at any point.

IEEE statement

IEEE C95.1 – 2005 – Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

ICNIRP Guidelines

When properly installed and operated, the use of this Radar conforms to: ICNIRP Guidelines 1998 - International Commission on Non-Ionising Radiation Protection: Guidelines for limiting exposure to time-varying electric, magnetic and electro-magnetic fields (up to 300 GHz) 1998.

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.

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.

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.

Declaration of Conformity

FLIR Belgium BVBA declares that the radio equipment type Quantum radome radar scanners, part numbers E70210 and E70344, are in compliance with the Radio Equipment Directive 2014/53/EU.

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

Connections to other equipment

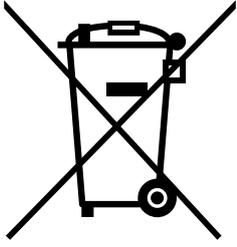
Requirement for ferrites on non-Raymarine cables

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.

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.

Radar licensing

Installation and operation of this radar may be subject to individual licensing of the equipment, operator or vessel. You are strongly advised to check with the requirements of the licensing authority of your national administration. In case of any difficulties, contact your local Raymarine dealer.

FCC Notice - Radar

Changes or modifications to this equipment not expressly approved in writing by Raymarine Incorporated could violate compliance with FCC rules and void the operator's authority to operate the equipment.

MSIP Warning Statement for Radio Devices (Korea only)

- 제작자 및 설치자는 해당 무선설비가 전파혼신 가능성이 있으므로 안전 인명과 관련된
- 서비스는 할 수 없음을 사용자 설명서 등을 통하여 운전자 및 사용자에게 충분히 알릴 것
- 법에 의해 전 방향 전파 발사 및 동일한 정보를 동시에 여러 곳으로 송신하는 점-대-다지점 서비스에의 사용은 금지되어 있습니다.

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.

Operation instructions

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

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

Retain your Wi-Fi passcode

To connect to the Radar using Wi-Fi (wireless), you will need to know the unit's **SSID**, and **Passcode**.

Both the SSID and Passcode are provided on the serial number label on the underside of the unit, and on spare serial number labels supplied in the box. You may wish to make a separate note of this information and keep in a secure location. You should also keep the Radar scanner packaging in a safe place for future reference.

The following information is applicable only to Quantum units running software version 1.62 or later, and Quantum Doppler units running software version 2.43 or later:

In the event that you misplace the SSID and Passcode before the initial pairing, you can power on your Quantum unit and determine the SSID by reviewing all available Wi-Fi networks, using a smartphone, tablet or laptop PC. An unpaired Quantum unit will advertise its SSID periodically in a 10-second cycle. This may take up to 3 minutes.

Once you've obtained the SSID, the next step is to contact [p.86 – Raymarine product support](#), who can then provide you with the passcode associated with your SSID.

Chapter 2: Document and product information

Chapter contents

- [2.1 Document information on page 16](#)
- [2.2 Parts supplied on page 17](#)
- [2.3 Quantum Radome product overview on page 18](#)

2.1 Document information

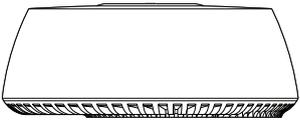
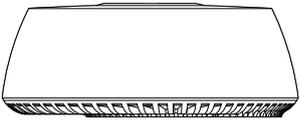
This document contains important information related to the installation of your Raymarine product. The document includes information to help you:

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

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

Applicable products

This document is applicable to the following products:

	Part number	Name	Description
	E70210	Quantum™ Q24C Radome	Quantum™ Radar scanner with RayNet and Wi-Fi connections. Supplied with a 10 m power cable.
	E70344	Quantum™ Q24W Radome	Quantum™ Radar scanner with Wi-Fi connection only. Supplied with a 10 m power cable.

Special bundle and promotional products

From time to time, Raymarine may supply certain products as special “bundle”, “package”, or “promotional” variants.

These bundles typically include additional accessories such as cables, and usually have a Txxxxx part number. For these bundle variants, the provided parts supplied and part numbers may differ slightly from those stated in this document. However, the core supplied product and its features will remain the same as those described in this document. To ensure that you are using the correct documentation for your product, please:

- Refer to the product’s core model number, which can be found listed on the label on the rear or underside of your product, or accessed from any Raymarine multifunction display via the Diagnostics page. Ensure that the number matches one of those listed in the “Applicable products” section of your product documentation.
- Alternatively, contact the place of purchase and request the information. You may need to provide the product’s serial number, which can be found on the product packaging and also on the label on the rear or underside of the unit.

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.

Product documentation

The following documentation is applicable to your product:

Description	Part number
Quantum™ Radome Installation instructions Installation of a Quantum™ Radar scanner and connection to a wider system of marine electronics.	87209 / 88055
Quantum™ Radome Mounting template Mounting diagram for surface mounting a Quantum™ Radar scanner.	87257

Description	Part number
LightHouse™ 2 MFD Operation Instructions Details the operation of the Radar application for multifunction displays running LightHouse™ 2 software.	81360
LightHouse™ 3 MFD Advanced Operation Instructions Details the operation of the Radar application for multifunction displays running LightHouse™ 3 software.	81370

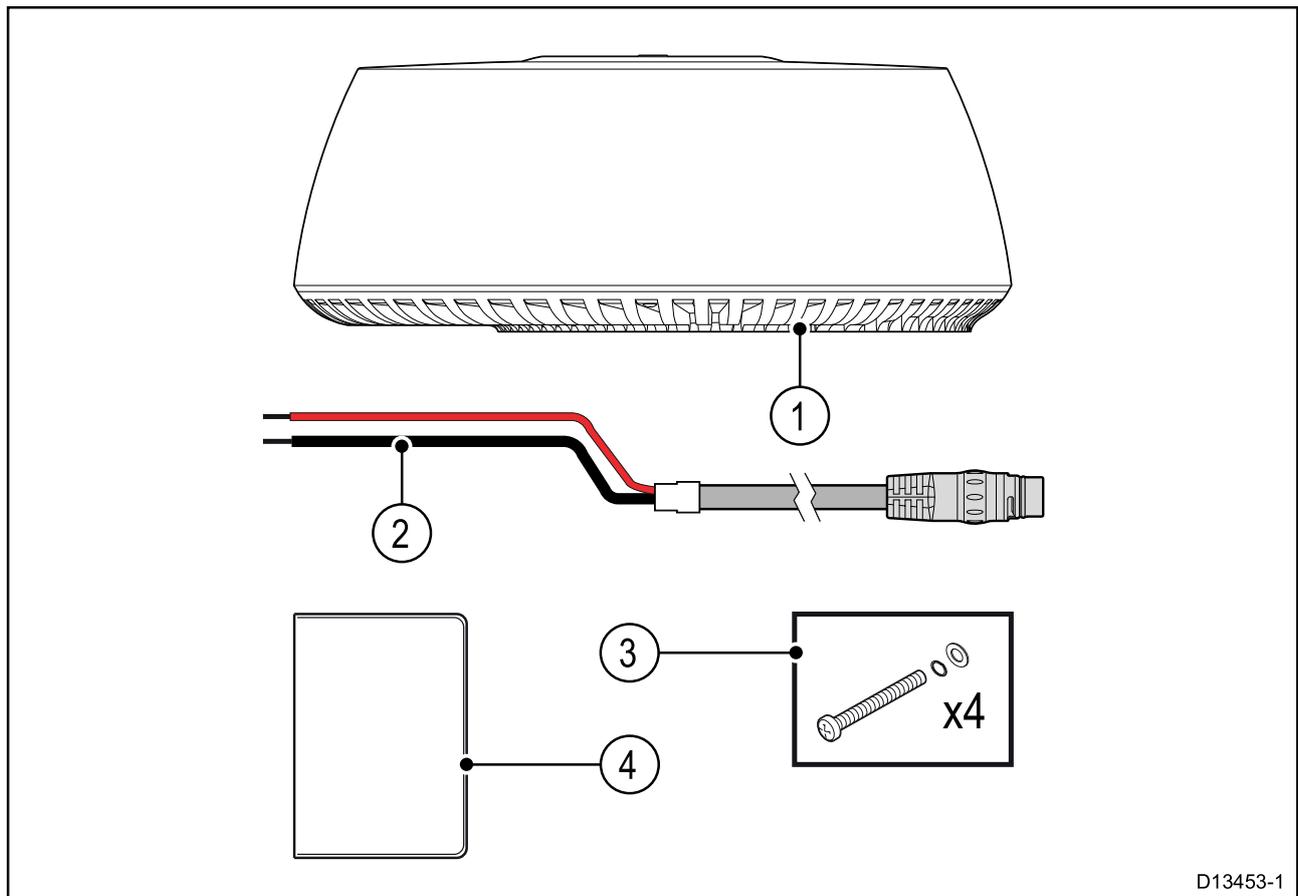
LightHouse MFD Operation instructions

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

	<p>All product documentation is available to download from the Raymarine website: www.raymarine.com/manuals</p> <ul style="list-style-type: none"> • LightHouse™ 2 MFD document number: 81360 • LightHouse™ 3 MFD document number: 81370
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2.2 Parts supplied

The following items are supplied with your product.



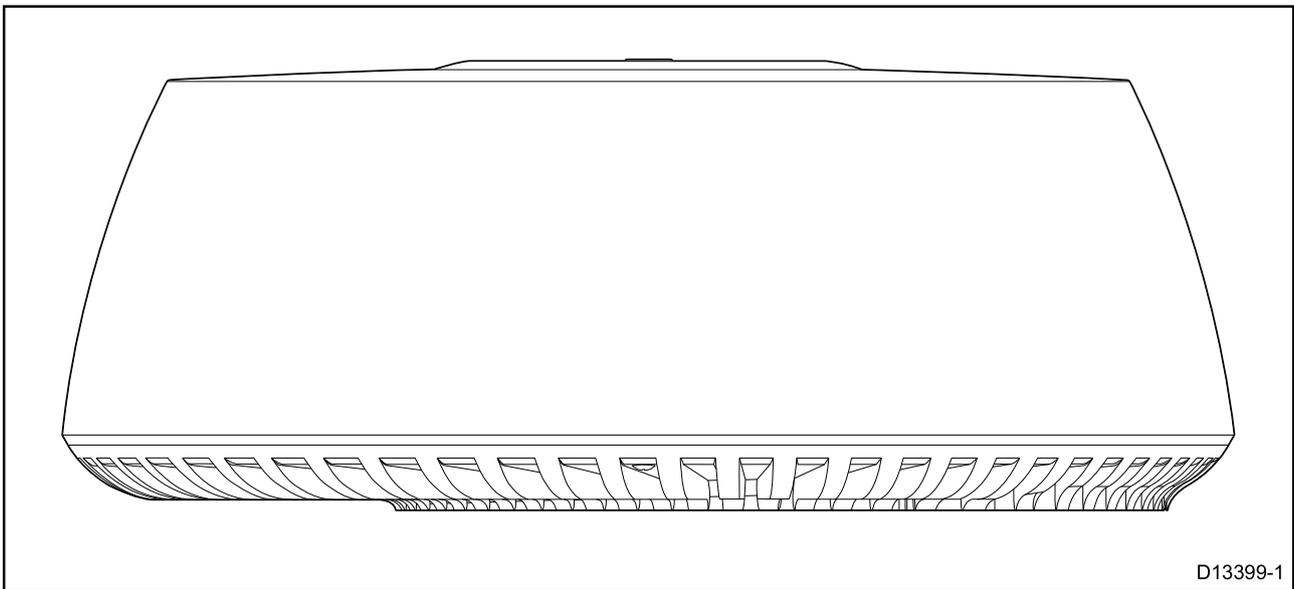
Item	Description	Quantity
1	Quantum™ Radome	1
2	10 m (32.8 ft.) Power cable	1

Item	Description	Quantity
3	M8 mounting bolts with spring washers and flat washers	4
4	Documentation pack (including mounting template)	1

Note: The list of parts supplied with your Quantum™ variant may differ slightly from the list provided here. Please be aware that, from time to time, Raymarine may supply certain products as special “bundle”, “package”, or “promotional” variants, which may contain different accessories compared to the core product variants described in this document. Refer to [Special bundle and promotional products](#) for more information.

2.3 Quantum Radome product overview

The Quantum™ Radome is a compact, solid-state Radar scanner, utilizing CHIRP pulse compression for improved range resolution, and Wi-Fi connectivity for easier installation. In conjunction with a compatible multifunction display, the Quantum™ scanner provides a map-like representation of the area around your vessel, enabling you to identify other vessels, buoys, and land features such as coastlines and hills.



The Quantum™ Radome has the following features:

- Solid-state technology (no magnetron) for improved efficiency, and rapid start-up.
- Range performance up to 24 nm (dependent on installation location).
- CHIRP pulse compression for improved target range resolution, and reduced background noise.
- Data connection via Wi-Fi, or (E70210 only) Raynet cable.
- Radar image display and control via Raymarine multifunction display.
- 24 RPM scanner rotation.
- Low power consumption.
- 12 V or 24 V operation.
- Waterproof to IPX 6.

Multiple Quantum Radar scanners

Only 1 (one) Quantum™ Radar scanner can be used at any one time, per networked system.

If you have more than one Quantum™ Radar scanner installed on your vessel and want to use them at the same time, the multifunction displays to which the scanners are connected must NOT be networked together. This applies to Quantum™ scanners connected either wired or wirelessly.

For more information, refer to: [p.78 – Multiple Quantum Radars – more information](#)

Chapter 3: Planning the installation

Chapter contents

- 3.1 Installation checklist on page 20
- 3.2 Required additional components on page 20
- 3.3 Multifunction display compatibility on page 21
- 3.4 Multifunction display software requirements on page 22
- 3.5 Tools required on page 23
- 3.6 Typical systems on page 23
- 3.7 Product dimensions on page 25
- 3.8 Location requirements on page 26
- 3.9 Quantum Wi-Fi only installation requirements on page 28

3.1 Installation checklist

Installation includes the following activities:

Installation Task	
1.	Plan your system.
2.	Obtain all required equipment and tools.
3.	Site all equipment.
4.	Route all cables.
5.	Drill cable and mounting holes.
6.	Make all connections into equipment.
7.	Secure all equipment in place.
8.	Power on and test the system.

Schematic diagram

A schematic diagram is an essential part of planning any installation. It is also useful for any future additions or maintenance of the system. The diagram should include:

- Location of all components.
- Connectors, cable types, routes and lengths.

Warnings and cautions

Important: Before proceeding, ensure that you have read and understood the warnings and cautions provided in the [Chapter 1 Important information](#) section of this document.

3.2 Required additional components

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

- Compatible Raymarine multifunction display. Refer to [p.21 – Compatible multifunction displays](#) for a list of compatible multifunction displays.
- Optional data cable (NOT applicable to Wi-Fi only variant). Refer to [p.93 – Spares and accessories](#) for suitable cables and adaptors for existing cable installations. (The Quantum™ scanner is Wi-Fi-enabled, and can be operated without a fixed data cable.)

Radar target acquisition data source requirements

Radar target acquisition requires the following data sources to be available on your system (e.g. connected to your multifunction display, via SeaTalkng® or NMEA 0183).

Data type	Example data source
COG (Course Over Ground)	GPS or GNSS receiver (MFD internal receiver or external receiver).
SOG (Speed Over Ground)	GPS or GNSS receiver (MFD internal receiver or external receiver).
HDG / HDT (True Heading)	Compass or Autopilot sensor providing Fastheading data (e.g. Evolution EV-1 / EV-2).

Operation instructions

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

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

Retain your Wi-Fi passcode

To connect to the Radar using Wi-Fi (wireless), you will need to know the unit's **SSID**, and **Passcode**.

Both the SSID and Passcode are provided on the serial number label on the underside of the unit, and on spare serial number labels supplied in the box. You may wish to make a separate note of this information and keep in a secure location. You should also keep the Radar scanner packaging in a safe place for future reference.

The following information is applicable only to Quantum units running software version 1.62 or later, and Quantum Doppler units running software version 2.43 or later:

In the event that you misplace the SSID and Passcode before the initial pairing, you can power on your Quantum unit and determine the SSID by reviewing all available Wi-Fi networks, using a smartphone, tablet or laptop PC. An unpaired Quantum unit will advertise its SSID periodically in a 10-second cycle. This may take up to 3 minutes.

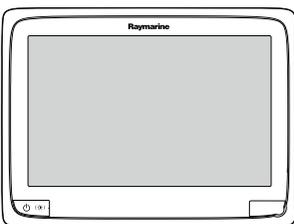
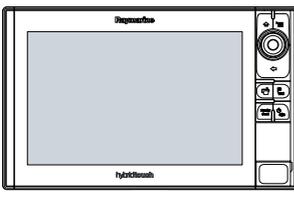
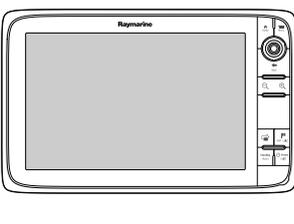
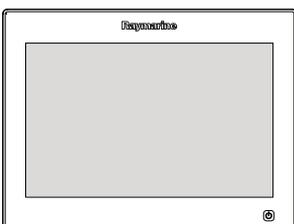
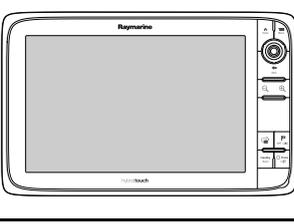
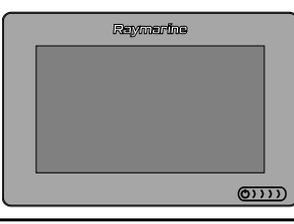
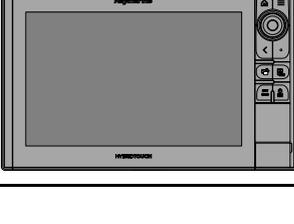
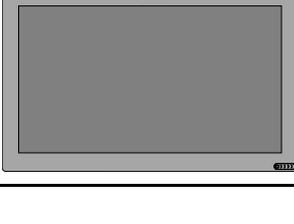
Once you've obtained the SSID, the next step is to contact [p.86 – Raymarine product support](#), who can then provide you with the passcode associated with your SSID.

3.3 Multifunction display compatibility

Compatible multifunction displays

This product is compatible with only LightHouse™-powered Raymarine multifunction displays.

LightHouse™ MFDs:

	Product variants		Product variants
	a Series		eS Series
	c Series		gS Series
	e Series		Axiom
	Axiom Pro / Pro-S		Axiom XL

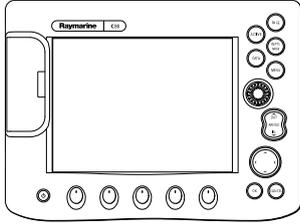
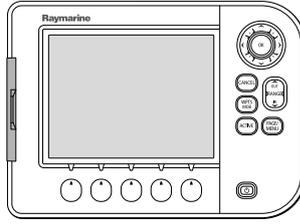
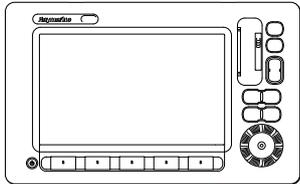
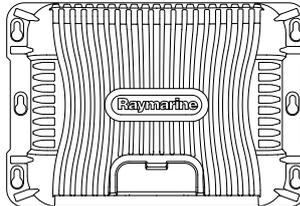
Non-Wi-Fi multifunction displays

E70076 (a65) and E70077 (a67) a Series LightHouse™ multifunction displays do NOT support Wi-Fi connections. These displays are NOT compatible with products that connect via Wi-Fi only.

Incompatible multifunction displays

This product is NOT compatible with the following legacy Raymarine multifunction displays.

Legacy MFDs

	Product variants		Product variants
	C-Series Classic C70, C80, C120 E-Series Classic E80, E120		A-Series Classic A50, A50D, A57D, A70, A70D
	C-Series Widescreen C90W, C120W, C140W E-Series Widescreen E90W, E120W, E140W		G-Series GPM400

3.4 Multifunction display software requirements

The operation of this product requires that your MFD is running Raymarine LightHouse™ software.

MFD software	Required version
LightHouse™ 2	17 or later
LightHouse™ 3	3.1 or later

Note:

- The latest MFD software can be obtained by visiting www.raymarine.com/software.
- The website also includes information on how to upgrade your product software.

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.

Software updates

The software running on the product can be updated.

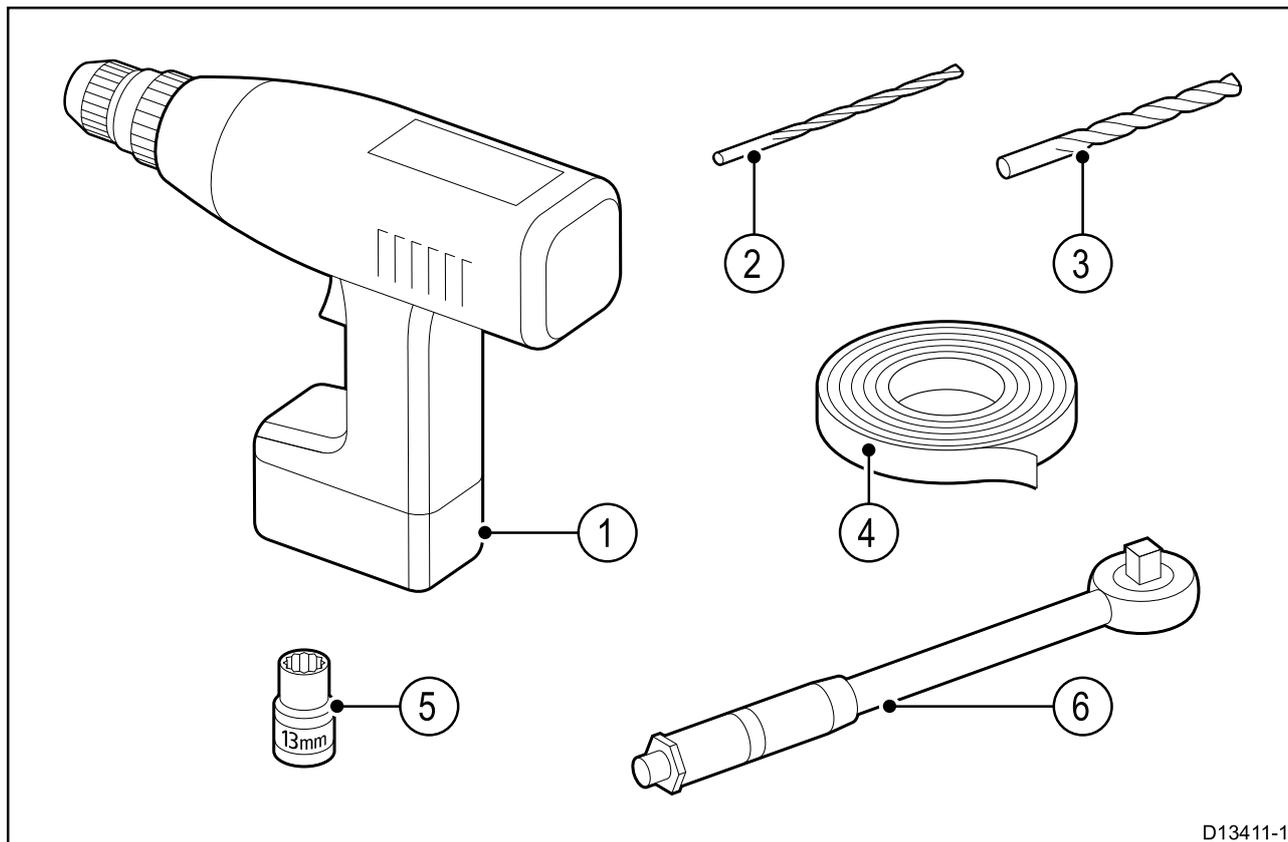
- Raymarine periodically releases software updates to improve product performance and add new features.
- The software on many products can be updated using a connected and compatible multifunction display (MFD).
- Refer to www.raymarine.com/software/ for the latest software updates and the software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

3.5 Tools required

Product installation requires the following tools:



D13411-1

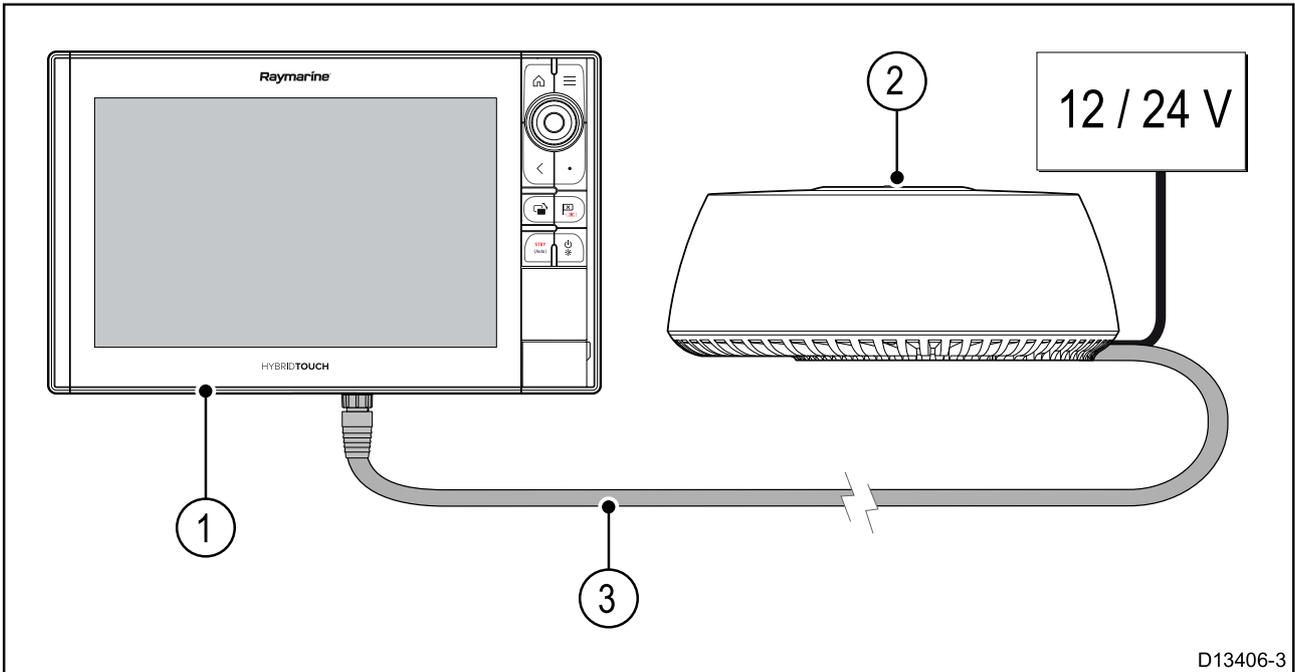
Item number	Description	Quantity
1	Power drill	1
2	3 mm drill bit	1
3	10 mm drill bit	1
4	Adhesive tape	1
5	13 mm socket	1
6	Torque wrench	1

3.6 Typical systems

Note: The following illustrations show the various products that can be connected in a typical system. These systems are shown as an example only and may differ from your planned installation.

- For information on how to connect the products, refer to the relevant *Cables and connections* section for your Quantum variant.
- For information on available cables and accessories, refer to [p.93 – Spares and accessories](#)

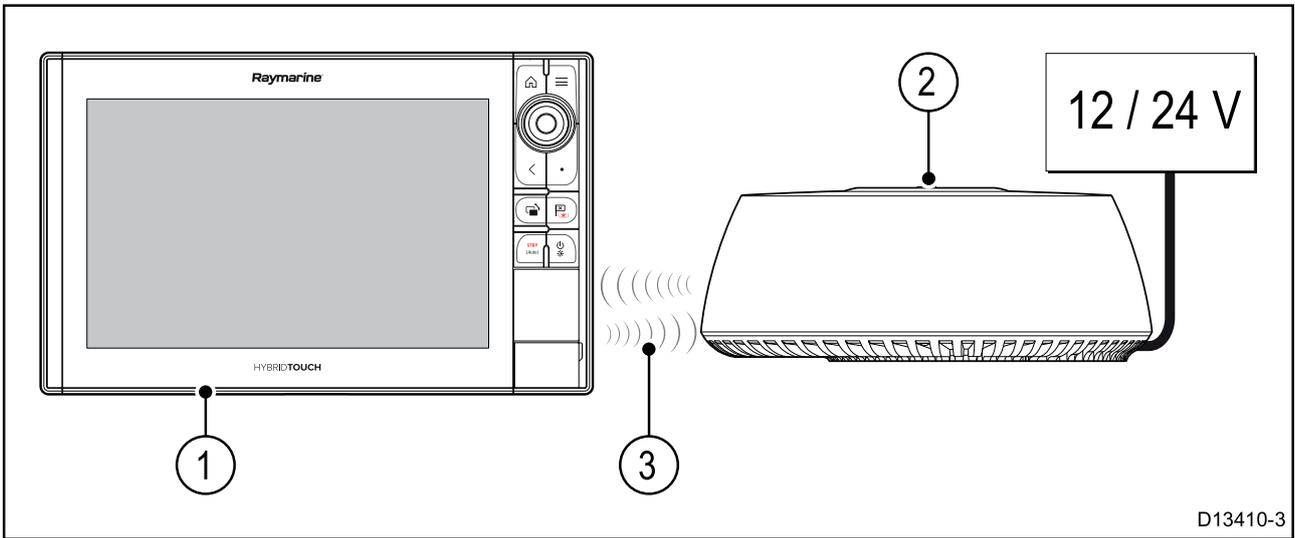
Example: basic Radar system (wired data connection)



Note: This example is NOT applicable to the Wi-Fi-only Quantum™ variant.

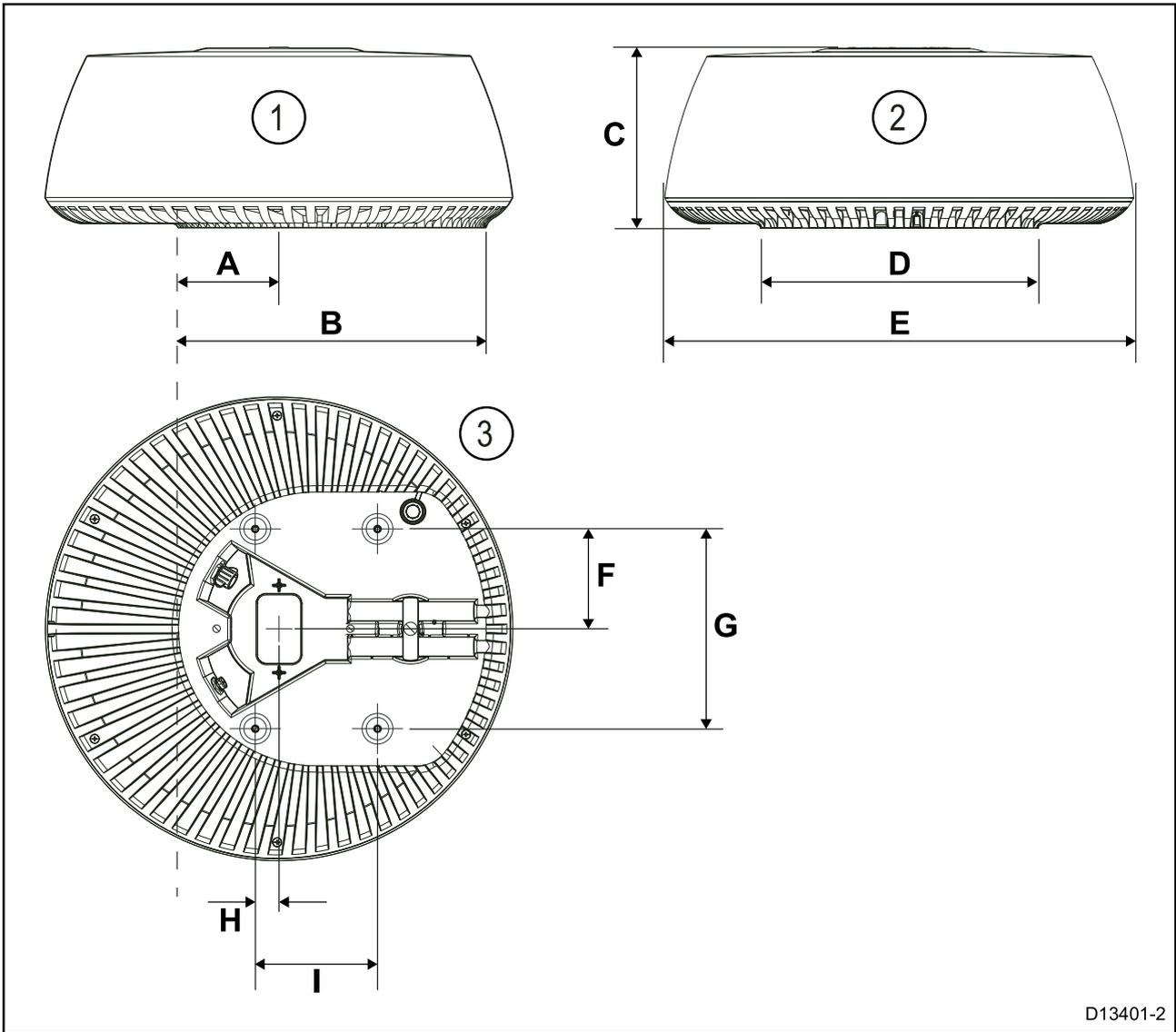
Item	Description
1	Multifunction display
2	Quantum™ Radome
3	RayNet data cable

Example: basic Radar system (wireless data connection)



Item	Description
1	Multifunction display
2	Quantum™ Radome
3	Wi-Fi datalink

3.7 Product dimensions



D13401-2

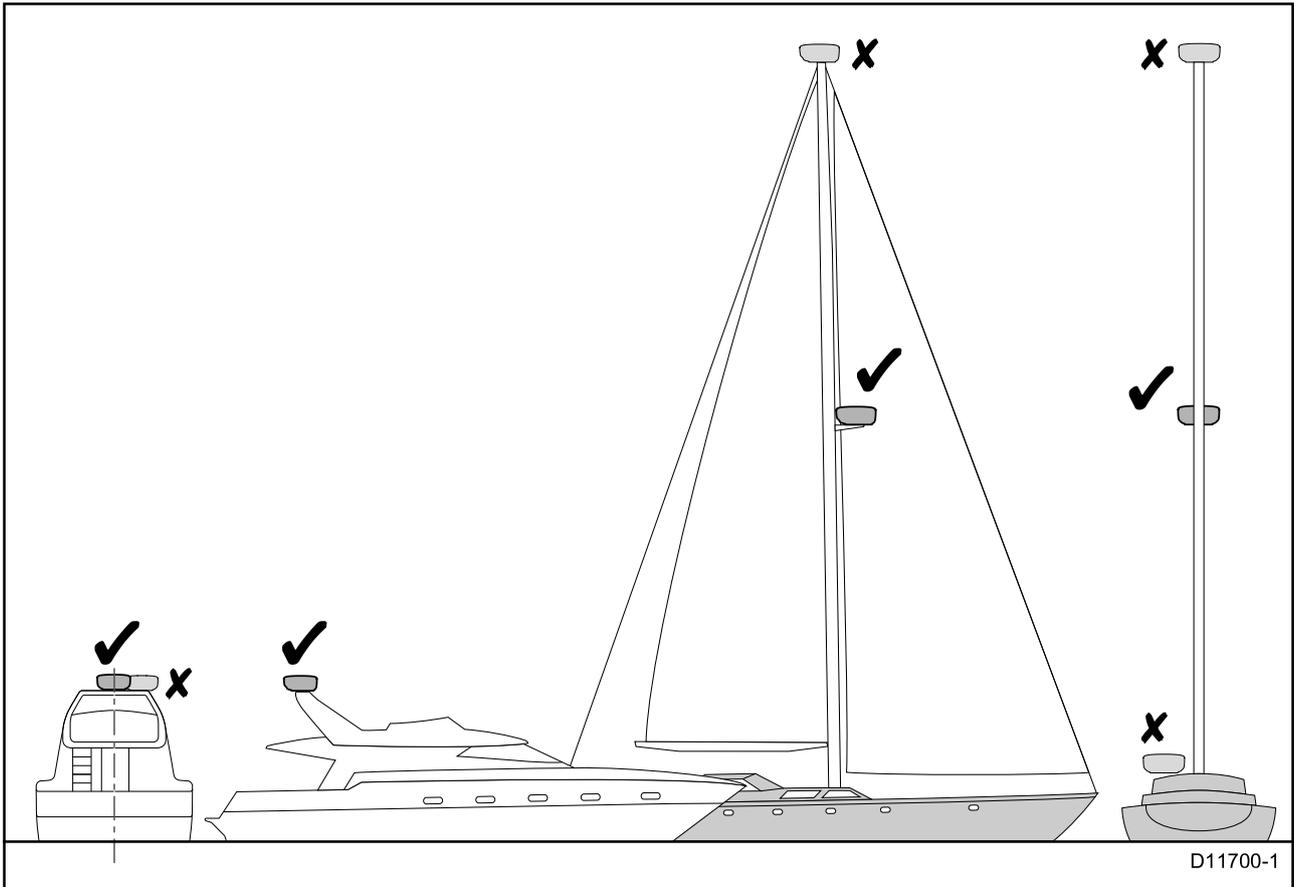
1. Side view of scanner.
2. Rear view of scanner.
3. Underside view of scanner.

Dimension	Measurement	Description
A	116.0 mm (4.57 in.)	Distance from centerline of scanner to front of mounting base.
B	355.0 mm (13.98 in.)	Distance from rear of mounting base to front of mounting base.
C	209.5 mm (8.25 in.)	Height of radar scanner.
D	319.5 mm (12.58 in.)	Mounting base width (rear of unit).
E	541.0 mm (21.30 in.)	Width of scanner.
F	116.5 mm (4.59 in.)	Distance from centerline to rear mounting hole.
G	233.0 mm (9.17 in.)	Distance between mounting holes.

Dimension	Measurement	Description
H	27.5 mm (1.08 in.)	Distance from centerline to front mounting hole.
I	141.5 mm (5.57 in.)	Distance between front and rear mounting holes.

3.8 Location requirements

The optimum height for the Quantum™ scanner is a location that is high enough above the waterline to give a long range line-of-sight to the horizon, but not so high as to be adversely affected by the vessel's pitching and rolling.



The scanner must also be mounted where it is:

- Above head height.
- Easily accessible.
- As near as possible to the vessel's centerline.
- On a rigid and stable platform, capable of securely supporting the scanner under seagoing conditions.
- Clear of large objects such as the flybridge, large engine stacks, searchlights, horns, masts etc. (see [p.26 – Shadow areas and false echoes](#) for additional information).
- Clear of heat and fumes.
- At least 1 m (3 ft) from a magnetic compass or other scanners.

Shadow areas and false echoes

Mount the Radar scanner away from large structures or equipment, such as engine stacks, searchlights, horns, or masts. These objects may cause shadow areas and false echoes. For example, if you mount the Radar scanner on a mast, echoes from other targets may be reflected from

the mast. Wet sails may also cause shadow areas, so Radar performance may be reduced in the rain. It is particularly important to avoid shadow areas near the bow. Raising or even lowering the Radar scanner may help to reduce these effects.

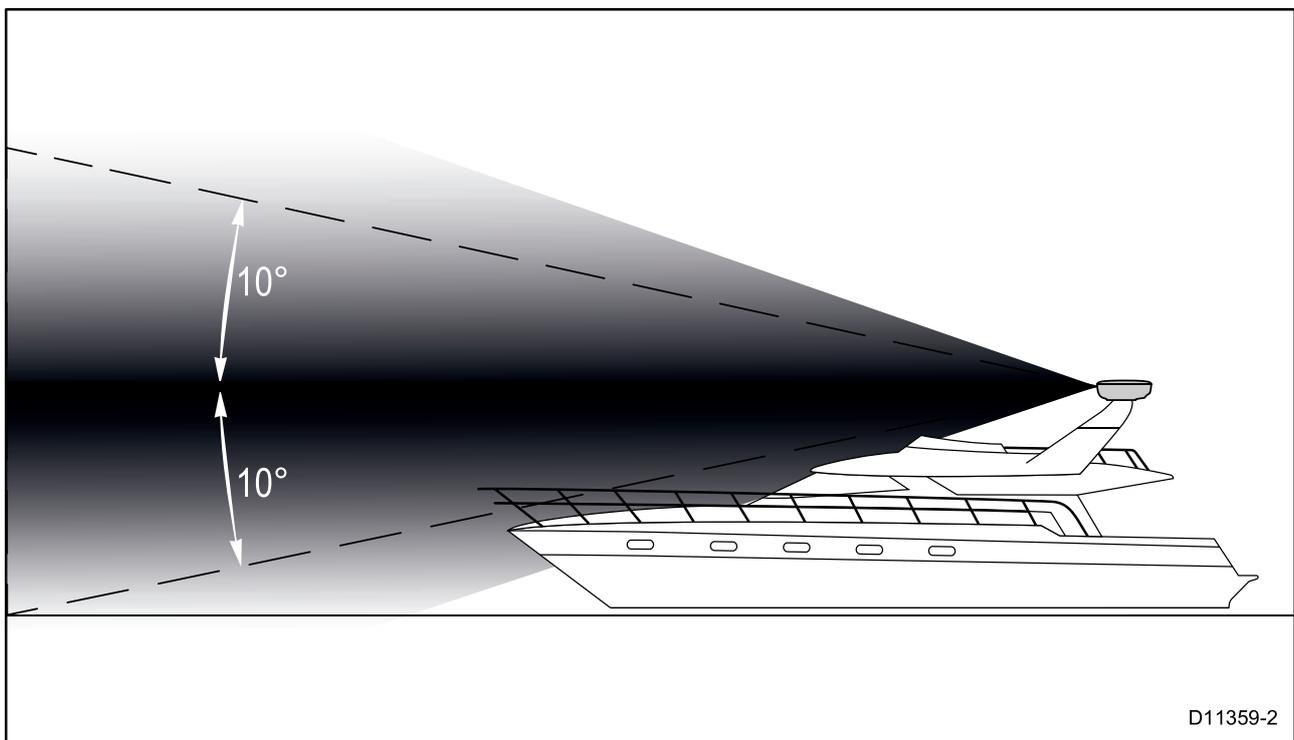
In shadow areas beyond the obstruction there will be a reduction of the beam intensity. There may be a blind sector if the beam intensity is not sufficient to obtain an echo from an object. This may occur even at close range. For this reason the angular width and relative bearing of any shadow area must be determined at installation.

You may be able to detect shadow areas or false echoes on your multifunction display. For example, sea clutter can be used as a good indicator of blind arcs. Dark sectors on the Radar display indicate possible shadowed areas. This information should be posted near the display unit and operators must be alert for targets in these blind areas.

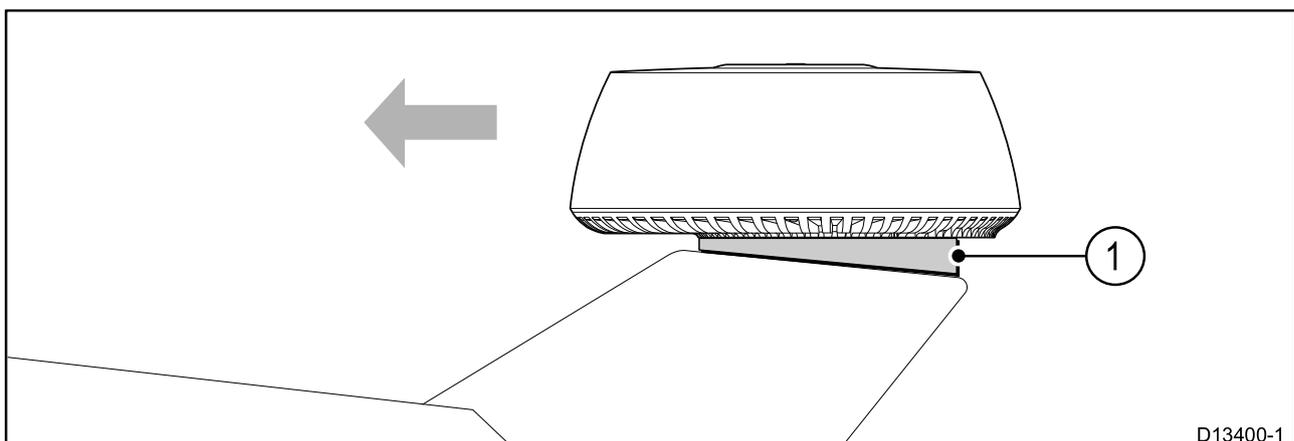
Radar scanner mounting angle

Ensure the Radar scanner rotates parallel to the water line.

The Radar beam from the Radar scanner is approximately 20° wide in the vertical direction, to give good target detection even when your vessel pitches and rolls.



Planing hull vessels, and some displacement hull vessels, adopt a higher bow angle when the vessel is at cruising speed. This may raise the Radar's main radiation angle, and can cause poor detection of nearby targets. It may be necessary to compensate for the bow rise to ensure optimum target detection. This can be achieved by fitting a wedge or washers between the mounting platform and the base of the Radar scanner, so that the Radar beam remains parallel to the water line when the vessel's bow rises at cruising speed.



Item	Description
1	Wedge or washers

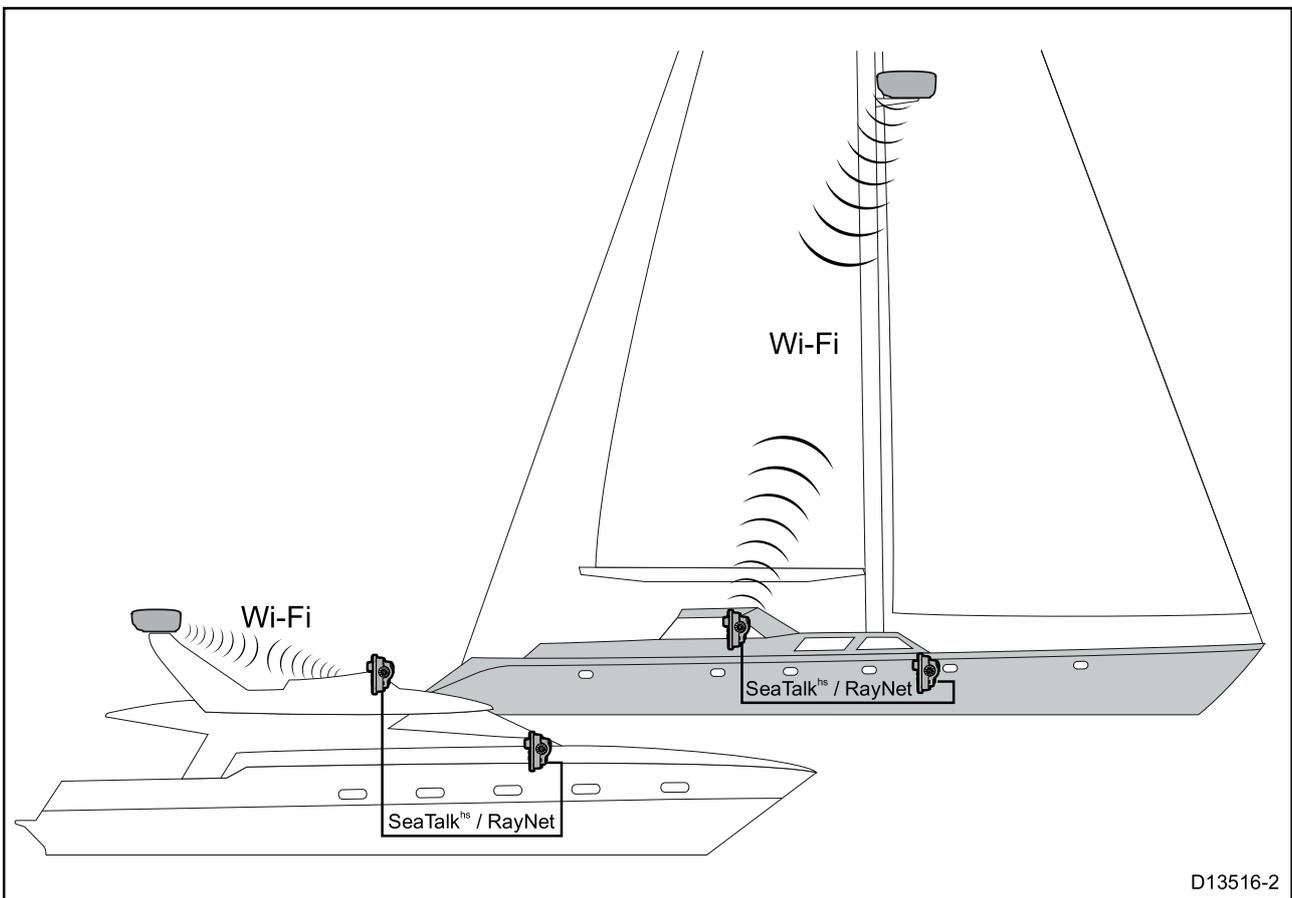
Multiple Radar scanners – location requirements

Important location considerations when installing multiple radar scanners on the same vessel.

- Scanners should be mounted above each other, vertically separated by at least 0.5 m (1.6 ft). This applies to all installation locations on the vessel.
- Multiple scanners should be mounted in a way that minimizes interference between the vertical beamwidths of the 2 scanners.
- In all cases, you should aim to achieve as much physical separation as possible, to minimize any potential interference.

3.9 Quantum Wi-Fi only installation requirements

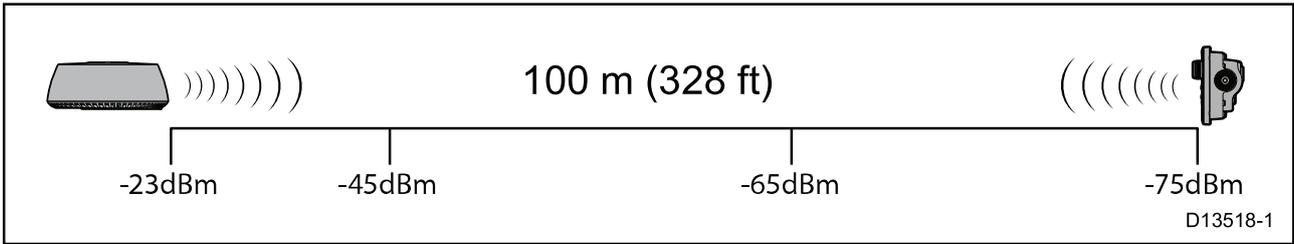
Whilst the Wi-Fi performance has been tested and proven in many different installation scenarios, the requirements below must be taken into consideration before choosing a location for the Quantum™ Radar.



In systems with multiple MFDs, the Radar should be connected to the MFDs that are located closest to it, or to the MFDs with the clearest line of sight to the Radar.

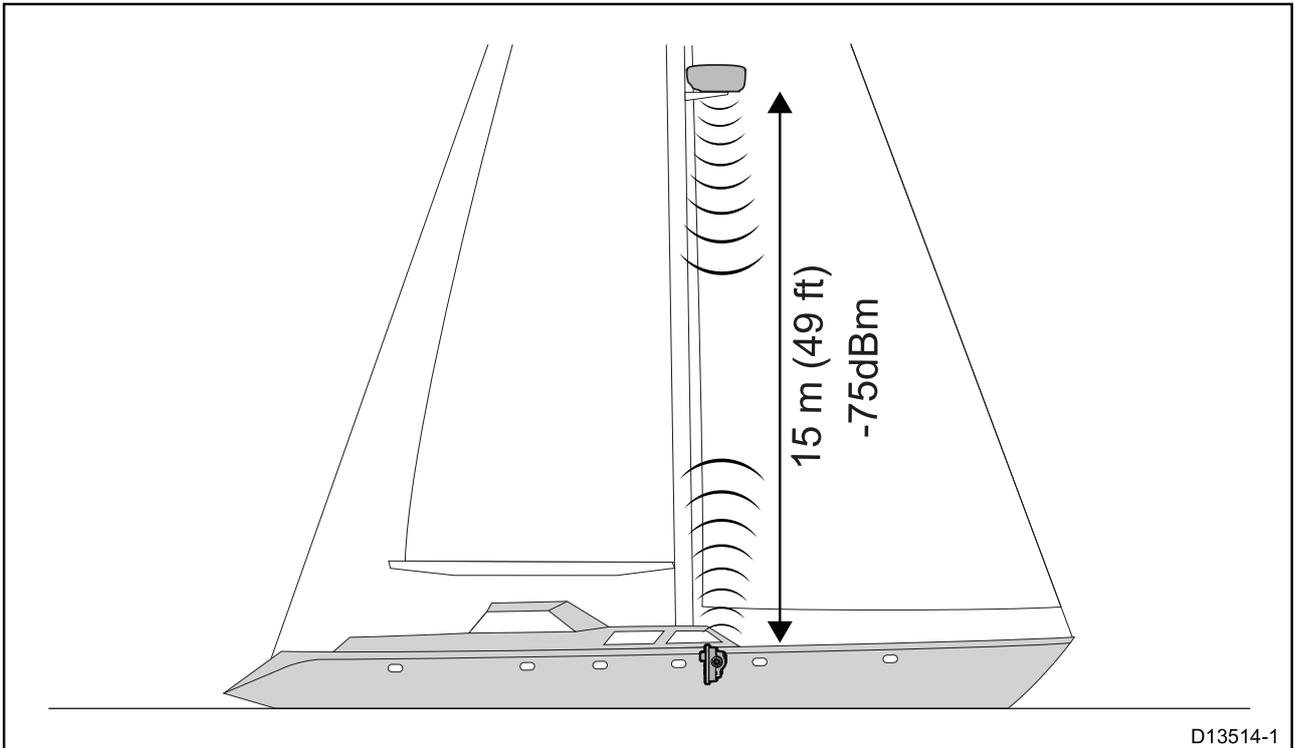
The maximum distance between MFD and Radar will vary depending on the installation environment (i.e. obstructions and interference).

Example 1 – Open air, line-of-sight in optimum conditions



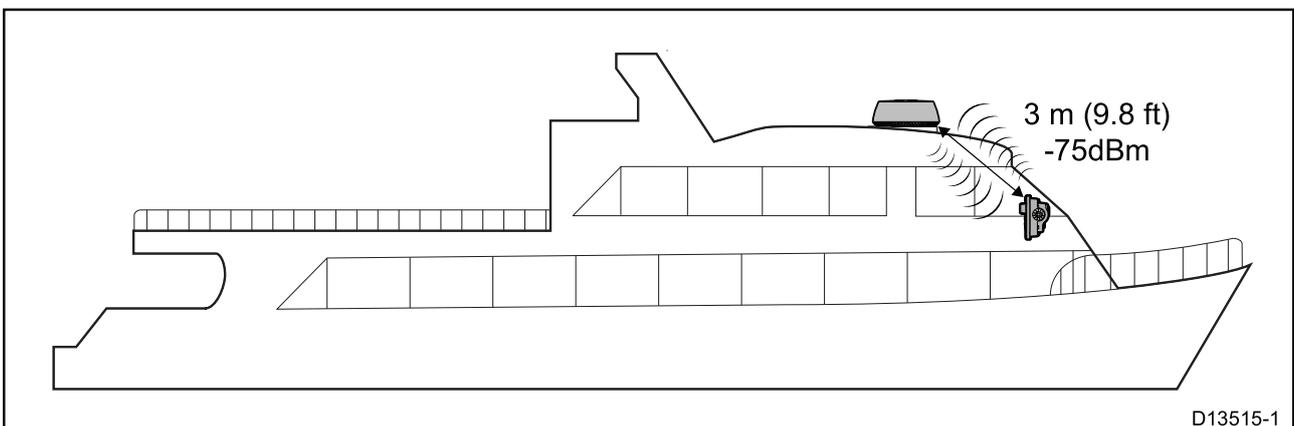
In optimum open air, clear line-of-sight conditions a reliable connection is possible at distances up to 100 m (328 ft). However, there are many factors that can influence this, so a pre-installation site survey should always be performed. For reliable Wi-Fi performance the signal strength should be better than -75dBm. The closer the signal is to zero the better the Wi-Fi performance will be (e.g. -40dBm is better than -75dBm). You can assess the potential signal strength at the desired location during the Pre-installation Site Survey using a Wi-Fi Analyzer app on your smart device.

Example 2 – Signal passing through Fiberglass coach roof



In the example above the maximum distance with acceptable Wi-Fi performance is 15 m (49 ft), due to the heavy fiberglass coach roof that the signal has to pass through.

Example 3 – Signal passing through heavy structure



In the example above the maximum distance with acceptable Wi-Fi performance is 3 m (9.8 ft), due to the metal roof that the signal has to pass through.

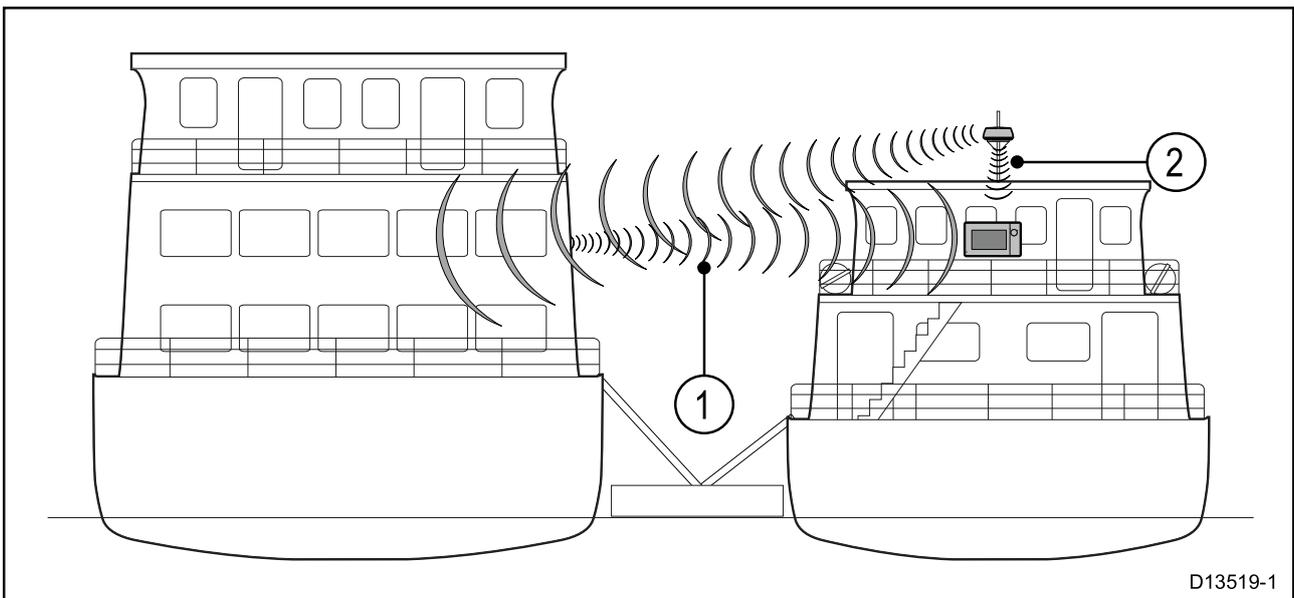
Obstacles in the direct line of sight between the Radar and MFD will further impact Wi-Fi Performance. The impact of each obstacle is usually minimal, however the effect is cumulative. Obstacles can include but are not limited to:

- **Vessel structure** — Where the Wi-Fi signal passes through a vessel bulkhead or a coach roof, the Wi-Fi performance will be impacted. Depending on the material and thickness of the structure the impact may be severe; for example, a thick steel bulkhead may completely block the Wi-Fi signal.
- **Radar mounting** — The type of installation can impact performance; for example, mounting on a solid steel platform will have a greater impact on performance than mounting on a bar-style mount.
- **Electrical equipment and other objects** — Any object in the direct line-of-sight between the Radar and MFD can impact Wi-Fi performance. Electrical, electronic and electromagnetic devices will have a greater impact than furniture.
- **MFD installation** — MFD installation can also impact Wi-Fi performance; for example, if the MFD is surface mounted in a steel construction dash, the Wi-Fi performance will be impacted.

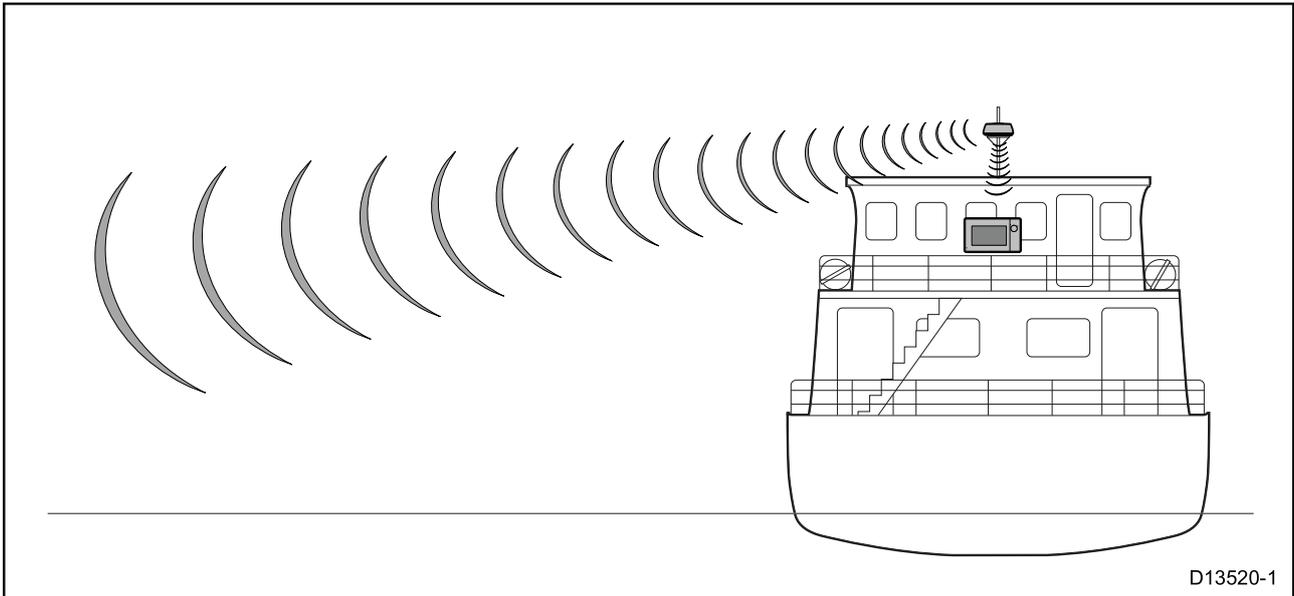
Wi-Fi Signal Reflection

When establishing a location for your Quantum Radar, that will be connected using a Wi-Fi connection, it is important to consider the effects your surroundings can have on the Wi-Fi signal. The Wi-Fi signal will reflect or ‘bounce’ off nearby objects which may create an easier path for the signal to take, whilst your connection may appear reliable it may quickly degrade when you take your vessel out into open water.

Example



1. In this example the Wi-Fi signal is bounced off a nearby vessel and back through the windows on the bridge, this provides an easier path than passing through the metal roof.
2. In this example the Wi-Fi signal is reduced when passing through the metal roof. This, however may be the only path the signal can take when out in open water.



Warning: Quantum Wi-Fi connection

During installation there will usually be structure that affects the Wi-Fi signal. Before using the Radar for navigation, ensure you test the reliability of your Wi-Fi connection in open waters and away from any other vessels or structure.

Wireless location requirements

A number of factors can influence wireless performance. It is important to ensure you test the connection performance at the desired location before installing wireless-enabled products.

Distance

The distance between wireless products should always be kept to a minimum. Do not exceed the maximum stated range of your wireless product (maximum range will vary for each device).

Wireless performance degrades over distance, so products farther away will receive less network bandwidth. Products installed close to their maximum wireless range may experience slow connection speeds, signal dropouts, or not being able to connect at all.

Line of sight

For best results the wireless product should have a clear, direct line of sight to the product it will be connected to. Any physical obstructions can degrade or even block the wireless signal.

The construction of your vessel can also have an impact on wireless performance. For example, metal structural bulkheads and roofing will reduce — and in certain situations — block the wireless signal.

If the wireless signal passes through a bulkhead containing power cables this can also degrade wireless performance.

Reflective surfaces such as metal surfaces, some types of glass and even mirrors can drastically affect performance or even block the wireless signal.

Interference and other equipment

Wireless products should be installed at least 1m (3 ft) away from:

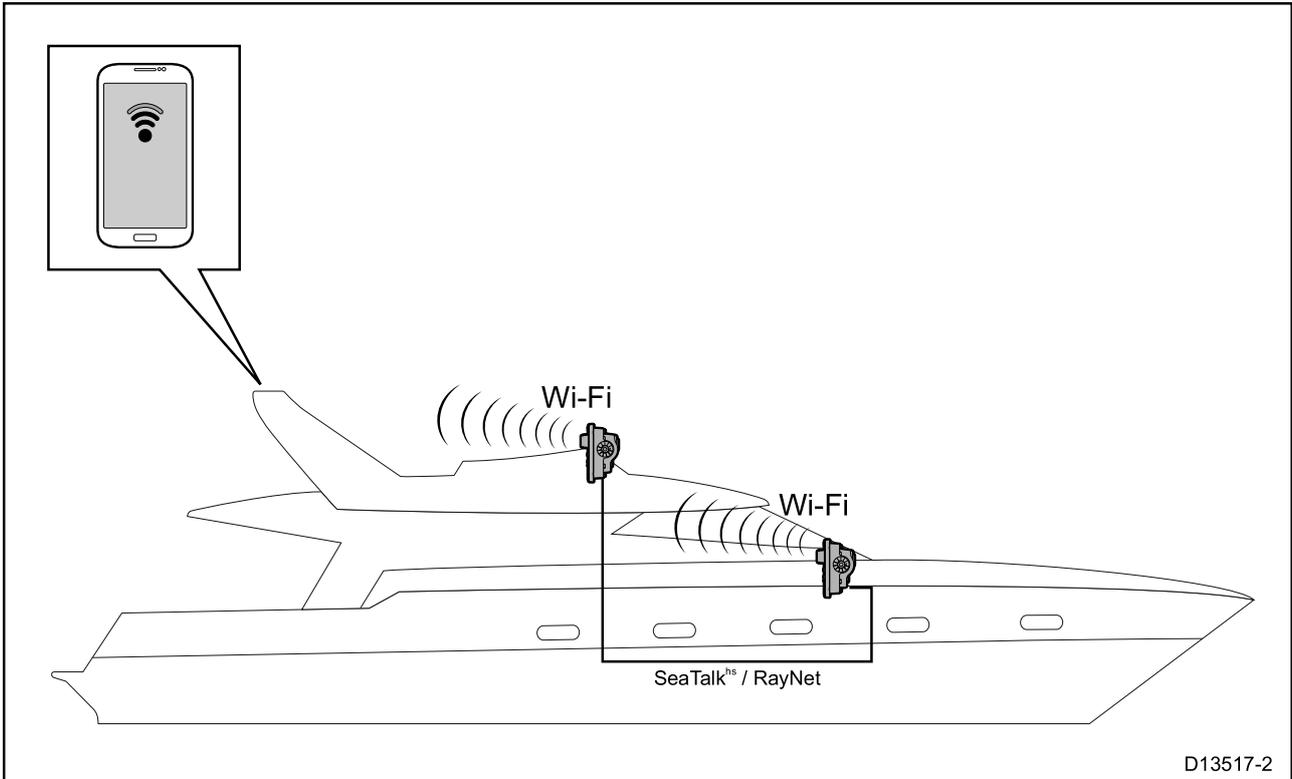
- Other wireless-enabled products.
- Transmitting products that send wireless signals in the same frequency range.
- Other electrical, electronic or electromagnetic equipment that may generate interference.

Interference from other people's wireless devices can also cause interference with your products. You can use a third-party wireless analyzer tool / smartphone app to assess the best wireless channel to use (e.g. a channel not in use or one used by the least number of devices).

Pre-installation site survey — Wi-Fi Analyzer

Before installing a Quantum Radar, that will be connected using Wi-Fi, a site survey should be performed to ensure the Wi-Fi Signal strength is sufficient to maintain a reliable connection.

It is recommended that you perform the site survey using a smart device and a Wi-Fi Analyzer app (e.g. Wi-Fi Analyzer by Farproc for android devices).



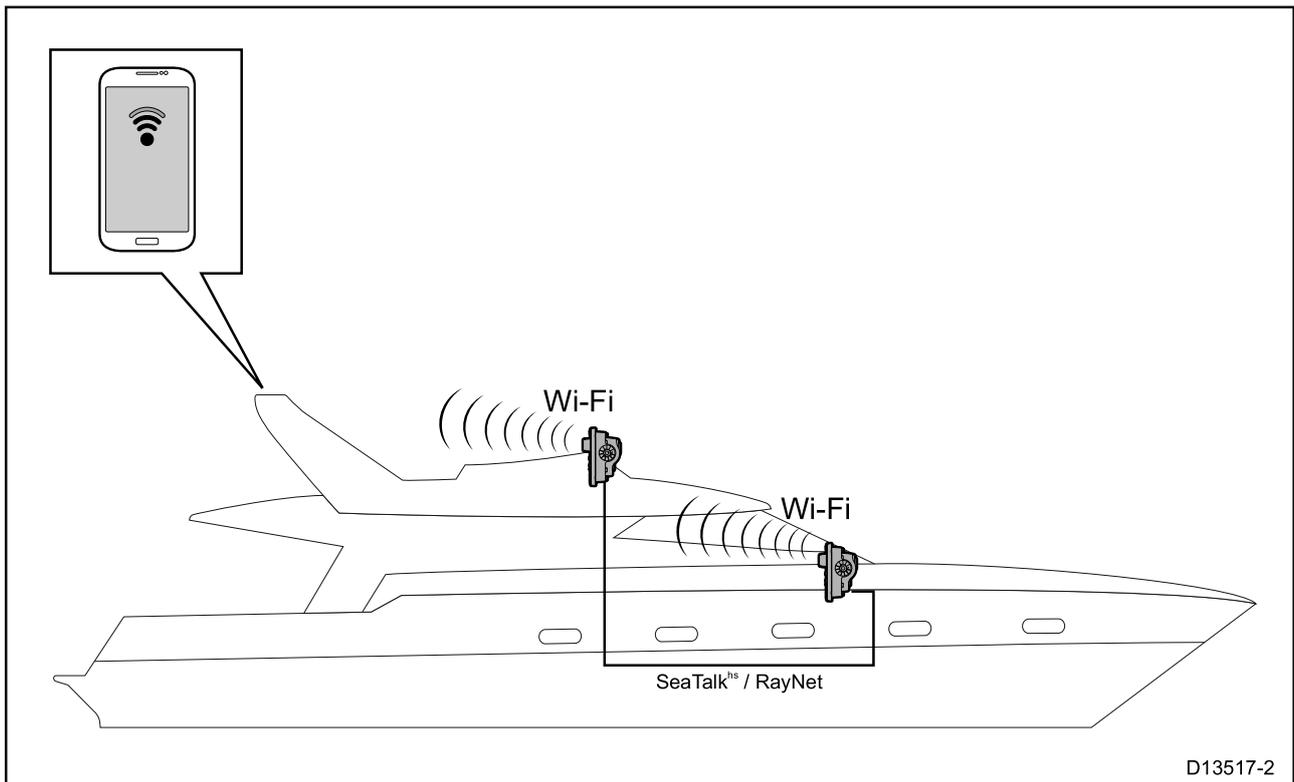
1. Install the Wi-Fi Analyzer app on your smart device.
2. Enable your MFDs Wi-Fi connection: (**Homescreen > Set-up > Wireless connection > Wi-Fi > Wi-Fi: On**)
3. Make a note of the MFDs Wi-Fi Name (**Homescreen > Set-up > Wireless connection > Wi-Fi > Wi-Fi Sharing > Wi-Fi Name**).
4. Go to the location you have chosen for your Radar.
5. Open the Wi-Fi Analyzer app on your smart device and scan available networks.
6. Establish the signal strength of your MFDs Wi-Fi network at the intended install location.

For reliable Wi-Fi performance the signal strength should be better than -75dBm , the closer the signal is to zero the better the Wi-Fi performance will be (e.g. -40dBm is better than -75dBm).

7. If you have a weak or intermittent signal then you will need to investigate further, please refer to the Wi-Fi location requirements guide to help establish what may be causing the problem.
8. For networks with multiple MFDs, repeat steps 2 to 7 for each MFD in your network.

Pre-installation site survey — Raymarine app

You can also use Raymarine apps such as **RayControl** or **RayView** to assess the reliability of the Wi-Fi connection at the desired installation location.

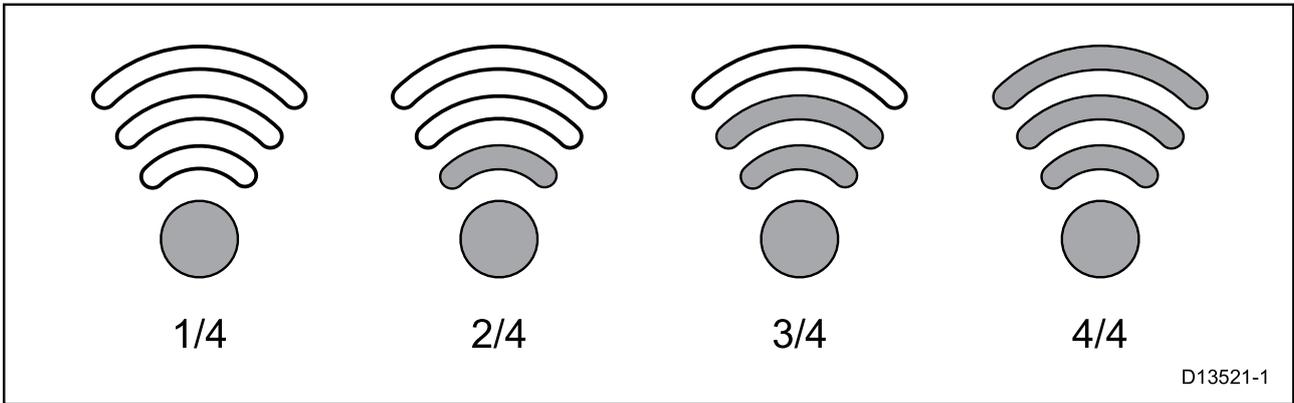


1. Enable your MFDs Wi-Fi connection: (**Homescreen > Set-up > Wireless connection > Wi-Fi > Wi-Fi: On**)
2. Enable 'Viewing only' or 'Remote control' from the Mobile apps menu: (**Homescreen > Set-up > Wireless connection > Wi-Fi > Wi-Fi Sharing > Mobile apps**).
3. Make a note of the MFDs Wi-Fi Name (**Homescreen > Set-up > Wireless connection > Wi-Fi > Wi-Fi Sharing > Wi-Fi Name**).
4. Go to the location you have chosen for your Radar.
5. Using your smart device, search for available Wi-Fi networks.
6. Find your MFDs network and check the signal strength reported by your device.
7. If you have a strong signal strength, open a Raymarine mobile app such as **RayView** or **RayControl** and check functionality at the desired location. If you do not experience any performance issues running the app then you can proceed with the installation.
8. If you have a weak or intermittent signal then you will need to investigate further, please refer to the Wi-Fi location requirements guide to help establish what may be causing the problem.
9. For networks with multiple MFDs, repeat steps 1 to 9 for each MFD in your network.

Wi-Fi signal strength

Wi-Fi signal strength is measured in decibel-milliwatts (dBm). The signal strength of the network you are currently connected to is usually represented graphically by a Wi-Fi symbol.

The signal strength range represented by each filled bar is determined independently by each device manufacturer. However, in general the performance will be similar.



- **1/4** — Unable to maintain a connection, usually accompanied by very poor connection speed (**LightHouse™** MFD: -150dBm or worse).
- **2/4** — Intermittent disconnects and reconnects, usually accompanied by a slow connection speed (**LightHouse™** MFD: -80dBm to -149dBm).
- **3/4** — Reliable connection with good connection speed (**LightHouse™** MFD: -70dBm to -79dBm).
- **4/4** — Reliable connection, excellent connection speed (**LightHouse™** MFD: -55dBm or better).

Chapter 4: Cables and connections (Quantum variant with RayNet)

Chapter contents

- 4.1 Wi-Fi only Quantum variants on page 36
- 4.2 General cabling guidance on page 36
- 4.3 Connections overview on page 38
- 4.4 Power connection on page 44
- 4.5 Network connection on page 48

4.1 Wi-Fi only Quantum variants

Important: This section does NOT apply to Wi-Fi-only Quantum variants. For information applicable to your product variant, refer to: [p.53 – Cables and connections \(Quantum variant with Wi-Fi only\)](#)

4.2 General cabling guidance

Cable types and length

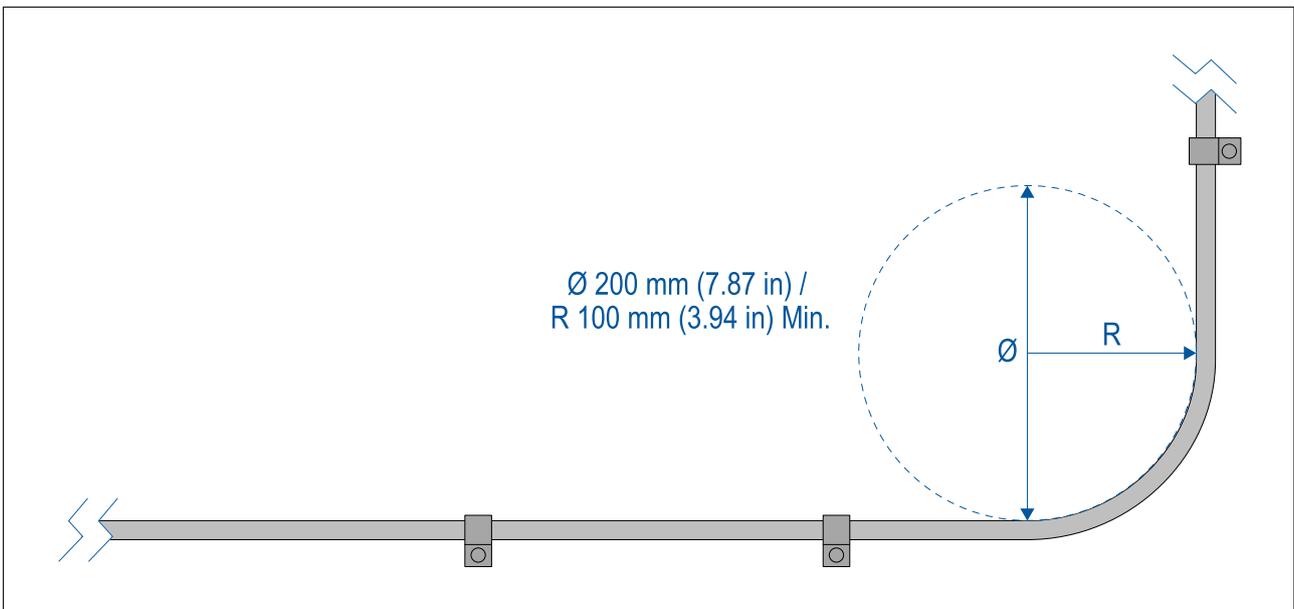
It is important to use cables of the appropriate type and length.

- 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 (\emptyset) 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

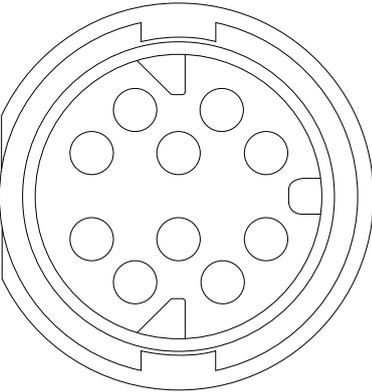
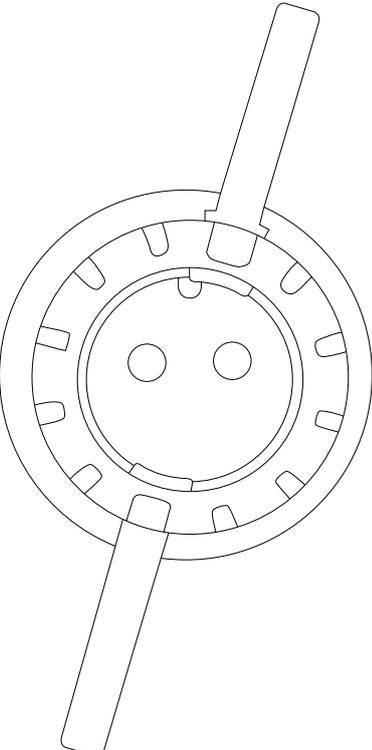
Ensure that cable shielding is not damaged during installation and that all cables are properly shielded.

Suppression ferrites

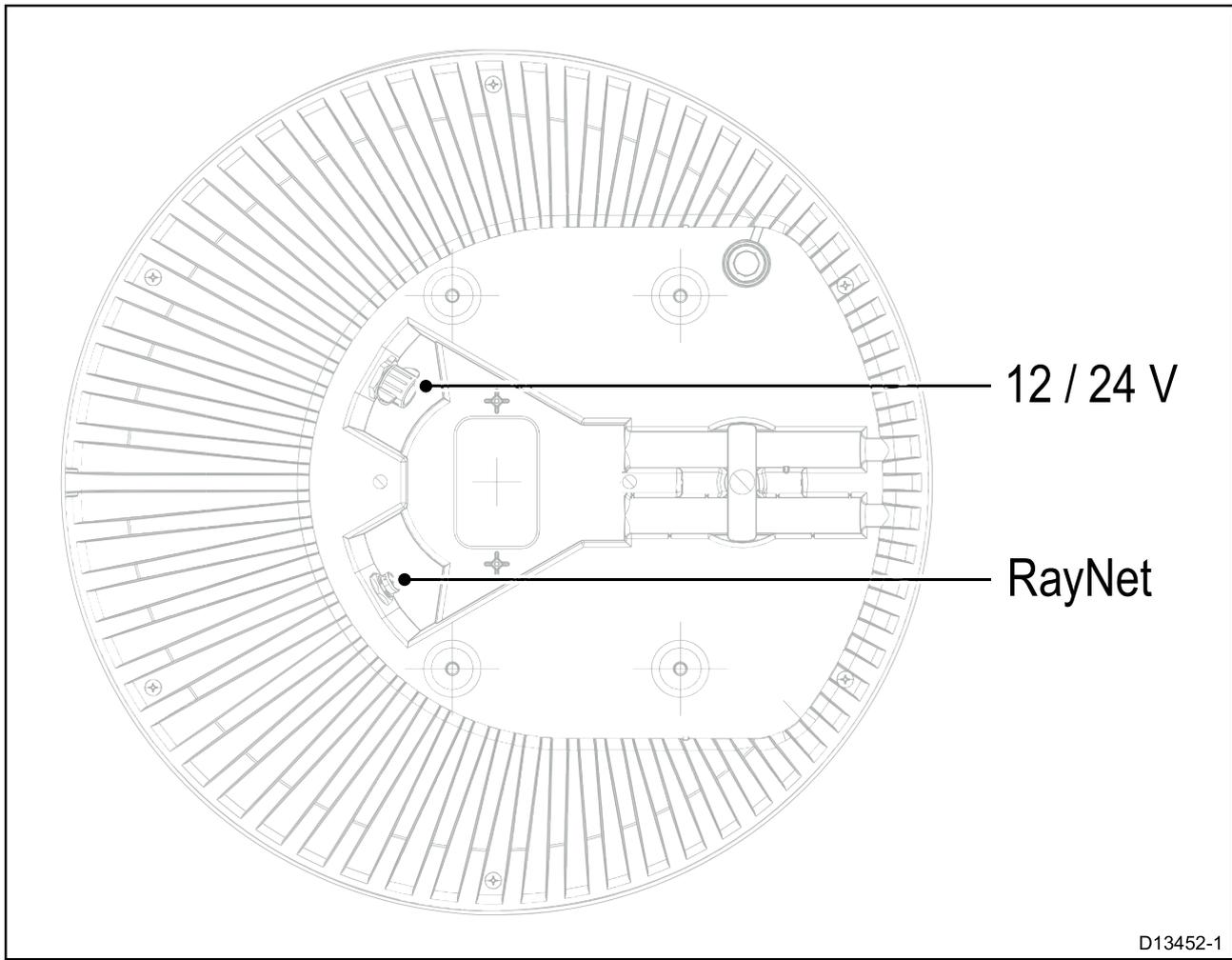
- Raymarine cables may be pre-fitted or supplied with suppression ferrites. These are important for correct EMC performance. If ferrites are supplied separately to the cables (i.e. not pre-fitted), you must fit the supplied ferrites, using the supplied instructions.
- If a ferrite has to be removed for 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.

4.3 Connections overview

Use the following information to help you identify the connections on your product.

Connector	Connects to:	Suitable cables
	RayNet network or device. Not required if connecting using Wi-Fi.	Refer to p.93 – Spares and accessories
	12 V / 24 V power supply.	Supplied with your product.

The power and data connections are located on the underside of the scanner unit, as shown in the following illustration.



D13452-1

Typical cable routing scenarios

There are 4 typical cable routing scenarios.

Note: The routing options described and illustrated in this section assume that a physical data connection is used between your Radar scanner and multifunction display (MFD). However, if the scanner is connected to your MFD via Wi-Fi, a physical RayNet connection is not required.

1. Cable routing for a scanner mounted on a platform, using separate cables for the power and data connection.
2. Cable routing for a scanner mounted on a platform, using the combined power and data cable from an existing Raymarine Digital Radar scanner installation. For this, the **A80308** Y-adapter accessory is required (not supplied with the scanner).
3. Cable routing for a scanner mounted on a pole, using separate cables for the power and data connection.
4. Cable routing for a scanner mounted on a pole, using the combined power and data cable from an existing Raymarine Digital Radar scanner installation. For this, the **A80308** Y-adapter accessory is required (not supplied with the scanner).

Cable routing — platform mount

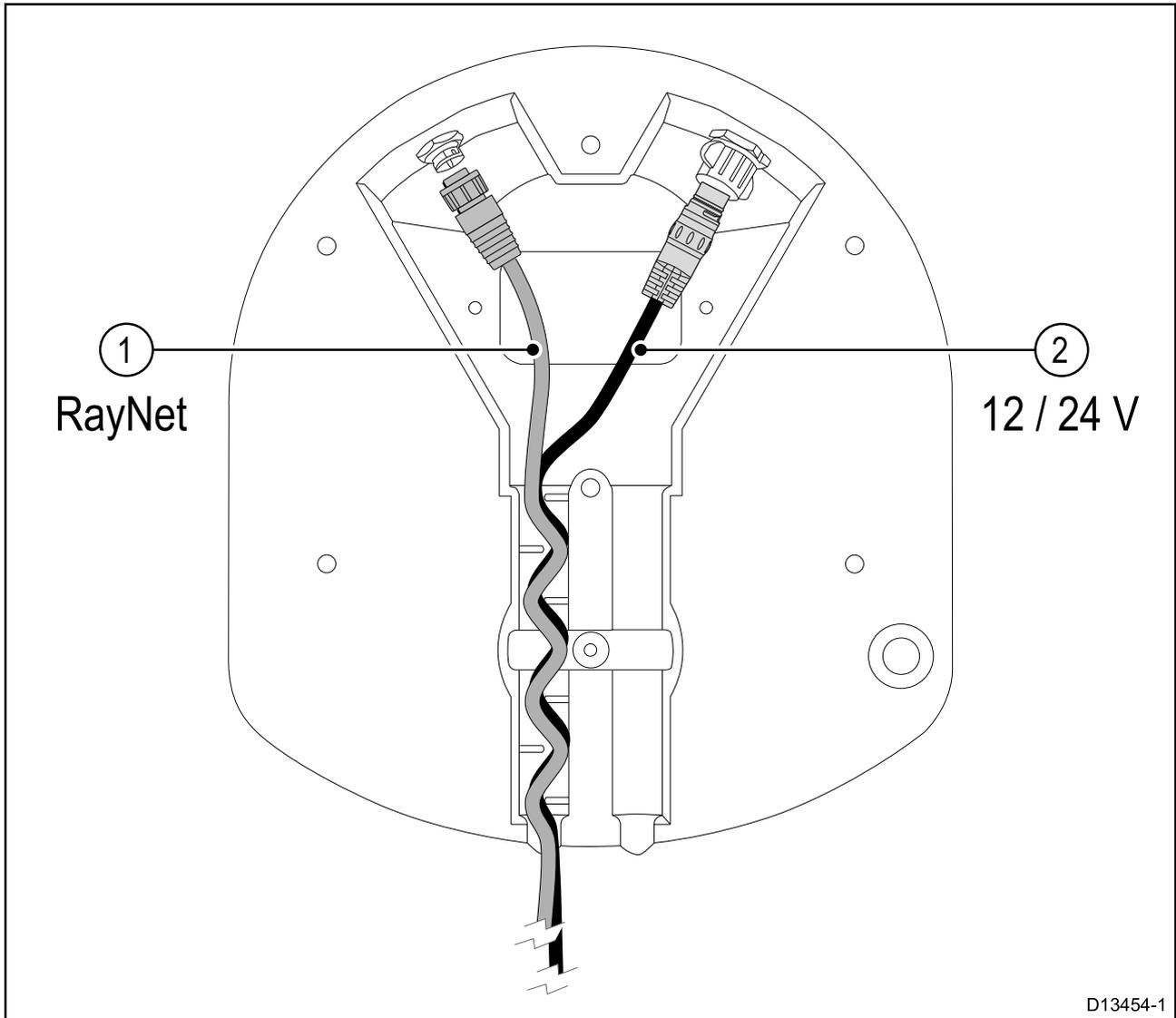
There are 2 typical cable routing scenarios for platform mount installations.

- Using separate power and data cables.
- Using an existing combined power / data cable from an older Raymarine Digital radar scanner. In this scenario, the **A80308** Y-adapter accessory is required (not supplied with the scanner).

Using separate power and data cables

Note: The routing options described and illustrated in this section assume that a physical data connection is used between your Radar scanner and multifunction display (MFD). However, if the scanner is connected to your MFD via Wi-Fi, a physical RayNet connection is not required.

The following drawing illustrates the cable routing for a scanner mounted on a platform, using separate cables for the power and data connections.

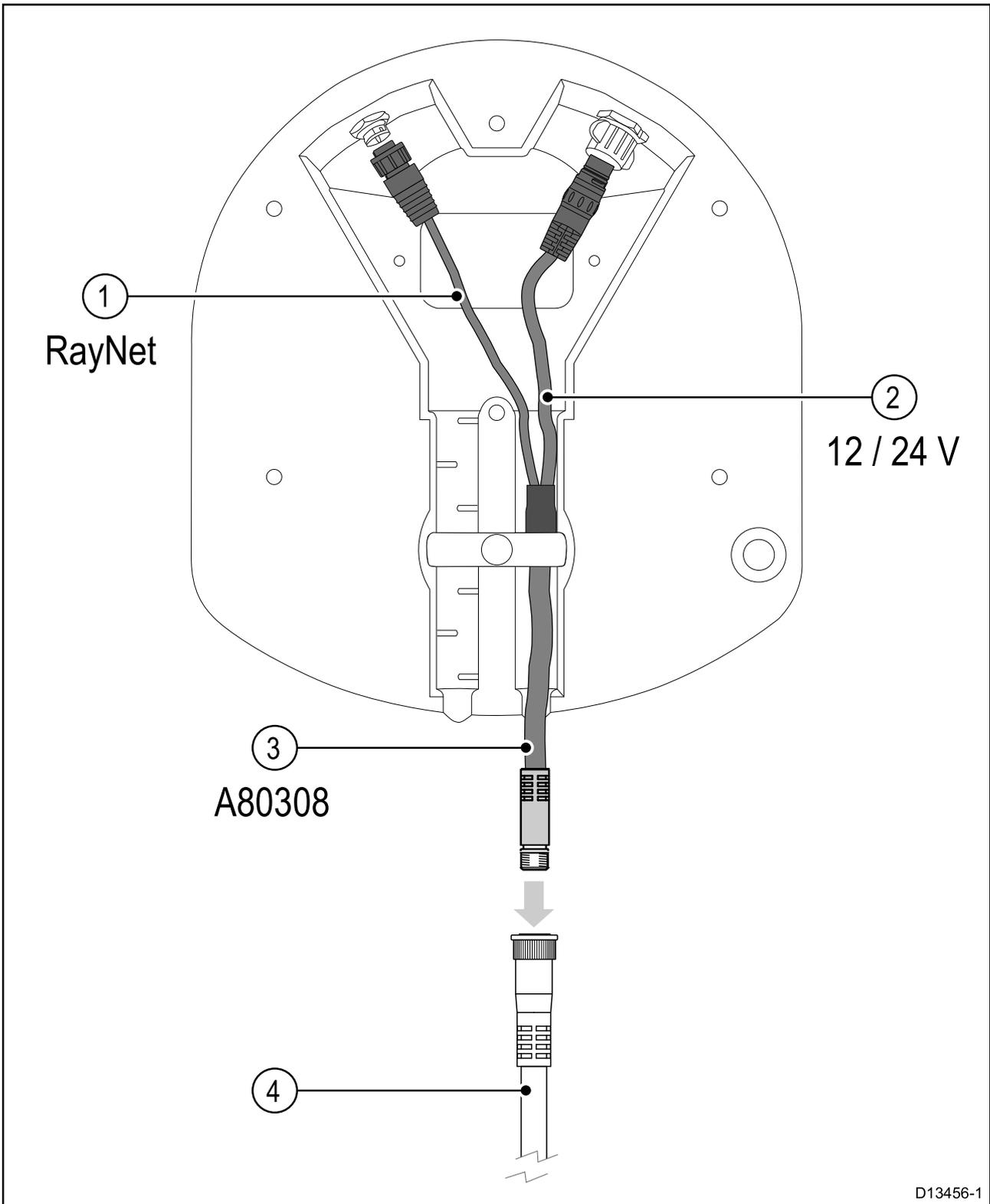


1. RayNet data connection.
2. 12 V / 24 V power connection.

Note:

- A separate power cable is supplied with all Quantum™ Radar variants.
- Not all Quantum™ radar variants are supplied with a RayNet cable. Refer to [p.15 — Document and product information](#)
- Refer to [p.96 — RayNet to RayNet cables and connectors](#) for information on suitable accessory RayNet cables.

Using an existing combined power / data cable from an older Raymarine Digital Radar



Note: The Y-adapter cable is actually white. For clarity, it is shown in the above drawing in different colors.

1. RayNet data connection. This cable is part of the **A80308** Y-adapter accessory cable.
2. 12 V / 24 V power connection. This cable is part of the **A80308** Y-adapter accessory cable.
3. **A80308** Y-adapter accessory cable (not supplied with the scanner).
4. Existing combined Digital Radar power / data cable.

Cable routing — pole mount

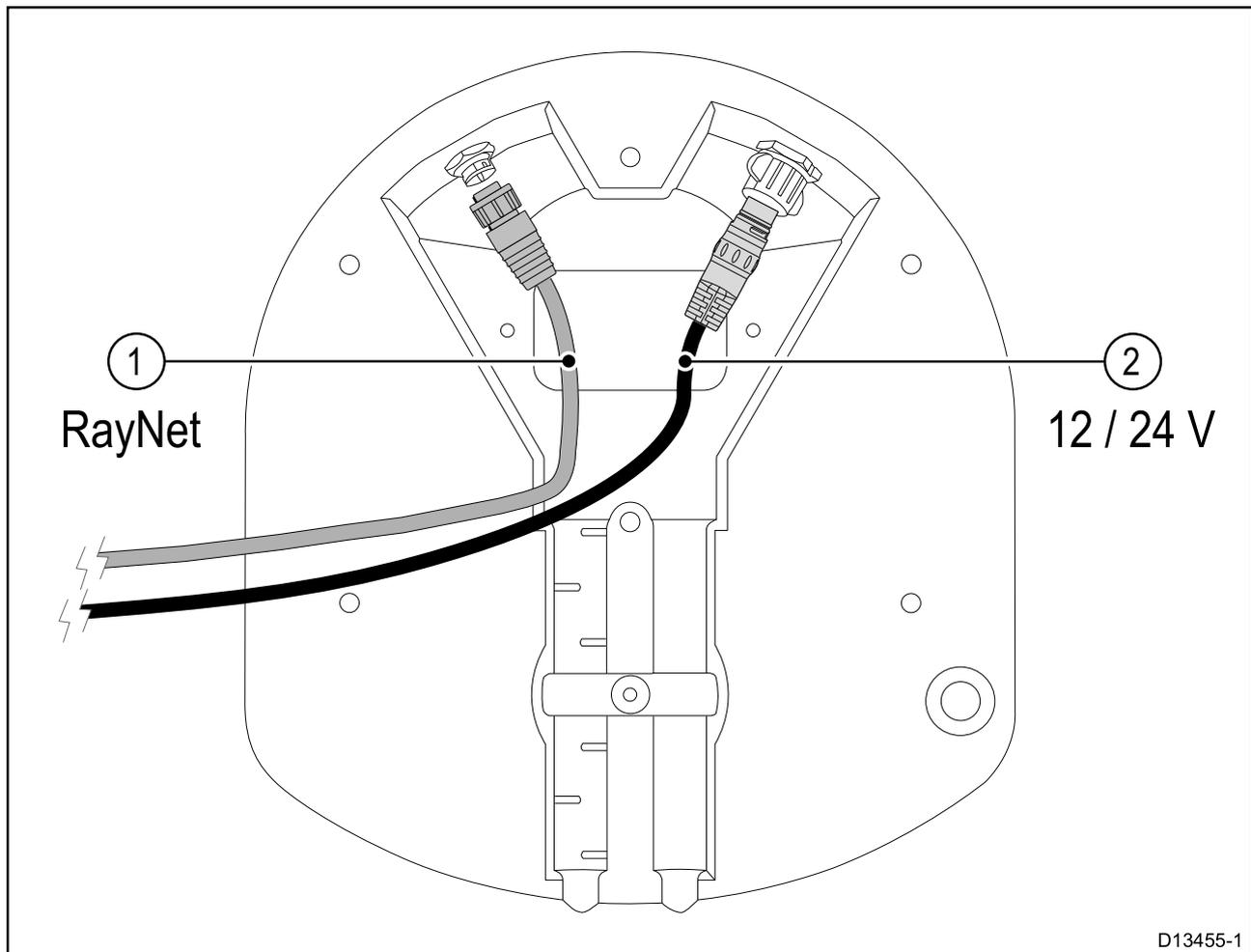
There are 2 typical cable routing scenarios for pole mount installations.

- Using separate power and data cables.
- Using an existing combined power / data cable from an older Raymarine Digital Radar scanner. In this scenario, the **A80308** Y-adaptor accessory is required (not supplied with the scanner).

Using separate power and data cables

Note: The routing options described and illustrated in this section assume that a physical data connection is used between your Radar scanner and multifunction display (MFD). However, if the scanner is connected to your MFD via Wi-Fi, a physical RayNet connection is not required.

The following drawing illustrates the cable routing for a scanner mounted on a platform, using separate cables for the power and data connection.

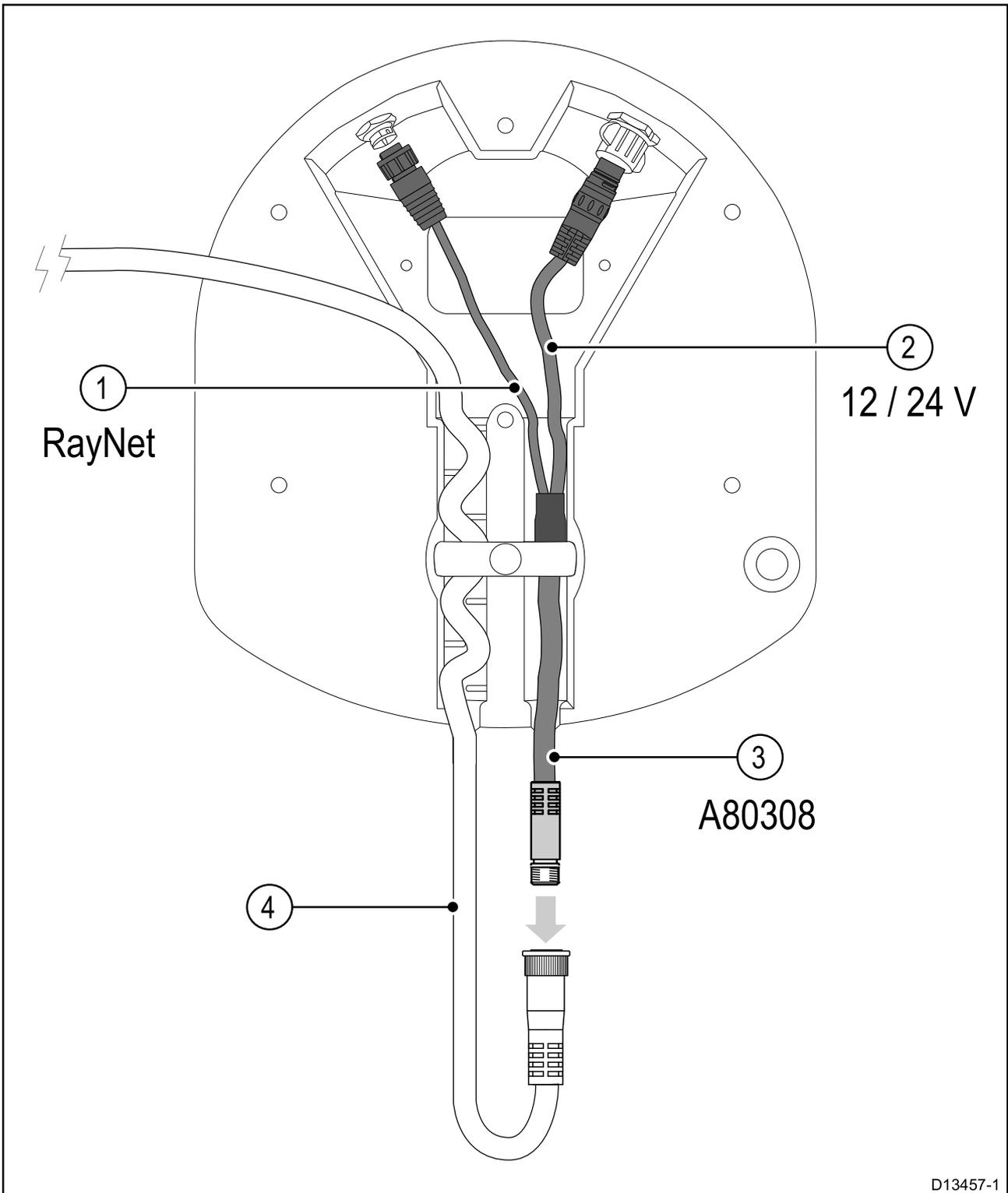


1. RayNet data connection.
2. 12 V / 24 V power connection.

Note:

- A separate power cable is supplied with all Quantum™ Radar variants.
- Not all Quantum™ radar variants are supplied with a RayNet cable. Refer to [p.15 — Document and product information](#) for more information.
- Refer to [p.96 — RayNet to RayNet cables and connectors](#) for information on suitable accessory RayNet cables.

Using an existing combined power / data cable from an older Raymarine Digital Radar



D13457-1

Note: The Y-adapter cable is actually white. For clarity, it is shown in the above drawing in different colors.

1. RayNet data connection. This cable is part of the **A80308** Y-adapter accessory cable.
2. 12 V / 24 V power connection. This cable is part of the **A80308** Y-adapter accessory cable.
3. **A80308** Y-adapter accessory cable (not supplied with the scanner).
4. Existing combined Digital Radar power / data cable.

Making connections

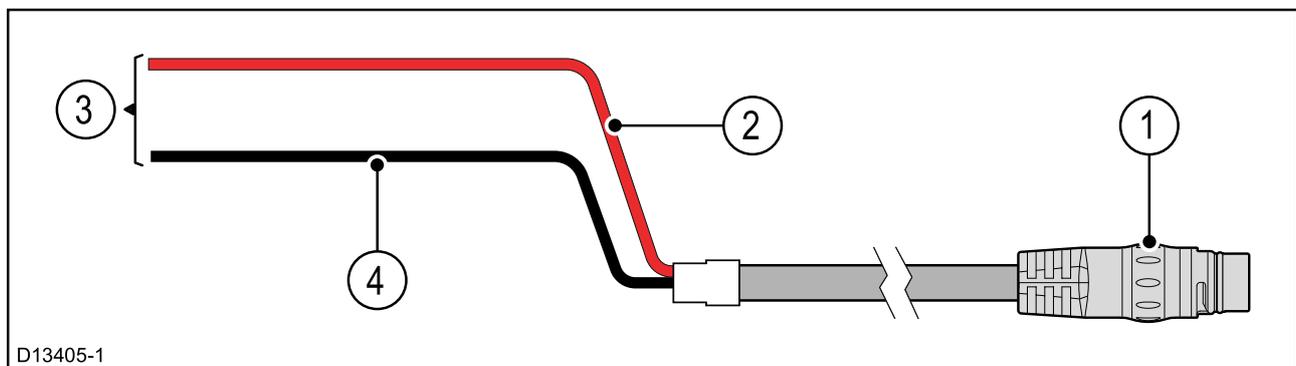
Follow the steps below to connect the cable(s) to your product. If you intend to use the scanner's Wi-Fi functionality to connect to your multifunction display, you need only connect a power cable to the scanner.

Note: If your vessel is already fitted with a combined power / data Digital Radar cable, you can use a Y-adaptor (part number A80308) to connect the existing cable-end to the scanner's connectors.

1. Ensure that the vessel's power supply is switched off.
2. Ensure that the multifunction display being connected to the scanner has been installed in accordance with the installation instructions supplied with that device.
3. Ensure the power connector locking collar on the scanner is in the unlocked position.
4. Route the power cable and optional data cable within the scanner base, as shown in the cable routing illustrations in this section. Cable routing depends on whether you mount the scanner on a platform or on a pole, and on whether you are using a Y-adaptor to connect to an existing combined power / data Digital Radar cable.
5. Ensure that the power cable connector is orientated so that the notch lines up with the guide in the connector.
6. Push the power cable connector all the way into the scanner's power connector.
7. Rotate the locking collar clockwise until it is in the locked position (2 clicks).
8. Push the optional data cable fully onto the corresponding connector on the scanner.
9. If you are using a Y-adaptor, make the final connection between the adapter and the existing combined power / data Digital Radar cable.

Note: When switching from a Wi-Fi connection to a wired connection for the Quantum Radar, you may encounter a connection issue if the Wi-Fi connection is established before the wired adaptor completes its initialization procedure. To resolve this issue, upgrade your Quantum unit to the latest software version, and then power cycle the unit.

4.4 Power connection



Note: A Y-adaptor cable (part number A80308) is available for existing installations that already use a combined power/data cable from a Digital or HD Color Radome. The Y-adaptor splits the existing combined cable into the separate data and power connectors used by the scanner.

Item	Description	Connects to:
1	Power cable.	Product's power connector.
2	Red cable (positive)	Power supply's positive terminal.
3	Connection to 12 V / 24 V power supply.	Power supply.
4	Black cable (negative)	Power supply's negative terminal.

In-line fuse and thermal breaker ratings

The following in-line fuse and thermal breaker ratings apply to your product:

In-line fuse rating	Thermal breaker rating
5 A	3 A

Note:

- 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.
- Your product's power cable may have an in-line fuse fitted, if not then you must add an in-line fuse / breaker to the positive wire of your product's power connection.



Warning: Grounding not required

This product is fully insulated and does NOT require separate grounding.

Power cable extension

The product is supplied with a power cable, which can be extended if required.

- 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.
- Raymarine recommends a **minimum** wire gauge of 14AWG (2.08 mm²) for any length of cable extension.
- For all lengths of extension to the power cable, ensure there is a continuous **minimum** voltage at the product's power connector of 10.8 V with a fully flat battery at 11 V.

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.

Power distribution

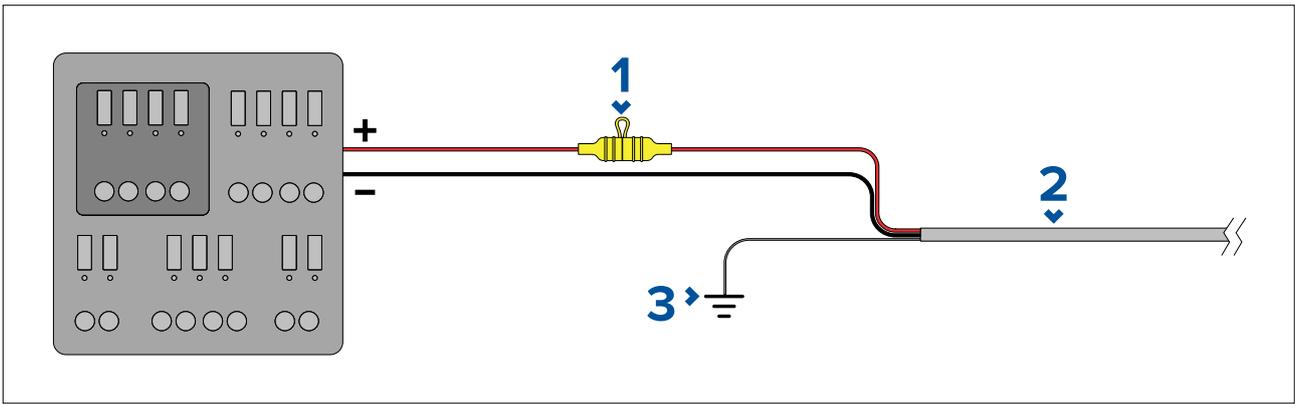
Recommendations and best practice.

- 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:

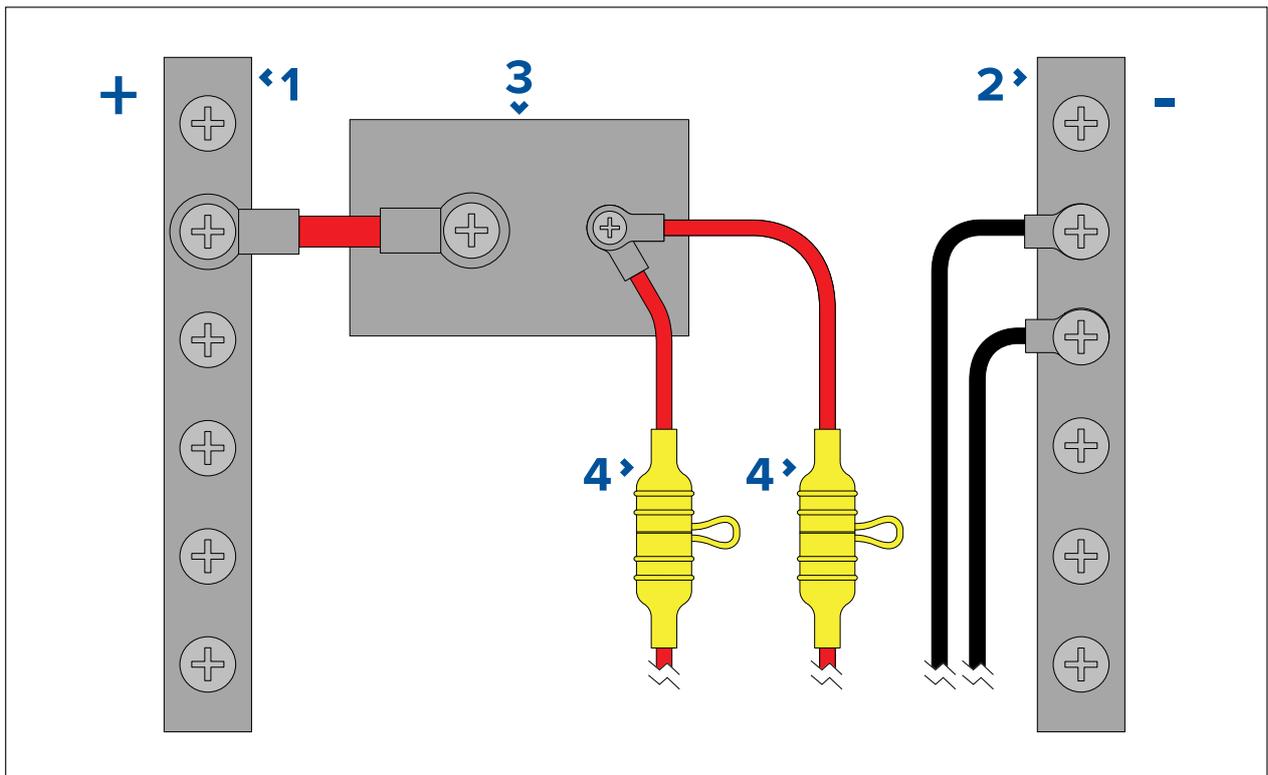
- When planning and wiring, take into consideration other products in your system, some of which (e.g. sonar modules) may place large power demand peaks on the vessel's electrical system, which may impact the voltage available to other products during the peaks.
- The information provided below is for 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)



1	Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: <i>In-line fuse and thermal breaker ratings</i> .
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 in-line fuses for each power circuit to provide the necessary protection.



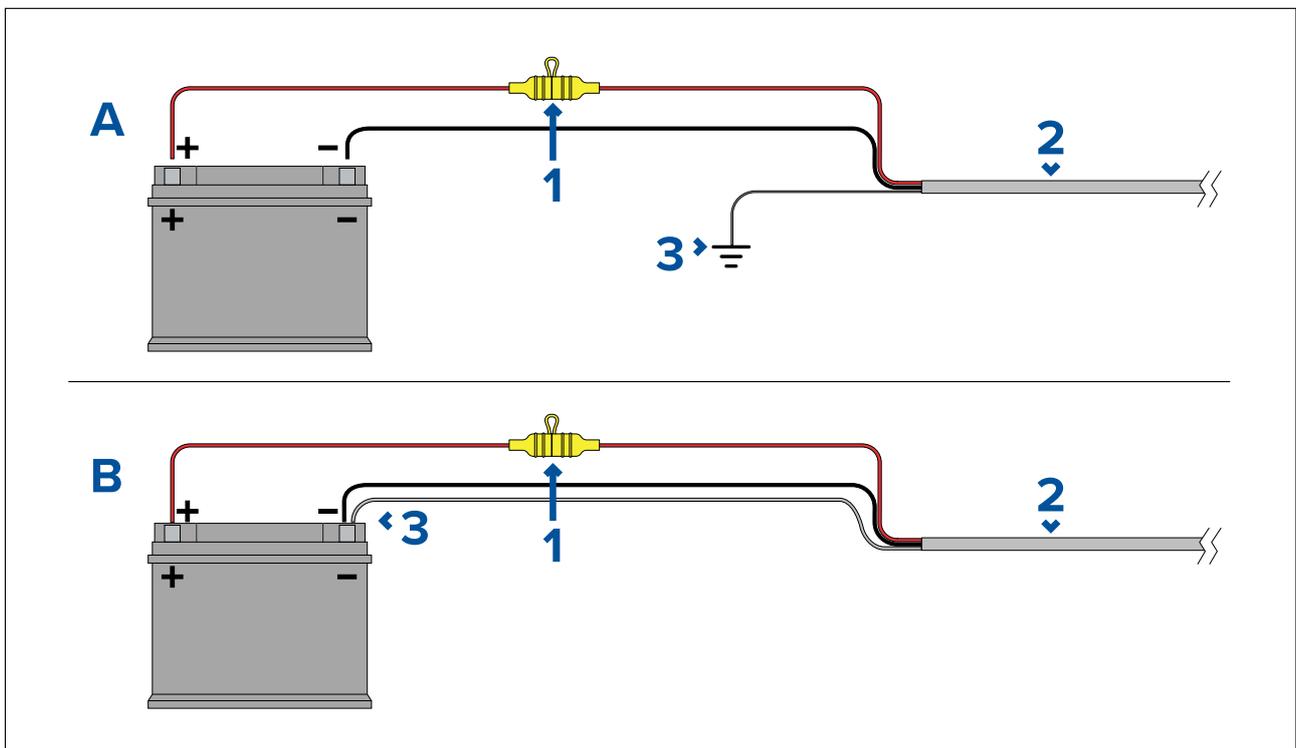
1	Positive (+) bar
2	Negative (-) bar
3	Circuit breaker
4	Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: <i>In-line fuse and thermal breaker ratings</i> .

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.
- The power cable supplied with your product may NOT include a separate drain wire. If this is the case, only the power cable's red and black wires need to be connected.
- 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.



1	Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: <i>In-line fuse and thermal breaker ratings</i> .
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, if your product's power cable is supplied with a separate drain wire then it 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, if your product's power cable is supplied with a separate drain wire then it should be connected directly to the battery's negative terminal.

Power cable extension

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)	12 (3.31 mm ²)	16 (1.31 mm ²)
>32 (>100)	10 (5.26 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.)

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



Warning: Grounding not required

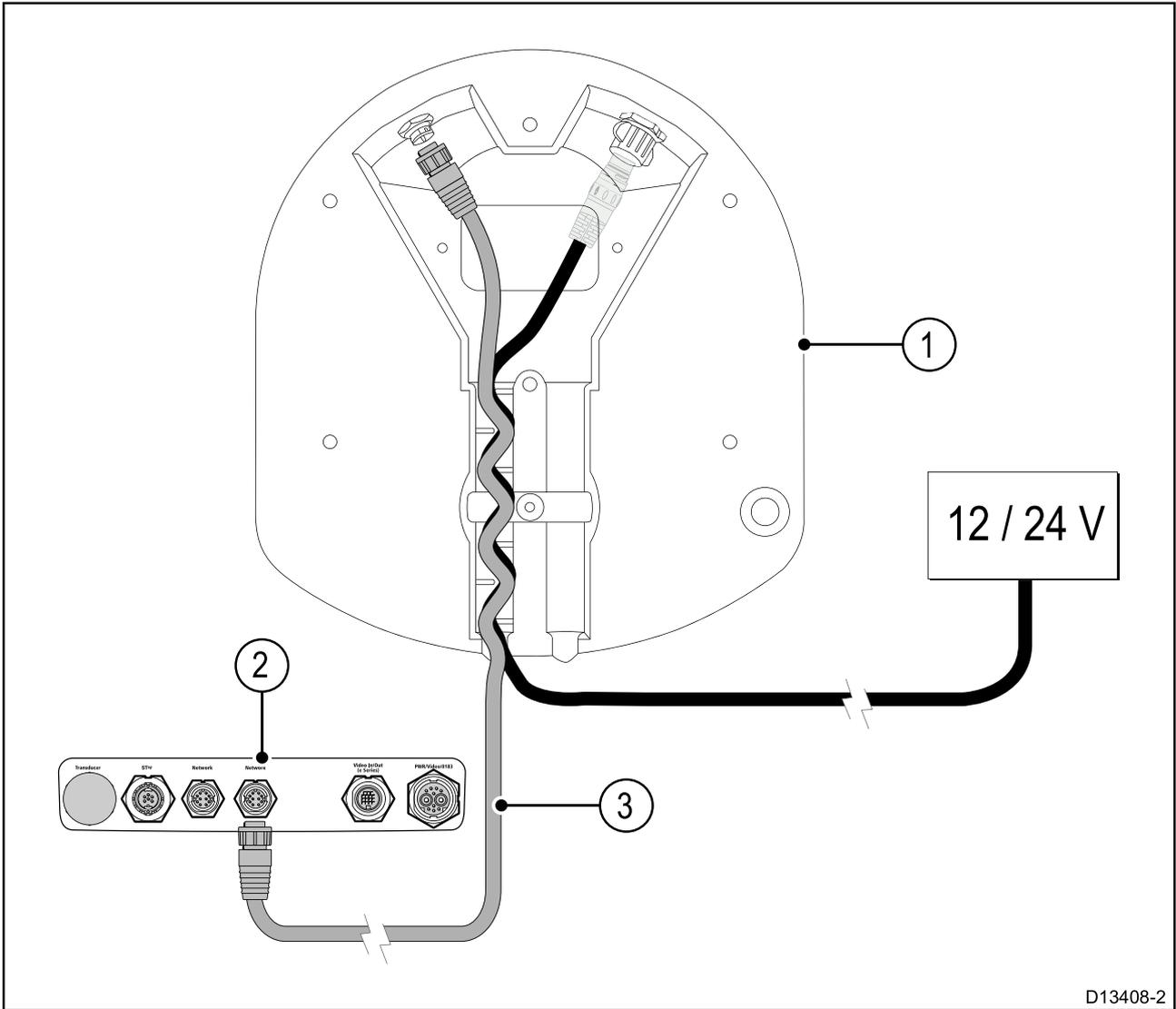
This product is fully insulated and does NOT require separate grounding.

4.5 Network connection

The scanner must be connected to a compatible Raymarine multifunction display (MFD), either via Wi-Fi, or via a physical RayNet cable connection. Once connected, the multifunction display can show Radar echo data.

Wired (RayNet) multifunction display connection

Scanner connected to a multifunction display using a RayNet cable.

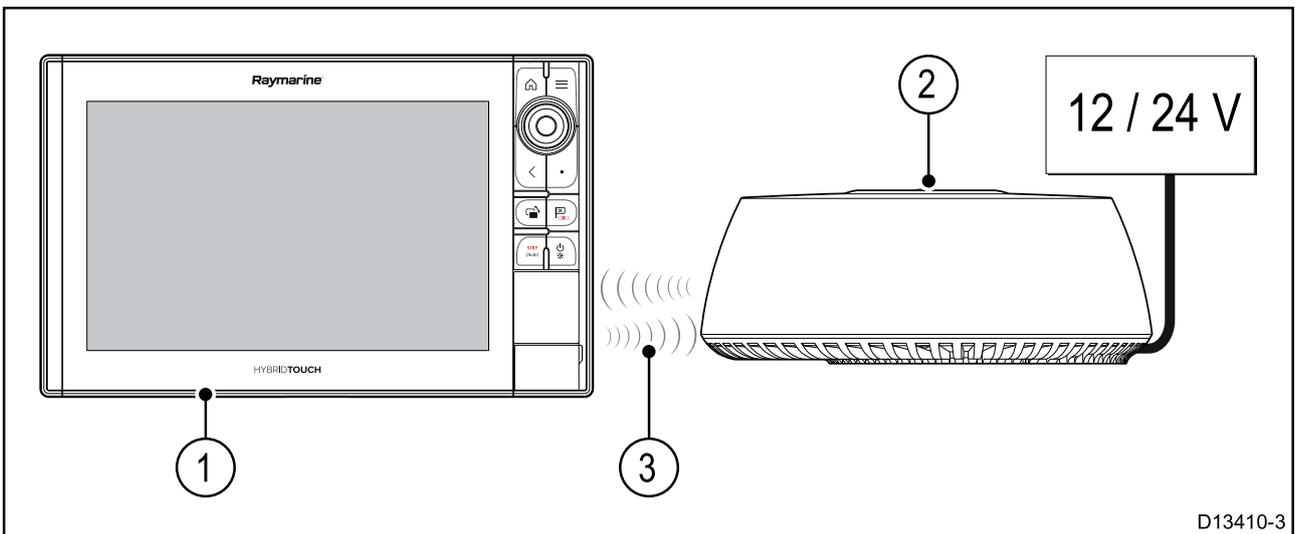


D13408-2

Item	Description
1	Quantum™ Radome (for clarity, only the connections area of the underside of the unit is shown here).
2	Connector panel of compatible Raymarine multifunction display (for clarity, only the connections area of the unit is shown here).
3	RayNet data cable.

Wi-Fi multifunction display connection

Scanner connected to a multifunction display using Wi-Fi.



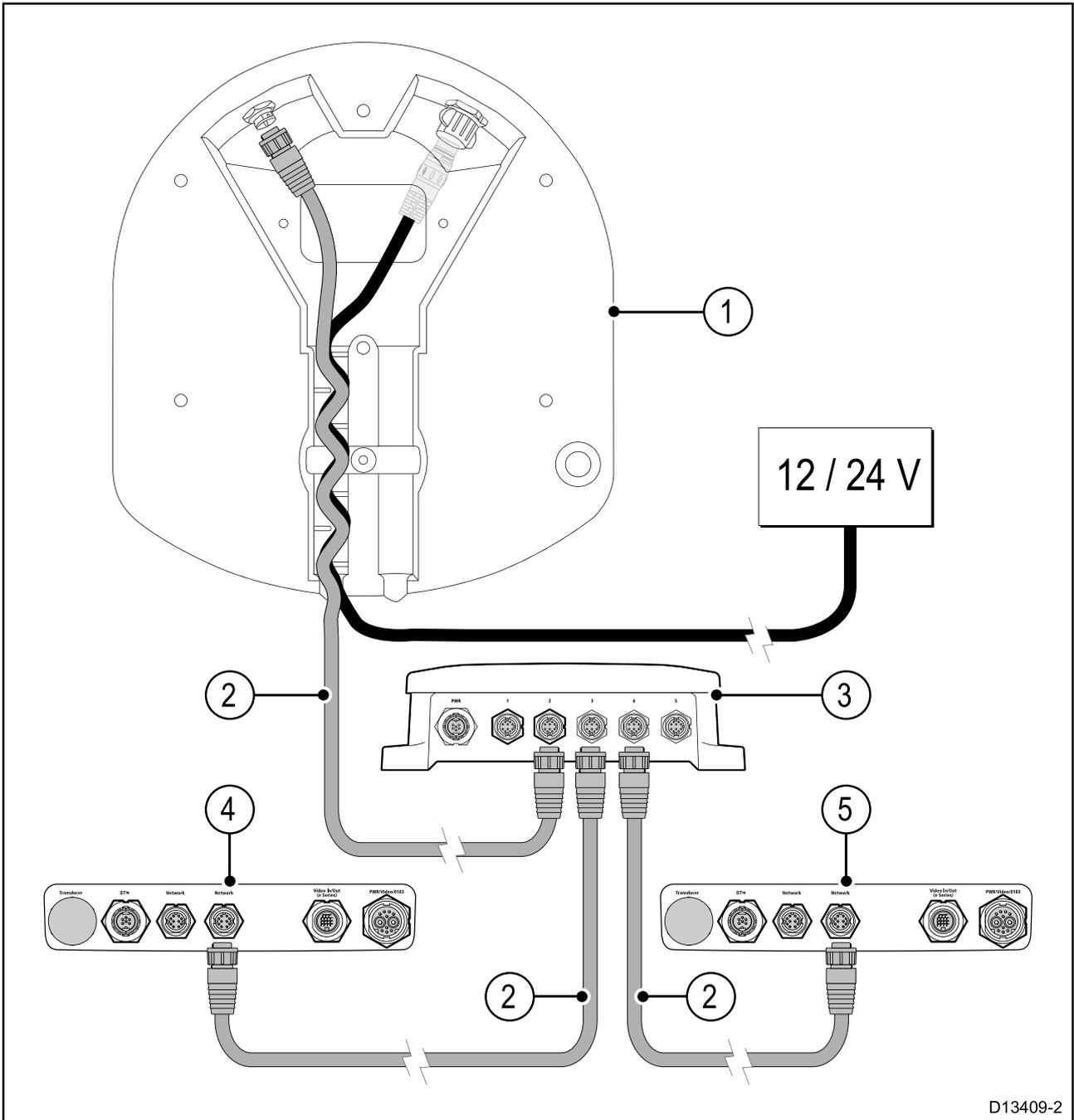
D13410-3

Item	Description
1	Compatible Raymarine multifunction display with Wi-Fi capability.
2	Quantum™ Radome.
3	Wi-Fi datalink.

Refer to [p.71 – System checks and troubleshooting](#), and to your MFD documentation for further information about setting up the Wi-Fi connection between your MFD and the Quantum™ scanner.

Multiple multifunction display configuration

A Raymarine network switch can be used to connect the unit to more than 1 multifunction display.



D13409-2

Item	Description
1	Quantum™ radome (for clarity, only the connections area of the underside of the unit is shown here).
2	RayNet cable.
3	RayNet network switch.

Item	Description
4	Connector panel of compatible Raymarine multifunction display (for clarity, only the connections area of the unit is shown here).
5	Connector panel of additional compatible Raymarine multifunction display (for clarity, only the connections area of the unit is shown here).

For details on available network hardware and cables refer to [p.93 — Spares and accessories](#).

Chapter 5: Cables and connections (Quantum variant with Wi-Fi only)

Chapter contents

- [5.1 General cabling guidance on page 54](#)
- [5.2 Power cable routing \(Wi-Fi variant only\) on page 55](#)
- [5.3 Power connection on page 57](#)

5.1 General cabling guidance

Cable types and length

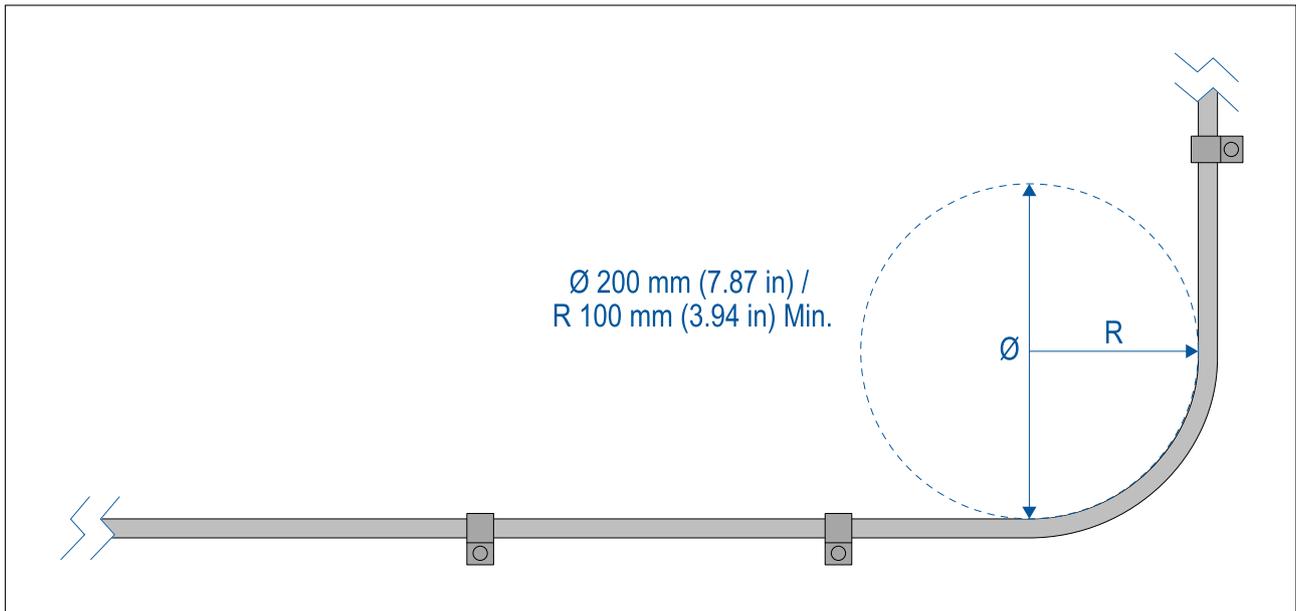
It is important to use cables of the appropriate type and length.

- 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 (\emptyset) 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.

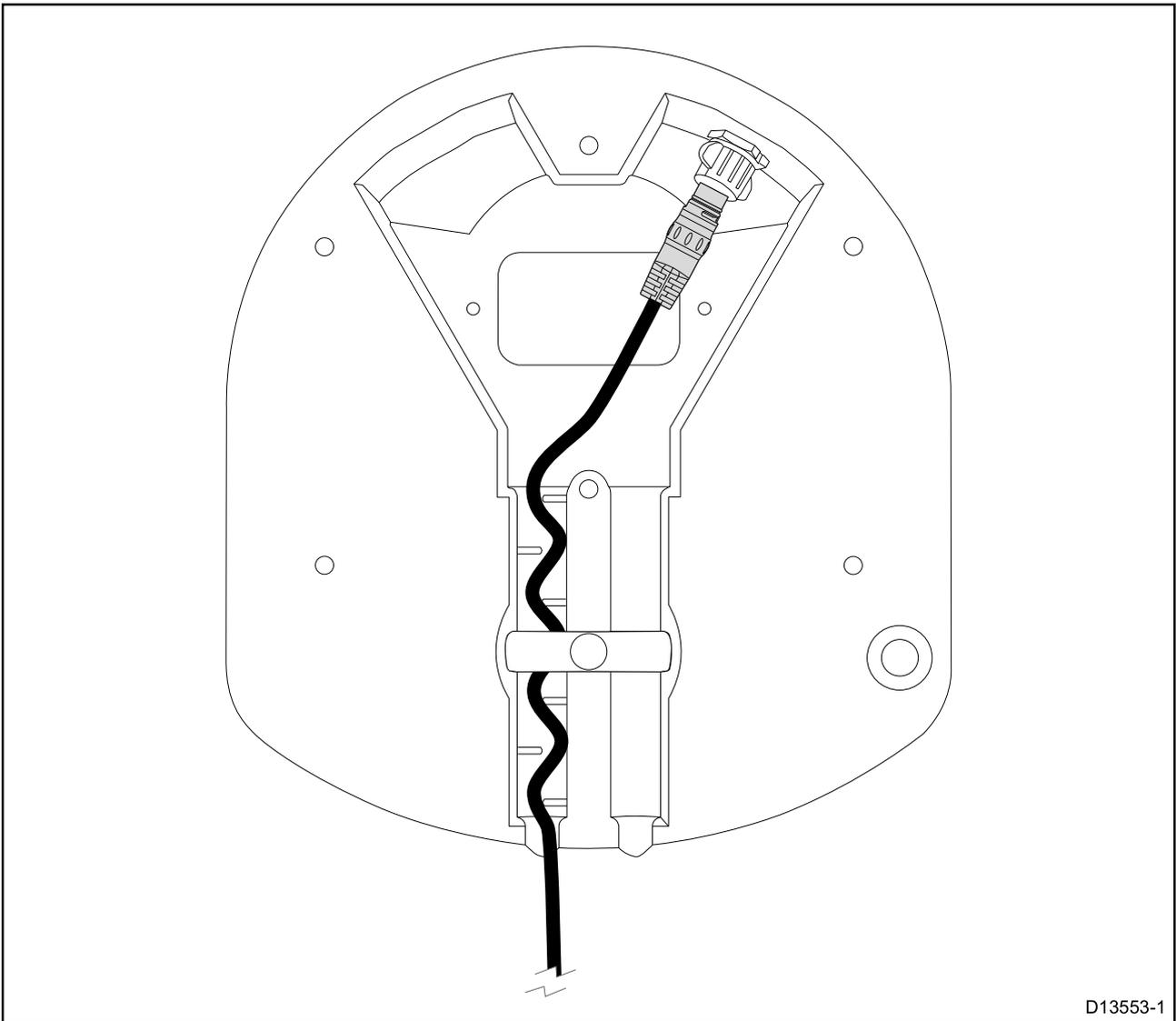
5.2 Power cable routing (Wi-Fi variant only)

There are 2 typical power cable routing scenarios, depending on how your Radar is secured to the vessel.

1. Platform mount.
2. Pole mount.

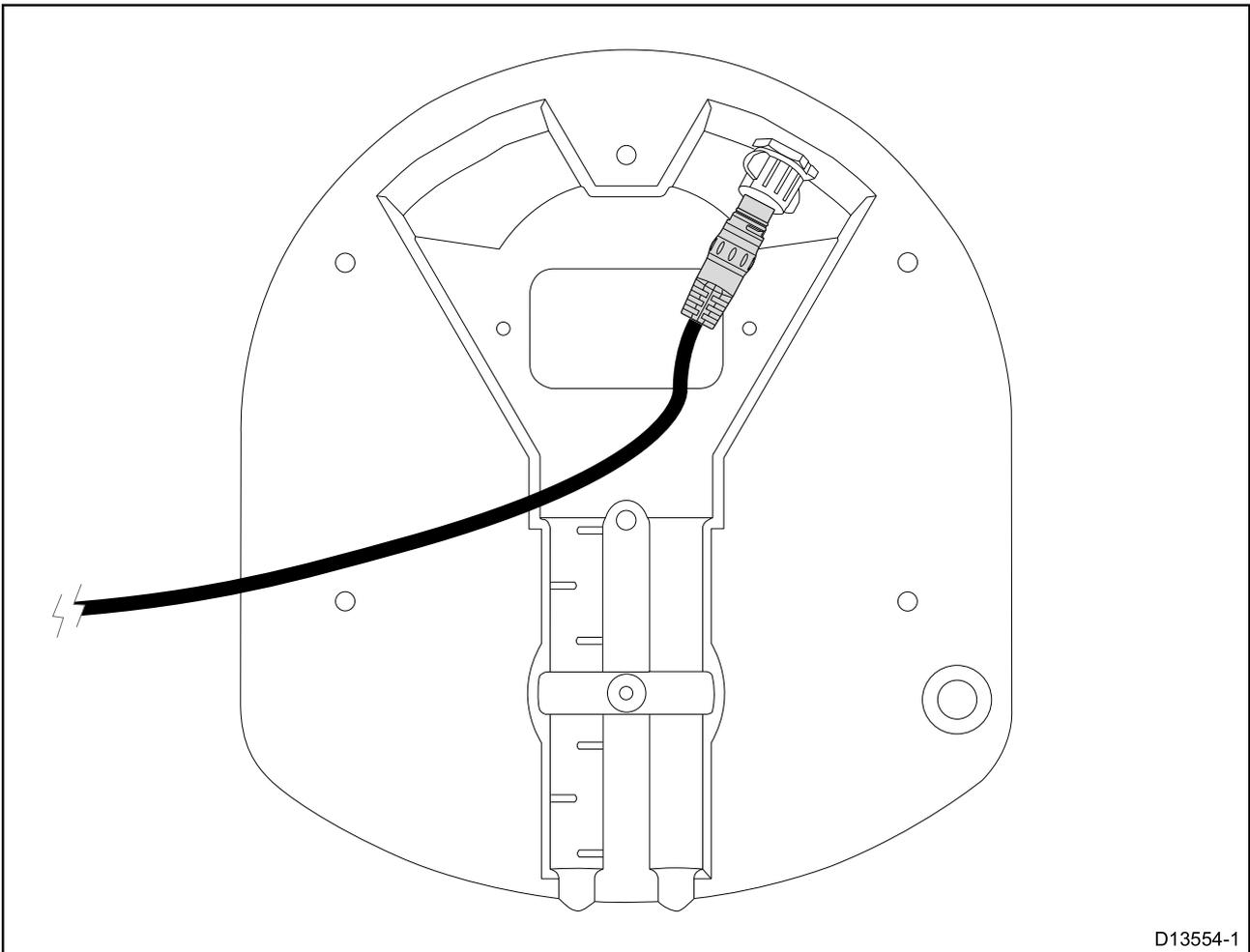
The recommended power cable routing for these 2 scenarios is illustrated in the following section.

Platform mount



Route the power cable through the provided channel.

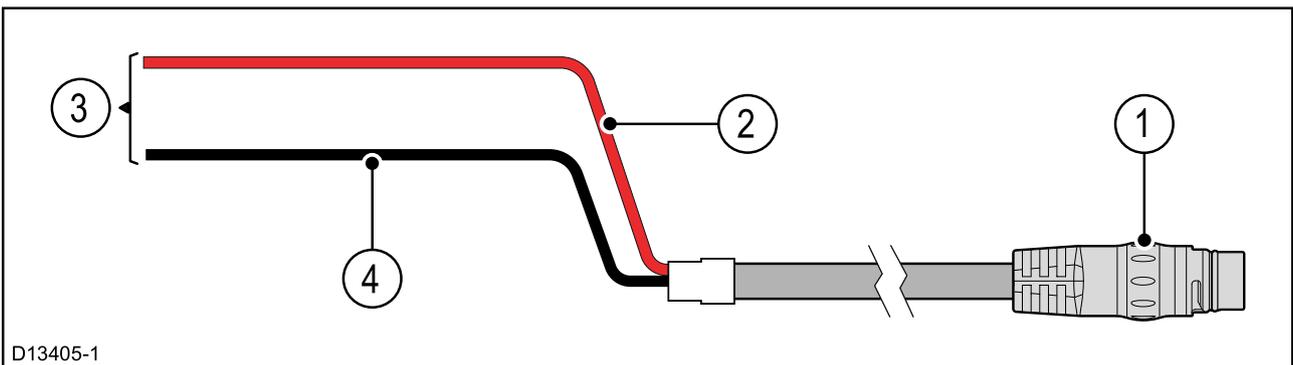
Pole mount



D13554-1

Route the power cable to the side of the unit to allow for the pole mount.

5.3 Power connection



D13405-1

Note: A Y-adapter cable (part number A80308) is available for existing installations that already use a combined power/data cable from a Digital or HD Color Radome. The Y-adapter splits the existing combined cable into the separate data and power connectors used by the scanner.

Item	Description	Connects to:
1	Power cable.	Product's power connector.
2	Red cable (positive)	Power supply's positive terminal.
3	Connection to 12 V / 24 V power supply.	Power supply.
4	Black cable (negative)	Power supply's negative terminal.

In-line fuse and thermal breaker ratings

The following in-line fuse and thermal breaker ratings apply to your product:

In-line fuse rating	Thermal breaker rating
5 A	3 A

Note:

- 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.
- Your product's power cable may have an in-line fuse fitted, if not then you must add an in-line fuse / breaker to the positive wire of your product's power connection.



Warning: Grounding not required

This product is fully insulated and does NOT require separate grounding.

Power cable extension

The product is supplied with a power cable, which can be extended if required.

- 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.
- Raymarine recommends a **minimum** wire gauge of 14AWG (2.08 mm²) for any length of cable extension.
- For all lengths of extension to the power cable, ensure there is a continuous **minimum** voltage at the product's power connector of 10.8 V with a fully flat battery at 11 V.

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.

Power distribution

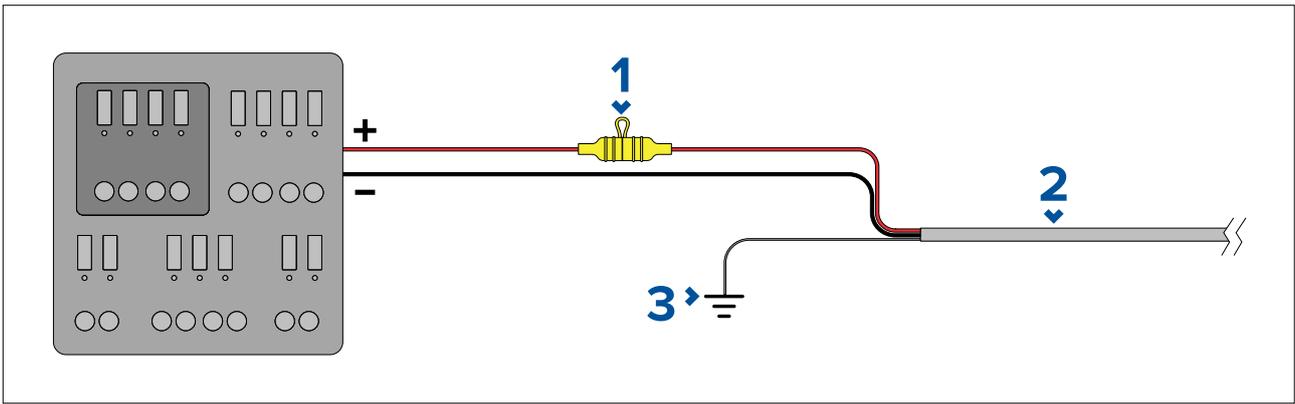
Recommendations and best practice.

- 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:

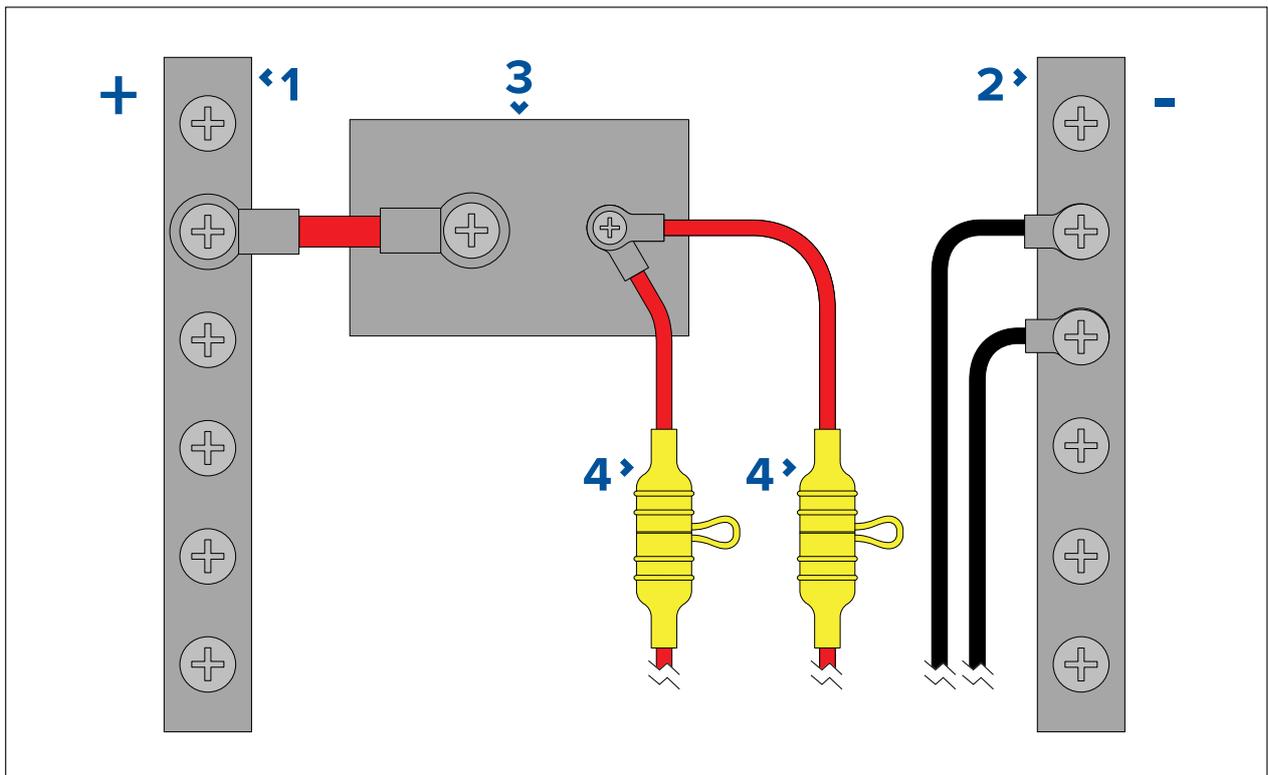
- When planning and wiring, take into consideration other products in your system, some of which (e.g. sonar modules) may place large power demand peaks on the vessel's electrical system, which may impact the voltage available to other products during the peaks.
- The information provided below is for 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)



1	Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: <i>In-line fuse and thermal breaker ratings</i> .
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 in-line fuses for each power circuit to provide the necessary protection.



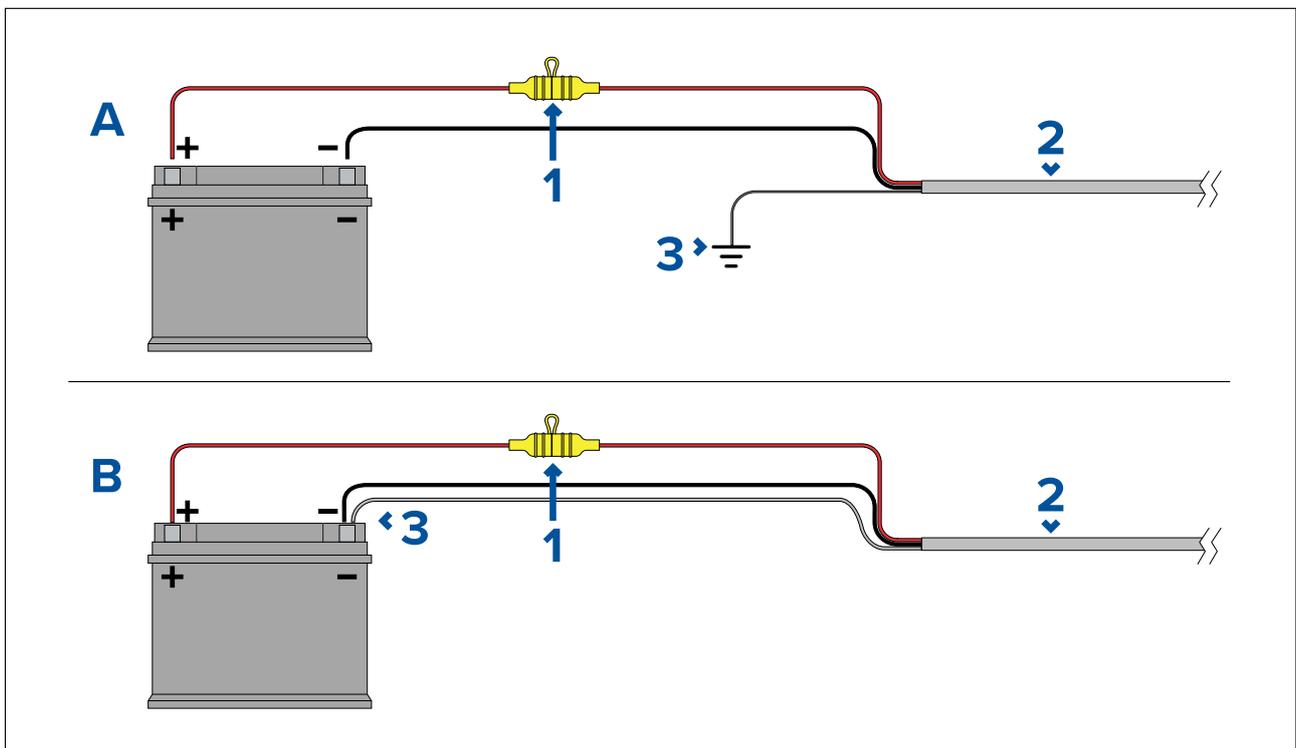
1	Positive (+) bar
2	Negative (-) bar
3	Circuit breaker
4	Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: <i>In-line fuse and thermal breaker ratings</i> .

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.
- The power cable supplied with your product may NOT include a separate drain wire. If this is the case, only the power cable's red and black wires need to be connected.
- 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.



1	Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: <i>In-line fuse and thermal breaker ratings</i> .
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, if your product's power cable is supplied with a separate drain wire then it 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, if your product's power cable is supplied with a separate drain wire then it should be connected directly to the battery's negative terminal.

Power cable extension

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)	12 (3.31 mm ²)	16 (1.31 mm ²)
>32 (>100)	10 (5.26 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.)

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



Warning: Grounding not required

This product is fully insulated and does NOT require separate grounding.

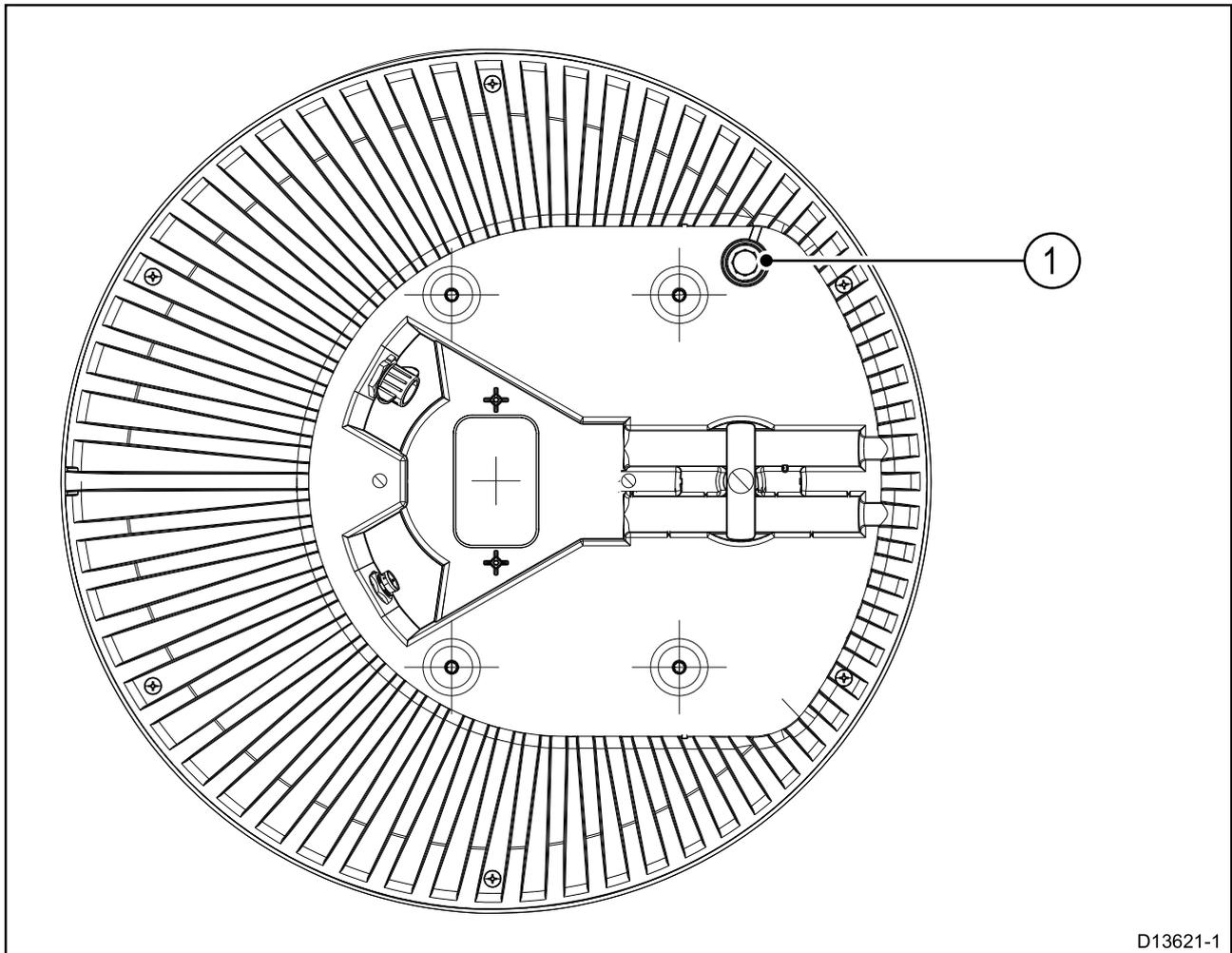
Chapter 6: Mounting

Chapter contents

- 6.1 Mounting pre-requisite: "breather" holes on page 64
- 6.2 Mounting the scanner on page 64
- 6.3 Radar scanner protection — sailing vessels on page 69

6.1 Mounting pre-requisite: "breather" holes

The base of the unit features a "breather", a series of small holes which allow air to circulate between the underside of the unit and the mounting surface.



1. Location of "breather" holes.

Ensure that the breather is not blocked in any way. Examples of obstacles to airflow include sealant and paint.

If necessary, use additional washers to allow a small gap between the underside of the unit and the mounting surface, for airflow.

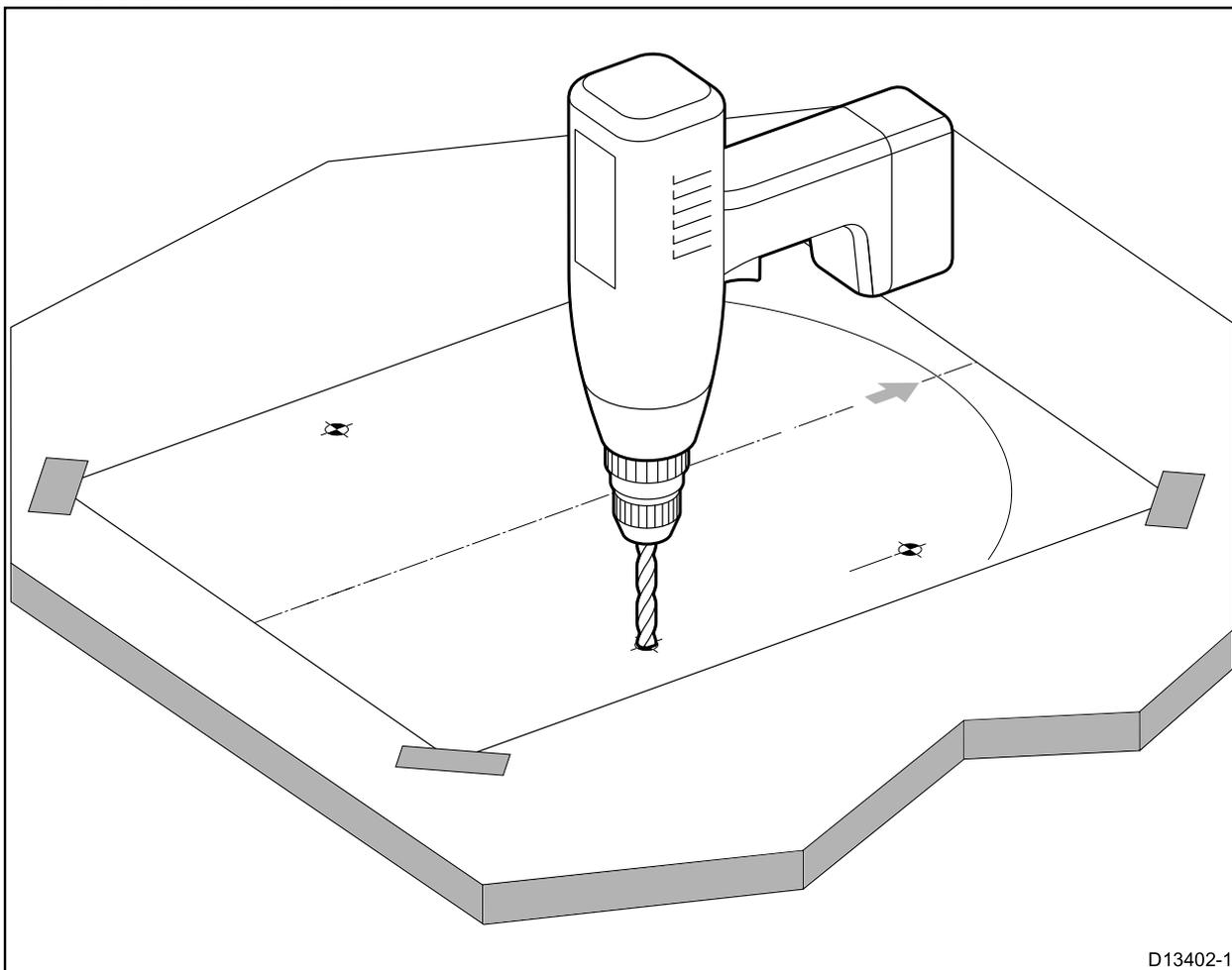
6.2 Mounting the scanner

Use a mounting location that:

- Is robust enough to support the Quantum™ scanner, under seagoing conditions.
- Meets the requirements described under *Scanner Position*.

Then:

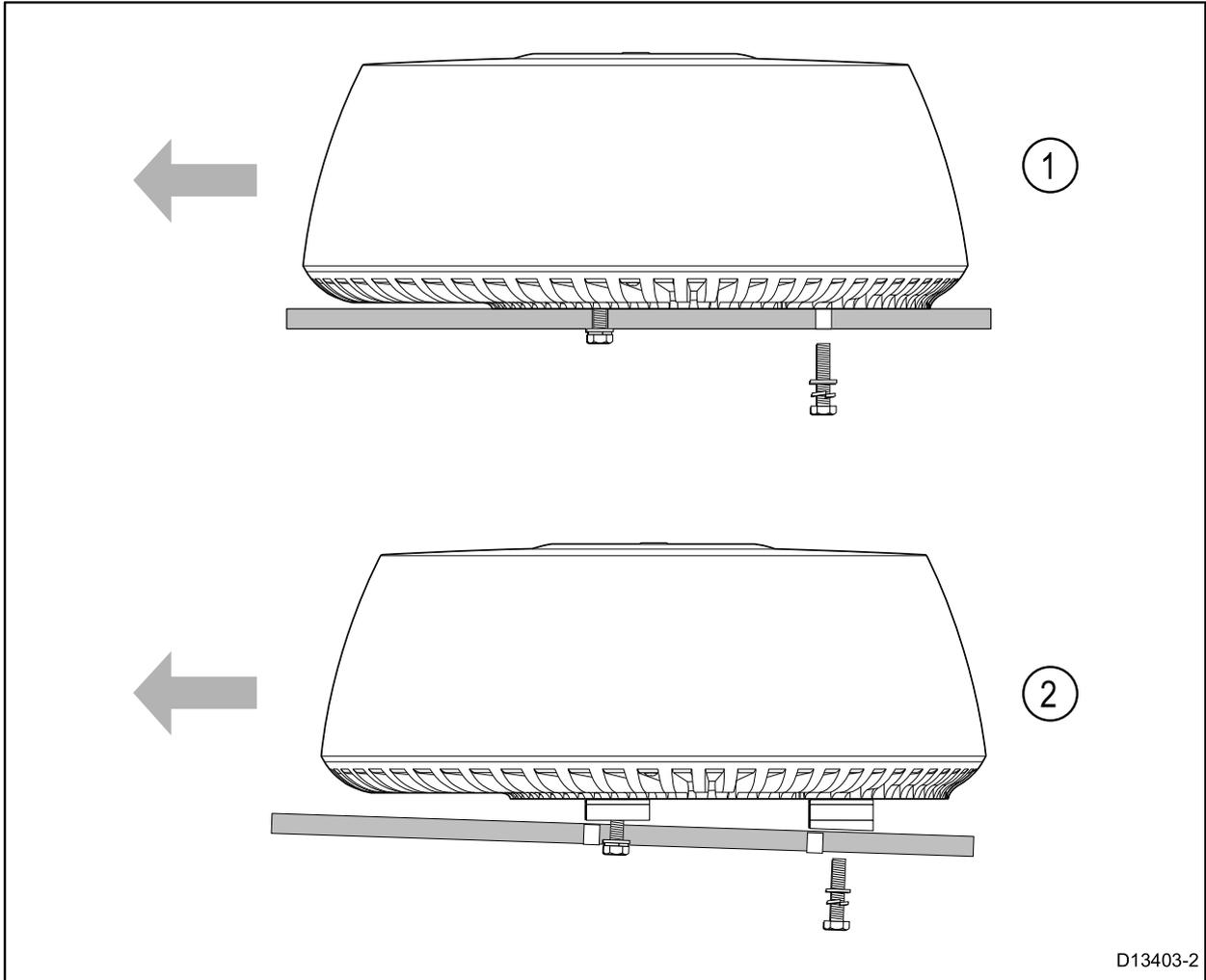
1. Tape the template to the mounting platform, ensuring that the arrow on the template is pointed towards the front of the vessel.



D13402-1

2. Drill 3 mm pilot holes in the four positions shown on the template.
3. Drill out the pilot holes to 10 mm diameter.

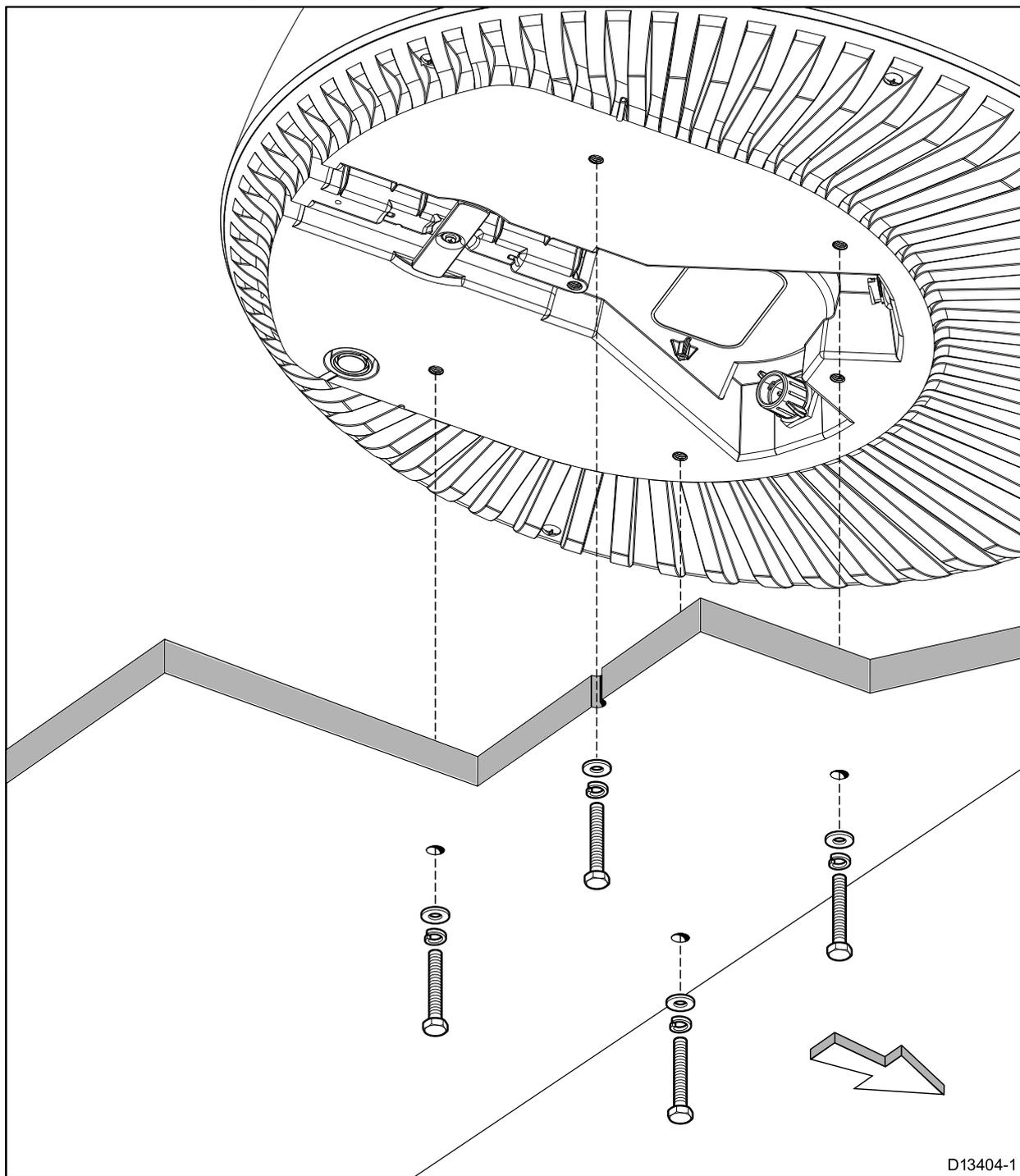
4. Place the Quantum™ scanner in position. If you are fitting it on a planing vessel, shim the rear of the scanner, so that the beam points slightly down in the forward direction when the boat is at rest, to compensate for the bow rising at cruising speed



Item	Description
1	Mounting platform, non-planing boat (level install)
2	Mounting platform, planing boat (typical planing angle shown)

5. Before securing the scanner to the mounting platform, connect the power cable (and optionally a data cable), ensuring that all cables are routed appropriately. Refer to [p.38 – Connections overview](#) for further information about making connections, and cable routing.
6. Ensuring that the bolts have a **minimum** insertion in the scanner base of 16 mm (0.63 in.), and a **maximum** of 22 mm (0.87 in.) (allowing for washers), secure the scanner with the 4 bolts, flat

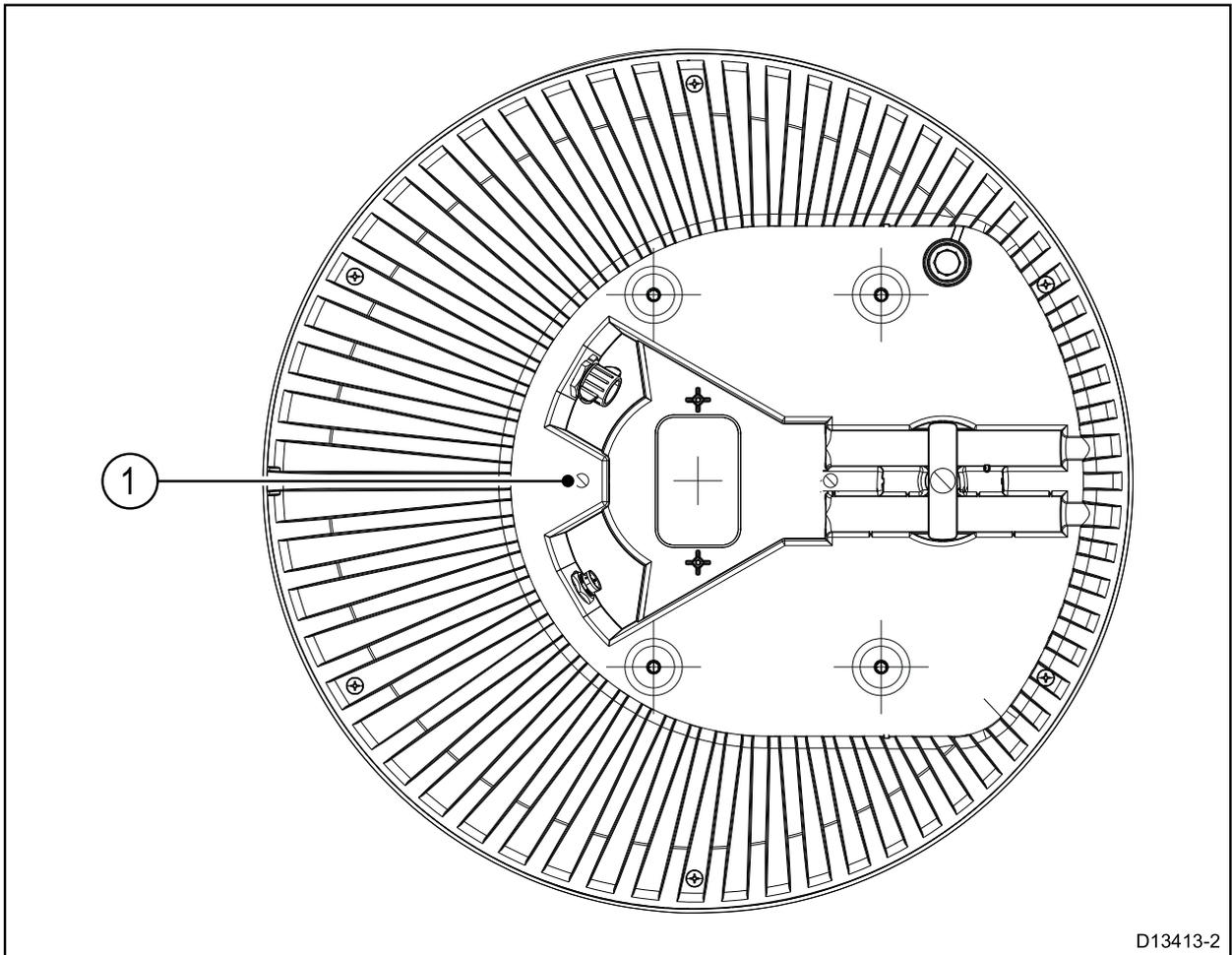
washers and spring washers provided, as illustrated. If necessary, use appropriate shims or extra washers to limit the length of bolt entering the scanner base.



D13404-1

7. Tighten the bolts to a torque of 15 Nm (11 lbf·ft).

8. Attach a safety lanyard (not supplied) to your vessel, and secure the free end to the scanner using the attachment point shown in the following illustration:



Item	Description
1	Safety lanyard attachment point.

Note: If you are installing the Radar scanner on a sailing vessel, additional protection for the Radar scanner may be required. Refer to [p.69 – Radar scanner protection – sailing vessels](#).

Multiple Quantum Radar scanners

Only 1 (one) Quantum™ Radar scanner can be used at any one time, per networked system.

If you have more than one Quantum™ Radar scanner installed on your vessel and want to use them at the same time, the multifunction displays to which the scanners are connected must NOT be networked together. This applies to Quantum™ scanners connected either wired or wirelessly.

For more information, refer to: [p.78 – Multiple Quantum Radars – more information](#)

Multiple Radar scanners – location requirements

Important location considerations when installing multiple radar scanners on the same vessel.

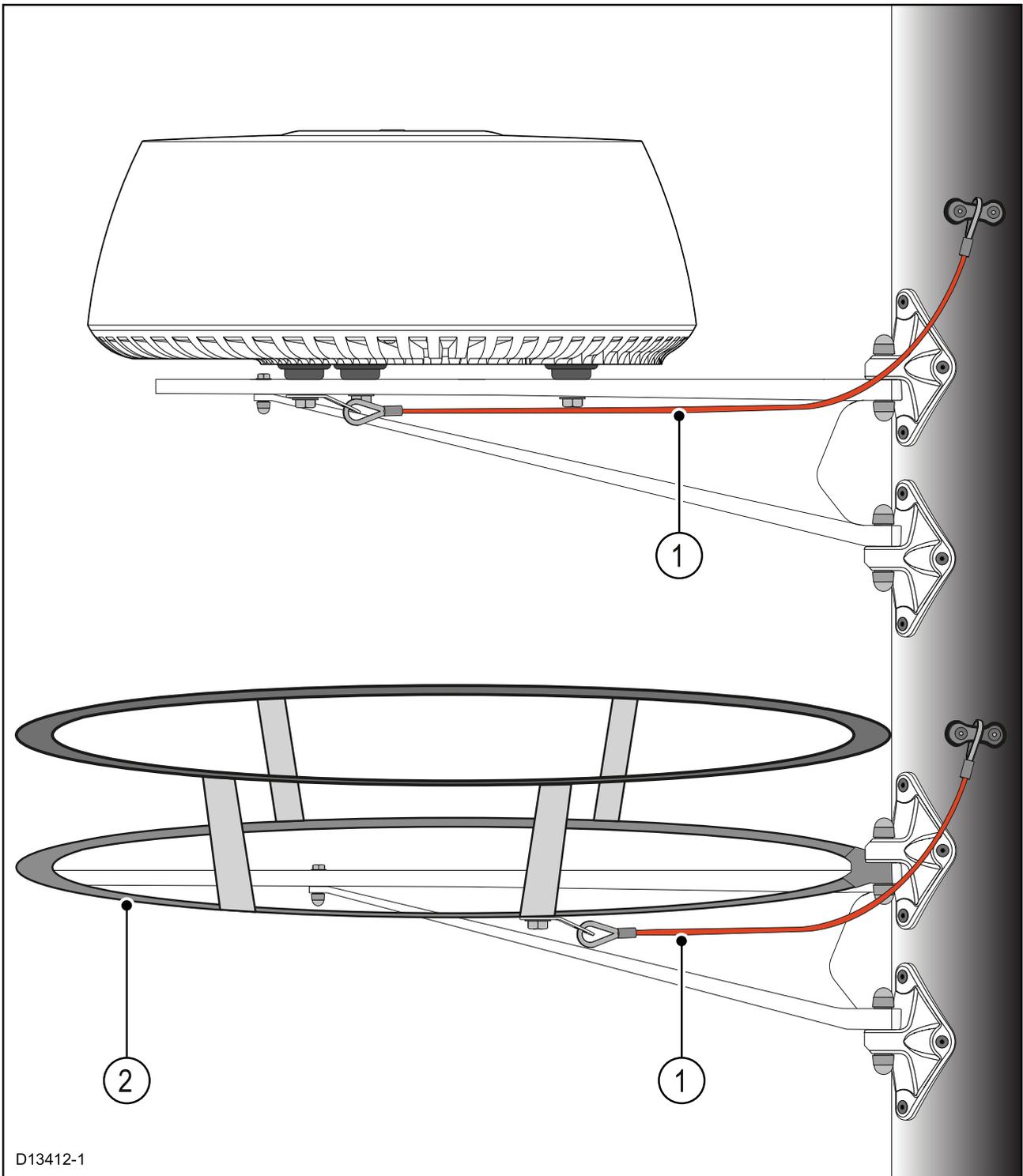
- Scanners should be mounted above each other, vertically separated by at least 0.5 m (1.6 ft). This applies to all installation locations on the vessel.
- Multiple scanners should be mounted in a way that minimizes interference between the vertical beamwidths of the 2 scanners.
- In all cases, you should aim to achieve as much physical separation as possible, to minimize any potential interference.

6.3 Radar scanner protection — sailing vessels

Additional considerations apply when installing the Radar scanner on a sailing vessel.

- When mounting the Radar scanner unit onto the mast, check that the unit is not fouled by the sails, especially when tacking.
- Depending on the type of sailing vessel and the design of the sailplan, a Radar scanner guard should be attached to the mast if the sails or rigging contact either the Radar scanner unit or the mounting bracket. Without a proper Radar guard, serious damage can result to the Radar mounting bracket and the Radar itself. In extreme cases, such damage could result in the Radar scanner unit being pulled off the mast. Therefore, it is recommended that a Radar scanner guard should be mounted additionally and separately to the Radar scanner mounting bracket.
- To prevent the risk of the Radar scanner unit falling after it has been damaged, the security lanyard supplied with the mast bracket **MUST** be secured properly to the mast and to the Radar scanner unit, according to the instructions provided with the bracket. If a safety lanyard is not supplied with the mounting bracket, contact your local dealer for appropriate parts. Do **NOT** attach other equipment to either the Radar scanner unit or the bracket.
- Raymarine strongly recommends that you check the condition and security of the bracket mounting feet, the security lanyard(s), the Radar scanner guard, and the Radar scanner unit itself, on a yearly basis (or more frequently depending on environmental applications). Any fittings should be replaced as appropriate.

The following illustration shows an example of an installation featuring a Radar scanner fitted to a typical mounting bracket, a Radar guard attached to the mast (separately to the Radar mounting bracket), and safety lanyards:



D13412-1

1. Example of a typical safety lanyard.
2. Example of a typical Radar scanner guard, attached to the mast independently of the Radar mounting bracket.

Note: The Radar guard shown in the illustration above is provided as an example only. The exact design and positioning of the Radar guard is wholly dependent on the nature of your vessel, sailplan, and installation environment. For example, for some vessels it is appropriate to locate the guard above the Radar scanner; for other vessels, it may be more appropriate to fit it below the scanner. Raymarine does not supply Radar guards but recommends that you select a guard that is attached directly to the mast and is completely separate to the Radar mounting bracket. It may be necessary to have a Radar guard custom designed to suit your specific vessel and installation environment. Please contact your local dealer for further advice.

Chapter 7: System checks and troubleshooting

Chapter contents

- [7.1 Post installation procedures on page 72](#)
- [7.2 Troubleshooting on page 76](#)

7.1 Post installation procedures

Before using the product, carry out the following:

- Mechanical checks.
- Switch on and initial setup.

Mechanical checks

Before switching on the product:

- Ensure that:
 - All securing bolts are fully tightened and the appropriate mechanical locking washers are in place.
 - All connections are securely made.
 - All connecting cables and wires are secured and protected as necessary.
- Ask your local Raymarine authorized installer to check the installation.

Connecting to a Radar scanner over RayNet

Once you've made all the relevant power and data connections as described in the *Cables and connections* section, you can use the Radar application on a compatible display to conduct further initial tests.

For detailed instructions on how to conduct the initial tests, refer to the *Radar application* chapter of the Operations handbook for your display.

Powering on a Quantum Radar

With the radar scanner in a powered off state, and connected to a compatible multifunction display (MFD):

1. On the MFD, launch the Radar application.
A message box is displayed indicating that a Radar scanner is off or “not connected”.
2. Select **On** from the onscreen message box.
The Radar will power up in Standby mode.
3. Once the Radar has powered up, select **Tx** to start the Radar transmitting.

Radar returns will now be displayed onscreen.

Pairing with a Quantum Radar using Wi-Fi

If your Radar scanner supports a Wi-Fi connection, you can connect to a **LightHouse™** MFD which also supports Wi-Fi. During pairing, the Wi-Fi credentials of all MFDs with Wi-Fi switched on are sent to the Quantum Radar. At subsequent power cycles the Quantum Radar will automatically connect to the MFD with the strongest signal.

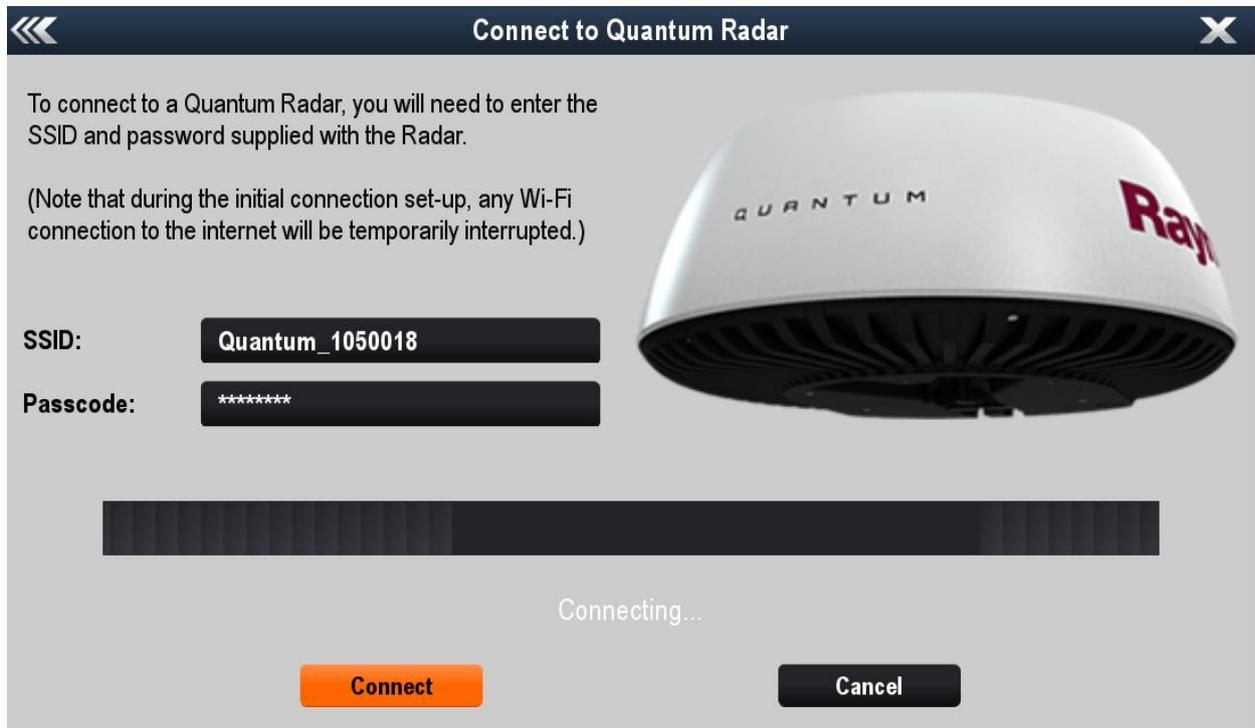
Note:

1. During initial set up you will have 60 minutes (for Quantum software versions 1.62 or later) or 10 minutes (for Quantum software versions earlier than 1.62) in which to connect the Radar to your MFD. After this time, if no connection is made, the Radar will automatically go to Sleep. If this occurs, power cycle the Radar to bring it out of Sleep mode and establish a connection.
2. Networked MFDs that only have their Wi-Fi enabled after the initial pairing period, will send Wi-Fi credentials to the Radar when their Wi-Fi is switched on.

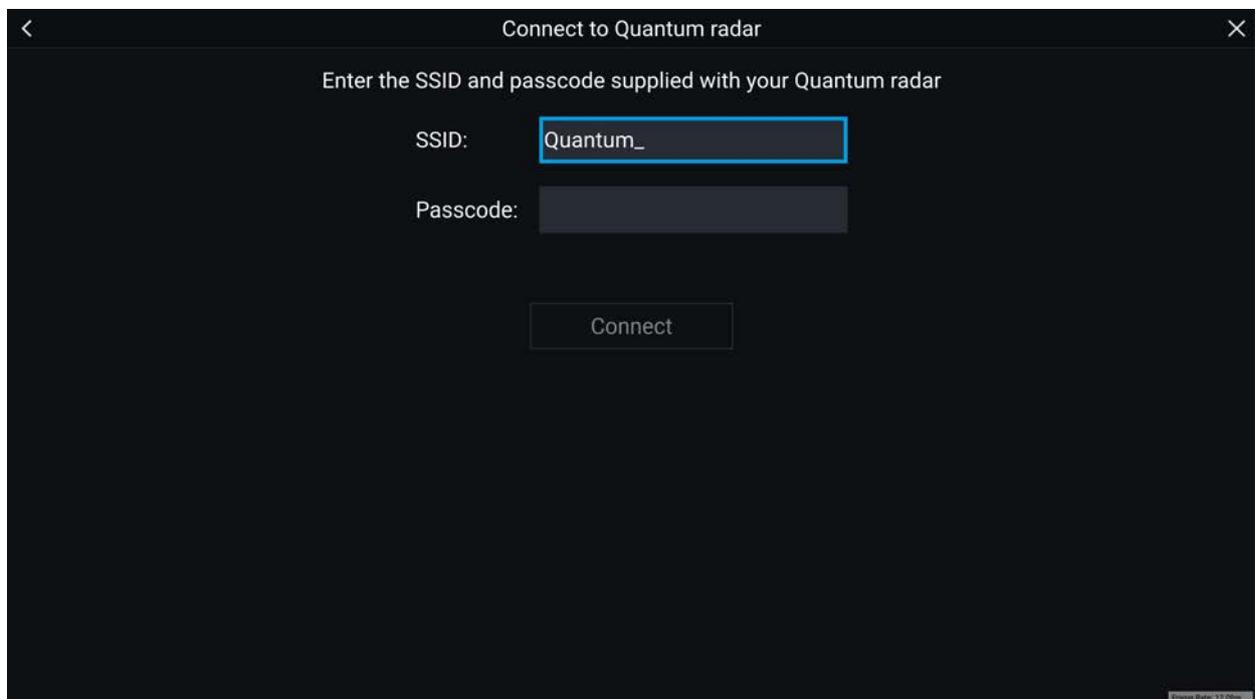
1. Apply power to your MFD(s).
2. Power on and then enable the Wi-Fi connection to the MFDs which have the strongest signal, as identified during the pre-installation site survey. Usually these will be the MFDs closest to and / or with the clearest line of sight to the Radar).
3. Apply power to your Radar scanner.
4. Select **Quantum Radar** from the settings menu on the MFD:
 - i. For LightHouse 2 MFD: **Homescreen > Set-up > System Settings > External Devices > Quantum Radar > Pair with Quantum Radar.**
 - ii. For LightHouse 3 MFD: **Homescreen > Settings > This display (tab) > Pair with Quantum.**

5. If prompted, select **OK** to enable your MFD's Wi-Fi connection.
 6. (For LightHouse 2 only): Enter the Radar's SSID (e.g. Quantum_1234567) in the **SSID** field.
 7. Enter the passcode (e.g. 901589£5) in the **Passcode** field.
- Refer to [p.74 – Retain your Wi-Fi Passcode](#) for details on locating your SSID and Passcode.

LightHouse 2 connection screen:



LightHouse 3 connection screen:



Important:

- Ensure that the SSID and Passcode are entered exactly as shown on the serial number label that was supplied with the Radar.
- The SSID is always made up of the word “**Quantum**”, followed by an underscore “_”, followed by the product’s 7 digit **serial number**, (e.g. **Quantum_1234567**).

8. Select **Connect**.

The initial connection can take up to 2 minutes to complete. If the connection does not complete within 2 minutes, power cycle the Radar and repeat Steps 4 to 8.

9. Select **OK** from the Successful Connection pop-up.
10. Open a Radar application page.
11. Check that the reported Radar on the power / transmit pop-up is the Radar that you have just paired with.
12. If the correct Radar is reported, select **Tx** (Transmit).
13. If the reported Radar is not the Radar scanner you just paired with, select the correct Radar from the Radar application menu: **Menu > Select Radar:** and then select **Tx** (Transmit).

The Radar image can be displayed on all networked MFDs.

MFD access point connection when connected to Quantum Wi-Fi

Depending on you MFD variant, you may be restricted from connecting your MFD to a Wi-Fi access point, if a Quantum Radar that is connected using Wi-Fi is currently transmitting on the system.

a, c, e, gS Series and **Axiom** MFDs CANNOT connect to a Wi-Fi access point if there is a transmitting Wi-Fi connected Quantum Radar in the system. To connect these MFDs to a Wi-Fi access point the Quantum Radar must be placed in Standby mode first.

eS Series and **Axiom Pro** MFDs CAN connect to a Wi-Fi access point at the same time as being connected to a transmitting Wi-Fi connected Quantum Radar.

Standby and sleep modes for Wi-Fi connections

The radar scanner has 2 modes which may initially prevent you from successfully pairing the radar to an MFD via Wi-Fi, in the event that the Wi-Fi connection between the 2 devices is lost. These modes are part of the scanner's normal operation, but it's important to understand how these modes can potentially impact the pairing process.

- **Sleep mode** — If the connection to the MFD is lost while the scanner is in **Standby** mode, the scanner will switch to Sleep mode within 30 minutes. When the connection to the MFD is restored, return the scanner to Standby mode using the **Power up Radar** option on the MFD's Shortcut screen, accessible by momentarily pressing the MFD's Power button.
- **Standby mode** — If the connection to the MFD is lost while the scanner is in **Transmit** mode, the scanner will switch to Standby mode within 5 seconds. When the connection to the MFD is restored, return the scanner to Transmit mode using the **Radar: Tx** option on the MFD's Shortcut screen.

For a full description of all the Radar modes and associated on-screen status symbols, refer to the *Radar scanner status symbols* topic in the *Radar application* chapter of your MFD's Operations handbook.

Retain your Wi-Fi passcode

To connect to the Radar using Wi-Fi (wireless), you will need to know the unit's **SSID**, and **Passcode**.

Both the SSID and Passcode are provided on the serial number label on the underside of the unit, and on spare serial number labels supplied in the box. You may wish to make a separate note of this information and keep in a secure location. You should also keep the Radar scanner packaging in a safe place for future reference.

The following information is applicable only to Quantum units running software version 1.62 or later, and Quantum Doppler units running software version 2.43 or later:

In the event that you misplace the SSID and Passcode before the initial pairing, you can power on your Quantum unit and determine the SSID by reviewing all available Wi-Fi networks, using a smartphone, tablet or laptop PC. An unpaired Quantum unit will advertise its SSID periodically in a 10-second cycle. This may take up to 3 minutes.

Once you've obtained the SSID, the next step is to contact [p.86 — Raymarine product support](#), who can then provide you with the passcode associated with your SSID.

Operation instructions

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

All product documentation is available to download from the Raymarine website:

www.raymarine.com/manuals.

Radar target acquisition data source requirements

Radar target acquisition requires the following data sources to be available on your system (e.g. connected to your multifunction display, via SeaTalkng[®] or NMEA 0183).

Data type	Example data source
COG (Course Over Ground)	GPS or GNSS receiver (MFD internal receiver or external receiver).
SOG (Speed Over Ground)	GPS or GNSS receiver (MFD internal receiver or external receiver).
HDG / HDT (True Heading)	Compass or Autopilot sensor providing Fastheading data (e.g. Evolution EV-1 / EV-2).

7.2 Troubleshooting

The troubleshooting information provides possible causes and corrective action required for common problems associated with 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 in order 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.

Troubleshooting procedure

Use the following table to identify problems and remedial actions.

Symptom	Action
<p>No connection can be made to the scanner.</p>	<p>Ensure the data cable (if used) is connected at both ends and is in good condition.</p> <p>If using a Wi-Fi (wireless) connection to the scanner unit, check that you have entered the correct Wi-Fi passcode for the SSID that matches your scanner. Both the SSID and Wi-Fi passcode are provided on the scanner packaging, and are also shown on the serial number label on the underside of the unit. For more information, refer to: p.78 – Retain your Wi-Fi passcode.</p> <p>If the scanner unit has shut down, awaken it by using the Power Up Radar option in the Shortcut screen, accessible on your MFD by momentarily pressing the MFD’s power key. The Radar unit will shut down within 60 minutes if a wireless (Wi-Fi) connection can’t be made to a multifunction display unit (MFD).</p> <p>Ensure power supply thermal breaker has not tripped or fuse has not blown. If necessary, reset breaker or replace fuse ONCE ONLY. If breaker keeps tripping or fuse keeps blowing, contact a Raymarine authorized dealer for assistance.</p> <p>Ensure power supply maintains the correct voltage when the system is switched on.</p> <p>Ensure all products in the system have the correct software. Refer to www.raymarine.com/software for the latest software updates and the software update procedure for your product.</p> <p>If the Quantum™ Radome is connected to the multifunction display (MFD) via a SeaTalk^{hs} or RayNet network switch, ensure that:</p> <ul style="list-style-type: none"> • All relevant equipment is correctly connected to the network switch. • The network switch power supply is satisfactory. • The network switch is in good condition. • Network cables are securely connected and in good condition.
<p>Connection problems when switching from a wireless (Wi-Fi) to a wired (RayNet) connection.</p>	<ol style="list-style-type: none"> 1. Upgrade MFD to latest software. 2. Upgrade Quantum radar to latest software. 3. Disable the MFD’s Wi-Fi connection (refer to the MFD operations manual for instructions). 4. Power cycle the Quantum radar. 5. Open the Radar app on the MFD and confirm that the Radar is transmitting. 6. Re-enable the MFD’s Wi-Fi connection. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note: For the latest software, refer to: www.raymarine.com/software</p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note: If at some point in the future you decide to revert to the wireless (Wi-Fi)</p> </div>

Symptom	Action
	connection, refer to the pairing procedure: p.72 – Pairing with a Quantum Radar using Wi-Fi.
Displayed bearing is different to the true bearing.	Carry out the bearing alignment procedure described in the MFD Operations manual. Note: Heading (HDG) is displayed in the Radar application on the multifunction display (MFD). Please be aware that bearing alignment refers to the relative bearing of targets to the vessel's bow using visual checks / traditional means.
“Failed to update wired adaptor” error during Quantum software update	Note: The following information does NOT apply to the Wi-Fi-only Quantum variant (E70344). A small number of Quantum units fail to retain the unit's serial number in the onboard memory. While this does not affect the normal operation or performance of the radar in any way, it is necessary to fix the issue for warranty and servicing purposes: <ul style="list-style-type: none"> • If your MFD is running LightHouse 3, you can fix this issue by upgrading your Quantum unit to the latest available software version. Then power cycle the Quantum unit. • If your MFD is running LightHouse 2, return the Quantum unit to Raymarine Service to have the serial number restored.

Multiple Quantum Radars — more information

Only 1 (one) Quantum™ Radar scanner can be powered at any one time, per networked system.

- It is possible to have 1 Quantum™ + 1 NON-Quantum Raymarine Digital radar scanner powered at the same time, on the same networked system.
- It is NOT possible to have 2 Quantum™ Radar scanners connected via Wi-Fi powered at the same time, on the same networked system, or a single standalone display. While it is technically possible to power up 2 Quantum™ radar scanners connected via Wi-Fi separately to 2 standalone (non-networked) displays, or 2 displays which each belong to a different RayNet network, this configuration is NOT recommended. There may be Wi-Fi radio interference between 2 Quantum™ radars operating at the same time.
- It is NOT recommended to have 2 Quantum™ Radar scanners connected via RayNet powered at the same time, on the same networked system. However, it is possible to have 2 Quantum™ radar scanners connected via RayNet separately to 2 standalone (non-networked) displays, or 2 displays which each belong to a different RayNet network.
- It is NOT possible to have 2 Quantum™ Radar scanners powered at the same time, where one is connected via RayNet, and the other is connected via Wi-Fi, on the same networked system, or single standalone display. However, it is possible to have 2 Quantum™ radar scanners powered in this configuration if they are connected separately to 2 standalone (non-networked) displays, or 2 displays which each belong to a different RayNet network.

Retain your Wi-Fi passcode

To connect to the Radar using Wi-Fi (wireless), you will need to know the unit's **SSID**, and **Passcode**.

Both the SSID and Passcode are provided on the serial number label on the underside of the unit, and on spare serial number labels supplied in the box. You may wish to make a separate note of this information and keep in a secure location. You should also keep the Radar scanner packaging in a safe place for future reference.

The following information is applicable only to Quantum units running software version 1.62 or later, and Quantum Doppler units running software version 2.43 or later:

In the event that you misplace the SSID and Passcode before the initial pairing, you can power on your Quantum unit and determine the SSID by reviewing all available Wi-Fi networks, using a smartphone, tablet or laptop PC. An unpaired Quantum unit will advertise its SSID periodically in a 10-second cycle. This may take up to 3 minutes.

Once you've obtained the SSID, the next step is to contact [p.86 — Raymarine product support](#), who can then provide you with the passcode associated with your SSID.

Wi-Fi troubleshooting

Before troubleshooting problems with your Wi-Fi connection, ensure that you have followed the Wi-Fi location requirements guidance provided in the relevant installation instructions and performed a power cycle/reboot of the devices you are experiencing problems with.

Cannot find network

Possible cause	Possible solutions
Wi-Fi not currently enabled on devices.	Ensure Wi-Fi is enabled on both Wi-Fi devices and rescan available networks.
Some devices may automatically turn off Wi-Fi when not in use to save power.	Power cycle / reboot devices and rescan available networks.
Device not broadcasting.	<ol style="list-style-type: none"> 1. Try to enable broadcasting of the device's network using the Wi-Fi settings on the device you are trying to connect to. 2. You may still be able to connect to the device, when it is not broadcasting, by manually entering the device's Wi-Fi Name / SSID and passphrase in the connection settings of the device you are trying to connect.
Devices out of range or signal being blocked.	Move devices closer together or, if possible remove the obstructions and then rescan available network.

Cannot connect to network

Possible cause	Possible solutions
Some devices may automatically turn off Wi-Fi when not in use to save power.	Power cycle/reboot devices and retry the connection.
Trying to connect to the wrong Wi-Fi network	Ensure you are trying to connect to the correct Wi-Fi network, the Wi-Fi network's name can be found in the Wi-Fi settings on the broadcasting device (the device that you are trying to connect to).
Incorrect network credentials	Ensure you are using the correct passphrase, the Wi-Fi network's passphrase can be found in the Wi-Fi settings on the broadcasting device (the device that you are trying to connect to).
Bulkheads, decks and other heavy structure can degrade and even block the Wi-Fi signal. Depending on the thickness and material used it may not always be possible to pass a Wi-Fi signal through certain structures	<ol style="list-style-type: none"> 1. Try repositioning the devices so the structure is removed from the direct line of sight between the devices, or 2. If possible use a wired connection instead.

Possible cause	Possible solutions
Interference being caused by other Wi-Fi enabled or older Bluetooth enabled devices (Bluetooth and Wi-Fi both operate in the 2.4 GHz frequency range, some older bluetooth devices may interfere with Wi-Fi signals.)	<ol style="list-style-type: none"> 1. Change the Wi-Fi Channel of the device you are trying to connect to and retry the connection. You can use free Wi-Fi analyzer apps on your smart device to help you choose a better channel (channel with least traffic). 2. Temporarily disable each wireless device in turn until you have identified the device causing the interference.
Interference caused by other devices that use the 2.4GHz frequency See list below of some common devices that use the 2.4GHz frequency: <ul style="list-style-type: none"> • Microwave ovens • Fluorescent lighting • Cordless phones / baby monitors • Motion sensors 	Temporarily switch off each device in turn until you have identified the device causing the interference, then remove or reposition the offending device(s).
Interference caused by electrical and electronic devices and associated cabling could generate an electromagnetic field which may interfere with the Wi-Fi signal.	Temporarily switch off each item in turn until you have identified the device causing the interference, then remove or reposition the offending device(s).

Connection extremely slow and or keeps dropping out

Possible cause	Possible solutions
Wi-Fi performance degrades over distance so products farther away will receive less network bandwidth. Products installed close to their maximum Wi-Fi range will experience slow connection speeds, signal drop outs or not being able to connect at all.	<ul style="list-style-type: none"> • Move devices closer together. • For fixed installations such as a Quantum Radar, enable the Wi-Fi connection on an MFD installed closer to the device.
Interference being caused by other Wi-Fi enabled or older Bluetooth enabled devices (Bluetooth and Wi-Fi both operate in the 2.4 GHz frequency range, some older bluetooth devices may interfere with Wi-Fi signals.)	<ol style="list-style-type: none"> 1. Change the Wi-Fi Channel of the device you are trying to connect to and retry the connection. You can use free Wi-Fi analyzer apps on your smart device to help you choose a better channel (channel with least traffic). 2. Temporarily switch off each device in turn until you have identified the device causing the interference, then remove or reposition the offending device(s).
Interference from devices on other vessels. When in close proximity to other vessels, for example, when moored up in a marina, many other Wi-Fi signals may be present.	<ol style="list-style-type: none"> 1. Change the Wi-Fi Channel of the device you are trying to connect to and retry the connection. You can use free Wi-Fi analyzer apps on your smart device to help you choose a better channel (channel with least traffic). 2. If possible, move your vessel to a location with less Wi-Fi traffic.

Network connection established but no data

Possible cause	Possible solutions
Connected to the wrong network.	Ensure that your devices is connected to the correct network.
Device software incompatibility	Ensure both devices are running the latest available software.
It may be possible that the device has become defective	<ol style="list-style-type: none">1. Try updating software to a later version, or2. try reinstalling the software.3. Obtain new replacement device.

Mobile application running slowly or not at all

Possible cause	Possible solutions
Raymarine app not installed	Install mobile app from relevant app store.
Raymarine app version not compatible with MFD software	Ensure mobile app and MFD software are latest available versions.
Mobile apps not enabled on MFD	Enable “Viewing only” or “Remote Control” as required in the Mobile Apps setting on your MFD.

Wi-Fi connection recovery

You should use the SSID and Passcode supplied with your Radar to pair the Radar with your MFD. In the event that the original SSID and Passcode cannot be located follow the steps below to try and re-connect to your Radar.

1. The Radar will store the Wi-Fi credentials (SSID and passphrase) of the last 10 devices it has been paired with, this means that you can use the Wi-Fi credentials from a MFD that has previously been paired with the Quantum Radar. Enter the MFD’s Wi-Fi Name and Wi-Fi Passphrase on the Quantum Radar pairing page and try to connect. The MFD’s Wi-Fi Name (SSID) and Passphrase is located in the Wi-Fi menu: **(Homescreen > Set-up > System Set-up > Wireless Connections > Wi-Fi > Wi-Fi Sharing)**
2. The following information is applicable only to Quantum units running software version 1.62 or later, and Quantum Doppler units running software version 2.43 or later: In the event that you misplace the SSID and Passcode before the initial pairing, you can power on your Quantum unit and determine the SSID by reviewing all available Wi-Fi networks, using a smartphone, tablet or laptop PC. An unpaired Quantum unit will advertise its SSID periodically in a 10-second cycle. This may take up to 3 minutes. Once you’ve obtained the SSID, the next step is to contact [p.86 – Raymarine product support](#), who can then provide you with the passcode associated with your SSID.

Operation instructions

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

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

Chapter 8: Maintenance

Chapter contents

- [8.1 Maintenance on page 84](#)

8.1 Maintenance

Once a year:

1. Power-off the Radar.
2. Remove one of the antenna-securing bolts and associated washers.
3. Clean the bolt and washers.
4. Ensure that the passage to the "breather" from the side of the unit is clear of sealant or paint, or other obstacles. For more information on the "breather", refer to: [p.64 – Mounting pre-requisite: "breather" holes](#).
5. Replace the bolt and associated washers.
6. Repeat steps 1 to 5 for all antenna-securing bolts.
7. Tighten all antenna-securing bolts to a torque of 15 Nm (11 lbf.ft).

Periodically, carry out these other maintenance tasks, with the Radar powered off:

- Ensure the antenna is firmly attached to the mounting surface.
- Check that any connected cables are in good condition and securely attached.
- Examine all cables for signs of chafing, cuts or other damage.



Warning: High voltage

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

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.

Chapter 9: Technical support

Chapter contents

- 9.1 Raymarine product support and servicing on page 86
- 9.2 Viewing product information (LightHouse™ 2) on page 87
- 9.3 Viewing product information (LightHouse™ 3) on page 87

9.1 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 MFD.

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>.

Region	Contact
United Kingdom (UK), EMEA, and Asia Pacific	<ul style="list-style-type: none">• E-Mail: emea.service@raymarine.com• Tel: +44 (0)1329 246 932
United States (US)	<ul style="list-style-type: none">• 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** — <http://forum.raymarine.com>
- **Software updates** — <http://www.raymarine.com/software>

Worldwide support

Region	Contact
United Kingdom (UK), EMEA, and Asia Pacific	<ul style="list-style-type: none">• E-Mail: support.uk@raymarine.com• Tel: +44 (0)1329 246 777
United States (US)	<ul style="list-style-type: none">• E-Mail: support@raymarine.com• Tel: +1 (603) 324 7900 (Toll-free: +800 539 5539)
Australia and New Zealand (Raymarine subsidiary)	<ul style="list-style-type: none">• E-Mail: aus.support@raymarine.com• Tel: +61 2 8977 0300
France (Raymarine subsidiary)	<ul style="list-style-type: none">• E-Mail: support.fr@raymarine.com• Tel: +33 (0)1 46 49 72 30
Germany (Raymarine subsidiary)	<ul style="list-style-type: none">• E-Mail: support.de@raymarine.com• Tel: +49 (0)40 237 808 0
Italy (Raymarine subsidiary)	<ul style="list-style-type: none">• E-Mail: support.it@raymarine.com• Tel: +39 02 9945 1001
Spain (Authorized Raymarine distributor)	<ul style="list-style-type: none">• E-Mail: sat@azimut.es• Tel: +34 96 2965 102
Netherlands (Raymarine subsidiary)	<ul style="list-style-type: none">• E-Mail: support.nl@raymarine.com• Tel: +31 (0)26 3614 905

Region	Contact
Sweden (Raymarine subsidiary)	<ul style="list-style-type: none"> E-Mail: support.se@raymarine.com Tel: +46 (0)317 633 670
Finland (Raymarine subsidiary)	<ul style="list-style-type: none"> E-Mail: support.fi@raymarine.com Tel: +358 (0)207 619 937
Norway (Raymarine subsidiary)	<ul style="list-style-type: none"> E-Mail: support.no@raymarine.com Tel: +47 692 64 600
Denmark (Raymarine subsidiary)	<ul style="list-style-type: none"> E-Mail: support.dk@raymarine.com Tel: +45 437 164 64
Russia (Authorized Raymarine distributor)	<ul style="list-style-type: none"> E-Mail: info@mikstmarine.ru Tel: +7 495 788 0508

9.2 Viewing product information (LightHouse™ 2)

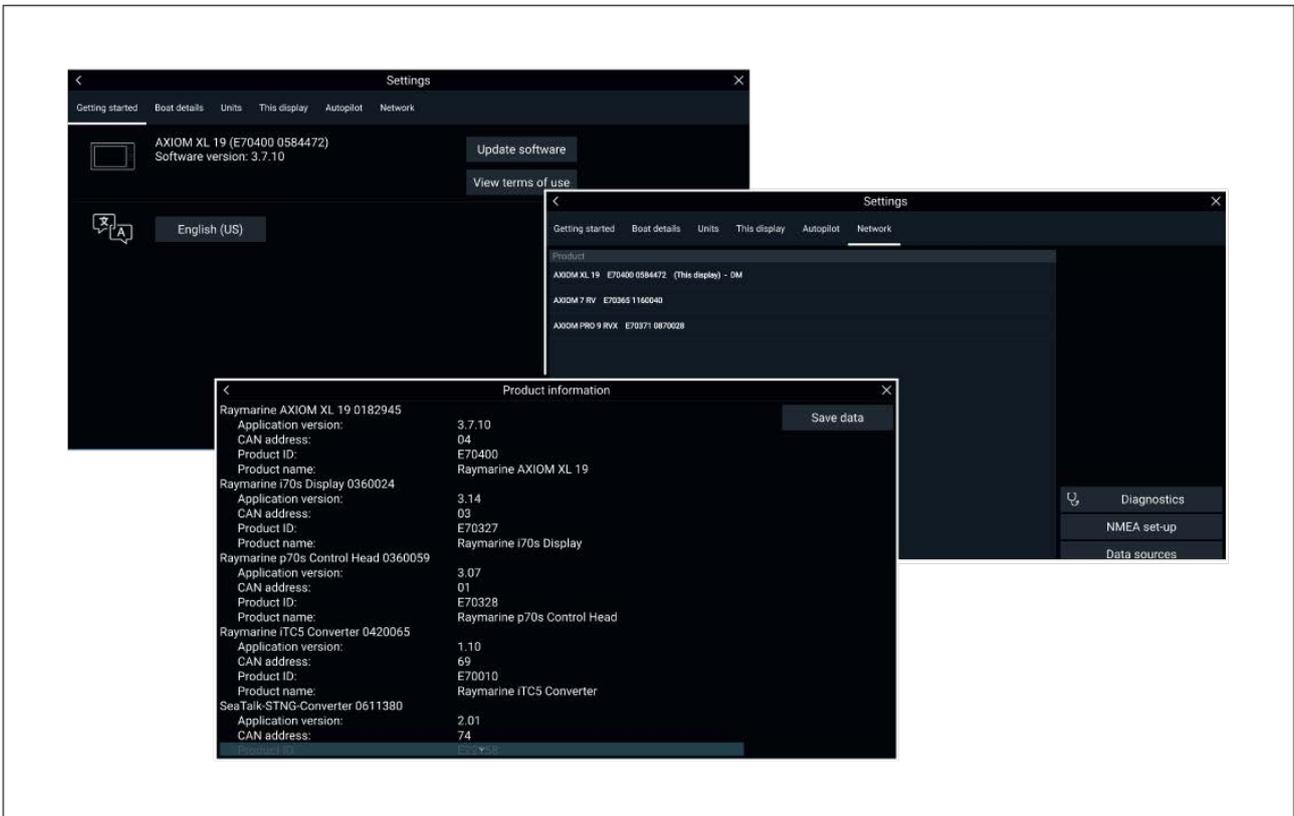
You can view information about your unit from the **Diagnostics** menu on a compatible multifunction display. This option displays information such as product serial number and software version.

With the Homescreen displayed:

1. Select **Set-up**.
2. Select **Maintenance**.
3. Select **Diagnostics**.
4. Select the **Select Device** option.
A list of connected devices is displayed.
5. Select the product for which you want to view information. Alternatively, select **Show All Data** to display information for all connected products.

9.3 Viewing product information (LightHouse™ 3)

Use the **Settings** menu to view hardware and software information about your MFD, and connected products.



1. Select **Settings**, from the Homescreen.
The **Getting started** menu contains hardware and software information for your MFD.
2. You can view further information about your MFD, or view information about products networked using SeaTalkhs[®] and SeaTalkng[®] / NMEA 2000, by selecting the **Network** tab, then:
 - i. to display detailed software information and your MFD's network IP address, select your MFD from the list.
 - ii. to display detailed diagnostics information for all products, select **Product info** from the **Diagnostics** pop over menu.

Chapter 10: Technical specification

Chapter contents

- [10.1 Technical specification on page 90](#)

10.1 Technical specification

Approvals

Approvals:	Certification:
USA:	47CFR FCC Part 2 & Part 80 Certificate of Approval
Canada:	RSS238 Iss. 1 Technical Acceptance Certificate
European Union & EFTA:	Radio Equipment Directive 2014/53/EU Certificate of Opinion
Australia/New Zealand:	ACMA Declaration of Conformity Compliance level 3

General

Dimensions:	
Diameter:	541.0 mm
Height:	209.5 mm
Weight:	5.6 kg
Supply voltage:	Either 12 V dc or 24 V dc nominal Minimum: 10.8 V dc Maximum: 31.2 V dc
Power consumption:	Transmit mode (maximum): 17 W Standby mode: 7 W Sleep mode (applies only to radars connected via Wi-Fi): 2 W
Environmental:	
Waterproof to:	IPX6
Operating temperature range:	-10°C to +55°C
Storage temperature range:	-25°C to +70°C
Additional storage conditions:	Store upright; do not block vents on underside
Humidity:	Up to 95% at 35°C
Maximum wind speed:	100 kts
Range scales:	1/16, 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, and 24 nautical miles

Transmitter

Type:	X-band solid-state transmitter with pulse compression technology
Transmit frequency:	9354 MHz to 9446 MHz
Peak power output:	20 W
Duplexer:	Circulator
Pulse widths (3 dB):	40 ns to 14.7µs
Chirp lengths:	400 ns to 22 µs
Pulse repetition frequency:	920 Hz to 5900 Hz
Chirp bandwidth:	Up to 32 MHz
Standby mode:	Scanner rotation - OFF Scanner transmission - OFF Wi-Fi link - ON

Receiver

IF frequency:	26 MHz
Noise figure:	Less than 4 dB

Antenna

Type:	Patch Array
Beamwidth (nominal)	Horizontal: 4.9° Vertical: 20°
Polarization:	Horizontal
Rotation speed:	24 rpm nominal

Target tracking

Target tracking	Tracking of 10 simultaneous Radar targets.
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Chapter 11: Spares and accessories

Chapter contents

- 11.1 Quantum Radar accessories on page 94
- 11.2 Network hardware on page 94
- 11.3 Network cable connector types on page 95
- 11.4 RayNet to RayNet cables and connectors on page 96
- 11.5 RayNet to RJ45 adapter cables on page 97

11.1 Quantum Radar accessories

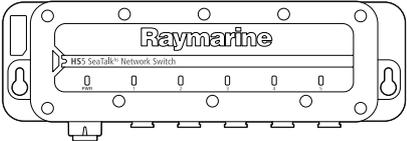
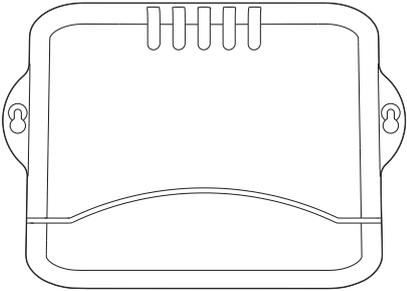
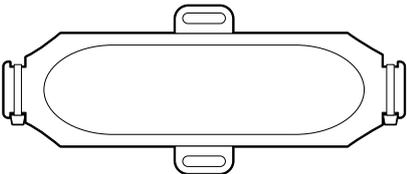
The following accessories are available for the Quantum™ Radar scanner:

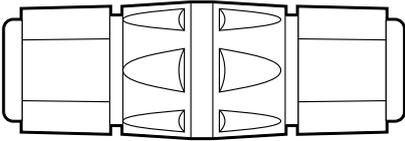
Accessories

Item	Part number
10 m (32.8 ft.) Quantum™ power cable	A80309
15 m (49.2 ft.) Quantum™ power cable	A80369
5 m (16.4 ft.) Quantum™ data cable	A80274
10 m (32.8 ft.) Quantum™ data cable	A80275
15 m (49.2 ft.) Quantum™ data cable	A80310
25 m (82.0 ft.) Quantum™ data cable	A80311
Quantum™ Y-adapter cable	A80308
RayNet cable joiner	A80162

Note: For more information on additional RayNet cables and adapters, refer to [p.96 — RayNet to RayNet cables and connectors](#) and [p.97 — RayNet to RJ45 adapter cables](#).

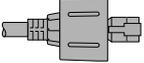
11.2 Network hardware

Item	Part number	Notes
HS5 RayNet network switch 	A80007	5–port switch for network connection of multiple devices featuring RayNet connectors. Equipment with RJ45 SeaTalk ^{hs} connectors can also be connected using suitable adapter cables.
RJ45 SeaTalk ^{hs} network switch 	E55058	8–port switch for network connection of multiple SeaTalk ^{hs} devices featuring RJ45 connectors.
RJ45 SeaTalk ^{hs} crossover coupler 	E55060	<ul style="list-style-type: none"> Enables direct connection of RJ45 SeaTalk^{hs} devices to smaller systems where a switch is not required. Enables the connection of RJ45 SeaTalk^{hs} devices to a HS5 RayNet network switch (in conjunction with suitable adapter cables). Enables 2 RJ45 SeaTalk^{hs} cables to be connected together to extend the length of the cabling. Recommended for internal installations. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Important: Do NOT use crossover devices for POE (Power Over Ethernet) connections.</p> </div>

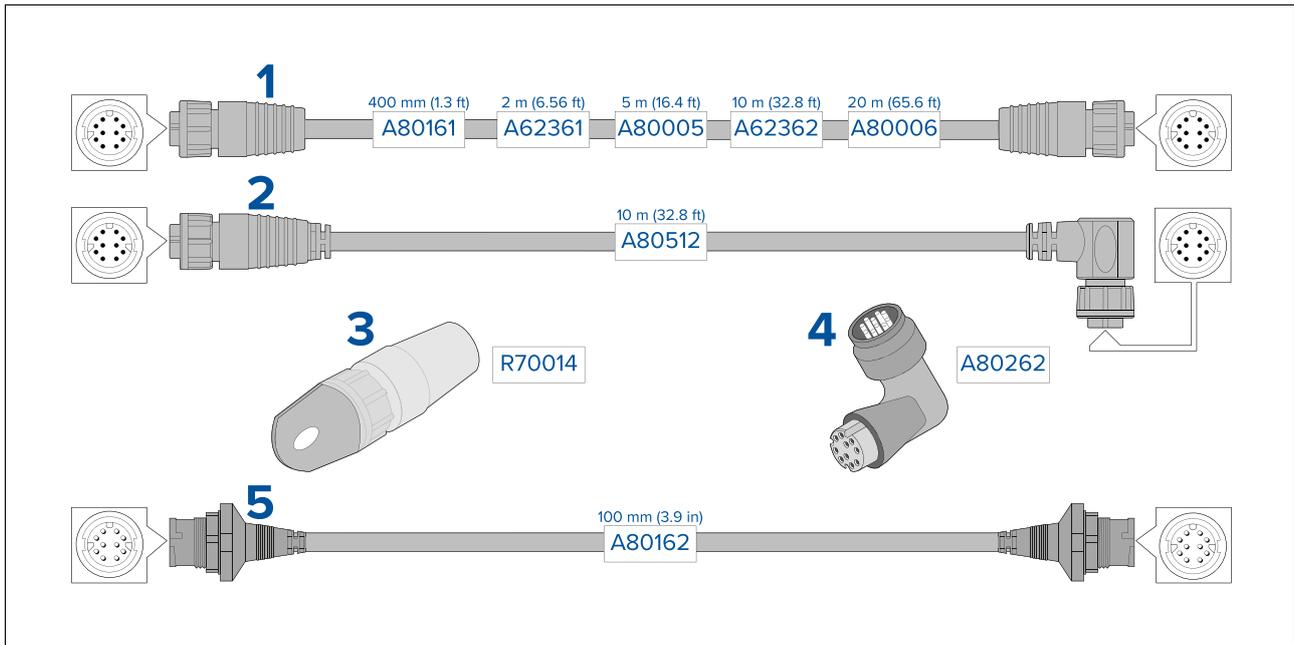
Item	Part number	Notes
Ethernet RJ45 coupler 	R32142	<ul style="list-style-type: none"> • Enables direct connection of RJ45 SeaTalk^{hs} devices to smaller systems where a switch is not required. • Enables the connection of RJ45 SeaTalk^{hs} devices to a HS5 RayNet network switch (in conjunction with suitable adapter cables). • Enables 2 RJ45 SeaTalk^{hs} cables to be connected together to extend the length of the cabling. Recommended for external installations.

11.3 Network cable connector types

There are 2 types of network cable connector — RayNet, and RJ45 SeaTalk^{hs}.

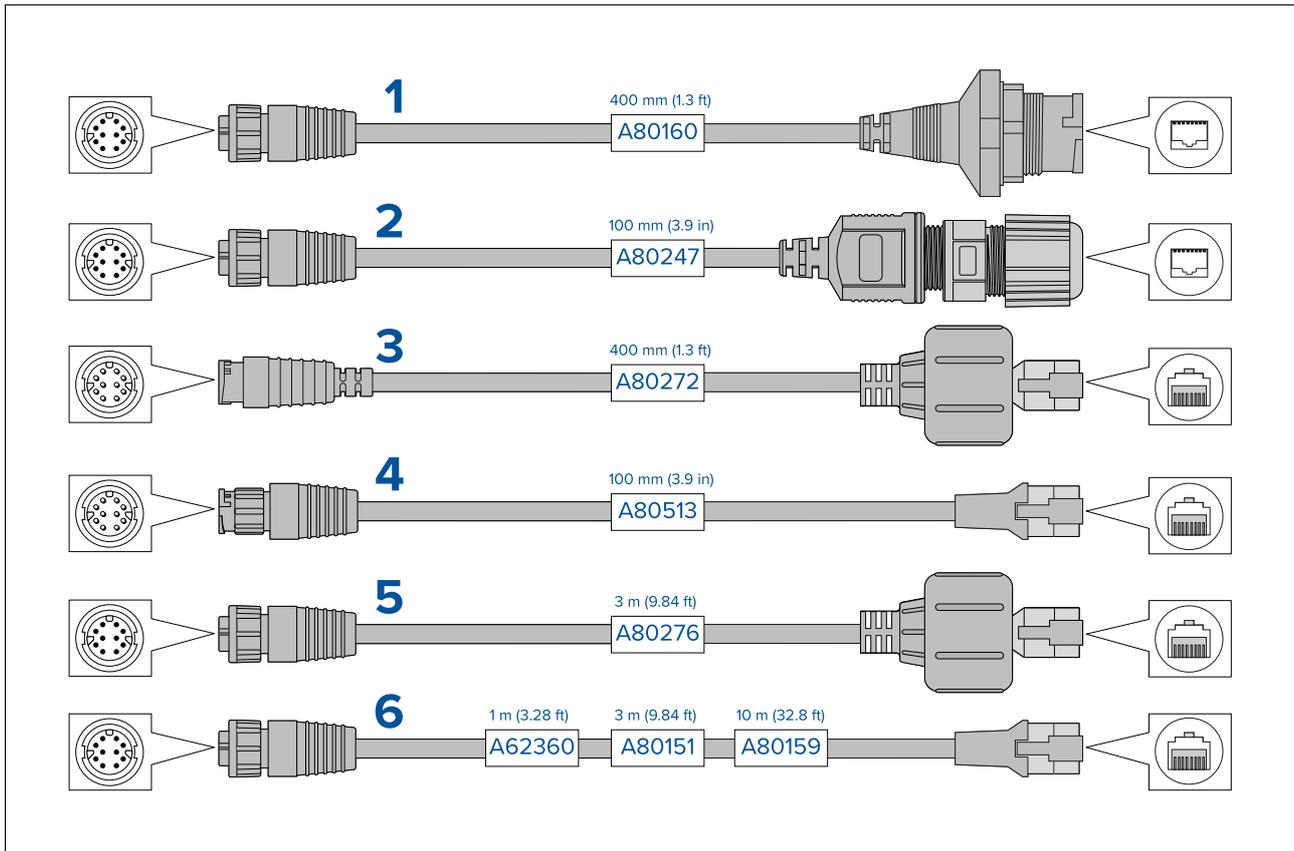
	RJ45 SeaTalk^{hs} connector.
	RayNet connector.

11.4 RayNet to RayNet cables and connectors



	Description
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. 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.

11.5 RayNet to RJ45 adapter cables



	Description
1	Adapter cable with a RayNet (female) socket on one end, and a waterproof (female) socket on the other end accepting the following cables with an RJ45 SeaTalk^{hs} waterproof locking (male) plug: <ul style="list-style-type: none"> • A62245 (1.5 m). • A62246 (15 m).
2	Adapter cable with a RayNet (female) socket on one end, and a waterproof (female) RJ45 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 SeaTalk^{hs} waterproof (male) plug on the other end.
4	Adapter cable with a RayNet (male) plug on one end, and an RJ45 SeaTalk^{hs} (male) plug on the other end.
5	Adapter cable with a RayNet (female) socket on one end, and an RJ45 SeaTalk^{hs} waterproof (male) plug on the other end.
6	Adapter cable with a RayNet (female) socket on one end, and an RJ45 SeaTalk^{hs} (male) socket on the other end.

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