AXIOM™ PRO

MFD / CHARTPLOTTER

INSTALLATION INSTRUCTIONS

English (en-US)
Date: 07-2023
Document number: 87319 (Rev 4)

Raymarine®

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CHAPTER 1: IMPORTANT INFORMATION

Safety warnings

Warning: Product installation and operation

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

Warning: High voltage

This product contains high voltage. Adjustments require specialized service procedures and tools only available to qualified service technicians. There are no user serviceable parts or adjustments. The operator should never remove the cover or attempt to service the product.

Warning: Switch off power supply

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

Warning: 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).

Product warnings

Caution: Product weight

- 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.

Warning: Marine-grade sealant

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

Regulatory notices

Regulatory e-Label

All the applicable regulatory and compliance standards for your product are listed in electronic format in a regulatory "e-label" document, which can be viewed on your product's display.

To access the Regulatory e-Label for your product:

From the Homescreen: *[Settings > Getting Started > Regulatory Approvals]*

Declaration of Conformity

FLIR Belgium BVBA declares that the radio equipment types Axiom Pro multifunction displays, part numbers E70371, E70481, E70372, E70482, E70373, E70483, 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.

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

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.

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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).

Warranty registration

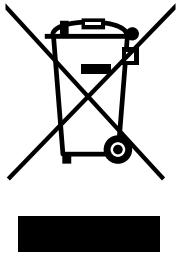
To register your Raymarine product ownership, please visit www.raymarine.com and register online.

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

Product disposal

Dispose of this product in accordance with the WEEE Directive.

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



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

IMO and SOLAS

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

Technical accuracy

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

Publication copyright

CHAPTER 2: DOCUMENT AND PRODUCT INFORMATION

CHAPTER CONTENTS

2.1 Applicable products

This document is applicable to the following products:

Axiom™ Pro Multifunction Displays

Product number	Name	Description
E70371	Axiom™ Pro 9 RVX	9” MFD with built-in RealVision™ 3D and 1kW sonar module.
E70481	Axiom™ Pro 9 S	9” MFD with built-in 200W CHIRP sonar module.
E70372	Axiom™ Pro 12 RVX	12” MFD with built-in RealVision™ 3D and 1kW sonar module.
E70482	Axiom™ Pro 12 S	12” MFD with built-in 200W CHIRP sonar module.
E70373	Axiom™ Pro 16 RVX	16” MFD with built-in RealVision™ 3D and 1kW sonar module.
E70483	Axiom™ Pro 16 S	16” MFD with built-in 200W CHIRP sonar module.

2.2 Document information

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

The document includes information to help you:

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

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

2.3 Document conventions

The following conventions are used throughout this document.

Formatting of user interface menus and settings.

References to menus and setting options are formatted using square brackets [].

Examples:

- You can select your desired cartography from the *[Cartography selection]* menu.
- MFD apps are accessed from the *[Homescreen]*.

Procedures for performing specific tasks using the product’s user interface.

The term “**Select**” is used to refer to the action of:

- Touchscreen control — using your finger to select a menu option or item on the screen.
- Physical buttons — Highlighting an item using the navigational controls and confirming the selection by pressing the *[OK]* button.

Examples:

- Select *[Ok]* to confirm your selection.
- Select *[Set-up]*

Procedures for navigating menu hierarchies.

Menu hierarchies are used in this document to provide a quick summary on how to access a particular function or menu option.

Examples:

- The internal sonar module is turned off from the Fishfinder app menu: *[Menu > Set-up > Sounder Set-up > Internal Sounder]*.
- The internal GPS can be switched off from the GPS settings menu: *[Homescreen > Status area > Satellites > Settings > Internal GPS]*

2.4 Document illustrations

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

All images are provided for illustration purposes only.

2.5 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)	87319
Surface mounting template	• 9” — 87235 • 12” — 87236 • 16” — 87313
Legacy MFD to Axiom Pro adaptor plates installation instructions	87321
RCR-SDUSB Installation instructions	87317
LightHouse™ 4 Advanced operation instructions	81406
LightHouse™ 3 Advanced operation instructions	81370

User manuals Print Shop

Raymarine® provides a Print Shop service, enabling you to purchase a high-quality, professionally-printed manual for your Raymarine® product.

Printed manuals are ideal for keeping onboard your vessel, as a useful source of reference whenever you need assistance with your Raymarine product.

To order a printed manual, delivered directly to your door, visit: http://www.raymarine.co.uk/view/?id=5175

For further information about the Print Shop, please visit the Print Shop FAQ pages: http://www.raymarine.co.uk/view/?id=5751

Note:

- Accepted methods of payment for printed manuals are credit cards and PayPal.
- Printed manuals can be shipped worldwide.
- Further manuals will be added to the Print Shop over the coming months for both new and legacy products.
- Raymarine user manuals are also available to download free-of-charge from the Raymarine® website, in the popular PDF format. These PDF files can be viewed on a PC / laptop, tablet, smartphone, or on the latest generation of Raymarine® multifunction displays.

2.6 LightHouse™ MFD Operation instructions

For operation instructions for your product please refer to the relevant LightHouse™ advanced operation instructions.

- **81406** — LightHouse™ 4 advanced operation instructions.
- **81370** — LightHouse™ 3 advanced operation instructions.

The operation instructions can be downloaded from the Raymarine website: www.raymarine.com/manuals. Please check the website to ensure you have the latest documentation.

Multifunction display software version

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

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

CHAPTER 3: COMPATIBLE TRANSDUCERS

CHAPTER CONTENTS

3.1 Compatible transducers — Axiom™ Pro MFDs

Depending on your MFD variant you can connect the following transducer types directly to your MFD:

Axiom Pro S:

- CPT-S CHIRP conical beam transducers that utilize the 9 pin DownVision™ connector.

Axiom Pro RVX — RV connection:

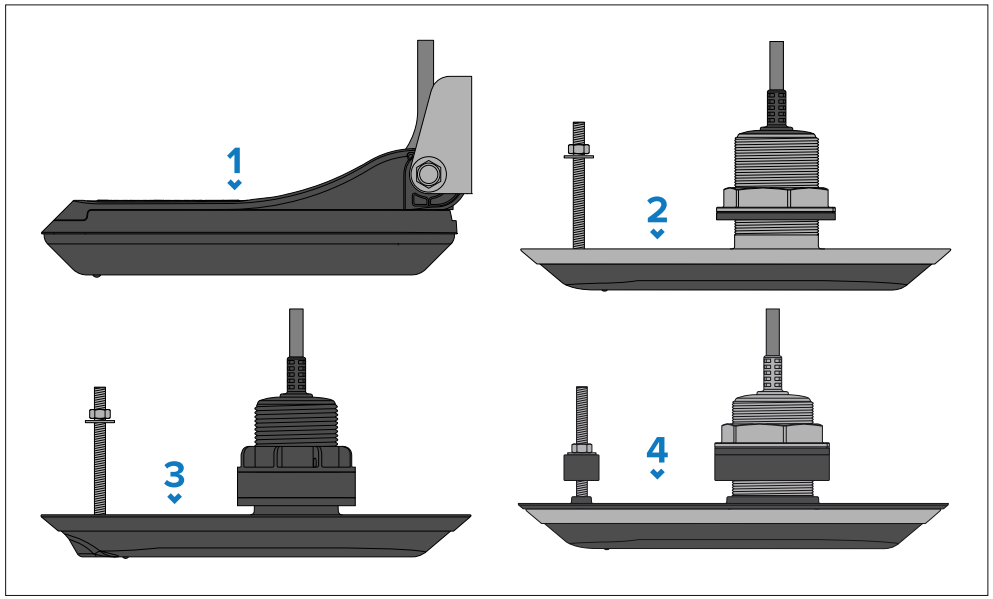
- RealVision™ 3D transducers.
- DownVision™ transducers.
- Non-CHIRP transducers can be connected using available adaptor cables. Refer to the Raymarine® website for compatible transducers: www.raymarine.com/transducers.

Axiom Pro RVX — 1kW connection:

- 1kW transducers. Refer to the Raymarine® website for compatible transducers: www.raymarine.com/transducers.
- Other transducers using available adaptor cables.

3.2 RealVision transducers

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

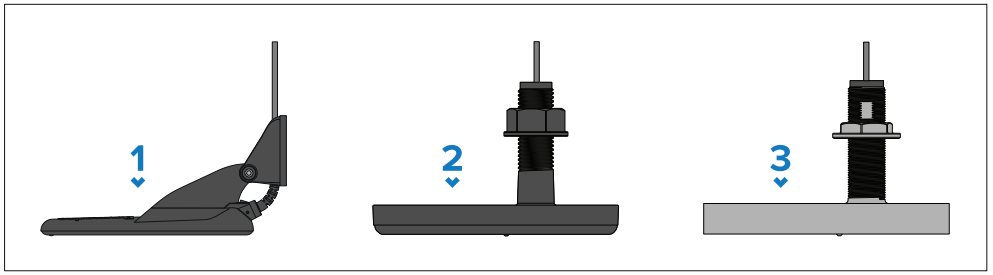


1	• **RV-100** RealVision™ 3D plastic transom mount transducer (A80464)
2	• **RV-200** RealVision™ 3D bronze 0° thru-hull all-in-one transducer (A80465) • **RV-212P** and **RV-212S** RealVision™ 3D bronze 12° thru-hull split-pair transducers (T70318) – **RV-212P** port transducer (A80466) – **RV-212S** starboard transducer (A80467) • **RV-220P** and **RV-220S** RealVision™ 3D bronze 20° thru-hull split-pair transducers (T70319) – **RV-220P** port transducer (A80468) – **RV-220S** starboard transducer (A80469)

3	• **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) – **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) – **RV-320P** port transducer (A80473) – **RV-320S** starboard transducer (A80474)
4	• **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) – **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) – **RV-420P** port transducer (A80618) – **RV-420S** starboard transducer (A80619)

3.3 DownVision™ transducers

The transducers listed below can be connected directly to DownVision™ (DV) variant MFDs. An adaptor is required for connection to RealVision™ (RV) variant MFDs.



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)

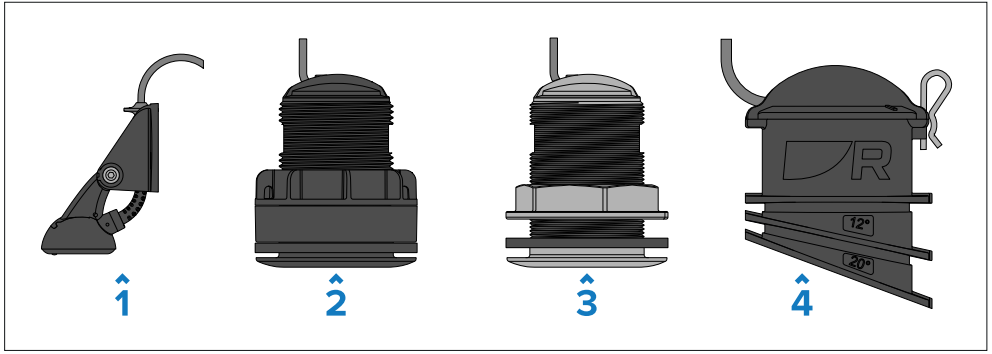
3.4 CHIRP conical beam transducers (using DownVision™ type connector)

The transducers listed below can be connected directly to DownVision™ (DV) variant MFDs or via an adaptor cable to RealVision™ (RV), RealVision™ + 1kW (RVX) and Sonar (S) variant MFDs.

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

Note:

CPT-S transducers do NOT offer DownVision™ channels.



1	• **CPT-S** plastic transom transducer (E70342)
2	• **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	• **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)
4	• **CPT-S** plastic in-hull transducer (A80691)

CHAPTER 4: PARTS SUPPLIED

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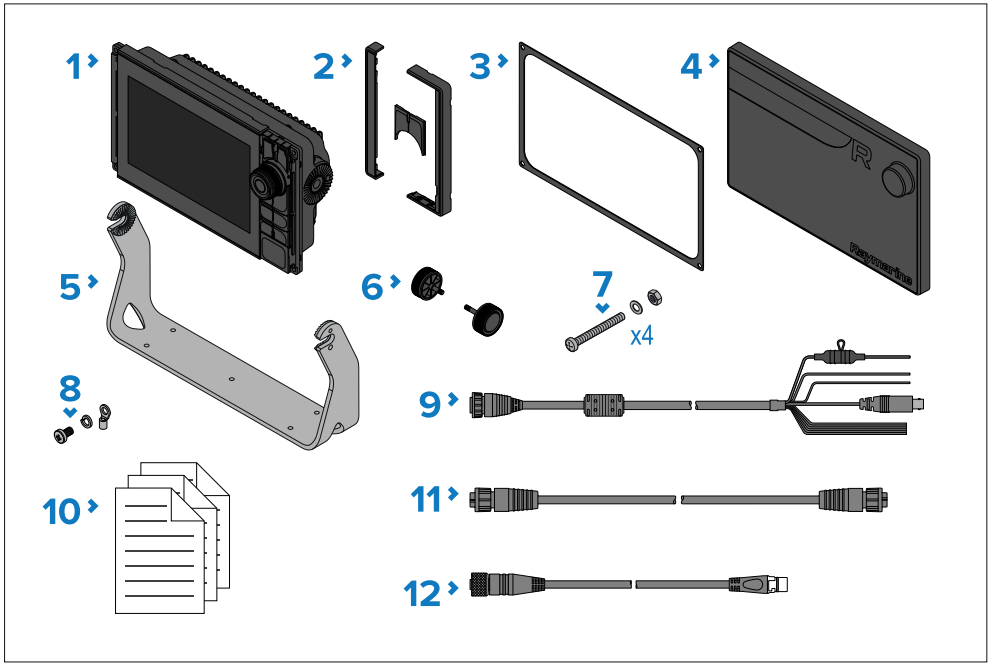
4.1 Parts supplied - Axiom Pro 9 and 12

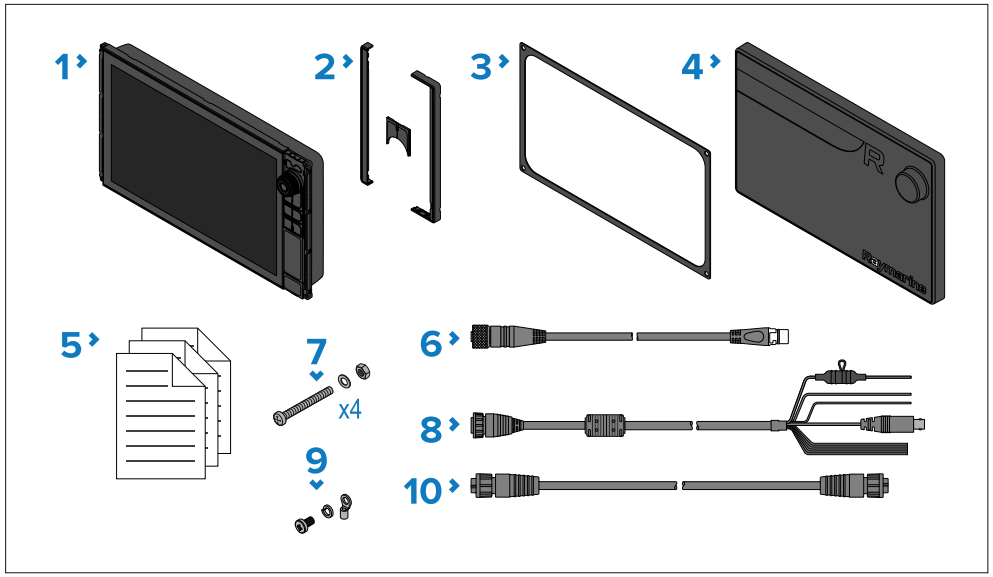
The parts listed are supplied with the following product numbers: E70371, E70481, E70372 and E70482.



1. Axiom Pro MFD
2. Front bezel pieces and Upper keypad
3. Panel mount gasket
4. Suncover
5. Trunnion bracket
6. Trunnion knobs x 2
7. Fixings (M4 x 40 pan head bolt x 4, M4 Nylock nut x 4 and M4 washer x 4)
8. M3x5 screw, M3 spring washer and M3 crimp terminal (for optional grounding connection)
9. Power/Video/NMEA 0183 cable 1.5 m (4.92 ft) straight
10. Documentation pack
11. RayNet 2 m (6.6 ft) network cable
12. SeaTalkng ™ to DeviceNet adaptor cable

4.2 Parts supplied - Axiom Pro 16

The parts listed are supplied with the following product numbers: E70373 and E70483.



1. Axiom Pro MFD
2. Front bezel pieces and Upper keypad
3. Panel mount gasket
4. Suncover
5. Documentation pack
6. SeaTalkng ™ to DeviceNet adaptor cable
7. Fixings (M4 x 40 pan head bolt x 4, M4 Nylock nut x 4 and M4 washer x 4)
8. Power/Video/NMEA 0183 cable 1.5 m (4.92 ft) straight
9. M3x5 screw, M3 spring washer and M3 crimp terminal (for optional grounding connection)
10. RayNet 2 m (6.6 ft) network cable

CHAPTER 5: PRODUCT DIMENSIONS

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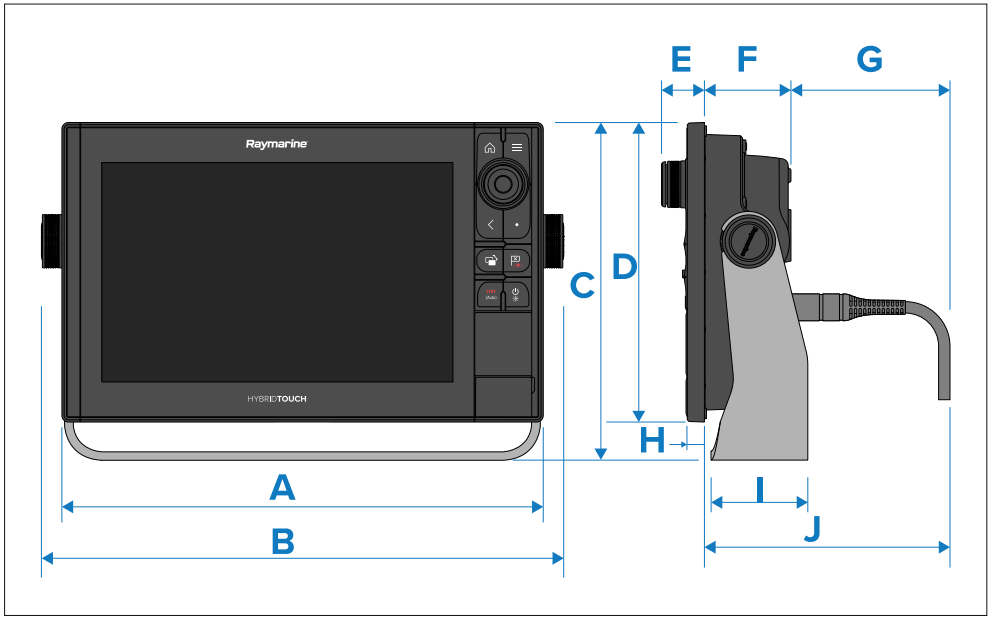
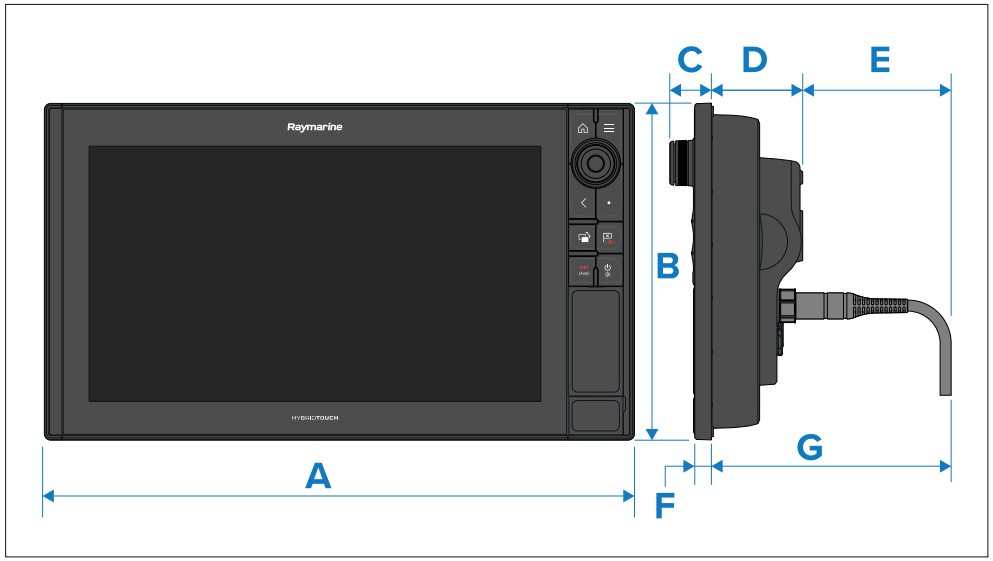
5.1 Axiom Pro 9 and 12 dimensions



	Axiom Pro 9	Axiom Pro 12
A	299.32 mm (11.78 in)	358.03 mm (14.1 in)
B	329.5 mm (12.97 in)	388.5 mm (15.3 in)
C	186.2 mm (7.33 in)	246.13 mm (9.69 in)
D	173.79 mm (6.84 in)	222.8 mm (8.77 in)
E	33.4 mm (1.31 in)	31.9 mm (1.26 in)
F	64.5 mm (2.54 in)	64.4 mm (2.54 in)
G	137.05 mm (5.4 in) straight connector 117.05 mm (4.61 in) right angled connector	137.1 mm (5.4 in) straight connector 117.1 mm (4.61 in) right angled connector
H	12.86 mm (0.51 in)	12.86 mm (0.51 in)
I	84 mm (3.31 in)	89 mm (3.50 in)
J	201.5 mm (7.93 in) straight connector 181.5 mm (7.15 in) right angled connector	201.5 mm (7.93 in) straight connector 181.5 mm (7.15 in) right angled connector

5.2 Axiom Pro 16 dimensions



A	452.02 mm (17.8 in)
B	258 mm (10.16 in)
C	33.4 mm (1.31 in)
D	68.4 mm (2.69 in)
E	138.6 mm (5.46 in) straight connector 118.6 mm (4.67 in) right angled connector
F	15.2 mm (0.6 in)
G	207 mm (8.15 in) straight connector 187 mm (7.36 in) right angled connector

CHAPTER 6: LOCATION REQUIREMENTS

CHAPTER CONTENTS

6.1 Warnings and cautions

Important:

Before proceeding, ensure that you have read and understood the warnings and cautions provided in the following section of this document:
p.8 — Important information

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).

6.2 General location requirements

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

Key factors which can affect product performance are:

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

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

Caution: Product weight

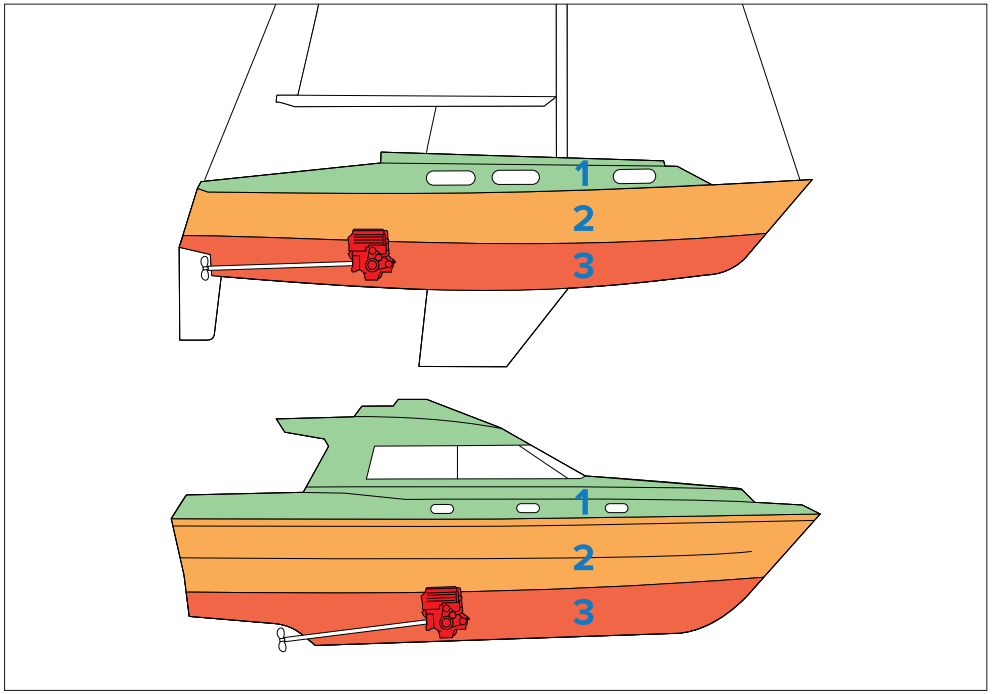
- Refer to the technical specification for your product to ensure the intended mounting surface is suitable to bear its weight.
- 2 people may be required for installation of larger / heavier products.

6.3 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.



Item	Location
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.

6.4 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.

6.5 Wireless location requirements for optimum performance

All wireless devices in your system must be located in such a way that they can reliably receive and/or transmit wireless signals.

A number of factors can influence wireless performance. For example, physical obstacles and certain vessel structures and materials can all negatively impact wireless performance. Therefore, **it's important to check a product's wireless performance at the desired installation location before drilling any mounting holes**.

Vessel construction and materials

Wherever possible, mount products on surfaces constructed from GRP (e.g. fiberglass resin, or foam), or on dry wooden bulkheads.

Conductive materials in the signal path can have a significant impact on wireless signal performance. Reflective surfaces such as metal surfaces, some types of glass and even mirrors can drastically affect performance or even block the wireless signal. Installation locations that are in close proximity to these materials should be avoided. **Do NOT mount wireless products directly to conductive materials.** This includes any mounting surface or enclosure/pod.

Examples of conductive materials include, but are not limited to:

- carbon fibre, kevlar, or aramid (including sails made from these materials)
- aluminium
- steel

In installations with conductive materials, if available, mount the wireless product using an accessory pole mount or deck mounting kit. A clearance of at least 10 cm (3.9 in) is required to minimize the ground effect from conductive materials. This applies to transmitters as well as displays. If moving the product fixes the problem, consider cutting an antenna clearance hole behind the unit (once the product position and mounting have been finalized).

Wireless performance can also be degraded in locations where the wireless signal passes through a bulkhead containing power cables.

Crew members (especially when wet) can also be obstructive to wireless signals, if their bodies pass through the signal area between wireless sensor and any associated displays.

Checking and optimizing signal strength

It may be necessary to experiment with the location of your wireless products to achieve optimal wireless performance and a clear signal path.

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.

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.

Some wireless products feature a signal strength indicator to assist in the process of determining the location with the best wireless performance. Choose the location with the highest and most consistently strong direct signal reading, during a 5 minute monitoring period. Try alternative locations for the transmitter to maximise the signal strength to the displays; e.g. try locations below a hatch or skylight or near to a window. A small change in product position can result in a significant change in the signal strength.

Note:

Some wireless products (e.g. a Hull Transmitter) will not transmit data unless a transducer is connected. Also consider that an NMEA or SeaTalkng product (e.g. an interface) will not transmit data unless an appropriate data source is connected.

Interference and other equipment

Interference from other people's wireless devices can 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).

Wireless products should be installed at least 1 m (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.

Software updates

It's also important to ensure all your wireless products are running the latest software versions, as improvements are made over time to wireless performance.

6.6 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 viewing angles for your product refer to the *Technical specification*.

6.7 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.

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.

Compass safe distance

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

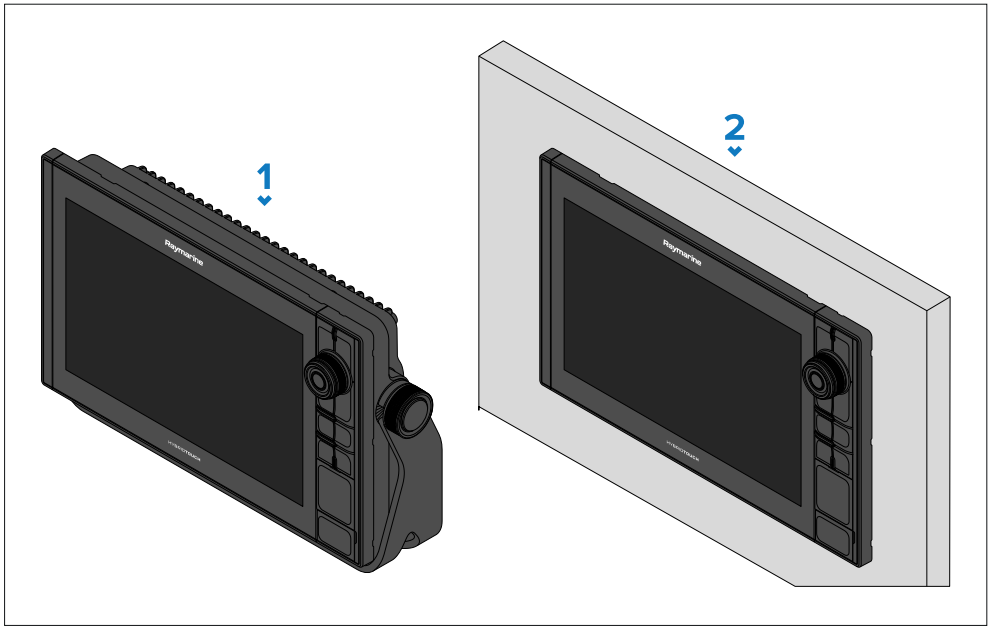
When choosing a suitable location for the product you should aim to maintain the maximum possible distance from any compasses. Typically this distance should be at least 1 m (3.3 ft) in all directions. However for some smaller vessels it may not be possible to locate the product this far away from a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

CHAPTER 7: INSTALLATION

CHAPTER CONTENTS

7.1 Mounting options

Axiom Pro 9, 12, and 16 can be surface mounted. The Axiom Pro 9 and 12 can also be bracket mounted on a trunnion.



1. Trunnion mounting (Axiom Pro 9 and Axiom Pro 16).
2. Surface mounting.

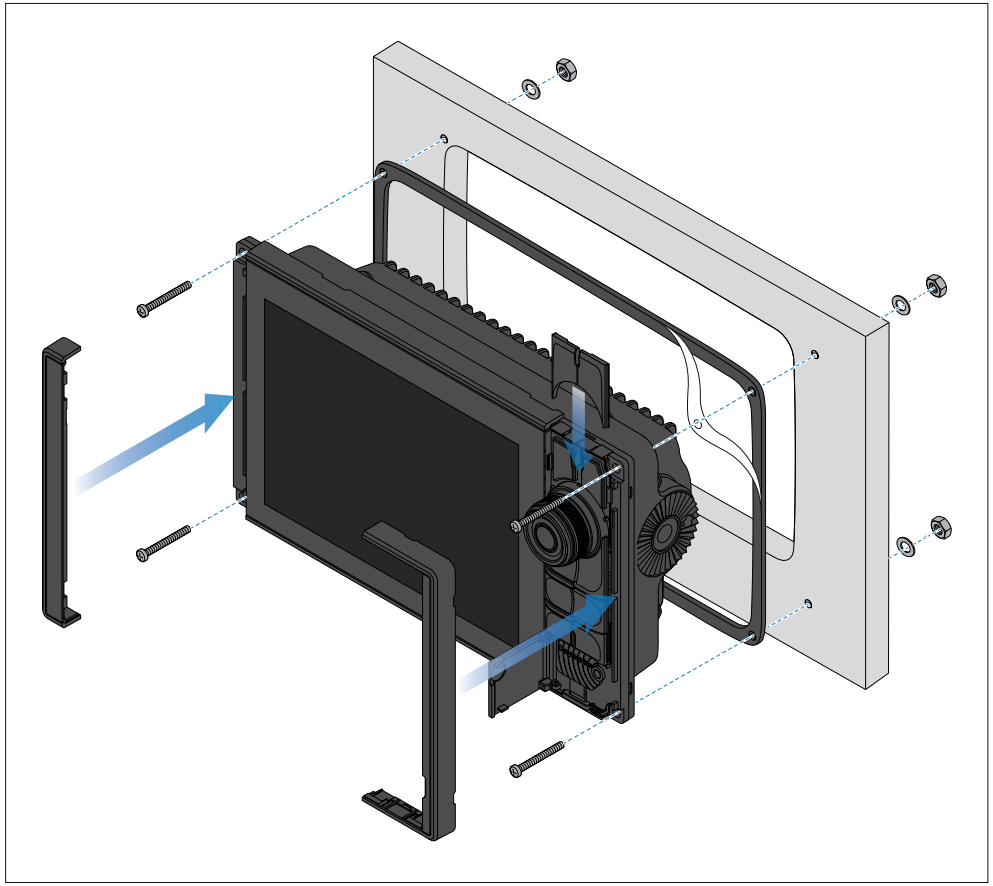
- A Bracket/ball mount plate is available which enables Axiom Pro 16 MFDs to be mounted on a suitable 3rd party ram/ball mount. For mounting details refer to: Ram / ball mounting.
- Legacy MFD adaptor plates are also available to enable you to easily swap out older MFDs for new Axiom Pro MFDs, please refer to Legacy adaptor plates for a list of available adaptors.

7.2 Surface mounting

Axiom Pro MFDs can be surface mounted.

Before mounting the unit, ensure that you have:

- Selected a suitable location.
- Identified the cable connections and route that the cables will take.
- Detached the Menu/Home buttons keypad.
- Detached the front screw covers.



1. Check the chosen mounting location. A clear, flat area with suitable clearance behind the panel is required.
2. Fix the supplied mounting template to the chosen location using masking or self-adhesive tape.
3. Using a suitable hole saw (the size is indicated on the template), make a hole in each corner of the cut-out area.
4. Using a suitable saw, cut along the inside edge of the cut-out line.
5. Ensure that the unit fits into the removed area and then file around any rough edges until smooth.

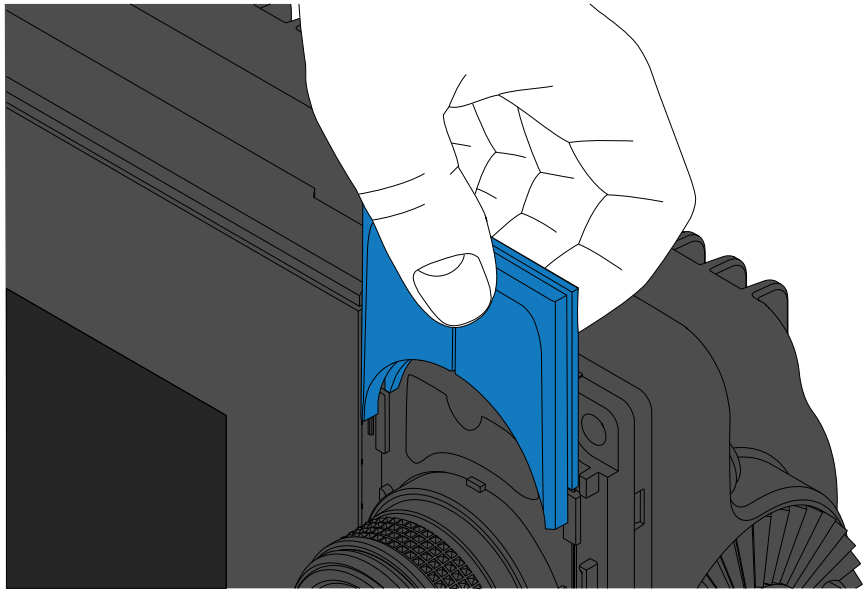
6. Drill 4 holes as indicated on the template to accept the fixings.
7. Place the gasket onto the rear of the display and press firmly onto the flange.
8. Connect the power, data and other cables to the MFD.
9. Slide the unit into place and secure using the fixings provided.
10. Attach the Menu/Home buttons keypad, by sliding it down from above the MFD.
11. Attach the bezel pieces to either side of the MFD.

Note:

The supplied gasket provides a seal between the unit and a suitably flat and stiff mounting surface or binnacle. The gasket should be used in all installations. It may also be necessary to use a marine-grade sealant if the mounting surface or binnacle is not entirely flat and stiff or has a rough surface finish.

Fitting the Menu-Home button

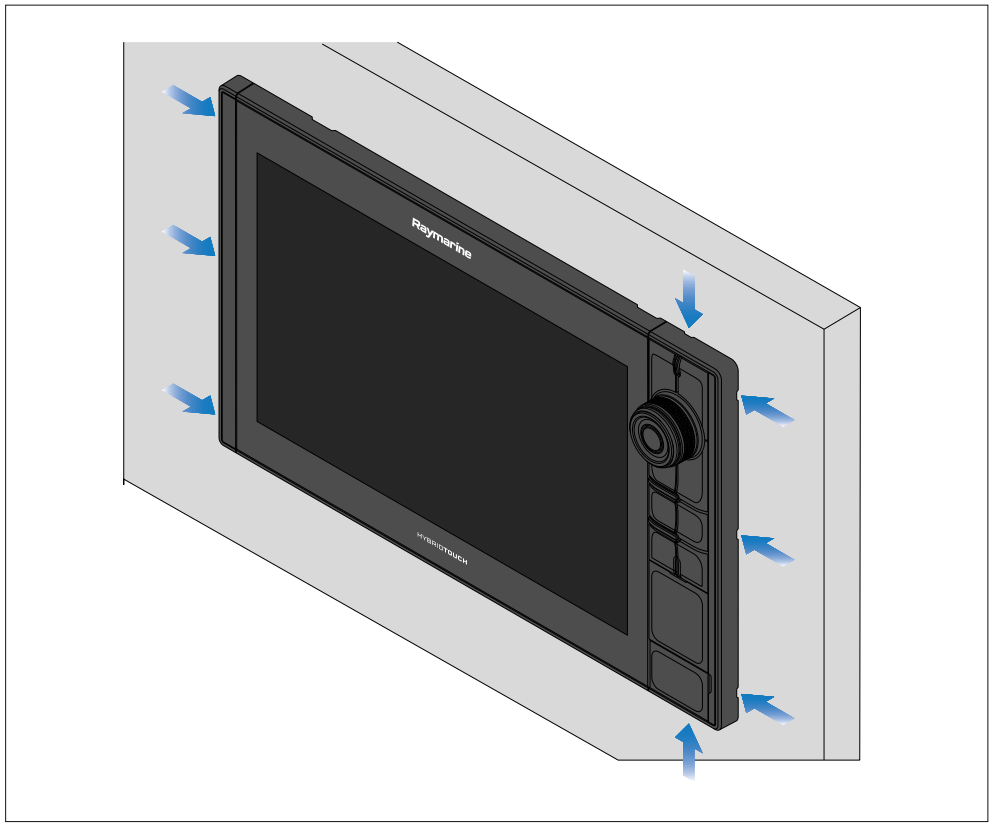
Follow the steps below to fit the Menu/Home button.



1. Slide the keypad's backing plate behind the locating tabs as shown in the illustration.

Removing the bezel pieces

If you need to remove the MFD once installed then the bezel pieces will need to be removed to gain access to the fixings.



1. Carefully insert the tip of a small flat blade screw driver into the recessed areas around the edge of the bezel pieces.
2. Gently lever the screw driver to push the bezel piece forward, away from the display.

The bezel piece should now come away from the display easily.

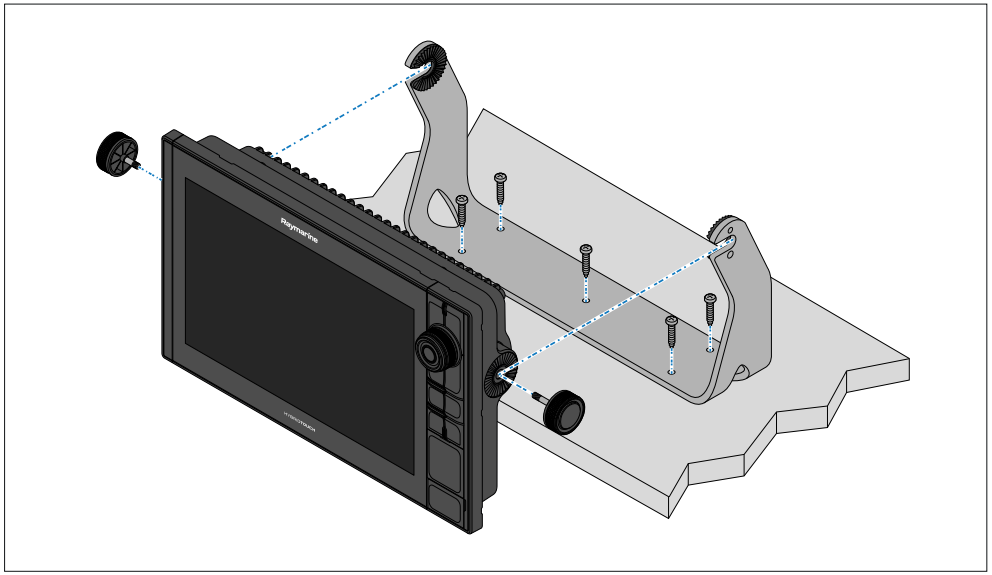
7.3 Bracket (trunnion) mounting

Axiom Pro 9 and 12 MFDs can be mounted on the supplied trunnion bracket. The bracket can be used to mount your MFD on a horizontal surface.

Note:

Fixings to the secure the trunnion bracket to a mounting surface are not provided. 5 x self tapping screws are required. The screws should be suitable for the mounting surface material and the 5.75 mm (0.23 in) diameter mounting holes in the trunnion bracket.

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



1. Check the underside of the mounting surface to ensure no damage will be caused by drilling.
2. Check the thickness of the mounting surface to ensure it is sufficient to support the display.
3. Using the Trunnion bracket as a template, mark and drill the 5 x pilot holes on the mounting surface.
4. Secure the trunnion bracket to the mounting surface using your self tapping screws and an appropriate screwdriver.
5. Insert the trunnion knobs into the sides of the display and tighten 3 to 4 turns.
6. Slide the display into the trunnion bracket so that the trunnion knob threads are slotted into the recesses in the trunnion bracket.
7. Secure the display by fully tightening the trunnion knobs, ensuring that the ratchet teeth are correctly engaged.

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

8. Route and connect necessary cables.

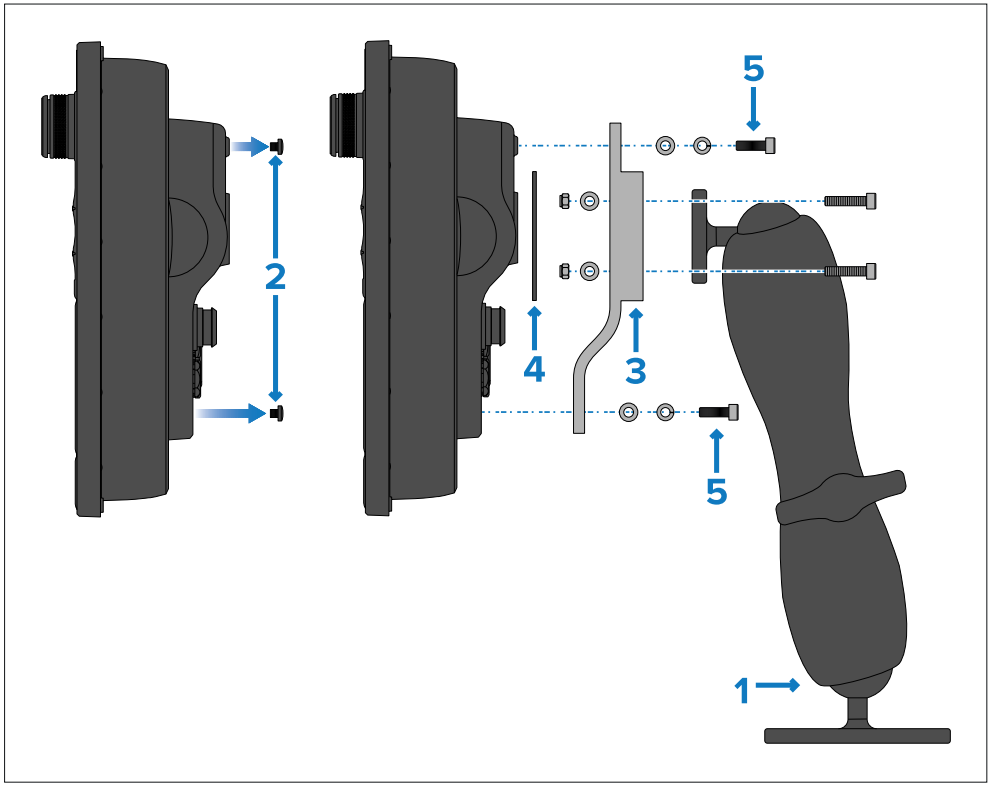
7.4 Ram / ball mounting

The Axiom® Pro 16 can also be mounted on a third-party Ball / ram mount using the Bracket / ball mount plate accessory (part number: A80537).

Ball / ram mount requirements

When purchasing a third-party ball / ram mount, it is important to ensure that:

- There are 4 fixing holes.
- The fixing hole spacing is 38 mm (1.5 in) between hole centers.
- The Ball / ram mount can support the MFD's weight: 5.35 Kg (11.79 lb) approximately.



1. Ensuring sufficient room for the MFD, mount your Ball / ram mount to the desired mounting surface
2. Remove the 4 x plastic pozi head machine screws from the rear of the MFD.
3. Attach the Bracket / ball mount plate to the Ball / ram mount, following the instructions provided with the ram mount.
4. Remove the backing from the foam gasket and stick the gasket to the front of the ram mount adaptor plate, ensuring that the holes are aligned with the holes in the plate.
5. Attach the ram mount adaptor plate to the back of the MFD, using the fixings holes revealed in step 1 and the 4 x fixings provided with the Bracket / ball mount plate.

CHAPTER 8: CABLES AND CONNECTIONS — GENERAL INFORMATION

CHAPTER CONTENTS

8.1 General cabling guidance

Cable types and length

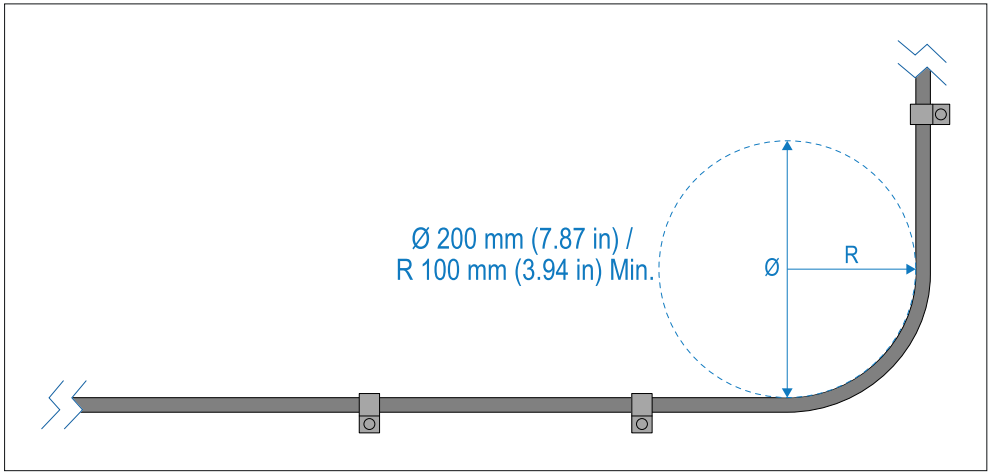
It is important to use cables of the appropriate type and length.

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

Cable routing

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

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



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

Strain relief

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

Circuit isolation

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

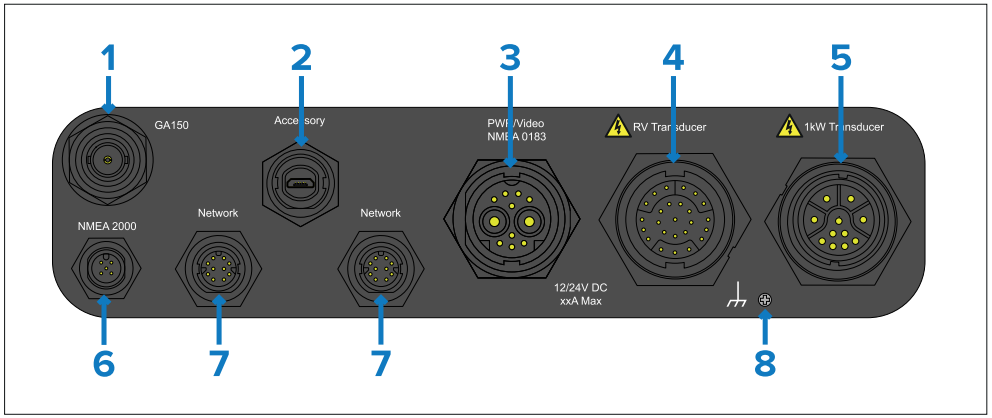
- Always use isolating transformers or a separate power-inverter to run PC's, processors, displays and other sensitive electronic instruments or devices.
- Always use an isolating transformer with Weather FAX audio cables.
- Always use an isolated power supply when using a 3rd party audio amplifier.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

Cable shielding

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

8.2 Connections overview — RVX variant displays

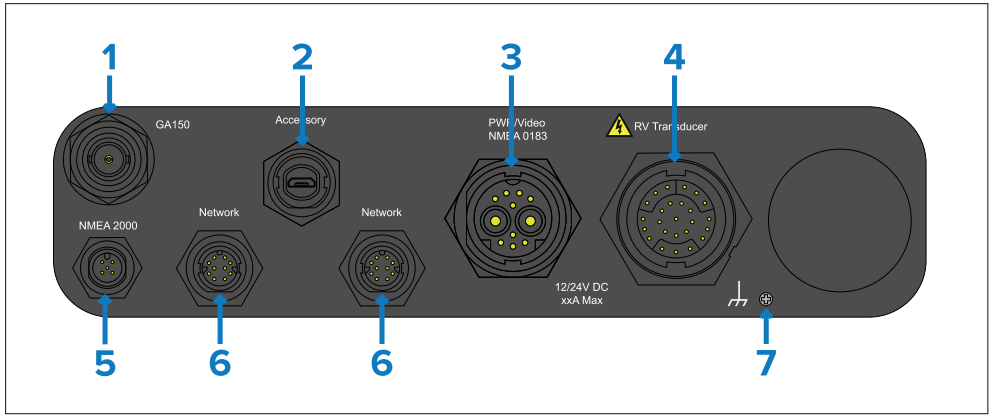
The following connections are available on Axiom® Pro **RVX** variant displays:



1. **GPS Antenna** — Enables connection of an optional external passive GNSS (GPS) antenna (e.g.: GA200, part number A80589).
2. **Accessory** — Enables connection of an external card reader, such as the RCR-SD/USB (part number A80440).
3. **PWR|Video|Data** — The power/video/data connector provides a connection to a 12 / 24 V dc power supply, an analog video input via BNC connector, and NMEA 0183 wires.
4. **RV/RVX Transducer** — Used to connect RealVision™ 3D transducers. Also allows connection of DownVision™, SideVision™ or CPT-S CHIRP conical beam transducers, via an adapter cable.
5. **1kW Transducer** — Enables the connection of CHIRP / Traditional (up to 1kW) transducers.
6. **NMEA 2000** — Enables connection to a SeaTalkng ® or NMEA 2000 network, using the supplied SeaTalkng ® to DeviceNet adaptor cable, or a suitable DeviceNet cable.
7. **Network** — The 2 x network connectors enable connection of RayNet devices.
8. **Ground** — The optional grounding point should **only** be used when the display experiences touchscreen interference from nearby equipment. The grounding point should be connected to the same RF ground point as the interfering equipment, or the vessel's negative battery terminal.

8.3 Connections overview — S variant displays

The following connections are available on Axiom® Pro **S** variant displays:



1. **GPS Antenna** — Enables connection of an optional external passive GNSS (GPS) antenna (e.g.: GA200, part number A80589).
2. **Accessory** — Enables connection of an external card reader, such as the RCR-SD/USB (part number A80440).
3. **PWR|Video|Data** — The power/video/data connector provides a connection to a 12 / 24 V dc power supply, an analog video input via BNC connector, and NMEA 0183 wires.
4. **Transducer** — Used to connect CPT-S CHIRP conical beam transducers via an adapter cable.
5. **NMEA 2000** — Enables connection to a SeaTalkng ® or NMEA 2000 network, using the supplied SeaTalkng ® to DeviceNet adaptor cable, or a suitable DeviceNet cable.
6. **Network** — The 2 x network connectors enable connection of RayNet devices.
7. **Ground** — The optional grounding point should **only** be used when the display experiences touchscreen interference from nearby equipment. The grounding point should be connected to the same RF ground point as the interfering equipment, or the vessel's negative battery terminal.

8.4 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.

8.5 Bare end wire connections

You must ensure that any bare end wires are adequately protected from short circuit and water ingress.

Bare ended wire connections

It is recommended that bare ended wire connections are made by soldering or using crimp connectors and then protected by wrapping the connection in insulation tape.

Unused bare ended wires

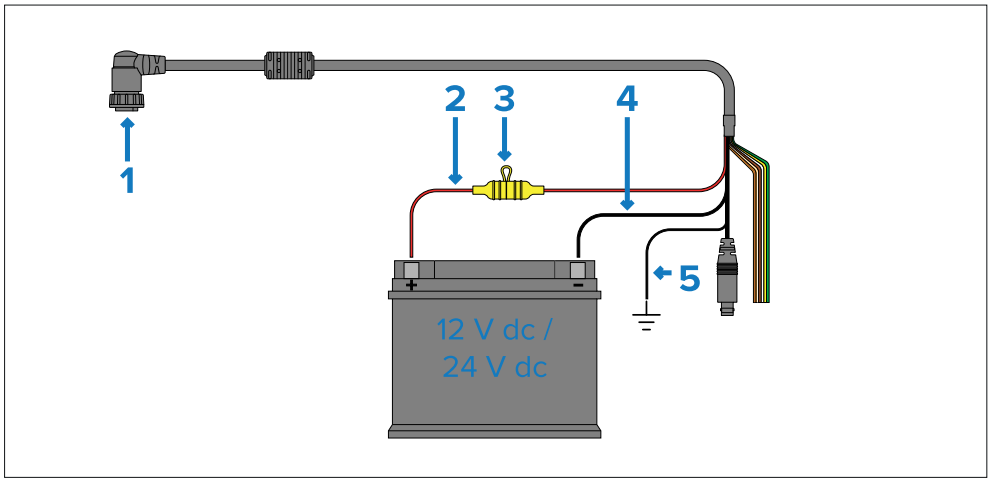
Any unused bare ended wires should be folded back and wrapped in insulation tape.

CHAPTER 9: POWER CONNECTIONS

CHAPTER CONTENTS

9.1 Axiom Pro / Axiom XL power connection

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



Note:

- Axiom Pro MFDs are supplied with a power cable that has a straight connector.
- Axiom XL MFDs are supplied with a power cable that has a right-angled connector.

1. Power/Video/NMEA 0183 cable connects to the rear of the MFD.
2. Positive (Red) wire connects to battery positive (+) terminal.
3. Inline fuse. For suitable fuse ratings, refer to: *In-line fuse and thermal breaker ratings*.
4. Negative wire connects to the battery's negative (-) terminal.
5. Ground wire connects to RF ground point. If no ground point is available connect to the battery negative (-) terminal.

Inline fuse and thermal breaker ratings

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

Inline fuse rating	Thermal breaker rating
15 A	15 A (if only connecting one device)

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 a fitted inline fuse. If not, you must fit an inline fuse 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.

9.2 Power distribution

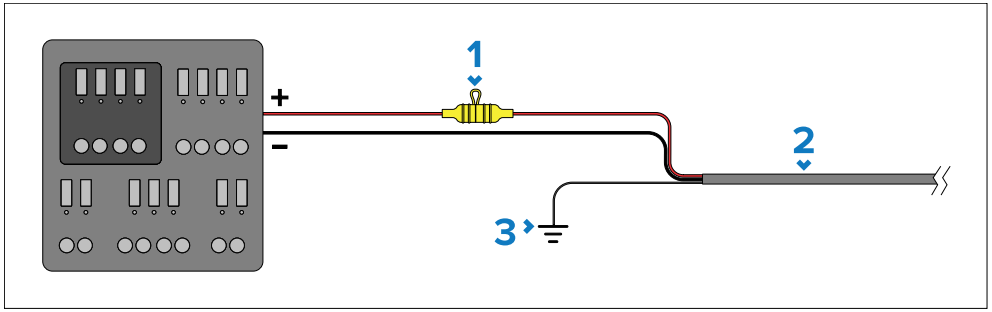
Recommendations and best practice for the power connection of products supplied with a drain wire as part of the supplied power cable.

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

Important:

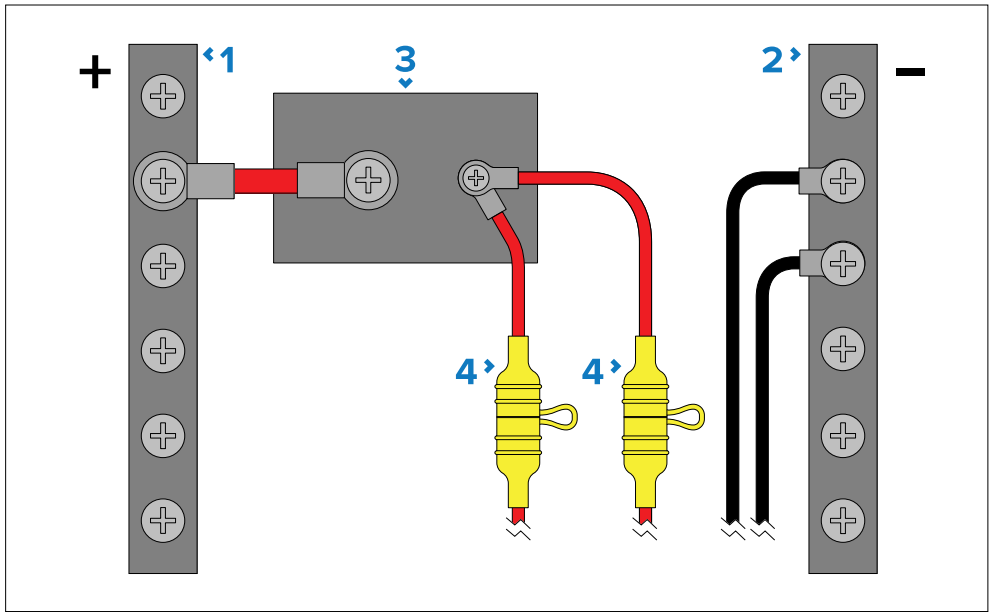
- When planning and wiring, take into consideration other products in your system, some of which (e.g. sonar modules) may place large power demand peaks on the vessel's electrical system, which may impact the voltage available to other products during the peaks.
- The information provided below is for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

Implementation — connection to distribution panel (Recommended)



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

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

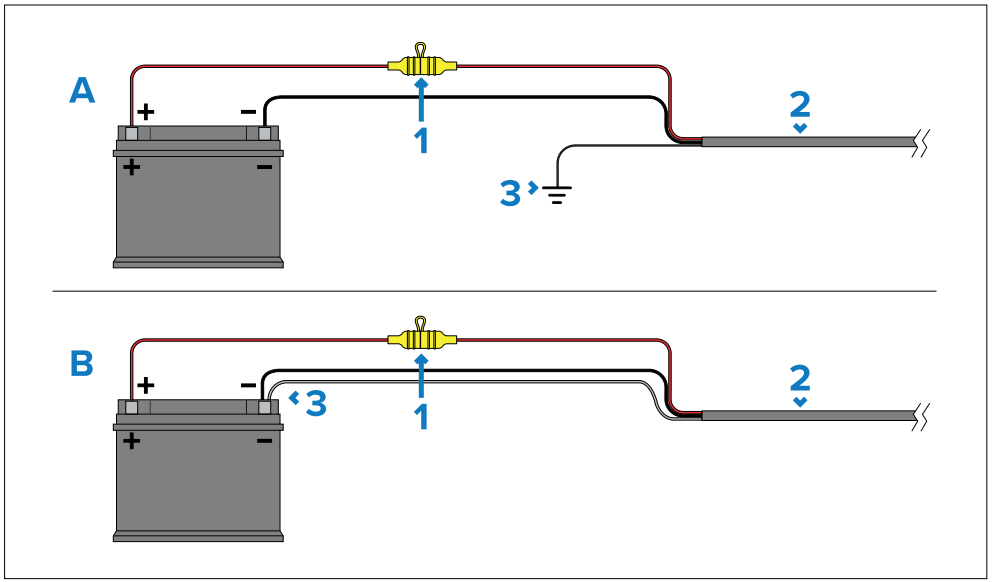


Item	Description
1	Positive (+) bar
2	Negative (-) bar
3	Circuit breaker
4	Waterproof fuse holder containing a suitably-rated inline fuse must be fitted. For suitable fuse rating, refer to: *Inline fuse and thermal breaker ratings*.

Important:

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

Implementation — direct connection to battery



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

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

Battery connection scenario A:

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

Battery connection scenario B:

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

Grounding

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

More information

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

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

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

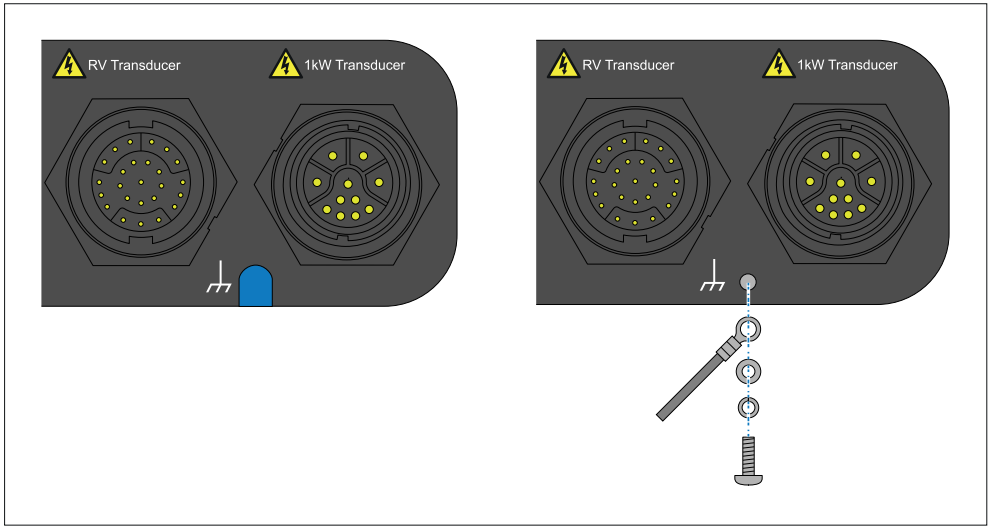
Do not connect this unit to a system which has positive grounding.

9.3 Grounding — optional dedicated drain wire

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

Important:

The ground point should ONLY be connected when touchscreen interference is observed.



Use a small flat blade screwdriver to remove the grounding screw hole cover.

Connect one end of the ground wire (not supplied) to your display using the supplied crimp, washer and screw.

Connect the other end of the ground wire to 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 mm^2 (#10 AWG) or greater.
- for runs of >1 m (3 ft), use 8 mm^2 (#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
- NMEA 0400

CHAPTER 10: NETWORK CONNECTIONS

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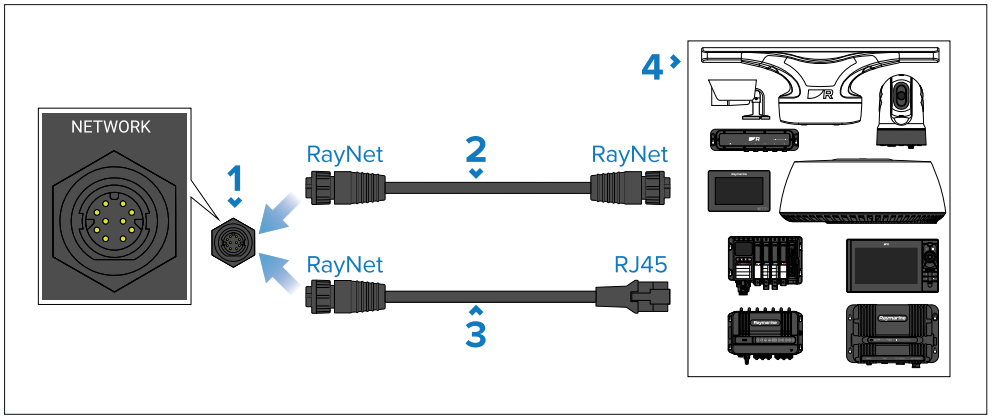
10.1 Network connection

The display can be connected to compatible network products by connecting a network cable between the product and one of the **NETWORK** connectors located on the rear of the display. Alternatively, the display can be connected to a network switch, e.g.: RNS-5, or the YachtSense™ Link marine router.

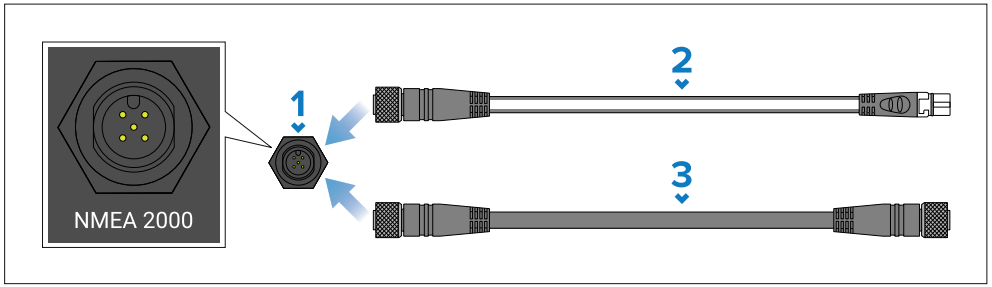


1. Display's **NETWORK** connector.
2. RayNet to RayNet cable — Connect one end of the RayNet cable to your display, and the opposite end to a RayNet device or RayNet network switch.
3. RayNet to RJ45 adapter cable — Connect the RayNet end of the cable to your display, and the opposite end to a network device with an RJ45 connector, or an RJ45 coupler.
4. Example compatible network devices with RayNet or RJ45 connectors (e.g.: Radar scanners, Sonar modules, Displays, Network switches, Cameras etc).

For a list of available network cables refer to Chapter 19 **Spares and accessories**

10.2 NMEA 2000 / SeaTalkng connection

The display can be connected to a NMEA 2000 / SeaTalkng ® network by connecting a spur cable to the **NMEA 2000** (DeviceNet) connector located on the rear of the display.



1. Display's **NMEA 2000** (DeviceNet) connector.
2. Use the supplied DeviceNet to SeaTalkng ® adaptor cable to connect to a SeaTalkng ® network backbone.
3. Alternatively you can connect to a NMEA 2000 backbone using a standard DeviceNet cable (not supplied).

Note:

1. SeaTalkng ® and NMEA 2000 devices must be connected to a correctly terminated backbone.
2. SeaTalkng ® and NMEA 2000 devices can not be connected directly to the display.
3. Refer to the instructions supplied with your SeaTalkng ® or NMEA 2000 device for details on creating a backbone.

Refer to Chapter 19 **Spares and accessories** for a list of available SeaTalkng ® cables.

10.3 NMEA 0183 connections

NMEA 0183 devices can be connected to your MFD using the NMEA 0183 wires on the supplied Power and data cable.

Important:

- Ensure all devices are powered off before making connections.

Your MFD can be configured for either *[Single-ended]* or *[Differential]* transmission. You must select the transmission type from the NMEA Set-up menu: *[Homescreen > Settings > Network > NMEA Set-up > Transmission mode]*.

2 NMEA 0183 ports are available:

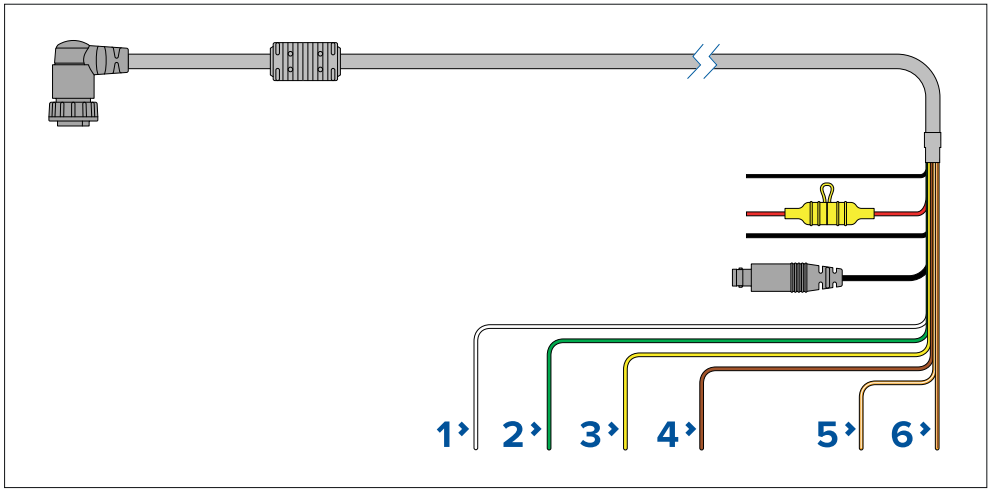
- **Port 1**: Receive and transmit 4,800 or 38,400 baud rate.
- **Port 2**: Receive only 4,800 or 38,400 baud rate.

Note:

- The Baud rate for each port must be set in your MFD's settings, refer to the operation instructions for your MFD for details on specifying baud rate.
- For Port 1, both the receive and transmit communicate at the same baud rate. For example, if you have one NMEA 0183 device connected to Port 1 receive, and another NMEA 0183 device connected to Port 1 transmit, both NMEA devices must use the same baud rate.

Up to 4 devices can be connected to the transmit on port 1 and up to 2 devices to the receive on each port.

NMEA 0183 wires/signals



1. White = Port 1, RX
2. Green = Port 1, RX
3. Yellow = Port 1, TX
4. Brown = Port 1, TX
5. Orange / White = Port 2, RX
6. Orange / Green = Port 2, RX

NMEA 0183 versions

Three versions of the NMEA 0183 standard have been released.

- **Version 1** — Single-ended transmission, high voltage (up to +/- 15 volts).
- **Version 2** — Differential transmission, low voltage +5 / 0 volt signalling.
- **Version 3** — Differential transmission, low voltage +5 / 0 volt signalling, high speed (38,400 baud rate).

Version 1 devices use a different connection method than Version 2 and version 3 devices. Version 1 devices use only 1 signal line with a ground connection used as the other line to complete the circuit.

Connecting a NMEA 0183 version 2+ transmitting device to a NMEA 0183 version 1 receiving device ("listener") can cause issues, as connecting the "B" line to the Ground connection causes current to flow every time the "B" line tries to go to +5 volts. Therefore, receiving devices must be tolerant of the higher voltages used in NMEA version 1 signalling, where the voltage levels can be up to +/- 15 volts.

NMEA 0183 wiring connections (Single-ended mode)

By default the MFD is configured for *[Single-ended]* transmission. The following wiring connections are required when using the default Single-ended mode on the MFD:

Connections to differential (version 2/ version 3) devices

When connecting the MFD (in Single-ended mode) to NMEA 0183 differential devices the following wiring applies:

Example — MFD Port 1 to NMEA 0183 differential talker device

MFD signal (wire color)	NMEA 0183 device signal
White (RX +)	TX / A / +
Green (RX -)	TX / B / -

Example — MFD Port 1 to NMEA 0183 differential listener device

MFD signal (wire color)	NMEA 0183 device signal
Yellow (TX +)	RX / A / +
Brown (TX -)	RX / B / -

Example — MFD Port 1 to NMEA 0183 differential talker and listener device

MFD signal (wire color)	NMEA 0183 device signal
White (RX +)	TX / A / +
Green (RX -)	TX / B / -
Yellow (TX +)	RX / A / +
Brown (TX -)	RX / B / -

Example — MFD Port 2 to NMEA 0183 differential talker device

MFD signal (wire color)	NMEA 0183 device signal
Orange / White (RX +)	TX / A / +
Orange / Green (RX -)	TX / B / -

Connections to single-ended (Version 1) devices

When connecting the MFD (in Single-ended mode) to NMEA 0183 single-ended devices the following wiring applies:

Example — MFD Port 1 to NMEA 0183 single ended talker device

MFD signal (wire color)	NMEA 0183 device signal
White (RX +)	TX / OUT / +
Green (RX -)	Common ground

Example — MFD Port 1 to NMEA 0183 single ended listener device

MFD signal (wire color)	NMEA 0183 device signal
Yellow (TX +)	RX / IN / +
Brown (TX -)	(1)DO NOT CONNECT

Example — MFD Port 2 to NMEA 0183 single ended talker device

MFD signal (wire color)	NMEA 0183 device signal
Orange / White (RX +)	TX / OUT / +
Orange / Green (RX -)	Common ground

Note:

- (1) The Brown (TX -) wire should be left disconnected but insulated to prevent short circuits.
- Refer to instructions provided with your NMEA 0183 device for wire color, signal and port information.

NMEA 0183 wiring connections (Differential mode)

The following wiring connections are required when using Differential mode on the MFD::

You can configure your MFD for *[Differential]* transmission from the *[NMEA Set-up]* menu: *[Homescreen > Settings > Network > NMEA Set-up > Transmission mode]*.

Connections to differential (version 2/ version 3) devices

When connecting the MFD (in Differential mode) to NMEA 0183 differential devices the following wiring applies:

Important:

When using Differential mode on the MFD the RX wire connections must be inverted when compared to Singled-ended mode connection.

Example — MFD Port 1 to NMEA 0183 differential talker device

MFD signal (wire color)	NMEA 0183 device signal
White RX B / -	TX / B / -
Green RX A / +	TX / A / +

Example — MFD Port 1 to NMEA 0183 differential listener device

MFD signal (wire color)	NMEA 0183 device signal
Yellow TX A / +	RX / A / +
Brown TX B / -	RX / B / -

Example — MFD Port 1 to NMEA 0183 differential talker and listener device

MFD signal (wire color)	NMEA 0183 device signal
White RX B / -	TX / B / -
Green RX A / +	TX / A / +
Yellow TX A / +	RX / A / +
Brown TX B / -	RX / B / -

Example — MFD Port 2 to NMEA 0183 differential talker device

MFD signal (wire color)	NMEA 0183 device signal
Orange / White RX B / -	TX / B / -
Orange / Green RX A / +	TX / A / +

Connections to single-ended (Version 1) devices

When connecting the MFD (in Differential mode) to NMEA 0183 single-ended devices the following wiring applies:

Example — MFD Port 1 to NMEA 0183 single ended talker device

MFD signal (wire color)	NMEA 0183 device signal
White RX B / -	Common ground
Green RX A / +	TX / OUT / +

Example — MFD Port 1 to NMEA 0183 single ended listener device

MFD signal (wire color)	NMEA 0183 device signal
Yellow TX A / +	RX / IN / +
Brown TX B / -	(1)DO NOT CONNECT

Example — MFD Port 2 to NMEA 0183 single ended talker device

MFD signal (wire color)	NMEA 0183 device signal
Orange / White RX B / -	Common ground
Orange / Green RX A / +	TX / OUT / +

Note:

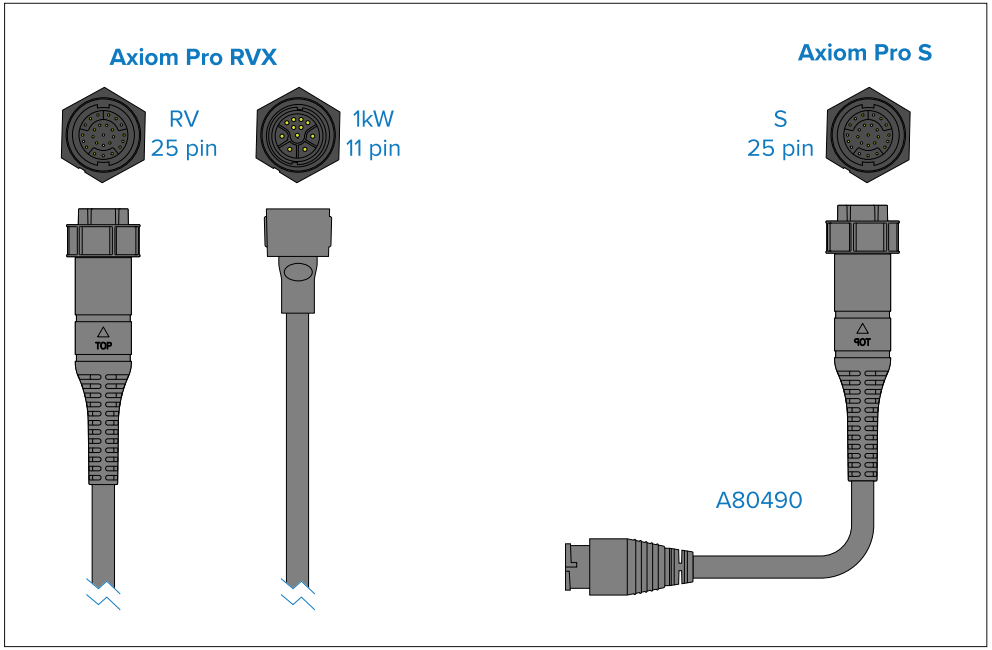
- (1) The Brown (TX) wire should be left disconnected but insulated to prevent short circuits.
- Refer to instructions provided with your NMEA 0183 device for wire color, signal and port information.

CHAPTER 11: TRANSDUCER CONNECTIONS

CHAPTER CONTENTS

11.1 Transducer connection (Axiom Pro)

Your MFD includes a built-in sonar module enabling you to direct connection of transducers.



- Axiom Pro RVX:
  - 1 x 25 pin connector — connect to RealVision™ 3D transducers
  - 1 x 11 pin connector — connect to 1kW transducers.
- Axiom Pro S
  - 1 x 25 pin connector — connect to transducer adaptor cable A80490, the adaptor cable then connects to a CPT-S series transducer.

Note:

1. Only CPT-S series transducers can be connected to Axiom Pro S variant MFDs.
2. Transducer extension cables are available.
3. Adaptor cables are also available that enable connection of different transducers. Refer to Axiom transducer adaptor cables for a list of available adaptor cables.

Warning: Transducer cables

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

Caution: Do not cut transducer cables

- Cutting the transducer cable severely reduces sonar performance. If the cable is cut, it must be replaced, it cannot be repaired.
- Cutting the transducer cable will void the warranty and invalidate the European CE mark.

RealVision transducer extension cables

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

Note:

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

Raymarine® offers he following optional extension cables are available:

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

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

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.

CHAPTER 12: VIDEO CONNECTIONS

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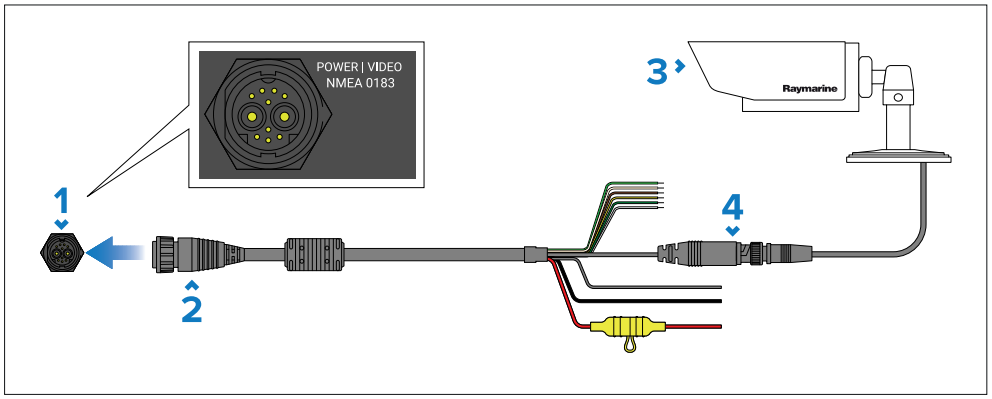
12.1 Analog video connection

Analog video feeds from sources such as a Thermal camera or Security camera can be connected to your display by connecting the device to the BNC connector on the display's power/video/NMEA 0183 cable. The video feed can be viewed using the Video app.



1. Display's **PWR/Video/NMEA 0183** connector.
2. Power/Video/NMEA 0183 cable (supplied with your display).
3. Analog video device.
4. Analog video BNC connector.

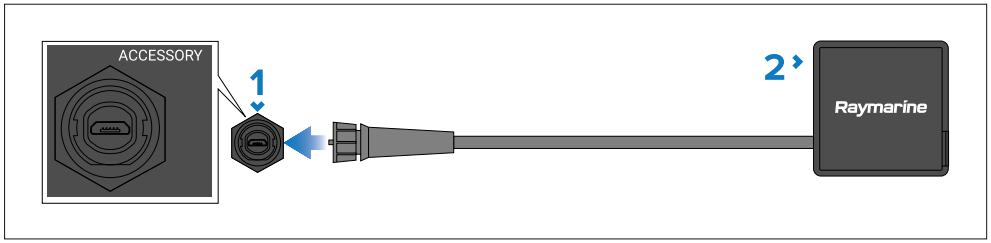
For installation details, refer to the documentation provided with your analog video device.

CHAPTER 13: USB CONNECTIONS

CHAPTER CONTENTS

13.1 Accessory connection

The display includes a built in dual slot MicroSD card reader. The **Accessory** connector can be used to expand storage capabilities by connecting an external memory card reader or external storage device to the display.



1. **ACCESSORY** connector.
2. Accessory device:
   - **RCR-SDUSB** (part number: A80440) — Includes 1x SD card slot (or MicroSD card when using an SD card adaptor) and 1x USB (Type A connector) (e.g. for connection of an external USB hard drive or pen / flash drive). The USB slot on the RCR-SDUSB can also supply 0.5A of current to charge mobile devices.
   - **RCR-1** (part number A80585) — Includes 1x MicroSD card slot.
   - **Bulkhead Mount Micro USB Socket** (part number: A80630) — Includes 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).

- To save screenshots (.png files), *[External SD]* or *[External USB]* must be selected as the *[Screenshot File]* location on the *[This display]* tab in the main display settings menu (accessible from Homescreen).
- To save 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.

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

Warning: USB device power

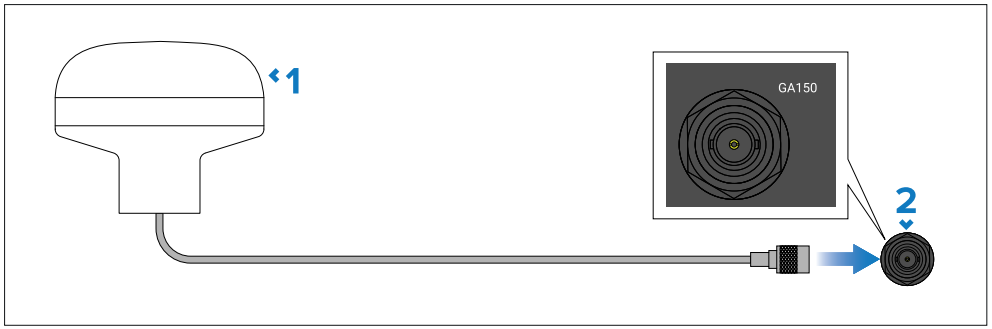
Do NOT connect any device to the product's USB connection that requires an external power source.

CHAPTER 14: GPS ANTENNA CONNECTION

CHAPTER CONTENTS

14.1 GNSS (GPS) antenna connection

For installations where the display does not have a clear view of the sky, or where a position fix is not possible or unreliable due to structure or other obstacles, a passive antenna (such as the **GA200**, part number A80589) can be connected to improve the performance of the display's internal GNSS (GPS) receiver. The antenna is connected to the connector labelled **GA150** located on the rear of the display.



1. Passive GNSS (GPS) antenna:
   - **GA200** (part number: A80589); or:
   - **GA150** (part number: A80288)
2. GNSS antenna connector (labelled: **GA150**).

For installation details, refer to the documentation provided with your GNSS (GPS) antenna.

CHAPTER 15: MAINTAINING YOUR DISPLAY

CHAPTER CONTENTS

15.1 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. Do NOT remove covers or attempt to access internal components, unless specifically instructed in the documentation provided.

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.

15.2 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 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.

Cleaning the display screen

A coating is applied to the display screen. This makes it water repellent, and prevents glare. To avoid damaging this coating, follow this procedure:

1. Switch off the power to the display.
2. Rinse the screen with fresh water to remove all dirt particles and salt deposits.
3. Allow the screen to dry naturally.
4. If any smears remain, very gently wipe the screen with a clean microfibre cleaning 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 16: TROUBLESHOOTING

CHAPTER CONTENTS

16.1 Troubleshooting

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

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

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

16.2 Power up troubleshooting

Product does not turn on or keeps turning off

Possible causes	Possible solutions
Blown fuse / tripped breaker.	1. Check condition of relevant fuses and breakers and connections, replace if necessary. (Refer to the *Technical Specification* 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	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	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 on an Axiom® Pro display

Important:

Before performing a power on reset ensure you have backed up your settings and user data to a memory card.

1. Switch off power at the breaker to ensure that the display is completely powered off, and not in Standby mode. Alternatively, remove the power cable from the display.
2. Within approximately 10 seconds of powering on your display, press and hold the *[Back]* and *[Switch active]* buttons until the screen goes black and the Raymarine logo appears.
   The display will boot into Recovery mode.
3. Use the directional controls to highlight *[Wipe data/factory reset]*.
4. Press *[Ok]*.
5. Select *[Yes]* to restore your display to factory default settings.
6. When 'Data wipe complete' is displayed, select *[Reboot system]* now.

16.3 GNSS (GPS) troubleshooting

Problems with the GNSS (GPS) and their possible causes and solutions are described here. Your position fix coordinates are displayed in the status area located in the top left corner of the Homescreen.

No position fix

Possible causes	Possible solutions
Display installation location (e.g.: installed below decks or in close proximity to equipment which may cause interference).	Connect an external passive GNSS (GPS) antenna such as the GA200 to the display GPS antenna connection.
Internal GNSS (GPS) receiver disabled.	When using your product's internal GNSS (GPS) receiver, ensure that it is enabled in the relevant settings menu. To access the relevant menu, select the status area located in the top left corner of the Homescreen and select *[Satellites]* and then select the *[Settings]* tab, locate the Internal GPS option and ensure it is enabled.
External GNSS (GPS) receiver connection fault.	When using an external GNSS (GPS) receiver, ensure that connections are secure and that the cabling is free from damage.
External GNSS (GPS) receiver or antenna location (e.g.: installed below decks or in close proximity to equipment which may cause interference).	Ensure the GNSS (GPS) receiver or antenna has a clear unobstructed view of the sky. Refer to the documentation supplied with your external receiver / antenna and ensure location requirements have been adhered to.
Geographic location or prevailing conditions preventing satellite fix.	Check periodically to see if a fix is obtained in better conditions or another geographic location.

16.4 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	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.	• 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.

Possible causes	Possible solutions
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.
Damaged cables	1. Check the unit's connector for broken or bent pins. 2. Check that the cable connector is fully inserted into the unit and that the locking collar is in the locked position. 3. Check the cable and connectors for signs of damage or corrosion, replace if necessary. 4. With the unit turned on, try flexing the power cable near to the display connector to see if this causes the unit to re-boot/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.

Possible causes	Possible solutions
Damaged cables	1. Check the unit's connector for broken or bent pins. 2. Check that the cable connector is fully inserted into the unit and that the locking collar is in the locked position. 3. Check the cable and connectors for signs of damage or corrosion, replace if necessary. 4. With the unit turned on, try flexing the power cable near to the display connector to see if this causes the unit to re-boot/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.
Transducer location	• Check that the transducer has been installed in accordance with the instructions provided with the transducer. • If a transom mount transducer is mounted too high on the transom it may be lifting out of the water, check that the transducer face is fully submerged when planing and turning.
Transducer kicked-up	If the transducer has a kick-up mechanism, check that it has not kicked up due to hitting an object.
Damaged or fouled transducer	Check 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	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.

16.5 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.	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	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.)	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
Interference caused by other devices that use the 2.4GHz frequency See list below of some common devices that use the 2.4GHz frequency: • 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.	• Move devices closer together. • For fixed installations such as a Quantum Radar, enable the Wi-Fi connection on an display 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.)	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.	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.	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 display software	Ensure mobile app and display software are latest available versions.
Mobile apps not enabled on display	Enable “Viewing only” or “Remote Control” as required in the Mobile Apps setting on your display.

16.6 Touchscreen troubleshooting

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

Touchscreen does not operate as expected:

Possible causes	Possible solutions
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.

16.7 Miscellaneous troubleshooting

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

Display behaves erratically (Frequent unexpected resets/System crashes or other erratic behavior):

Possible causes	Possible solutions
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. **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.

CHAPTER 17: TECHNICAL SUPPORT

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17.1 Raymarine product support and servicing

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

Product information

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

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

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

Servicing and warranty

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

Don't forget to visit the Raymarine website to register your product for extended warranty benefits: https://www.raymarine.com/en-us/support/product-registration

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

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

United States (US):

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

Web support

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

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

Worldwide support

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

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

United States (US):

- Help desk: https://raymarine.custhelp.com/app/home
- 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):

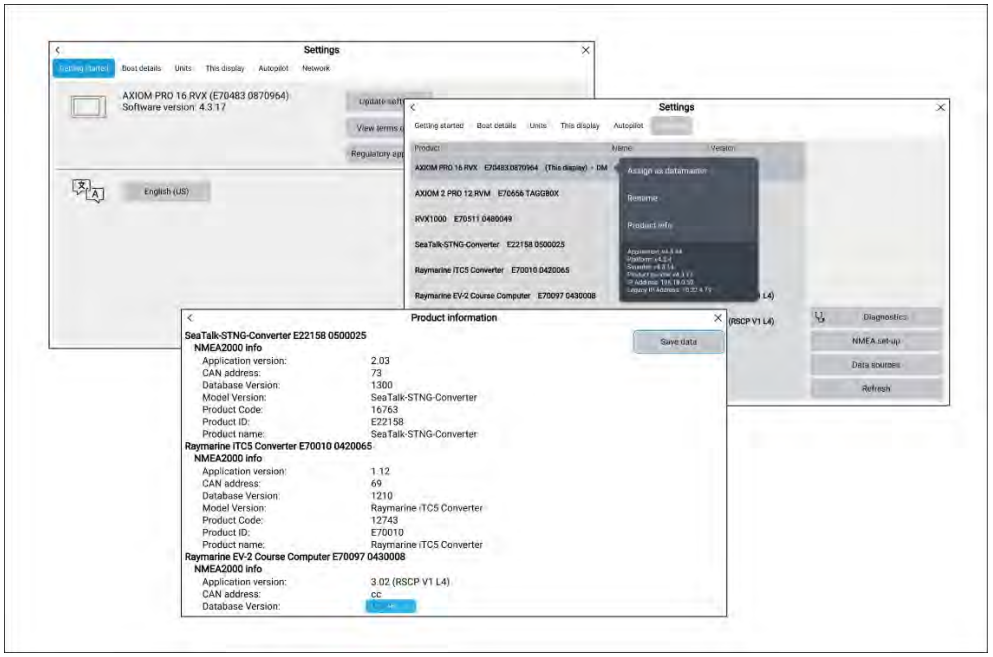
- E-Mail: support.dk@raymarine.com
- Tel: +45 437 164 64

Russia (Authorized Raymarine distributor):

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

Viewing product information

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



1. Select *[Settings]*, from the Homescreen.
   The *[Getting started]* menu contains hardware and software information for your display.
2. You can view further information about your display, 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 display's network IP address, select your display 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 display 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 display has an active Internet connection via Wi-Fi. Next, launch the AnyDesk app from your display'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 display.**
- **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.**

17.2 Learning resources

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

Video tutorials

Raymarine official channel on YouTube

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

Training courses

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

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

Technical support forum

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

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

CHAPTER 18: TECHNICAL SPECIFICATION

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18.1 Axiom Pro technical specification

Power

	Axiom™ **Pro 9**	Axiom™ **Pro 12**	Axiom™ **Pro 16**
Nominal supply voltage:	12 / 24 V dc		
Operating voltage range:	8 V dc to 32 V dc		
Current (Maximum):	5 A		
Off-current (Maximum @ 12 V dc)	11 mA (0.13 Watts)		
Off-current (Maximum @ 24V dc)	18 mA (0.43 Watts)		
Fuse requirements:	• Inline fuse = 15 Amp, or • Thermal breaker = 15 Amp		
Power consumption: (Maximum @ 12 V dc)	• RVX — 33.12 Watts • S — 24.96 Watts	• RVX — 29.88 Watts • S — 21.12 Watts	• RVX — 42.36 Watts • S — 31.68 Watts
Power consumption: (Maximum @ 24 V dc)	• RVX — 30.96 Watts • S — 25.2 Watts	• RVX — 28.8 Watts • S — 22.56 Watts	• RVX — 40.8 Watts • S — 31.44 Watts

Note:

Power consumption figures for RVX variants were taken using a RealVision™ transducer and S variants using a CPT-S `transducer.

Environmental

	Axiom™ **Pro 9**	Axiom™ **Pro 12**	Axiom™ **Pro 16**
Operating temperature range:	-25°C (-13°F) to + 55°C (131°F)		
Storage temperature range:	-30°C (–22°F) to + 70°C (158°F)		
Humidity:	up to 93% @ 40°C (104°F)		
Water ingress protection:	IPx6 and IPx7		

LCD specification

	Axiom™ **Pro 9**	Axiom™ **Pro 12**	Axiom™ **Pro 16**
Size (diagonal):	9.0”	12.1”	15.6”
Type:	IPS (In-Plane Switching)		
Color depth:	24 bit		
Resolution:	1280 x 720 HD	1280 x 800 WXGA	1920 x 1080 FHD
Ratio:	16:9	16:10	16:9
Illumination:	1200 nits / 1200 cd/m²		
Viewing angle:	Top 88° / Bottom 88° / Left 88° / Right 88°		
Number of simultaneous touches:	1 to 16		

Data connections

	Axiom™ **Pro 9**	Axiom™ **Pro 12**	Axiom™ **Pro 16**
Transducer:	• RVX variant – 25 pin RealVision™ connector – 11 pin 1kW connector • S variant – 25 pin connector (requires adaptor cable)		
NMEA 2000:	1 x DeviceNet male connector		
NMEA 0183:	2 x NMEA 0183 ports via Power/Video/NMEA 0183 cable: • NMEA port 1: Input and output, 4,800 / 38,400 baud rate • NMEA port 2: Input only, 4,800 / 38,400 baud rate		
External GNSS antenna:	1 x TNC type external GNSS antenna connection.		
Analog video input:	1 x Composite female BNC connector via Power/Video/NMEA 0183 cable.		
Accessory:	1 x USB Micro B		
Network:	1 x RayNet type SeaTalkhs ™ connector (10 / 100 / 1,000 Mbits/s)		
Wi-Fi:	802.11/b/g/n		
Bluetooth:	Bluetooth V4.0		
LEN (Load Equivalency Number):	1		

Storage

	Axiom™ **Pro 9**	Axiom™ **Pro 12**	Axiom™ **Pro 16**
Internal:	16 GB Solid State (14 GB usable)		
MicroSD card reader:	2 x MicroSDXC card slot		
External (via RCR-SDUSB accessory):	• 1 x SD card slot • 1 x USB A		
External (via RCR-2 accessory):	2 x MicroSDHC card slots		

18.2 Internal sonar specification

RealVision™ 3D sonar specification

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

Specification	
Sonar channels: (*Output power / Responsive Frequency Range*)	• **RealVision™ 3D** (*70 W / 350 kHz ± 5%*) • **SideVision™** (*70 W / 350 kHz ± 5%*) • **DownVision™** (*35 W / 350 kHz ± 5%*) • **Conical CHIRP**: **High** (*100 W / 200 kHz ± 5%*)
Sensors:	• Temperature sensor • AHRS (Attitude and Heading Reference System) sensor

1kW sonar specification

The following specification only applies to Axiom™ Pro RVX products.

Channels	Channels • 1 x 50 kHz Low CHIRP • 1 x 200 kHz High CHIRP
Range	0.9 m (3 ft) to 914.4 m (3,000 ft) (In optimum conditions using a 1kW transducer.)

18.3 Internal GNSS (GPS / GLONASS) receiver specification

Channels:	Multiple — ability to simultaneously track up to 28 satellites
Cold start:	<2 minutes
Receiver IC Sensitivity:	• 165 dBm (Tracking) • 160 dBm (Acquisition) • 148 dBm (Cold start)
GNSS compatibility:	• GPS • GLONASS • Beidou
SBAS compatibility:	• 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:	• Internal — Ceramic chip mounted near top of unit
Position Accuracy:	• Without SBAS: <= 15 metres 95% of the time • With SBAS: <= 5 metres 95% of the time

CHAPTER 19: SPARES AND ACCESSORIES

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19.1 AXIOM Pro accessories

	Part numbers		
Item	Axiom™ **Pro 9**	Axiom™ **Pro 12**	Axiom™ **Pro 16**
RCR-SDUSB — External MicroSD and USB reader	A80440		
RMK-10 — MFD remote control	A80438 / T70293		
GA150 external passive GNSS (GPS) antenna	A80288		
GA200 external passive GNSS (GPS) antenna	A80589		
Suncover	A80534	A80535	A80536
Axiom Pro Bracket/Ball mount plate	N/A	N/A	A80537
Right angled RV transducer adaptor cable (adaptor cable length: 45 mm (1.77 in.).	A80515		

Axiom transducer adaptor cables

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

Axiom DV adaptor cables

A80484	Axiom DV to 7-pin Embedded Transducer Adapter
A80485	Axiom DV to 7-pin CP370 Transducer Adapter
A80486	Axiom DV to 9-pin DV & 7-Pin Embedded Transducers Y-Cable
A80487	Axiom DV to 9-pin DV & 7-Pin CP370 Transducers Y-Cable

Axiom RV adaptor cables

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 adaptor plates

Adaptor plates are available to enable installation of Axiom Pro and Axiom 2 Pro displays in the place of a legacy display.

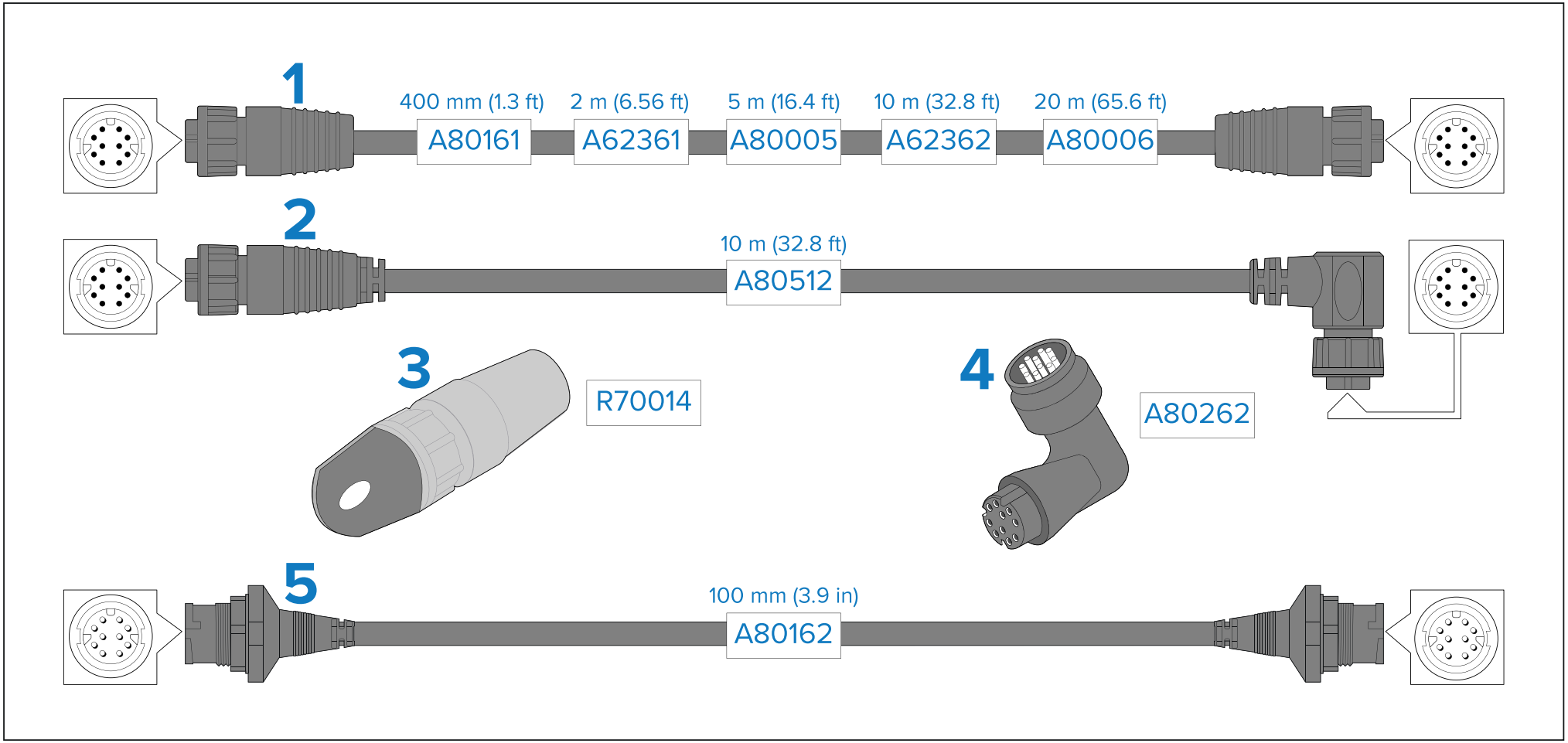
Adaptor description	Part number
C90W / E90W to Axiom Pro 9 / Axiom 2 Pro 9 adaptor plate	A80530
C120W / E120W to Axiom Pro 12 / Axiom 2 Pro 12 adaptor plate	A80531
e165 / E140W to Axiom Pro 16 / Axiom 2 Pro 16 adaptor plate	A80533

19.2 AXIOM Pro spares

	Part numbers		
Item	Axiom™ **Pro 9**	Axiom™ **Pro 12**	Axiom™ **Pro 16**
Power/Video/NMEA 0183 cable 1.5 m (4.9 ft)	R62379		
Angled Power/Video/NMEA 0183 cable 1.5 m (4.9 ft) with right angled connector	R70029		
Keypad assembly	R70600		
Trim kit — Replacement bezel pieces	R70383	R70387	R70598

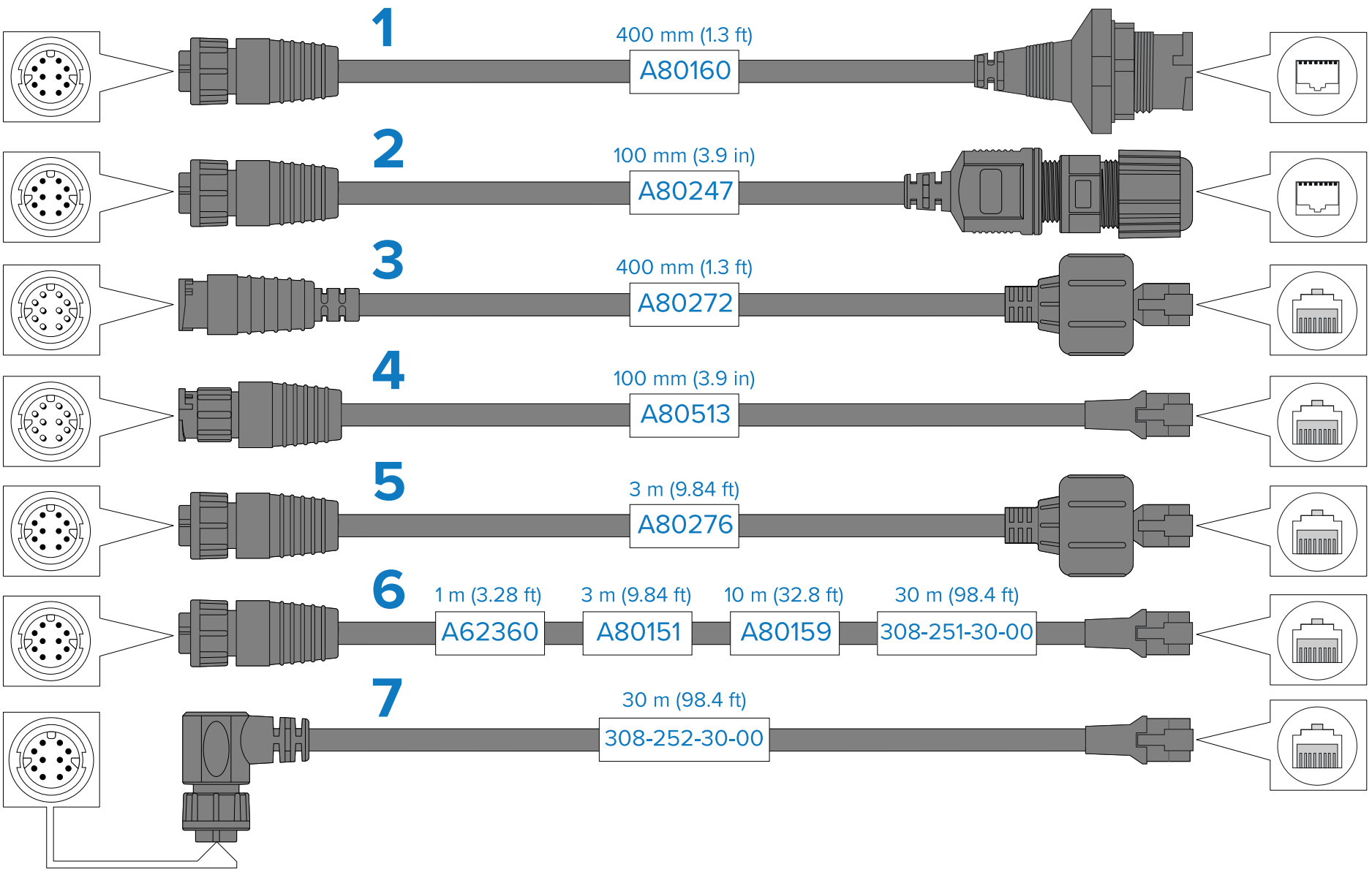
	Part numbers		
Item	Axiom™ **Pro 9**	Axiom™ **Pro 12**	Axiom™ **Pro 16**
Mounting seal kit	R70385	R70388	R70599
Trunnion kit	R70384	R70389	N/A

19.3 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.

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



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

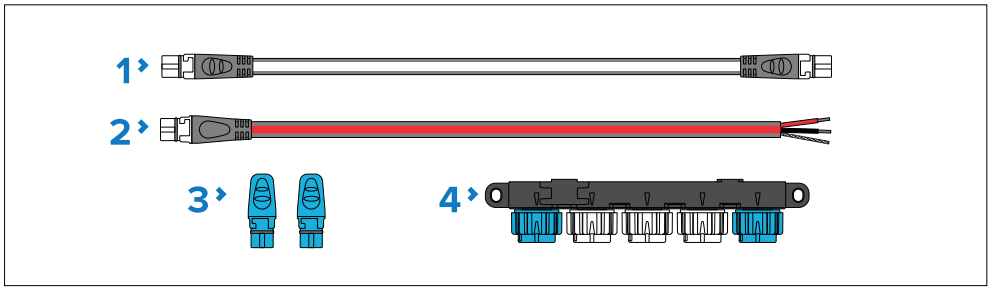
19.5 SeaTalkng ® cables and accessories

SeaTalkng ® cables and accessories for use with compatible products.

SeaTalkng ® kits

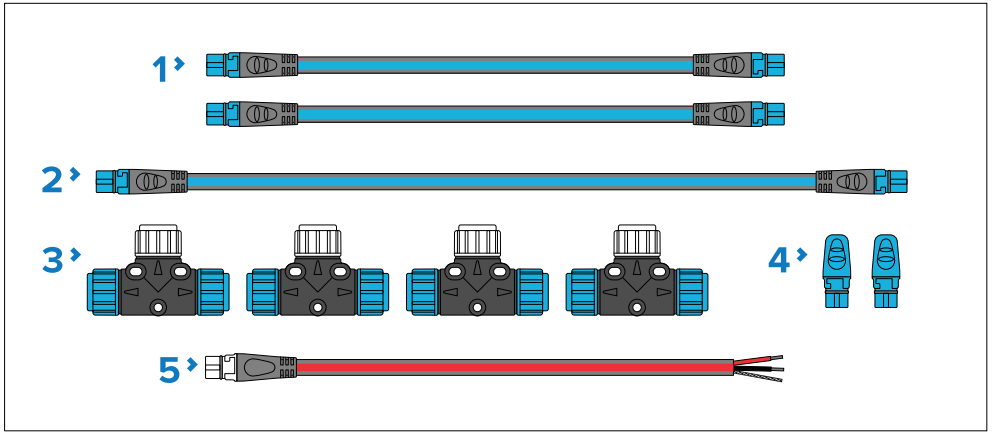
SeaTalkng kits enable you to create a simple SeaTalkng backbone.

Starter kit (part number: T70134) consists of:



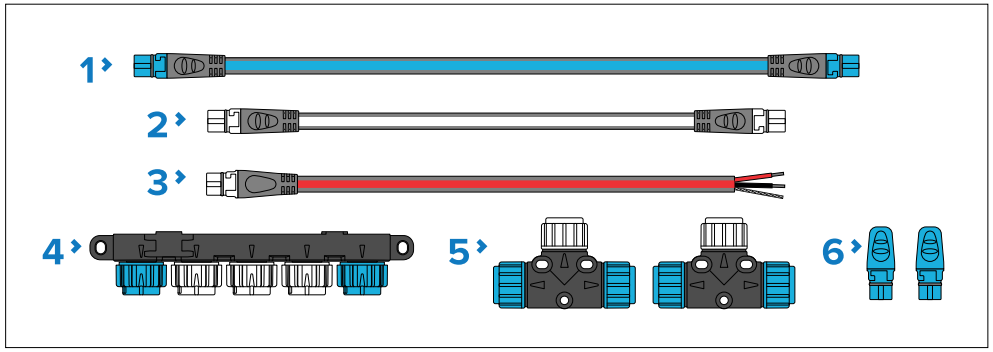
1. 1 x Spur cable 3 m (9.8 ft) (part number: **A06040**). Used to connect device to the SeaTalkng backbone.
2. 1 x Power cable 2 m (6.6 ft) (part number: **A06049**). Used to provide 12 V dc power to the SeaTalkng backbone.
3. 2 x Backbone terminators (part number: **A06031**). Terminators must be fitted to both ends of the SeaTalkng backbone.
4. 1 x 5-Way connector (part number: **A06064**). Each connector block allows connection of up to 3 SeaTalkng devices. Multiple connector blocks can be 'daisy chained' together.

Backbone kit (part number: A25062) consists of:



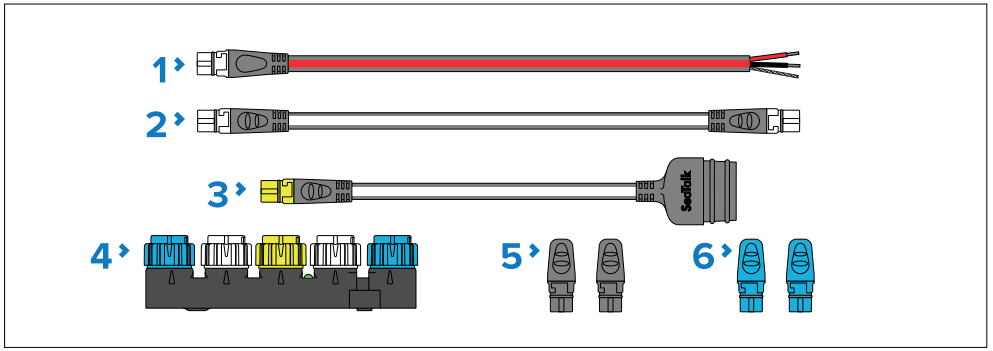
1. 2 x Backbone cables 5 m (16.4 ft) (part number: **A06036**). Used to create and extend the SeaTalkng backbone.
2. 1 x Backbone cable 20 m (65.6 ft) (part number: **A06037**). Used to create and extend the SeaTalkng backbone.
3. 4 x T-piece (part number: **A06028**). Each T-piece allows connection of one SeaTalkng device. Multiple T-pieces can be 'daisy chained' together.
4. 2 x Backbone terminators (part number: **A06031**). Terminators must be fitted to both ends of the SeaTalkng backbone.
5. 1 x Power cable 2 m (6.6 ft) (part number: **A06049**). Used to provide 12 V dc power to the SeaTalkng backbone.

Evolution autopilot cable kit (part number: R70160) consists of:



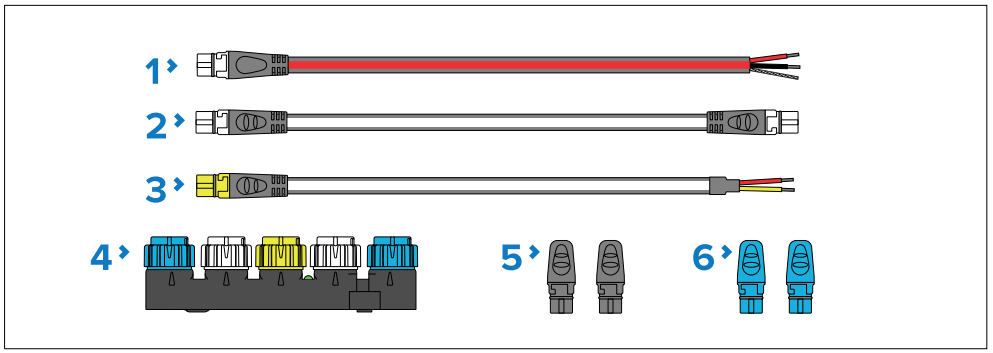
1. 1 x Backbone cable 5 m (16.4 ft) (part number: **A06036**). Used to create and extend the SeaTalkng backbone.
2. 1 x Spur cable 1 m (3.3 ft) (part number: **A06040**). Used to connect device to the SeaTalkng backbone.
3. 1 x Power cable 2 m (6.6 ft) (part number: **A06049**). Used to provide 12 V dc power to the SeaTalkng backbone.
4. 1 x 5-Way connector (part number: **A06064**). Each connector block allows connection of up to 3 SeaTalkng devices. Multiple connector blocks can be 'daisy chained' together.
5. 2 x T-pieces (part number: **A06028**). Each T-piece allows connection of one SeaTalkng device. Multiple T-pieces can be 'daisy chained' together.
6. 2 x Backbone terminators (part number: **A06031**). Terminators must be fitted to both ends of the SeaTalkng backbone.

SeaTalk to SeaTalkng converter kit (part number: E22158) consists of:



1. 1 x Power cable 2 m (6.6 ft) (part number: **A06049**). Used to provide 12 V dc power to the SeaTalkng backbone.
2. 1 x Spur cable 1 m (3.3 ft) (part number: **A06039**). Used to connect a device to the SeaTalkng backbone.
3. 1 x SeaTalk (3 pin) to SeaTalkng adapter cable 0.4 m (1.3 ft) (part number: **A22164**). Used to connect SeaTalk devices to the SeaTalkng backbone via the SeaTalk to SeaTalkng converter.
4. 1 x SeaTalk to SeaTalkng converter (part number: **E22158**). Each converter allows connection of one SeaTalk device and up to 2 SeaTalkng devices.
5. 2 x Spur blanking plugs (part number: **A06032**). Used to cover unused spur connections in 5–way blocks, T-piece connectors and SeaTalk to SeaTalkng converter.
6. 2 x Backbone terminators (part number: **A06031**). Terminators must be fitted to both ends of the SeaTalkng backbone.

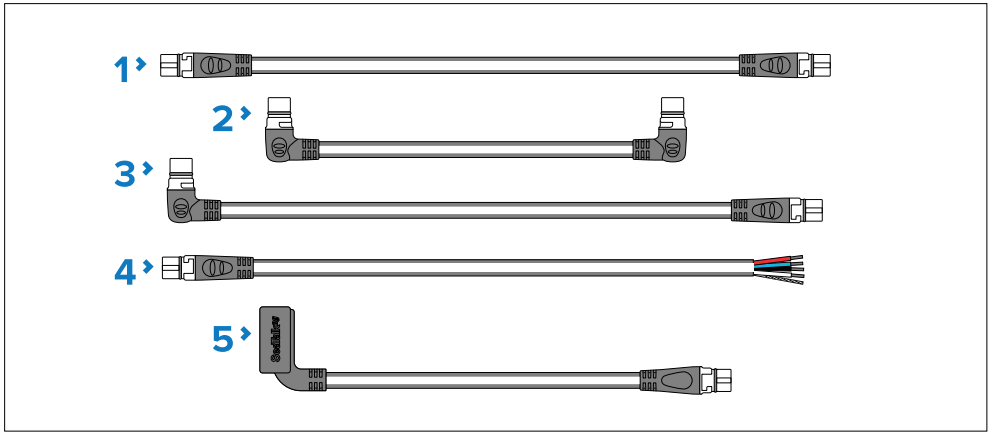
NMEA 0183 VHF 2 wire to SeaTalkng converter kit (part number: E70196) consists of:



1. 1 x Power cable 2 m (6.6 ft) (part number: **A06049**). Used to provide 12 V dc power to the SeaTalkng backbone.
2. 1 x Spur cable 1 m (3.3 ft) (part number: **A06039**). Used to connect a device to the SeaTalkng backbone.
3. 1 x NMEA 0183 VHF stripped-end (2 wire) to SeaTalkng adapter cable 1 m (3.3 ft) (part number: **A06071**). Used to connect an NMEA 0183 VHF radio to the SeaTalkng backbone via the NMEA 0183 VHF to SeaTalkng converter.
4. 1 x SeaTalk to SeaTalkng converter (part number: **E22158**). Each converter allows connection of 1 SeaTalk device and up to 2 SeaTalkng devices.
5. 2 x Spur blanking plugs (part number: **A06032**). Used to cover unused spur connections in 5-way blocks, T-piece connectors and SeaTalk to SeaTalkng converter.
6. 2 x Backbone terminators (part number: **A06031**). Terminators must be fitted to both ends of the SeaTalkng backbone.

SeaTalkng® spur cables

SeaTalkng spur cables are required to connect devices to the SeaTalkng backbone.



1. SeaTalkng spur cables:
   - Spur cable 0.4 m (1.3 ft) (part number: **A06038**).
   - Spur cable 1 m (3.3 ft)(part number: **A06039**).
   - Spur cable 3 m (9.8 ft) (part number: **A06040**).

- Spur cable 5 m (16.4 ft) (part number: **A06041**).

2. Elbow (right angled) to elbow (right angled) spur cable 0.4 m (1.3 ft) (part number: **A06042**). Used in confined spaces where a straight spur cable will not fit.
3. Elbow (right angled) to straight spur cable 1 m (3.3 ft) (part number: **A06081**). Used in confined spaces where a straight spur cable will not fit.
4. SeaTalkng to stripped-end spur cables (Connects compatible product that do not have a SeaTalkng connector such as transducer pods):
   - SeaTalkng to stripped-end spur cable 1 m (3.3 ft) (part number: **A06043**)
   - SeaTalkng to stripped-end spur cable 3 m (9.8 ft) (part number: **A06044**)
5. ACU / SPX autopilot to SeaTalkng spur cable 0.3 m (1.0 ft) (part number **R12112**). Connects the course computer to the SeaTalkng backbone. This connection can also be used to provide 12 V dc power to the SeaTalkng backbone.

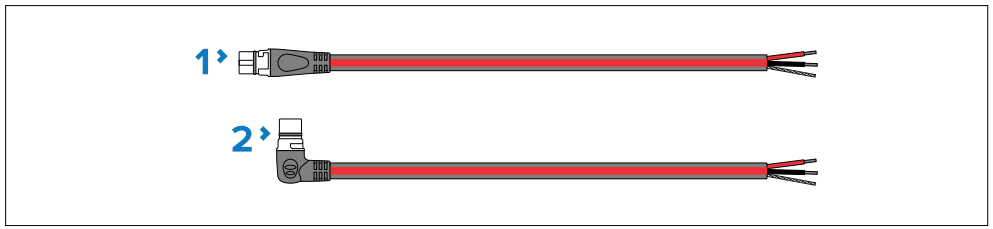
SeaTalkng® backbone cables

SeaTalkng backbone cables are used to create or extend a SeaTalkng backbone.

- Backbone cable 0.4 m (1.3 ft) (part number: **A06033**).
- Backbone cable 1 m (3.3 ft) (part number: **A06034**).
- Backbone cable 3 m (9.8 ft) (part number: **A06035**).
- Backbone cable 5 m (16.4 ft) (part number: **A06036**).
- Backbone cable 9 m (29.5 ft) (part number: **A06068**).
- Backbone cable 20 m (65.6 ft) (part number: **A06037**).

SeaTalkng® power cables

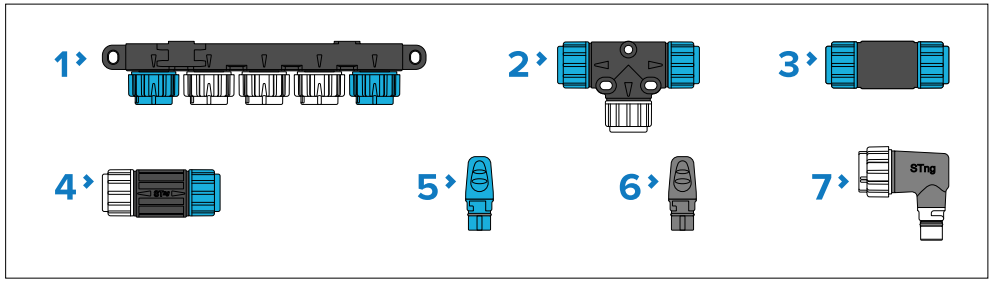
SeaTalkng power cables are used to provide the SeaTalkng backbone with a single 12 V dc power source. The power connection must include a 5 amp inline fuse (not supplied).



1. Power cable (straight) 2 m (6.6 ft) (part number: **A06049**).
2. Elbow (right angled) power cable 2 m (6.6 ft) (part number: **A06070**).

SeaTalkng® connectors

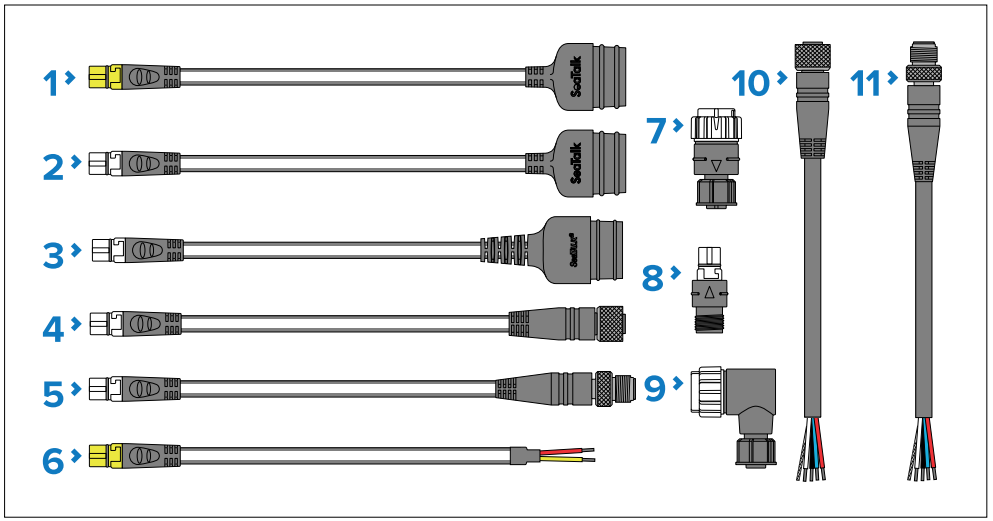
SeaTalkng connectors are used to connect SeaTalkng devices to the SeaTalkng backbone and to create and extend the backbone.



1. 5-Way connector (part number: **A06064**). Each connector block allows connection of up to 3 SeaTalkng devices. Multiple connector blocks can be 'daisy chained' together.
2. T-piece (part number: **A06028**). Each T-piece allows connection of one SeaTalkng device. Multiple T-pieces can be 'daisy chained' together.
3. Backbone extender (part number: **A06030**). Used to connect 2 backbone cables together.
4. Inline terminator (part number: **A80001**). Used to connect a spur cable and SeaTalkng device at the end of a backbone instead of a backbone terminator.
5. Backbone terminator (part number: **A06031**). Terminators must be fitted to both ends of the SeaTalkng backbone.
6. Spur blanking plug (part number: **A06032**). Used to cover unused spur connections in 5–way blocks, T-piece connectors, or the SeaTalk to SeaTalkng converter.
7. Elbow (right angled) spur connector (part number: **A06077**). Used in confined spaces where a straight spur cable will not fit.

SeaTalkng® adaptors and adaptor cables

SeaTalkng adaptor cables are used to connect devices designed for different CAN bus backbones (e.g.: SeaTalk or DeviceNet) to the SeaTalkng backbone.



1. SeaTalk (3 pin) to SeaTalkng converter cable 1 m (3.3 ft) (part number: **A22164 / A06073**). Can be used to connect a SeaTalk device to a SeaTalkng backbone via the SeaTalk to SeaTalkng converter, or to connect a SeaTalkng product directly to a SeaTalk network.
2. SeaTalk (3 pin) to SeaTalkng adaptor cable 0.4 m (1.3 ft) (part number: **A06047**). Can be used to connect a SeaTalk device to a SeaTalkng backbone via the SeaTalk to SeaTalkng converter, or to connect a SeaTalkng product directly to a SeaTalk network.
3. SeaTalk2 (5 pin) to SeaTalkng adaptor cable 0.4 m (1.3 ft) (part number: **A06048**). Used to connect SeaTalk2 devices or networks to a SeaTalkng backbone.
4. SeaTalkng to DeviceNet (female) adaptor cables connect NMEA 2000 devices that use a DeviceNet connector to the SeaTalkng backbone, or connects SeaTalkng devices to an NMEA 2000 network. The following cables are available:
   - SeaTalkng to DeviceNet (female) adaptor cable 0.4 m (1.3 ft) (part number: **A06045**).
   - SeaTalkng to DeviceNet (female) adaptor cable 1 m (3.3 ft) (part number: **A06075**).
5. SeaTalkng to DeviceNet (male) adaptor cables. Connect NMEA 2000 devices that use a DeviceNet connector to the SeaTalkng backbone, or connect SeaTalkng devices to an NMEA 2000 network. The following cables are available:
   - SeaTalkng to DeviceNet (male) adaptor cable 0.1 m (0.33 ft) (part number: **A06078**).
   - SeaTalkng to DeviceNet (male) adaptor cable 0.4 m (1.3 ft) (part number: **A06074**).
   - SeaTalkng to DeviceNet (male) adaptor cable 1 m (3.3 ft) (part number: **A06076**).
   - SeaTalkng to DeviceNet (male) adaptor cable 1.5 m (4.92 ft) (part number: **A06046**).
6. NMEA 0183 VHF stripped-end (2 wire) to SeaTalkng adapter cable 1 m (3.3 ft) (part number: **A06071**). Used to connect an NMEA 0183 VHF radio to the SeaTalkng backbone via the NMEA 0183 VHF to SeaTalkng converter.
7. SeaTalkng (male) to DeviceNet (female) adaptor (**A06082**).
8. SeaTalkng (female) to DeviceNet (male) adaptor (**A06083**).
9. SeaTalkng (male) to DeviceNet (female) elbow (right angled) adaptor (**A06084**).
10. DeviceNet (female) to stripped-end adaptor cable (0.4 m (1.3 ft) (part number: **E05026**).
11. DeviceNet (male) to stripped-end adaptor cable (0.4 m (1.3 ft) (part number: **E05027**).

Appendix A NMEA 0183 sentences

For a list of supported NMEA 0183 sentences, please refer to the relevant Operations manual for your display.

LightHouse version	Operations manual
LightHouse 3	81370
LightHouse 4	81406

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

Appendix B NMEA 2000 PGNs

For a list of supported NMEA 2000 PGNs, please refer to the relevant Operations manual for your display.

LightHouse version	Operations manual
LightHouse 3	81370
LightHouse 4	81406

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

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