Raymarine

ALPHA

Installation Instructions

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English (en-US)
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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 or damage to your vessel. It may also cause poor product performance or invalidate the product warranty.

• 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.bit.ly/rym-warranty

Warning: Potential ignition source

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

Warning: Switch off power supply

Ensure that 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 to do so in this document.

Product warnings

Warning: Product grounding

Before applying power to this product, it MUST be correctly grounded, in accordance with the instructions provided.

Warning: Positive ground systems

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

Warning: Power supply voltage

Connecting this product to a voltage supply greater than the specified maximum rating may cause permanent damage to the unit. For the correct voltage, refer to the information label affixed to the product.

Warning: Collision avoidance

In order to avoid potential physical damage to the unit, ensure that the environment surrounding the unit is clear from potential objects that may cause collisions.

Caution: Power supply protection

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

Caution: Sun covers

• Sun covers are used to protect the display screen against the damaging effects of ultraviolet (UV) light. If your product is supplied with a sun cover always ensure it is fitted when the product is not in use.

• To avoid potential loss of the sun cover, ensure that the sun cover is removed when travelling at high speed, whether in the water or when the vessel is being towed.

• To avoid potential screen damage, ensure that the rear surface of the sun cover and the display screen are clean and free from debris before placing the sun cover on the screen.

Regulatory notices

TFT Displays

The colors of the display may seem to vary when viewed against a colored background or in colored light. This is a perfectly normal effect that can be seen with all color Thin Film Transistor (TFT) displays.

Water ingress

Water ingress disclaimer

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

Disclaimer

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

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

Third-party hardware, such as converters, adapters, routers, switches, Access Points etc., provided by third parties, may be made available directly to you by other companies or individuals under separate terms and conditions, including separate fees and charges. Raymarine UK Ltd or its affiliates have not tested or screened the third-party hardware.

Raymarine has no control over, and is not responsible for:

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- (b) the privacy or other practices of such third-party hardware.

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Declaration of Conformity

Raymarine UK Ltd declares that the products listed below are in conformity with the relevant sections of the listed designated standards and / or other normative documents:

- Alpha 7 performance display, part number: E70649
- Alpha 9 performance display, part number: E70650

Region	Standard	Mark
UK	EMC Regulations 2016	UKCA
EU	EMC Directive 2014/30/EU	CE

The original Declaration of Conformity certificates may be obtained via the documentation page at www.bit.ly/alpha-display-docs

PSTI Compliance

For products sold into the United Kingdom (UK), use the following link to obtain the product's Statement of Compliance with the *Product Security and Telecommunications Infrastructure* (PSTI) Regulations:

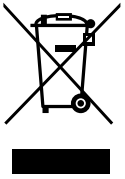
Visit the following web address and enter the product's model name or number (SKU) into the provided search field:

- www.bit.ly/rym-sec-com

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: https://bit.ly/rym-recycling

Warranty policy and registration

Visit the Raymarine website to **read the latest warranty policy**, and **register** your product's warranty online: www.bit.ly/rym-warranty

It is important that you register your product to receive full warranty benefits. Your product package includes a barcode label indicating the serial number of the unit. This serial number is also provided on a label affixed to the product itself. You will need this serial number when registering your product online.

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 to ensure you have the most up-to-date version(s) of the documentation for your product: www.docs.raymarine.com

Publication copyright

CHAPTER 2: DOCUMENT INFORMATION

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2.1 Applicable products

This document is applicable to the following products:

- Alpha 7 performance display, part number: E70649
- Alpha 9 performance display, part number: E70650

2.2 Multifunction display (MFD) requirement

The Alpha Series performance display is not a standalone product. It MUST be connected to a Raymarine **Axiom-Series** or **Axiom 2-Series** Multifunction display (MFD) / chartplotter. All displays must be running the latest available software versions.

The Alpha Series is compatible with the following Raymarine Multifunction displays / chartplotters:

Compatible Raymarine MFDs	Required MFD software version
Axiom 2-Series: Axiom 2 Pro, Axiom 2 XL	LightHouse 4, v4.7.172 or later
Axiom-Series: Axiom, Axiom+, Axiom Pro, Axiom XL	LightHouse 4, v4.7.172 or later

Alpha software download link
www.bit.ly/rym-alpha-download

LightHouse 4 software download link
www.bit.ly/LH4-download

2.3 Product documentation

The following documentation is applicable to your product:

Applicable documents

Documentation number	Description
87457	Alpha Series Performance Display Installation Instructions (this document)
81415	Alpha Series Performance Display Operation Instructions
87427	Alpha 7 Performance Display Mounting Template
87428	Alpha 9 Performance Display Mounting Template
88130	Alpha Series Performance Display Mast Bracket Installation Instructions

All product documentation is available from the Raymarine website: www.bit.ly/rym-docs

Operation instructions

For instructions on how to operate your product, refer to the separate *Operation Instructions* document.

Please check the website to ensure you have the latest documentation:

Document	Number	Link
Alpha *Operation Instructions*	81415	www.bit.ly/alpha-display-docs

2.4 Document illustrations

While every effort is made to ensure that the illustrations provided in this publication accurately reflect the final released product, due to editorial and production lead times, your product — and if applicable — its user interface, may differ slightly from the illustrations provided in this document, depending on product variant and date of manufacture.

All images are provided for illustration purposes only.

CHAPTER 3: PRODUCT AND SYSTEM OVERVIEW

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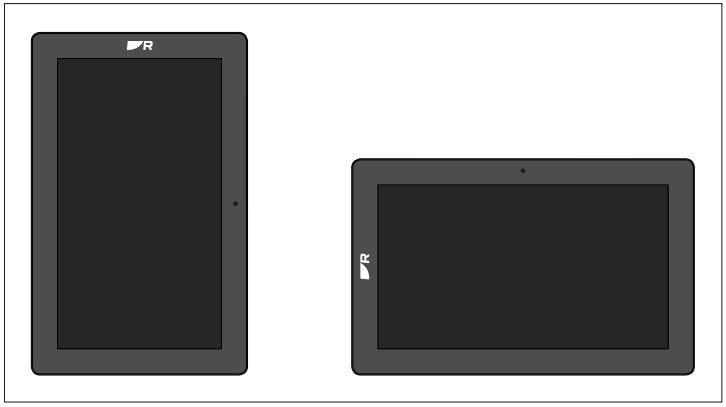
3.1 Product overview

Alpha is a high brightness and high contrast sunlight-viewable touchscreen performance display, optimized for sailing applications.



Available in 2 different screen sizes, the Alpha Series displays can be mounted in portrait or landscape configurations, and in conjunction with Raymarine® Axiom™ multifunction displays / chartplotters and compatible sensors, show key environmental, navigational and vessel data in a fully-customizable format.

With the ability to be daisy-chained in groups of up to 4 displays for simplified mast and deck cabling, Alpha displays are ideal for providing vital performance data at the optimum locations on your vessel.

The performance display has the following key features:

- 7" (*Alpha 7 performance display*) (E70649) or 9" (*Alpha 9 performance display*) (E70650) polarized sunglasses-friendly high brightness and high contrast anti-glare IPS display, with wide viewing angles and accurate touch controls.
- Hydrotough™ display technology with nano-coated, impact-resistant glass repels water, oil, and smudges.
- Ambient light sensor for automatic display brightness adjustment.
- Maximum installation flexibility with flush, surface, or mast mounting options in portrait or landscape orientation. Single or dual display mast brackets available as optional accessories.
- Retro-fit mounting option — fits the mounting hole of an existing Raymarine® instrument, such as ST60, ST60+, i50, i60, i70, or i70s.
- Simplified cabling — a robust single waterproof cable carries both power and data (available separately, in a range of lengths).
- Up to 4 Alpha displays can be connected together in a "daisy chain", for expanded systems.
- Fully customizable data pages and widgets for the following categories: *Battery*, *Boat*, *Depth*, *Distance*, *Engine*, *Environment*, *Fuel*, *GPS*, *Generators*, *Heading*, *Inside environments*, *Navigation*, *Pilot*, *Speed*, *Time*, *Water tanks* and *Wind*.
- Lockable touchscreen display, with remotely-controllable brightness and data page selection via a connected (and required) Raymarine® Axiom™ multifunction display / chartplotter.
- Waterproof to IPx6 and IPx7 (suitable for above or below decks installation).
- 12 / 24 V dc operation.
- Low power consumption:
  - (Alpha 7 performance display) — 10.10 W (maximum) @ 12 V dc / 12.34 W (maximum) @ 24 V dc
  - (Alpha 9 performance display) — 12.27 W (maximum) @ 12 V dc / 12.51 W (maximum) @ 24 V dc

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The Alpha Series is compatible with the following Raymarine Multifunction displays / chartplotters:

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Axiom-Series: Axiom, Axiom+, Axiom Pro, Axiom XL	LightHouse 4, v4.7.172 or later

Alpha software download link
www.bit.ly/rym-alpha-download

LightHouse 4 software download link
www.bit.ly/LH4-download

3.3 Required additional components

This product forms part of a system of electronics and requires the following additional components in order to function.

Compatible multifunction display

For information on the multifunction displays / chartplotters which are compatible with your product, refer to:
p.14 — Multifunction display (MFD) requirement

Network and power cables

For information on the separately available network and power cables that are required to operate your product, refer to:

- **p.18 — Cable requirement**
- **p.18 — Network connections**

Cable extensions

Some installations may also require extensions to network or power cables. For information on cable extensions, refer to:

- **p.37 — Network connections**
- **p.40 — Power connections**

3.4 Additional components

The performance display can be partnered with the RSW Smart Wind transducer for highly accurate measurement of wind speed and direction without a need for calibration tables.

The RSW Smart Wind transducer uses a high performance AHRS 3D sensor and Smart Wind technology to deliver improved wind speed and direction stability from tack to tack, by compensating for:

- Boat speed.
- Leeway.
- Mast twist and bend.
- Mast rotation.
- Dynamic vessel motion (pitch and roll).
- Sail effects (upwash calculations).

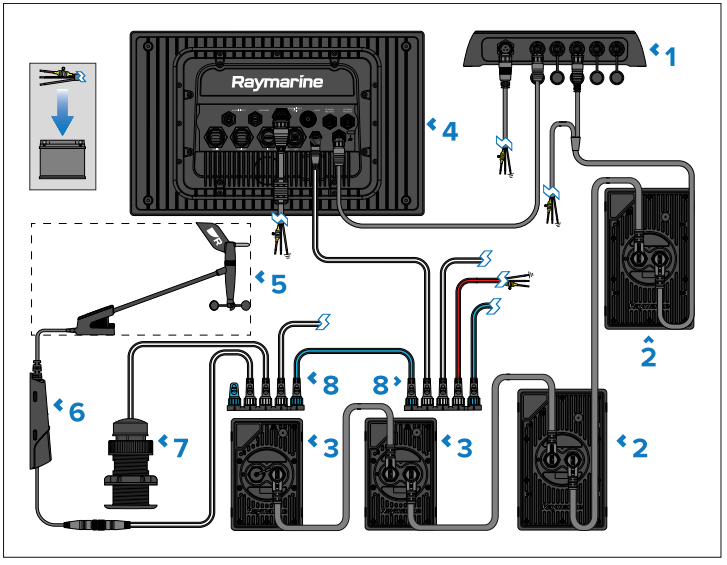
3.5 System overview (example only)

The following illustrations provide an overview of different products which can be connected to and used in conjunction with the performance display.

Note:

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

• Power connections are not shown in this illustration. For power connection information, refer to the following section:
p.40 — Power connections



1. RNS-5 Network switch.
2. Alpha 9 performance display.
3. Alpha 7 performance display.
4. Axiom 2 XL multifunction display.
5. RSW-Wired Smart Wind transducer — for more details, refer to: **p.15 — Additional components**
6. NMEA 2000 gateway (supplied with RSW-Wired Smart Wind transducer).
7. DST810 Thru-Hull transducer.
8. SeaTalkng ® 5–way connector (A06064).

3.6 Software updates

Product software updates may be made available which add new features and improve existing functionality. It's important to ensure that you have the latest software for your products by regularly checking the Raymarine website for new software releases.

To check for the latest software updates and the software update procedure for your specific product(s), refer to: www.bit.ly/rym-software

Unless otherwise stated, software updates for Raymarine products are performed using a Raymarine MFD / chartplotter.

- Where applicable, you should always backup your user data and settings before performing a software update.
- To update SeaTalk NG products, you must use the datamaster MFD / chartplotter which is physically connected to the SeaTalk NG backbone.
- Ethernet (RayNet) products can be updated from any MFD / chartplotter on the same network as the product to be updated.
- In order to perform a software update, any connected Autopilot or Radar must be switched to Standby.
- The MFD / chartplotter "Check online" feature is only available when connected to the Internet.

Note:
If in doubt as to the correct procedure for updating your product software, refer to your dealer or Raymarine technical support.

Caution: Installing software updates

• The software update process is carried out at your own risk. Before initiating the update process ensure you have backed up any important files.

• Ensure that the product(s) has a reliable power supply and that the update process is not interrupted.

• Damage caused by an incomplete update is not covered by Raymarine warranty.

• By downloading the software update package, you agree to these terms.

CHAPTER 4: PARTS SUPPLIED

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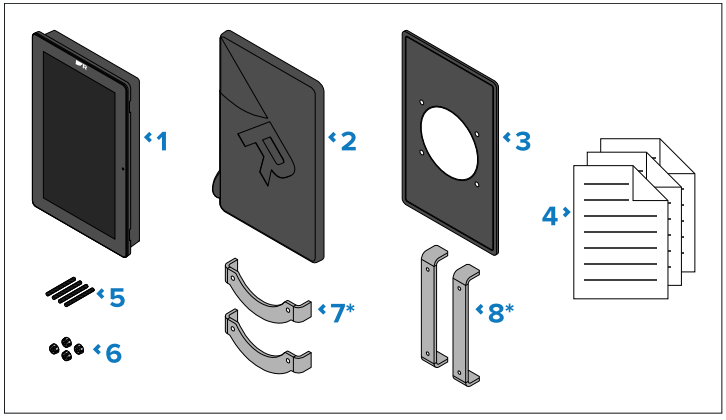
4.1 Parts supplied

The following parts are supplied with your product:

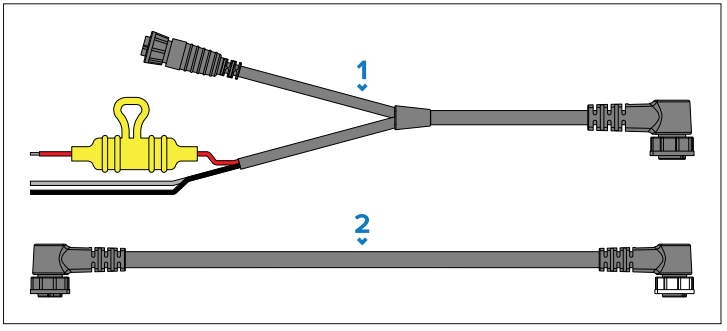


1. Alpha Series performance display.
2. Suncover.
3. Waterproof gasket.
4. Documentation pack.
5. 4 x Threaded studs, M4 x 40 mm.
6. 4 x Thumb nuts.
7. * Supplied with Alpha 7 only — 2 x mounting brackets.
8. * Supplied with Alpha 9 only — 2 x mounting brackets.

4.2 Power cable requirement

Your performance display requires a separately available combined RayNet and power cable in order to function, which is **NOT supplied** with the product.

Depending on your system configuration, either one or both of the following cables will be required:



1. 8–pin right angled power to RayNet and bare end power wires cable, available separately — used to supply power to the performance display directly from a 12 V or 24 V power source.
2. 8–pin right angled daisy chain cable, available separately — used to supply power and data to additional performance displays connected (or “daisy-chained”) in a series.

4.3 Inline fuse and thermal breaker ratings

The performance display’s power cable is fitted with a waterproof fuse holder and an 8 A inline fuse, which is appropriate for up to 3 additional daisy-chained displays. In the instance where the supplied inline fuse needs to be replaced, or when installing a thermal breaker, please observe the following inline fuse and thermal breaker ratings:

Important:
The suitable fuse rating for an inline fuse and thermal breaker is dependent on the number of devices you are connecting. When connecting multiple Alpha displays in a series (up to 4 maximum), ensure that **the fuse rating is appropriate for the total power consumption of all daisy-chained Alpha displays in your system**.

The ratings listed below are applicable when replacing the power cable's supplied 8 A inline fuse. If in doubt, consult an authorized Raymarine® dealer.

Number of displays in a series	Inline fuse rating	Thermal breaker rating
1	2 A	2 A
2	4 A	4 A
3	6 A	6 A
4	8 A	8 A

CHAPTER 5: PRODUCT DIMENSIONS

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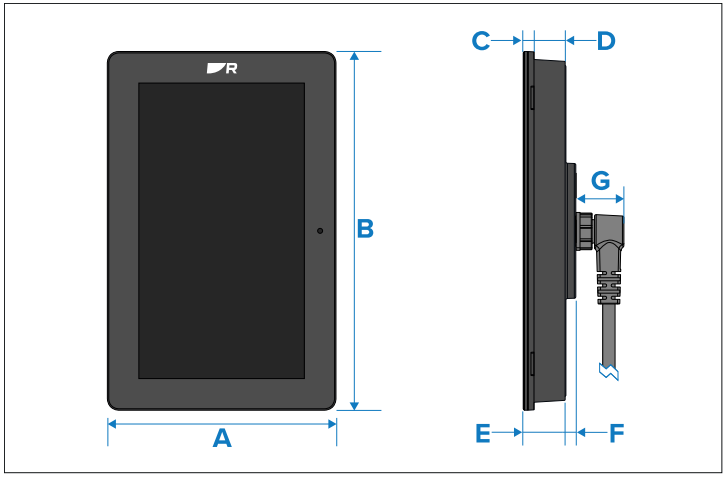
5.1 Product dimensions



	Alpha 7	Alpha 9
A	120.1 mm (4.73 in)	148.9 mm (5.86 in)
B	188.4 mm (7.42 in)	235.9 mm (9.29 in)
C	7 mm (0.28 in)	7 mm (0.28 in)
D	18 mm (0.71 in)	20.5 mm (0.81 in)
E	25 mm (0.98 in)	27.5 mm (1.08 in)
F	7 mm (0.28 in)	7 mm (0.28 in)
G	30.9 mm (1.22 in)	30.9 mm (1.22 in)

CHAPTER 6: LOCATION REQUIREMENTS

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6.1 Warnings and cautions

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

• **p.8 — Important information**

6.2 General location requirements

Below are important requirements that need to be considered when choosing a suitable location to install your product.

The product is suitable for mounting above or below decks.

The product should be mounted in a location where it will be:

- Protected from physical damage and excessive vibration.
- Well ventilated and away from heat sources.
- Away from any potential ignition source such as an engine room, near fuel tanks or a gas locker.
- Easily accessible for operations.

When choosing a location for the product, consider the following to ensure reliable and trouble-free operation:

- Access — there must be sufficient space to enable cable connections and to avoid tight cable bends.
- Electrical interference — the product should be mounted far enough away from any equipment that may cause interference such as engines, motors, generators, radio transmitters / receivers and cables carrying high power.
- Magnetic compass — refer to the *Compass safe distance* section in this document for advice on maintaining a suitable distance between this product and any compasses on your vessel.
- Mounting surface — ensure the product is adequately supported on a secure surface. Refer to the weight information provided in the *Technical specification* for this product and ensure that the intended mounting surface is suitable for bearing the product weight. Do NOT mount units or cut holes in places which may damage the structure of the vessel.

6.3 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 must aim to maintain a distance of **at least** 1 m (3.3 ft.) in all directions from any compasses.

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 on state.

6.4 Viewing angle considerations

As display contrast and color are affected by the viewing angle, before choosing the mounting position of your display, it is recommended that you temporarily power up the display (prior to installation) and experiment with different installation locations, to enable you to best judge which location provides the optimum viewing angle for your specific installation.

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

6.5 EMC installation guidelines

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

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

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

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

- Raymarine equipment and cables connected to it are:
  - At least 1 m (3.28 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 (6.56 ft) from the path of a radar beam. A radar beam can normally be assumed to spread 20 degrees above and below the radiating element.
- The product is supplied from a separate battery from that used for engine start. This is important to prevent erratic behavior and data loss which can occur if the engine start does not have a separate battery.
- Raymarine specified cables are used.
- Cables are not cut or extended, unless doing so is detailed in the installation manual.

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

6.6 Suppression ferrites

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

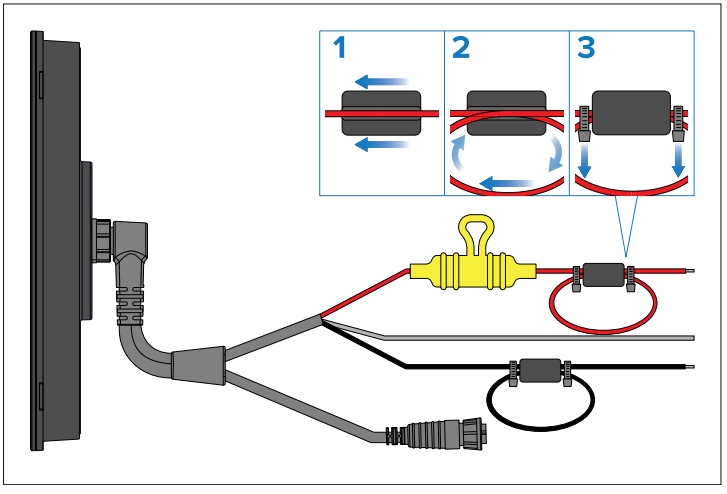
6.7 Suppression ferrite installation requirement

Raymarine® equipment and accessories conform to the appropriate Electromagnetic Compatibility (EMC) regulations for use in the recreational marine environment.

To ensure EMC Compliance, **the specified products must be fitted with the supplied cable ferrite(s)**, according to the instructions provided.

6.8 Suppression ferrite installation procedure

Follow the steps listed below to fit the supplied suppression ferrites to **both** your 8-pin power cable's red (positive) **and** black (negative) wires.



1. Feed the suppression ferrite approximately halfway down the length of the red (positive) power cable wire.
2. Wrap the red (positive) power cable wire around the outside of the suppression ferrite, and then feed the wire back through the ferrite so that a loop is formed (as shown in the above illustration).
3. Secure the suppression ferrite in place using cable ties (not supplied), directly at both ends.

4. Cut off any excess from the cable ties.

Repeat steps 1–4 for the power cable's black (negative) wire.

6.9 Connections to other equipment

Requirement for ferrites on non-Raymarine cables:

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

For more information, refer to your third-party cable manufacturer.

CHAPTER 7: CABLES AND CONNECTIONS — GENERAL INFORMATION

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7.1 General cabling guidance

Cable types and length

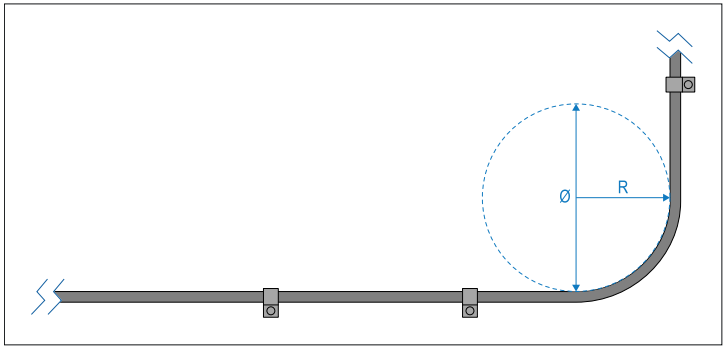
It is important to use cables of the appropriate type and length.

- 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 and bend radius

To maximize cable performance and lifespan, it's important to ensure that all cables are routed correctly and adequate space is provided to allow for each cable's minimum bend radius.

Minimum cable bend radius



Do NOT bend cables excessively. Wherever possible, ensure that your chosen product installation location allows enough clearance for the minimum cable bend diameter specified in the following table:

	Description	Value
Ø	Cable minimum bend **diameter**.	200 mm (7.87 in.)
R	Cable minimum bend **radius**.	100 mm (3.94 in.)

Note:
For products where multiple different cable types are connected, each with a different minimum cable bend radius, the higher figure is provided in the table above (i.e. the cable with the greatest minimum bend radius is specified).

Cable routing — best practices

- 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 (conduit).
- 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.

Cable shielding

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

Important:
Be aware that some **third-party** cables and adapters (for example, certain Ethernet cables using RJ45 connectors) are not always shielded. To prevent breaks in cable shielding continuity and potential grounding issues, special attention is required to ensure that any cables, extension cables, adapters, or other signal-coupling devices used in cable runs **maintain all shield connections throughout the cable run**.

Suppression ferrites

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

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.

Bare-ended wire connections

You must ensure that any bare-ended 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 electrical insulation tape.

Unused bare-ended wires

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

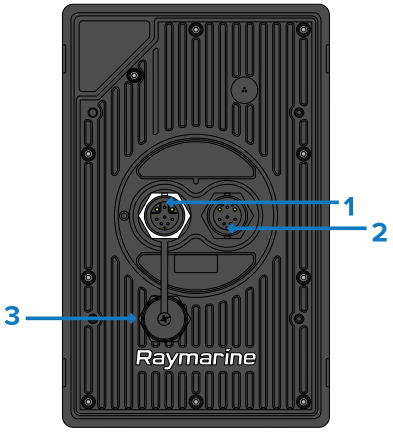
Warning: Positive ground systems

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

7.2 Connections overview

The Alpha Series performance display includes the following connections:

Note:
The performance display is supplied with a protective cap fitted to the Daisy-chain connection port.
The protective cap should remain in place until connections are made. If a connection is not required then the protective cap should not be removed.



1. Daisy-chain connector (*Port 1 — white*).
2. Power / RayNet (Ethernet) connector (*Port 2 — black*).

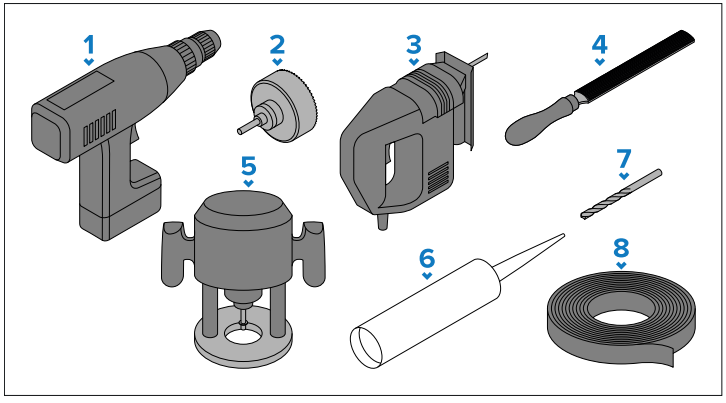
3. Protective cap — only remove if daisy-chaining Alpha Series displays.

CHAPTER 8: MOUNTING

CHAPTER CONTENTS

8.1 Tools required

The following tools are required for installation:

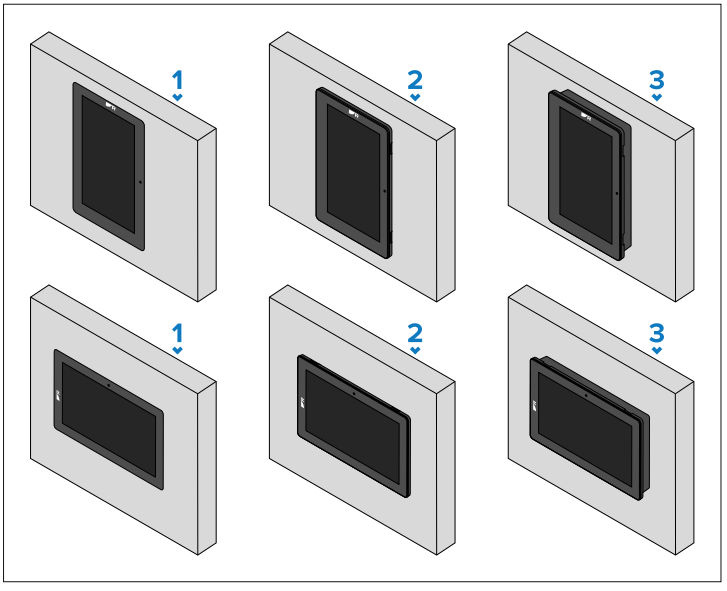


1. Power drill.
2. Hole cutter of an appropriate size for the 8.00 mm (0.31 in) surface and flush mount corner diameter cutout line, or the 90.94 mm (3.58 in) retrofit / offset mount center diameter cutout line.
3. Jigsaw.
4. Half round file (or sandpaper).
5. * Hand router with a router bit of an appropriate size for the 11.50 mm (0.45 in) corner diameter, required for the flush mount rebate.
6. Marine grade sealant.
7. Drill bit.
8. Masking / self adhesive tape.

Note:
* Items are only required when flush mounting the display.

8.2 Mounting options

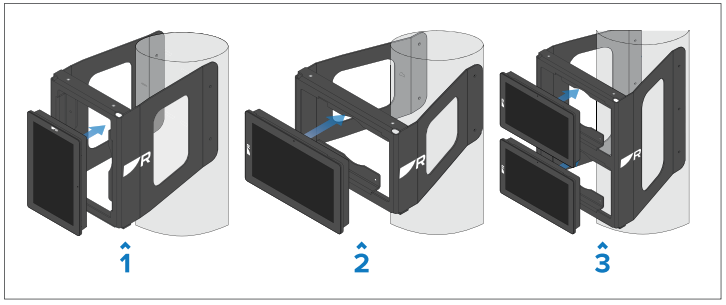
The performance display can be mounted flush with the mounting surface (flush mount), with the glass protruding from the mounting surface (surface mount), or with the instrument's body protruding from the mounting surface (retrofit / offset mount).



1. Portrait or landscape flush mount.
2. Portrait or landscape surface mount.
3. Portrait or landscape retrofit / offset mount — this is typically used when replacing an existing Raymarine® instrument, such as ST60, ST60+, i50, i60, i70, i70s.

Accessory mounting options

The performance display can also be mounted to a mast using one of the separately available mast bracket accessories.



1. Single portrait mast bracket.
2. Single landscape mast bracket.
3. Dual landscape mast bracket.

Each accessory bracket is supplied with installation instructions. For a list of mast bracket accessory part numbers, refer to:
p.64 — Spares and accessories

Bracket mast size compatibility

Before obtaining and attempting to install an Alpha display mast bracket, ensure that the diameter of your mast does not exceed the minimum and maximum mast bracket tolerances specified below.

Important:

• Depending on the diameter of your mast, one or more of the following accessory mast brackets may not be appropriate for the size of your mast.

• Exceeding the specified mast bracket tolerances may cause damage to the bracket and any attached products.

Single mast bracket tolerances (portrait):

Display variant	Minimum and maximum mast tolerances
Alpha 7:	90 mm (3.54 in) min to 150 mm (5.91 in) max.
Alpha 9:	120 mm (4.72 in) min to 210 mm (8.27 in) max.

Single mast bracket tolerances (landscape):

Display variant	Minimum and maximum mast tolerances
Alpha 7:	90 mm (3.54 in) min — 150 mm (5.91 in) max.
Alpha 9:	120 mm (4.72 in) min — 210 mm (8.27 in) max.

Dual mast bracket tolerances (landscape):

Display variant	Minimum and maximum mast tolerances
Alpha 7:	90 mm (3.54 in) min — 150 mm (5.91 in) max.
Alpha 9:	120 mm (4.72 in) min — 210 mm (8.27 in) max.

8.3 Horizon level mounting

It is recommended that you mount the performance display level with the horizon for the *[SailPoint]* and *[3D compass]* widgets to line up with the display screen when the boat is stationary.

Note:
Other widgets will not be affected by the performance display's level.
For more information on the performance display's *[SailPoint]* and *[3D compass]* widgets, refer to the Alpha Series Performance Display Operation Instructions (81415).

8.4 Rear mount requirements

Access to the rear of the display and mounting surface is required in order to install the display.

Ensure there is sufficient access and space behind the mounting surface to attach and tighten the fixings and also to connect the cables.

8.5 Preparing the mounting surface — surface mounting

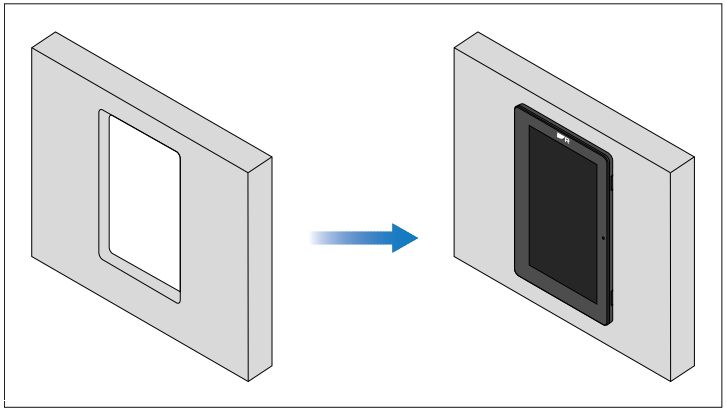
Surface mounting requires one cutout hole. When the performance display is surface mounted, the glass/bezel will protrude from the mounting surface.

Note:
The following procedure is for preparing the mounting surface for surface mount installations. For flush or retrofit / offset mounting details, refer to:

- **p.33 — Preparing the mounting surface — flush mounting**
- **p.34 — Preparing the mounting surface — retrofit / offset mounting**

Important:
Before preparing the mounting surface ensure that:

- Your selected location meets the location requirements. For details refer to: **p.22 — Location requirements**
- You have identified cable connections and the route that the cables will take.



1. Mark the cutout line identified on the supplied mounting template on the mounting surface.
2. Use a drill and an appropriate size drill bit or hole cutter to cut out the corners of the cutout line. The corner diameter for the instruments is 8.00 mm (0.31 in).
3. Use a jigsaw or similar cutting tool to cut out the remainder of the cutout area.
4. Use a half round file and/or sandpaper to smooth any rough edges or burs on the cutout hole.

8.6 Preparing the mounting surface — flush mounting

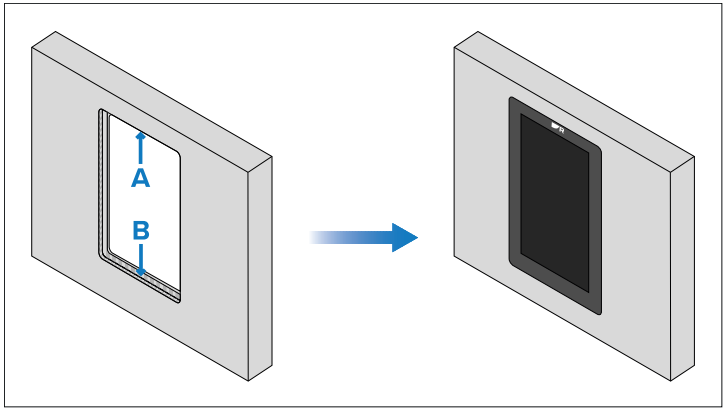
Flush mounting requires the same cutout hole as surface mounting and an additional rebate around the edge of the cutout area. When the performance display is flush mounted, the glass will be flush with the mounting surface.

Note:
The following procedure is for preparing the mounting surface for flush mount installations. For surface or retrofit / offset mounting details, refer to:

- **p.33 — Preparing the mounting surface — surface mounting**
- **p.34 — Preparing the mounting surface — retrofit / offset mounting**

Important:
Before preparing the mounting surface ensure that:

- Your selected location meets the location requirements. For details refer to: **p.22 — Location requirements**
- You have identified cable connections and the route that the cables will take.



- **A** — Cutout (when flush mounting the cutout will be the same size as for surface mounting).
- **B** — Flush mounting requires an extra rebate to recess the display fully in the mounting surface.

Important:
When flush mounting, the fixings go through holes drilled in the rebated, and therefore thinnest, part of the mounting surface. **Before preparing the mounting surface, ensure that sufficient surface thickness will remain (once rebated) to take the weight of the display.** The final rebated area must be **at least** as thick as the display's bezel (7.00 mm (0.28 in)), in order to ensure that the display sits entirely flush with the mounting surface. Due to these requirements, not all mounting surface types and materials are suitable for flush mounting the display. *It is the installer's responsibility to ensure that the mounting surface is suitable for flush mounting.* **If the mounting surface is not suitable, the display must be surface or trunnion mounted instead.**

1. Mark the cutout line identified on the supplied mounting template on the mounting surface.
2. Mark the rebate for flush mount line identified on the supplied mounting template on the mounting surface.
3. Use a drill and an appropriate size drill bit or hole cutter to cut out the corners of the cutout line. The corner diameter for the instruments is 8.00 mm (0.31 in).
4. Use a jigsaw or similar cutting tool to cut out the remainder of the cutout area.
5. Use a router hand tool to recess the marked rebate area to a depth of 7.00 mm (0.28 in).
6. Carefully (and temporarily) fit the display to the cutout area, to check for a good fit. **Do not use any fixings at this time.** If the fit is very tight, it may be necessary to remove the display and file the edges of the cutout to achieve a better fit, using a half round file and/or sandpaper. Alternatively, if the fit is loose and there is a visible gap between the display's outer bezel and the cutout, this will need to be filled with marine-grade sealant or suitable packing material to fill the gap. *This should only be done once the display has been secured to the surface using the fixings, as described in the next mounting procedure*.
7. Use a half round file and/or sandpaper to smooth any rough edges or burs on the cutout hole.

8.7 Preparing the mounting surface — retrofit / offset mounting

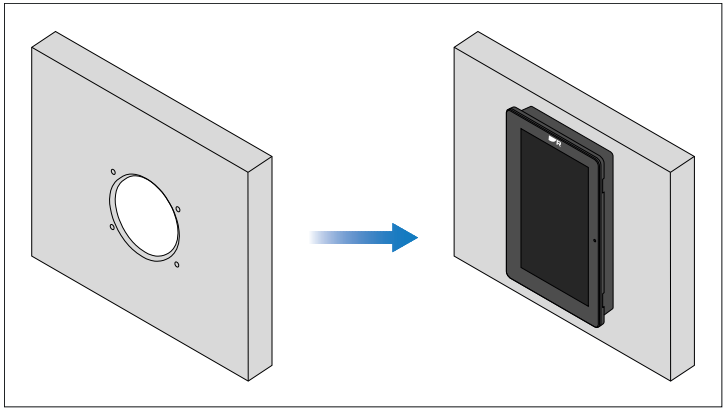
Retrofit / offset mounting requires one cutout hole. When the performance display is retrofit / offset mounted, the glass / bezel and case will protrude from the mounting surface.

Note:
The following procedure is for preparing the mounting surface for retrofit / offset mount installations. For flush or surface mount installation details, refer to:

- **p.33 — Preparing the mounting surface — surface mounting**
- **p.33 — Preparing the mounting surface — flush mounting**

Important:
Before preparing the mounting surface ensure that:

- Your selected location meets the location requirements. For details refer to: **p.22 — Location requirements**
- You have identified cable connections and the route that the cables will take.

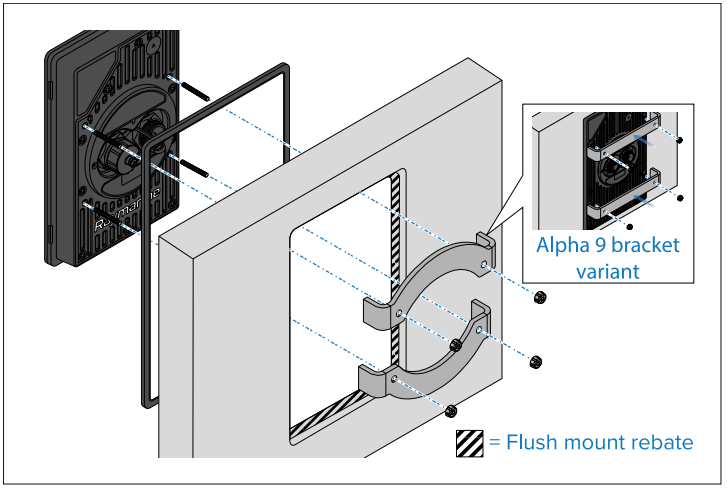


1. Mark the cutout line and drill hole locations identified on the supplied mounting template on the mounting surface.
2. Use a drill and an appropriate size drill bit to drill the holes required at the marked locations.
3. Use a drill and an appropriate size hole cutter to cut around the cutout line. The retrofit / offset mount cutout diameter is 90.94 mm (3.58 in).
4. Use a half round file and / or sandpaper to smooth any rough edges or burs on the cutout hole.

8.8 Surface and flush mounting

Follow the steps below to surface or flush mount the performance display.

Important:
In above-decks installations, marine-grade sealant should be used to seal the gap between the mounting surface and the performance display bezel.



1. Ensure you have followed the relevant instructions for preparing the mounting surface for performance display mounting.
2. Route the relevant cables behind the mounting surface cut-out.

   This may be difficult or not possible once the display has been mounted.
3. (Flush mount only) remove the waterproof gasket cutout as shown above, and fit the gasket onto the performance display.
4. Depending on your mounting method, place the performance display into the cutout / flush mount rebate.
5. Insert the supplied threaded studs into the performance display.
6. Place the supplied mounting brackets over the threaded studs.
7. Attach the supplied thumb nuts to the end of each stud.
8. Tighten the thumb nuts by hand until the brackets and display are secured firmly in position.

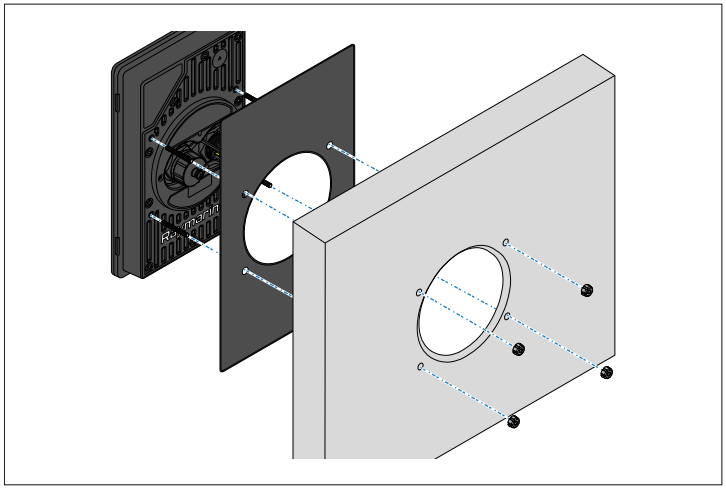
Warning: Marine-grade sealant

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

8.9 Retrofit / offset mounting

The performance display can be retrofitted to the mounting position of an existing Raymarine® instrument, such as the ST60, ST60+, i50, i60, i70, i70s. In this mounting scenario, the performance display bezel protrudes from the mounting surface, with a 24 mm (0.9 in.) gap between the bezel and the mounting surface.

Important:
In above-decks installations, marine-grade sealant should be used to seal the gap between the mounting surface and the performance display bezel.



1. Ensure you have followed the relevant instructions for preparing the mounting surface for retrofit / offset mounting.
2. In the case of a retrofit, remove the existing instrument product, and any associated cables.
3. Route the relevant cables for the new performance display behind the mounting surface cutout.

   This may be difficult or not possible once the display has been mounted.
4. Insert the supplied threaded studs into the rear of the performance display.
5. Remove the waterproof gasket cutout as shown above, and fit the gasket over each threaded stud onto the performance display.
6. Place the threaded studs into the drilled holes on the rear of the performance display.
7. Attach the supplied thumb nuts to the end of each stud.
8. Tighten the thumb nuts by hand until the performance display is secured firmly in position.

Warning: Collision avoidance

In order to avoid potential physical damage to the unit, ensure that the environment surrounding the unit is clear from potential objects that may cause collisions.

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.

CHAPTER 9: NETWORK CONNECTIONS

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9.1 Maximum IP network configuration

The recommended maximum number of supported devices on any single Ethernet / RayNet network is shown below. Whilst it may be possible to connect more products than the quantities stated, or to substitute products, exceeding the stated limits may cause the network to become unstable and networked devices to respond slower than expected.

- Up to 10 x Axiom-Series / Axiom 2-Series displays.
- Up to 10 x Alpha-Series displays.
- Up to 8 x Simultaneous IP camera feeds (More than 8 cameras can be connected but only up to 8 can be displayed at the same time).
- Up to 2 x Radar scanners (Only one can be a Quantum-Series).
- Up to 4 external sonar modules.
- 1 x YachtSense DCS
- 1 x DockSense or NeuBoat Dock system.
- 1 x RMK-9 or RMK-10.
- 1 x YachtSense Link router.
- Up to 3 x third-party integrated hardware devices (e.g.: Lumishore™).

It is recommended that all network devices are connected directly to an Ethernet / RayNet network switch. To ensure adequate network traffic bandwidth on larger systems involving a high volume of data throughput, a Gigabit-speed network switch is recommended (such as the RNS-5 or RNS-8).

9.2 Network connections overview

The following section will provide two different network connection scenarios, one of which is required in order for the performance display to function:

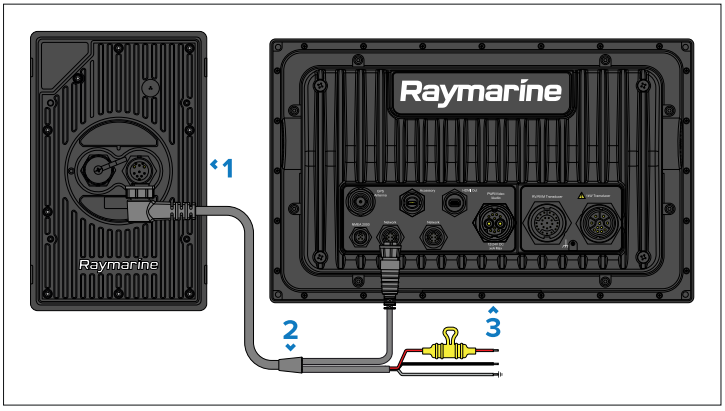
- **p.38 — Required compatible multifunction display connection**
- **p.38 — Multiple performance display connections**

Note:
Power connections are not shown throughout each of the following illustrations. For appropriate power connection information, refer to the instructions which accompany each device.

Required MFD connection

In order to function, your performance display **must** be networked to a compatible multifunction display / chartplotter via a separately available 8-pin right-angled power to RayNet and bare end power wires cable.

Example: RayNet cable connection scenario



1. Alpha Series performance display.
2. 8-pin right-angled power to RayNet and bare end power wires cable, available separately.
3. Compatible Raymarine® multifunction display / chartplotter (Axiom 2 Pro illustrated).

Note:

• For a list of compatible multifunction displays / chartplotters, refer to: **p.14 — Multifunction display (MFD) requirement**

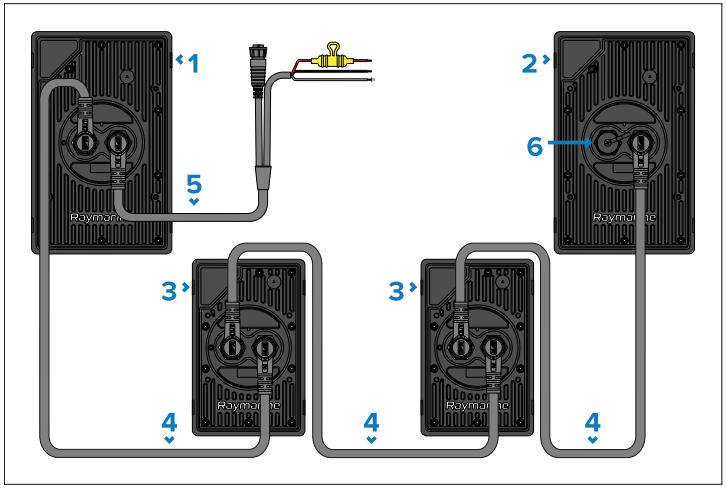
• For information on the available cables and accessories, refer to the following section: **p.64 — Spares and accessories**

Multiple performance display connections

Multiple performance displays can be connected together (daisy-chained) for the purpose of an expanded system, via a separately available 8-pin right-angled daisy-chain accessory cable.

A maximum of 4 performance displays can be daisy-chained in a series and a maximum of 10 performance displays can be connected per system.

Example: daisy-chain network connection scenario



Important:
When daisy-chaining instruments together, ensure that a suitably-rated fuse is installed before applying power. **The fuse rating must be appropriate for the total power consumption of all daisy-chained instruments in your system**. For more information, refer to: **p.42 — Inline fuse and thermal breaker ratings**

1. Alpha 9 performance display — receiving power directly from a 12 V or 24 V power source via a separately available power and RayNet cable.
2. Alpha 9 performance display — receiving power from the previous instrument in series via a separately available daisy-chain cable.
3. Alpha 7 performance display — receiving power from the previous instrument in series via a separately available daisy-chain cable.
4. 8-pin right-angled daisy chain cable, available separately.
5. 8-pin right-angled power to RayNet and bare end power wires cable, available separately.
6. Protective cap — must be fitted when connector is not in use.

Note:
For information on the available cables and accessories, refer to the following section: **p.64 — Spares and accessories**

Network cable extensions

If you wish to extend the length of a network cable connected to your product, refer to the following section for further information: **p.64 — Spares and accessories**

CHAPTER 10: POWER CONNECTIONS

CHAPTER CONTENTS

10.1 Power options

This product must be powered using ONE of the following methods.

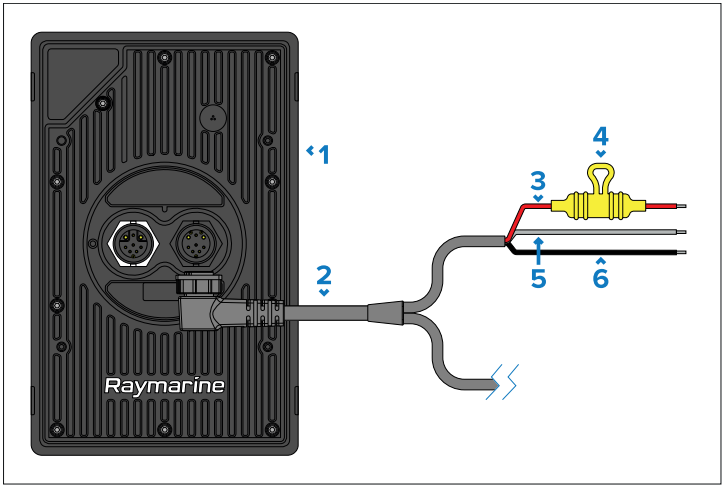
1. **Directly powered** — via:
   - A direct connection to a vessel's power supply using a separately available 8-pin right-angled power to RayNet and bare end power wires cable.
   - Only one performance display should be directly powered in both single and expanded systems (up to 4 performance displays maximum in a series and up to 10 performance displays per system). For more information, refer to: **p.41 — Direct power connection**
2. **Daisy-chain powered** — via:
   - A connection to another performance display's daisy-chain connector using a separately available 8-pin right-angled daisy-chain accessory cable.
   - Each additional performance display should be powered via the use of a daisy-chain cable in an expanded system (up to 4 performance displays maximum in a series and up to 10 performance displays per system). For more information, refer to: **p.38 — Multiple instrument connections**

Note:
For information on the available cables and accessories, refer to the following section: **p.64 — Spares and accessories**

10.2 Direct power connection

The performance display can be powered directly from a 12 V or 24 V power source by using a separately available RayNet and bare end power wires accessory cable.

The separately available power and RayNet cables include bare stripped wires, which are suitable for direct connection to a 12 V or 24 V power supply:



1. Alpha Series performance display.
2. 8-pin right-angled power to RayNet and bare end power wires cable, available separately.
3. Red wire (positive) — connects to the power supply's positive terminal.
4. Waterproof fuse holder containing inline fuse (included with cable).
5. Gray wire (drain) — connects to the vessel RF ground (if available), or the negative battery terminal.
6. Black wire (negative) — connects to the power supply's negative terminal.

Note:
For information on available cables and accessories, refer to the following section: **p.64 — Spares and accessories**

10.3 Inline fuse and thermal breaker ratings

The performance display's power cable is fitted with a waterproof fuse holder and an 8 A inline fuse, which is appropriate for up to 3 additional daisy-chained displays. In the instance where the supplied inline fuse needs to be replaced, or when installing a thermal breaker, please observe the following inline fuse and thermal breaker ratings:

Important:
The suitable fuse rating for an inline fuse and thermal breaker is dependent on the number of devices you are connecting. When connecting multiple Alpha displays in a series (up to 4 maximum), ensure that **the fuse rating is appropriate for the total power consumption of all daisy-chained Alpha displays in your system**.

The ratings listed below are applicable when replacing the power cable's supplied 8 A inline fuse. If in doubt, consult an authorized Raymarine® dealer.

Number of displays in a series	Inline fuse rating	Thermal breaker rating
1	2 A	2 A
2	4 A	4 A
3	6 A	6 A
4	8 A	8 A

10.4 Power distribution

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

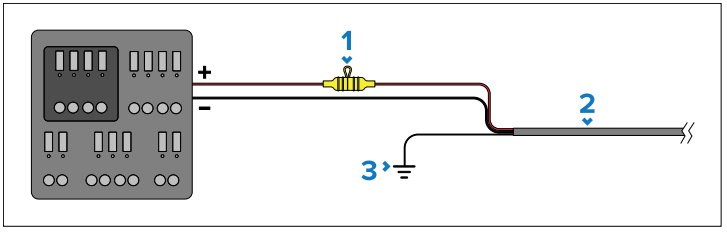
- The product is supplied with a power cable, either as a separate item or a captive cable permanently attached to the product. Only use the power cable supplied with the product. Do NOT use a power cable designed for, or supplied with, a different product.
- Refer to the *Power connection* section for 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.

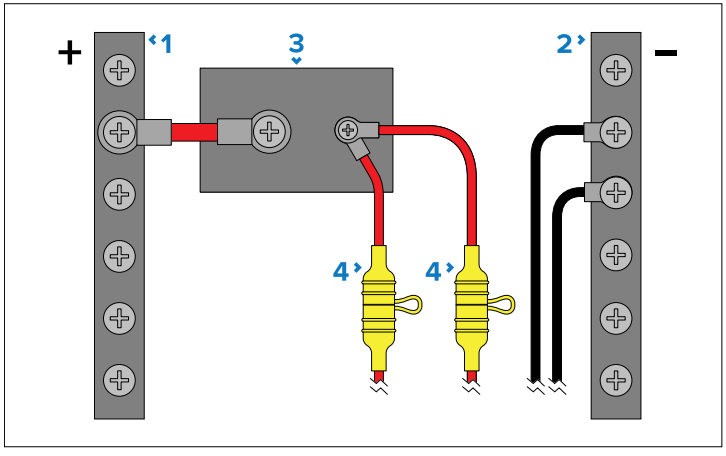
Implementation — connection to distribution panel (Recommended)



	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 mm^2) cable.

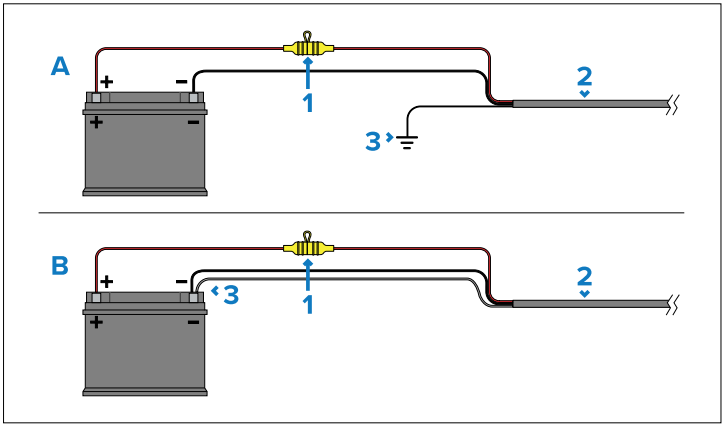
- Ideally, all equipment should be wired to individual suitably-rated thermal breakers or fuses, with appropriate circuit protection. Where this is not possible and more than 1 item of equipment shares a breaker, use individual inline fuses for each power circuit to provide the necessary protection.
- The power cable supplied with your product includes a drain wire, which must be connected to the vessel's common RF ground.



	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.

	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
- ISO 13297: Small craft — Electrical systems — Alternating and direct current installations
- ISO 10133: Small craft — Electrical systems — Extra-low-voltage d.c. installations
- ABYC E-11 AC & DC Electrical Systems on Boats
- ABYC A-31 Battery chargers and Inverters
- ABYC TE-4 Lightning Protection

10.5 Power cable extension (12 / 24 V systems)

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

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

Cable length in meters (feet)	Wire gauge in AWG (mm^2) for 12 V supply	Wire gauge in AWG (mm^2) for 24 V supply
<8 (<25)	16 (1.31 mm^2)	18 (0.82 mm^2)
16 (50)	14 (2.08 mm^2)	16 (1.31 mm^2)
24 (75)	12 (3.31 mm^2)	14 (2.08 mm^2)
>32 (>100)	10 (5.26 mm^2)	12 (3.31 mm^2)

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

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

10.6 Power cable drain wire connection

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

The purpose of the drain wire is to drain excess voltage from the cable shield, giving it a path to safety. The drain wire protects the cable's inner signal conductors from electrical noise emitted by other cables and devices.

Although the drain wire is not intended to ground the product's internal circuits, it's important that the drain wire is connected to the vessel's common RF ground point, which should be used for all equipment in your system. If several items require grounding,

the drain wires and dedicated ground connections (if available) of all equipment should first be connected to a single local point (e.g. within a distribution panel), and then this point connected via an appropriately-rated conductor to the vessel's RF common ground point. An RF ground point is typically a circuit with a very low-impedance signal at Radio Frequency, connected to the sea via an electrode immersed in the sea, or bonded to the inner side of the hull in an area that is underwater.

On vessels without an RF ground system, the drain wires and dedicated ground connections (if available) of all equipment should be connected directly to the vessel's negative battery terminal.

The dc power system should be either:

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

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

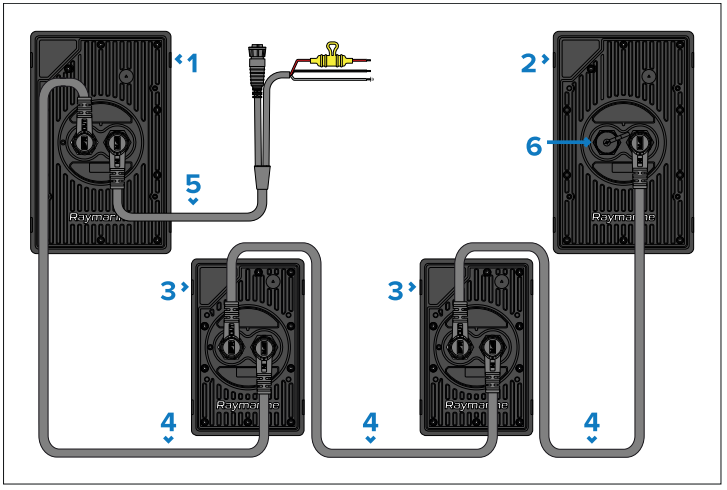
- for runs of <1 m (3.3 ft), use 6 mm2 (10 AWG) or greater.
- for runs of >1 m (3.3 ft), use 8 mm2 (8 AWG) or greater.

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

10.7 Multiple performance display connections

Multiple performance displays can be connected together (daisy-chained) for the purpose of an expanded system, via a separately available 8-pin right-angled daisy-chain accessory cable. A maximum of 4 performance displays can be daisy-chained in a series and a maximum of 10 performance displays can be connected per system.

Example: daisy-chain network connection scenario



Important:
When daisy-chaining instruments together, ensure that a suitably-rated fuse is installed before applying power. **The fuse rating must be appropriate for the total power consumption of all daisy-chained instruments in your system**. For more information, refer to: **p.42 — Inline fuse and thermal breaker ratings**

1. Alpha 9 performance display — receiving power directly from a 12 V or 24 V power source via a separately available power and RayNet cable.
2. Alpha 9 performance display — receiving power from the previous instrument in series via a separately available daisy-chain cable.
3. Alpha 7 performance display — receiving power from the previous instrument in series via a separately available daisy-chain cable.
4. 8-pin right-angled daisy chain cable, available separately.
5. 8-pin right-angled power to RayNet and bare end power wires cable, available separately.
6. Protective cap — must be fitted when connector is not in use.

Note:
For information on the available cables and accessories, refer to the following section: **p.64 — Spares and accessories**

CHAPTER 11: SYSTEM CHECKS

CHAPTER CONTENTS

11.1 Initial power on test

Before attempting an initial power on test, ensure that you have correctly networked and powered the performance display in accordance with the instructions provided throughout the following sections:

- **p.37 — Network connections**
- **p.40 — Power connections**

Once the power cable has been connected and adequate power is being supplied, the performance display will begin to boot.

The performance display will remain on until power is no longer being supplied to the unit.

- If you are experiencing issues, ensure that you have read and followed the information listed above before referring to the troubleshooting advice found within the follow section: **p.51 — Troubleshooting**
- For comprehensive operation instruction information, refer to the documentation listed within the following section: **p.50 — Operation instructions**

CHAPTER 12: OPERATION

CHAPTER CONTENTS

12.1 Operation instructions

For instructions on how to operate your product, refer to the separate *Operation Instructions* document.

Please check the website to ensure you have the latest documentation:

Document	Number	Link
Alpha *Operation Instructions*	81415	www.bit.ly/alpha-display-docs

CHAPTER 13: TROUBLESHOOTING

CHAPTER CONTENTS

13.1 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 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 and servicing* section of this manual for useful links and contact details.

13.2 Power up troubleshooting

Troubleshooting assistance with typical causes of power-related issues, and their solutions.

Product does not power up, or keeps switching 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 *Power Connections* 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 product's *Power* 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 product switched on, try carefully flexing the power cable near to the product's *Power* 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 vessel's power supply may be wired incorrectly. Ensure that the product's *Installation Instructions* have been followed completely.

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 power up, or keeps switching off*'.
Software corruption:	1. In the unlikely event that the product's software has become corrupted, try downloading and installing the latest software from: www.bit.ly/rym-software 2. If your product includes a display: as a last resort, attempt to perform a 'Power on Reset'. Be aware that this will delete all settings / presets and user data, and revert the unit back to factory default settings.

Performing a factory reset

If you wish to restore your data pages to the default configuration, or, if you are experiencing problems with the Alpha Series performance display which cannot be resolved using the troubleshooting advice provided, you may need to perform a *[Factory reset]*.

Note:

• Restoring your performance display to factory default settings will cause all custom data pages to be deleted.

• This setting will be temporarily disabled in the instance where the *[Autopilot control]* preset page has been created and your autopilot is engaged.

1. To *[Factory reset]* your device via the *[Settings]* menu:
   i. Navigate to: *[Data page view > Overlay menu > Settings > Factory reset]*.
   ii. Select *[Reset]*.
2. To *[Factory reset]* your device via the physical recovery button:
   i. Press the factory reset button on the rear of your unit (to the left of the daisy-chain connector) when applying power.

The performance display will now reset to factory default settings, all user data will be removed and the display will reboot to the startup wizard.

13.3 System data troubleshooting

Troubleshooting assistance with typical causes of system data issues, and their solutions.

System data is unavailable at all displays

Possible causes	Possible solutions
Data is not being received at the display:	1. Check the relevant product, network cabling and connections for signs of damage or corrosion, and replace if necessary.
Data source is not operating:	1. Check the source of the missing data for signs of damage or corrosion, and replace if necessary. 2. If possible, check that the data source is correctly powered and operational. 3. Refer to the *Installation Instructions* provided with the equipment to ensure it has been correctly installed.
Software mismatch between equipment may prevent communication:	1. Ensure that all products have the latest software installed.

System data is missing from some, but not all, displays

Possible causes	Possible solutions
Connection problem:	1. Check the product's attached cable(s) and connections for signs of damage or corrosion, and replace if necessary.
Software corruption:	1. In the unlikely event that the product's software has become corrupted, try downloading and installing the latest software from www.bit.ly/rym-software 2. Refer to the product's *Operation Instructions* for details on updating software for connected devices.
Software mismatch between equipment may prevent communication:	1. Ensure that all products have the latest software installed.

Incorrect data reported

Possible causes	Possible solutions
Data source calibration error:	1. Switch off power supply to system, and then switch back on again. 2. Re-calibrate or re-configure the data source, following the instructions provided with the relevant device(s).

13.4 System data: backup and restore troubleshooting

Troubleshooting assistance with typical causes of issues related to the backup and restoration of system data, and their solutions.

Cannot save backup file

Possible causes	Possible solutions
Not enough space on the memory card being used for the backup:	• Ensure that sufficient storage space exists on the memory card before attempting to *[Save a backup]* via the *[Settings]* menu.

Cannot restore backup file

Possible causes	Possible solutions
Selected file is for a different product variant:	• Ensure that the Alpha unit that you are attempting to restore from a backup is the same specific product variant (e.g. Alpha 7) from which the backup file was created.
Selected file is from a device set to a different display orientation mode:	• Ensure that the Alpha unit that you are attempting to restore is set to the same *[Landscape]* / *[Portrait]* mode as the Alpha unit from which the backup file was created.

13.5 Miscellaneous troubleshooting

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

Product behaves erratically (frequent unexpected resets / system crashes, or other erratic behavior):

Possible causes	Possible solutions
Intermittent problem with power to the product.	• 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 that sufficient current is being provided to the product.
Software mismatch on system (upgrade required):	Go to https://bit.ly/rym-software for the latest software downloads.
Corrupt data / other unknown issue:	Perform a factory reset — refer to the relevant *Installation Instructions* document. **Important:** This will result in the loss of any settings and user data stored on the product. Save any important data to a memory card before resetting.

CHAPTER 14: MAINTENANCE

CHAPTER CONTENTS

14.1 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.

14.2 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.

> **Caution: Product cleaning**
>
> 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.

14.3 Cleaning the display case

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

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

14.4 Cleaning the display screen

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

1. Switch off the power to the performance 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.

14.5 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 15: TECHNICAL SUPPORT

CHAPTER CONTENTS

15.1 Raymarine technical 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.

Servicing and warranty

Raymarine offers dedicated service departments for warranty, service, and repairs.
Visit the Raymarine website to **read the latest warranty policy**, and **register** your product's warranty online:

- www.bit.ly/rym-warranty

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

- Web: www.bit.ly/rym-service
- Tel: +44 (0)1329 246 932

United States (US):

- Web: www.bit.ly/rym-service
- Tel: +1 (603) 324 7900

Web support

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

- **Manuals and Documents** — www.bit.ly/rym-docs
- **Technical support forum** — www.bit.ly/rym-support
- **Software updates** — www.bit.ly/rym-software

Telephone and online support

Region	Contact details
All regions	**Online support:** www.bit.ly/rym-support
United Kingdom (UK) and EMEA	**Telephone:** +44 (0)1329 246 777 **Address:** Marine House, Cartwright Drive, Fareham, PO15 5RJ, UK.
United States (US)	**Telephone:** Tel: +1 (603) 324 7900 (Toll-free: +800 539 5539) **Address:** 110 Lowell Road, Hudson, NH 03051, USA.
Australia and New Zealand (Raymarine subsidiary)	**Telephone:** +61 2 8977 0300 **Address:** Suite 1.01, 26 Rodborough Road, Frenchs Forest, NSW, 2086, Australia.
France (Raymarine subsidiary)	**Telephone:** +33 (0)1 46 49 72 30 **Address:** 35 avenue Michel Crépeau, 17000 La Rochelle - France.
Germany (Raymarine subsidiary)	**Telephone:** +49 40 237 808 0 **Address:** Atlantic-Haus, Zirkusweg 1, 20359 Hamburg.
Italy (Raymarine subsidiary)	**Telephone:** +39 02 9945 1001 **Address:** Via L. Manara 2, 20812 Limbiate (MB), Italy.
Spain (Authorized Raymarine distributor)	**Telephone:** +34 96 2965 102 **Email:** sat@azimut.es
Netherlands / Benelux (Authorized Raymarine distributor)	**Telephone:** +31 (0)26 3614 905 **Address:** Florijnweg 21G, 6883 JN VELP, Nederland.

Region	Contact details
Sweden (Raymarine subsidiary)	**Telephone:** +46 (0)317 633 670 **Address:** Bolshedens Industriväg 18, 427 50 Billdal, Sweden.
Finland (Raymarine subsidiary)	**Telephone:** +358 (0)207 619 937 **Address:** Suomalaistentie 1-3, 02270 Espoo, Finland.
Norway (Raymarine subsidiary)	**Telephone:** +47 692 64 600 **Address:** Årvollskogen 30, 1529 Moss, Norway.
Denmark (Raymarine subsidiary)	**Telephone:** +45 437 164 64 **Address:** Centervej 7, 4600 Køge, Denmark.
Russia (Distributor)	**Telephone:** Tel: +7 495 788 0508 **Email:** info@mikstmarine.ru

15.2 Diagnostic product information

Diagnostic product information can be viewed and exported from a Raymarine LightHouse MFD / chartplotter, for supported products networked using RayNet (Ethernet), RJ45, RJ45 (SeaTalk HS) or SeaTalk NG / NMEA 2000 cables.

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

1. Sending detailed product information to the Raymarine product support team, in the event of a problem or fault with your product. The information can be exported to a MicroSD card, and you can then copy the file for the purposes of emailing it to the product support team. For contact details, refer to: **p.58 — Technical support**
2. Maintaining detailed off-boat records. This is particularly useful for vessels that have multiple Raymarine products installed.

To view or export diagnostic product information, access the *[Diagnostics]* menu. For instructions on how to access this menu, refer to the relevant *Operation Instructions* for your MFD / chartplotter.

15.3 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:

- www.bit.ly/rym-training

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:

- www.bit.ly/rym-support

CHAPTER 16: TECHNICAL SPECIFICATION

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16.1 Physical specification

Specification	
Dimensions:	• Refer to: p.21 — Product dimensions
Port separation distance:	• 5.71 mm (0.22 in)
Weight:	• Alpha 7 display — 0.72 kg (1.59 lbs) • Alpha 9 display — 1.18 kg (2.60 lbs)

16.2 Power specification

Specification	
Nominal supply voltage:	12 V / 24 V dc
Operating voltage range:	10.8 V to 32 V dc
Current:	• Alpha 7 display — 0.84 A (nominal) @ 12 V dc / 0.43 A (nominal) @ 24 V dc • Alpha 9 — 1.02 A (nominal) @ 12 V dc / 0.52 A (nominal) @ 24 V dc
Power consumption:	• Alpha 7 display — 10 W (maximum) • Alpha 9 display — 12 W (maximum)
Inline fuse rating:	8 A
Thermal breaker rating:	8 A

Important:
The suitable fuse rating for an inline fuse and thermal breaker is dependent on the number of devices you are connecting. When connecting multiple Alpha displays in a series (up to 4 maximum), ensure that **the fuse rating is appropriate for the total power consumption of all daisy-chained Alpha displays in your system**.

16.3 Network specification

Specification	
Data connections:	1 x Daisy-chain connector. 1 x Power / RayNet Ethernet connector.

16.4 Environmental specification

Specification	
Operating temperature range:	-25°C to +55°C (-13°F to +131°F)
Storage temperature range:	-30°C to +70°C (-22°F to +158°F)
Relative humidity:	93% Max.
Waterproof rating:	IPx6 and IPx7

16.5 Display specification

Specification	
Type:	• Alpha 7 display — 7” IPS TFT LCD • Alpha 9 display — 9” IPS TFT LCD
Brightness / Luminance:	1500 nits / 1500 cd/m^2
Viewing angles:	• Portrait — 85 + / 85 + • Landscape — 85 + / 85 +
Resolution:	• Alpha 7 display — 1024 (H) x 600 (V) • Alpha 9 display — 1280 (H) x 720 (V)

Specification	
Aspect ratio:	• Alpha 7 display — 15.4 : 9 • Alpha 9 display — 16 : 9
PPI (Pixels Per Inch):	• Alpha 7 display — 170 PPI • Alpha 9 display — 163 PPI
Color:	24-bit color (16.7 million colors)
Refresh rate:	60 Hz

16.6 Conformance specification

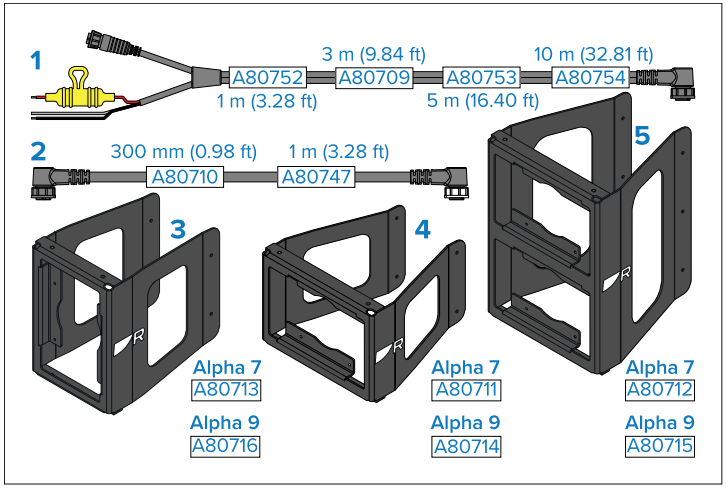
Specification	
Europe, Australia & New Zealand:	EN 60945:2002
Canada:	ICES-003
USA:	CFR47 Part 15
Japan / China:	IACS section E10
Product markings:	• UKCA • CE • Australian Tick • WEEE Directive • Industry Canada

CHAPTER 17: SPARES AND ACCESSORIES

CHAPTER CONTENTS

17.1 Accessories

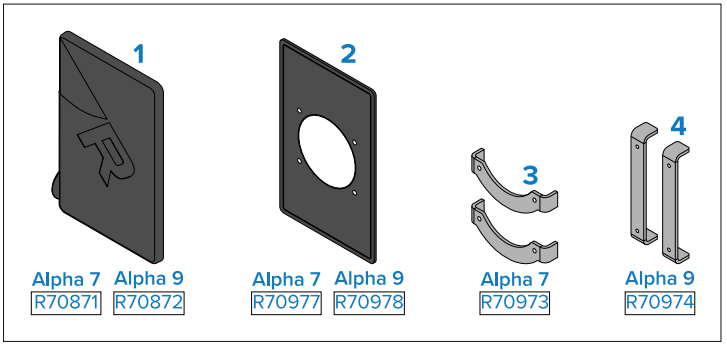
The following accessories are available for your product:



1. 8-pin right-angled power to RayNet and bare-end power wires cable.
2. 8-pin right-angled daisy chain cable.
3. Single portrait mast bracket.
4. Single landscape mast bracket.
5. Dual landscape mast bracket.

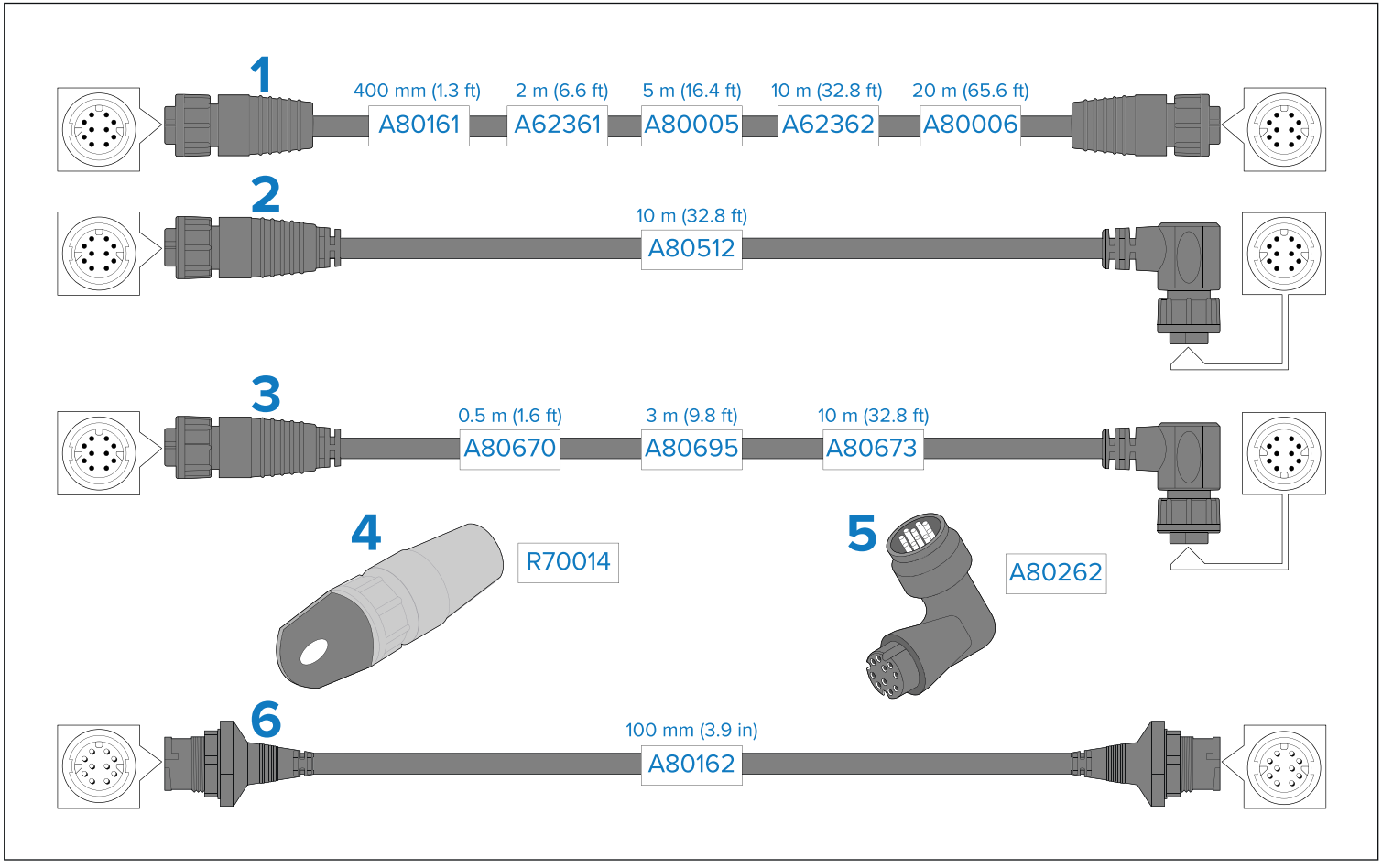
17.2 Spares

The following spares are available for your product:



1. Suncover.
2. Mounting gasket.
3. (Alpha 7 only) mounting bracket kit.
4. (Alpha 9 only) mounting bracket kit.

17.3 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. 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. Available as an alternative to the (A80512) accessory cable, for installations which require an alternate cable routing direction.
4. RayNet cable puller (5 pack).

5. RayNet to RayNet right-angle coupler / adapter. Suitable for connecting RayNet cables at 90° (right angle) to devices, for installations where space is limited.
6. Adapter cable with a RayNet (male) plug on both ends. Suitable for joining (female) RayNet cables together for longer cable runs.

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