



RNS-5

NETWORK SWITCH

INSTALLATION INSTRUCTIONS

English (en-US)

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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.
- Certified installation by an approved installer is recommended. A certified installation qualifies for enhanced product warranty benefits. Contact your dealer for further details, and refer to the separate warranty document packed with your 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.

Product warnings



Warning: Product grounding

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



Warning: Positive ground systems

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



Warning: Power supply voltage

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

Caution: Power supply protection

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

Caution: Service and maintenance

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

Regulatory notices

Disclaimer

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

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

EMC installation guidelines

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

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

Note:

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

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

- Raymarine® equipment and cables connected to it are:
 - At least 1 m (3.3 ft) from any equipment transmitting or cables carrying radio signals e.g. VHF radios, cables and antennas. In the case of SSB radios, the distance should be increased to 2 m (6.6 ft).
 - More than 2 m (6.6 ft) from the path of a radar beam. A radar beam can normally be assumed to spread 20 degrees above and below the radiating element.
- The product is supplied from a separate battery from that used for engine start. This is important to prevent erratic behavior and data loss which can occur if the engine start does not have a separate battery.
- Raymarine® specified cables are used.
- Cables are not cut or extended, unless doing so is detailed in the installation manual.

Note:

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

Suppression ferrites

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

- Where an installation requires multiple ferrites to be added to a cable, additional cable clips should be used to prevent stress on the connectors due to the extra weight of the cable.

Connections to other equipment

Requirement for ferrites on non-Raymarine cables:

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

Declaration of Conformity

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

- RNS-5 Network Switch, part number: A80731

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

Warranty registration

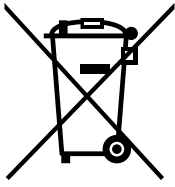
To register your Raymarine product ownership, please visit www.raymarine.com and register online.

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.

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CHAPTER 2: DOCUMENT INFORMATION

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- 2.1 Applicable products — page 11
- 2.2 Product documentation — page 11
- 2.3 Document illustrations — page 11

2.1 Applicable products

This document is applicable to the following products:

RNS-5 Network Switch (**A80731**) — 5-port Gigabit network switch.

2.2 Product documentation

The following documentation is applicable to your product:

- **87442** — RNS-5 Network Switch Installation Instructions (this document).
- **87433** — RNS-5 Network Switch Mounting Template.

2.3 Document illustrations

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

All images are provided for illustration purposes only.

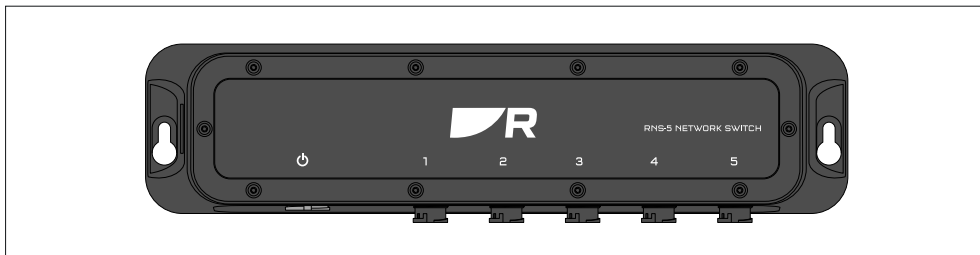
CHAPTER 3: PRODUCT AND SYSTEM OVERVIEW

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- 3.1 Product overview — page 13
- 3.2 Required additional components — page 13
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3.1 Product overview

The Raymarine® RNS-5 network switch enables you to connect and share data between multiple devices featuring a RayNet connector (or RJ45 / SeaTalkhs® connector via adapter cables), at up to speeds of one Gigabit per second.



The network switch has the following key features:

- 5x ethernet ports, using waterproof RayNet connectors.
- Each port can transfer data at the following speeds: 10/100/1000 Mbits/s.
- Multiple switches can be connected together in a “daisy chain” for expanded systems.
- Rugged enclosure — waterproof to IPx6 and IPx7 standard.
- Ignition protection to EN ISO 8846:2017 standard.
- Status and speed LED indicators for each port.
- Compatible with devices featuring any of the following connectors:
 - RayNet.
 - RJ45 (SeaTalkhs®), via adapter cables.
 - RJ45, via adapter cables.
- Examples of devices that can be networked together include:
 - Radar scanner.
 - Sonar module.
 - Thermal camera.
 - Multifunction display.

Note:

Connections to equipment with RJ45 or SeaTalkhs® connectors must be made via adapter cables. For suitable adapter cables, refer to the following section: [p.51 — RayNet to RJ45 adapter cables](#)

3.2 Required additional components

Network switches must be used in conjunction with the following items, available separately from Raymarine®

Network cables

For information on the cables that are suitable for your product, refer to the following section: [p.29 — Network connections](#)

Cable extensions

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

- [p.29 — Network connections](#)
- [p.33 — Power connections](#)
- [p.48 — Spares and accessories](#)

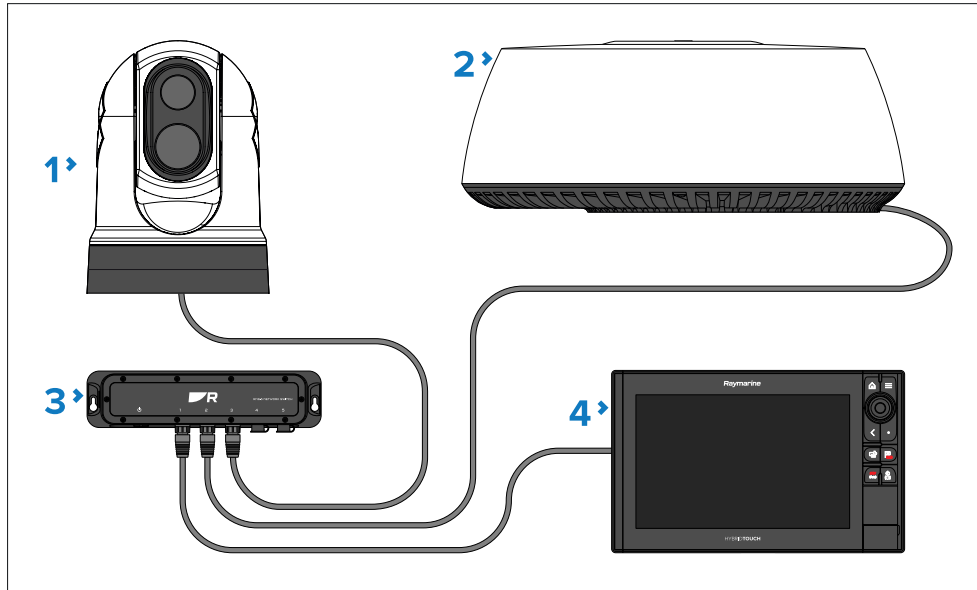
3.3 Typical system

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

Note:

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

Example: typical system



1. Thermal camera.
2. Radar scanner.
3. RNS-5 network switch.
4. Multifunction display.

Note:

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

- [p.24 — Cables and connections — General information](#)
- [p.29 — Network connections](#)
- [p.33 — Power connections](#)

For information on the available cables and accessories, refer to the following section: [p.48 — Spares and accessories](#)

3.4 Compatible network devices

Your network switch is compatible with the following network devices:

- Any Raymarine® products featuring RayNet connectors can be connected to the network switch via the use of a RayNet to RayNet network cable.
- Any Raymarine® products featuring RJ45 (SeaTalkhs®) connectors can be connected to the network switch via the use of a RayNet to RJ45 (SeaTalkhs®) network adapter cable.
- Any Raymarine® / non-Raymarine® product featuring an RJ45 connector can be connected to the network switch via the use of a RayNet to RJ45 network adapter cable.

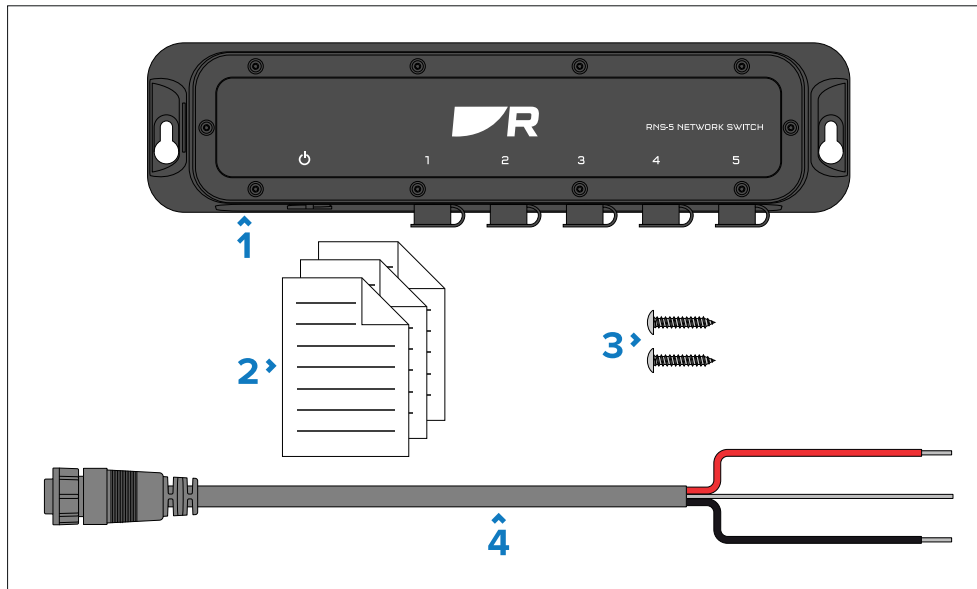
CHAPTER 4: PARTS SUPPLIED

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- 4.1 Parts supplied — page 16
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4.1 Parts supplied

List of parts supplied in the box.

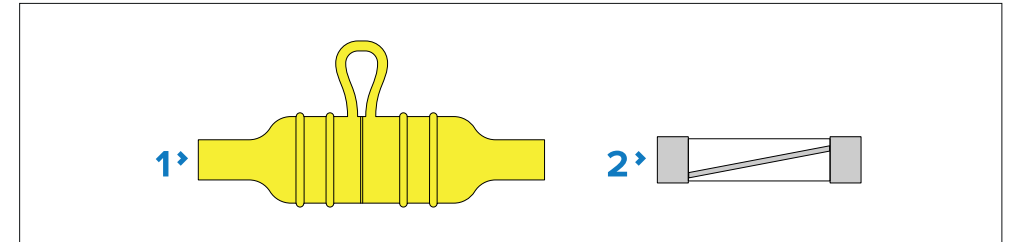


Item	Description
1	RNS-5 Network Switch.
2	Documentation.
3	Fixing screws (M4, 8.94 x 25 mm) x2.
4	Power cable (1.5 m (4.9 ft)).

4.2 Inline fuse requirement

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

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



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

Fuse ratings

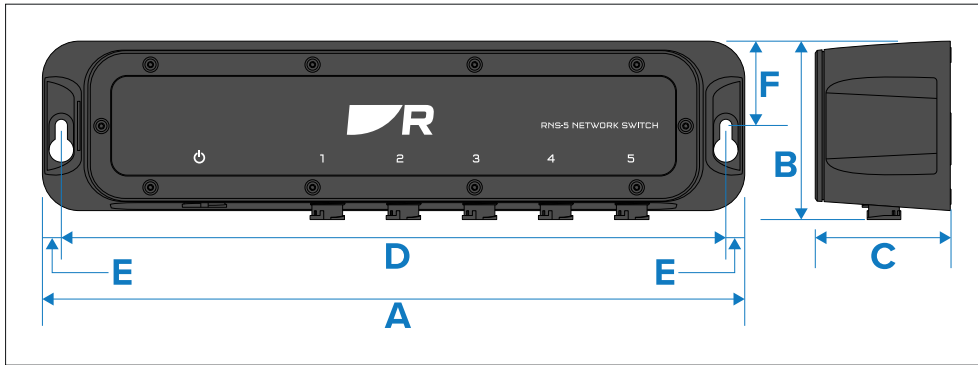
- Voltage rating — must be equal to or greater than the voltage of your vessel's power supply.
- Current rating — refer to the appropriate *Power connection* section of this document for further details.

CHAPTER 5: PRODUCT DIMENSIONS

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- [5.1 Product dimensions — page 18](#)

5.1 Product dimensions



Item	Dimension
A	286.00 mm (11.26 in)
B	72.65 mm (2.86 in)
C	55.50 mm (2.19 in)
D	270.70 mm (10.66 in)
E	7.65 mm (0.30 in)
F	34.33 mm (1.35 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 [p.7 – Important information](#) section of this document.

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.

6.3 Ignition Protection

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

6.4 EMC installation guidelines

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

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

Note:

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

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

- Raymarine® equipment and cables connected to it are:
 - At least 1 m (3.3 ft) from any equipment transmitting or cables carrying radio signals e.g. VHF radios, cables and antennas. In the case of SSB radios, the distance should be increased to 2 m (6.6 ft).
 - More than 2 m (6.6 ft) from the path of a radar beam. A radar beam can normally be assumed to spread 20 degrees above and below the radiating element.
- The product is supplied from a separate battery from that used for engine start. This is important to prevent erratic behavior and data loss which can occur if the engine start does not have a separate battery.
- Raymarine® specified cables are used.
- Cables are not cut or extended, unless doing so is detailed in the installation manual.

Note:

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

6.5 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.

6.6 Compass safe distance

When choosing a suitable location for your product you should aim to maintain the maximum possible distance between the product and any installed compass. This distance should be at least 1 m (3 ft) in all directions. For smaller vessels it may not be possible to achieve this distance. In this situation ensure that the compass is not affected by the product when it is powered on.

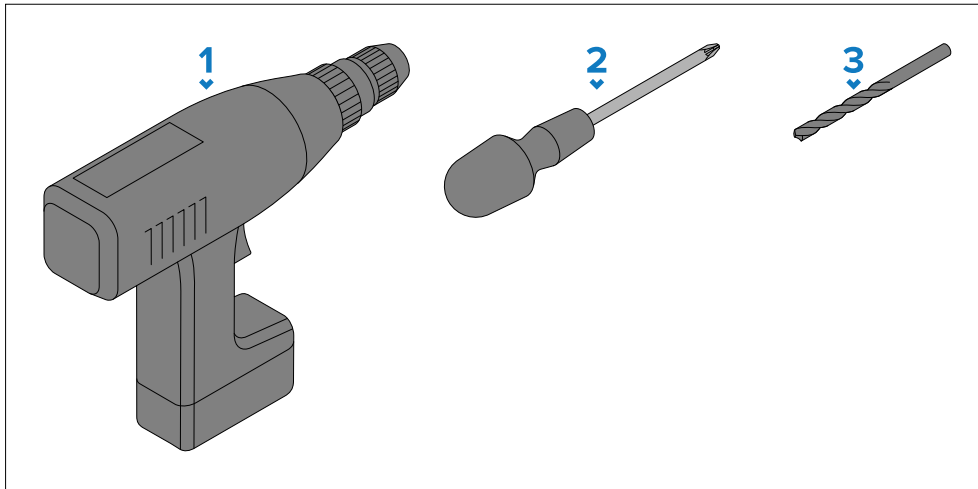
CHAPTER 7: MOUNTING

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7.1 Tools required

Product installation requires the following tools:



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

Note:

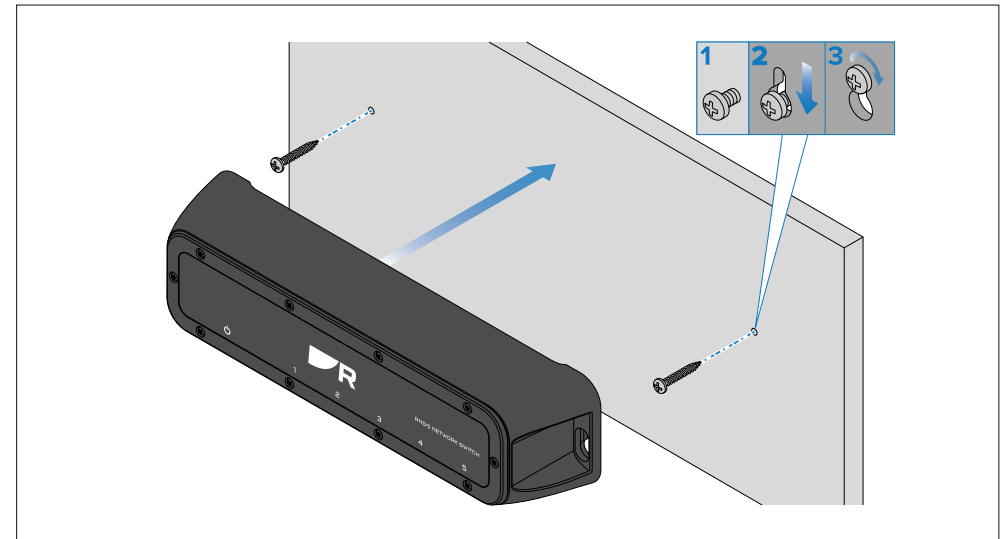
The appropriate drill bit size is dependent on the thickness and material of the mounting surface.

7.2 Mounting the unit

Instructions for mounting the unit.

Before mounting the product, ensure that you have:

- Selected a suitable location, based on the location requirements found in this document.
- Identified the relevant cable connections and the route that the cables will take.



1. Prepare the mounting surface:
 - i. Fix the supplied mounting template to the chosen location, using masking or self-adhesive tape.
 - ii. Drill 2 holes as indicated on the template to accept the fixings.
 - iii. Remove the mounting template.
 - iv. Screw the fixings approximately half way into the holes in the mounting surface.
2. Place the unit over the fixing screws and push the unit downwards to engage the keyhole slots.
3. Fully tighten the screws.

CHAPTER 8: CABLES AND CONNECTIONS — GENERAL INFORMATION

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8.1 General cabling guidance

Cable types and length

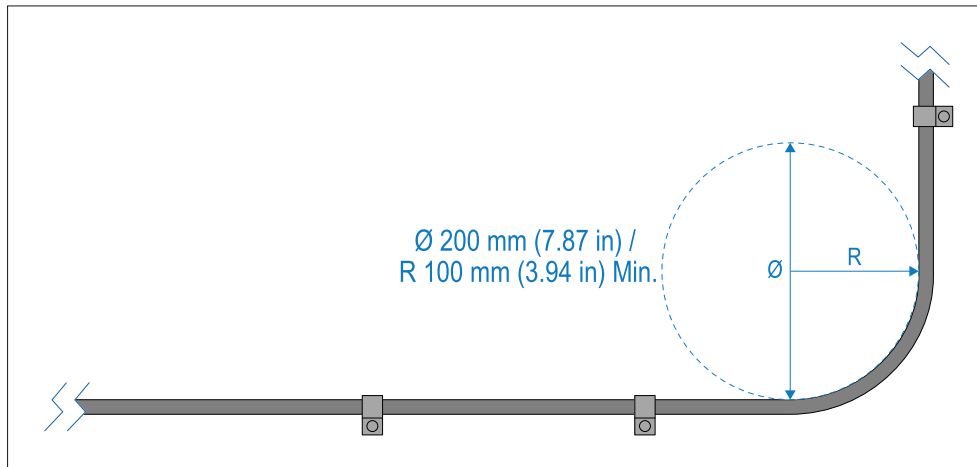
It is important to use cables of the appropriate type and length.

- 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 (\emptyset) of 200 mm (7.87 in) / minimum bend radius (R) of 100 mm (3.94 in).



- Protect all cables from physical damage and exposure to heat. Use trunking or conduit where possible. Do NOT run cables through bilges or doorways, or close to moving or hot objects.
- Secure cables in place using cable clips or cable ties. Coil any excess cable and tie it out of the way.
- Where a cable passes through an exposed bulkhead or deckhead, use a suitable watertight feed-through.

- Do NOT run cables near to engines or fluorescent lights.
- Always route data cables as far away as possible from:
 - Other equipment and cables.
 - High current carrying AC and DC power lines.
 - Antennas.

Strain relief

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

Circuit isolation

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

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

Cable shielding

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

Suppression ferrites

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

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



Warning: Positive ground systems

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

Connecting cables

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

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

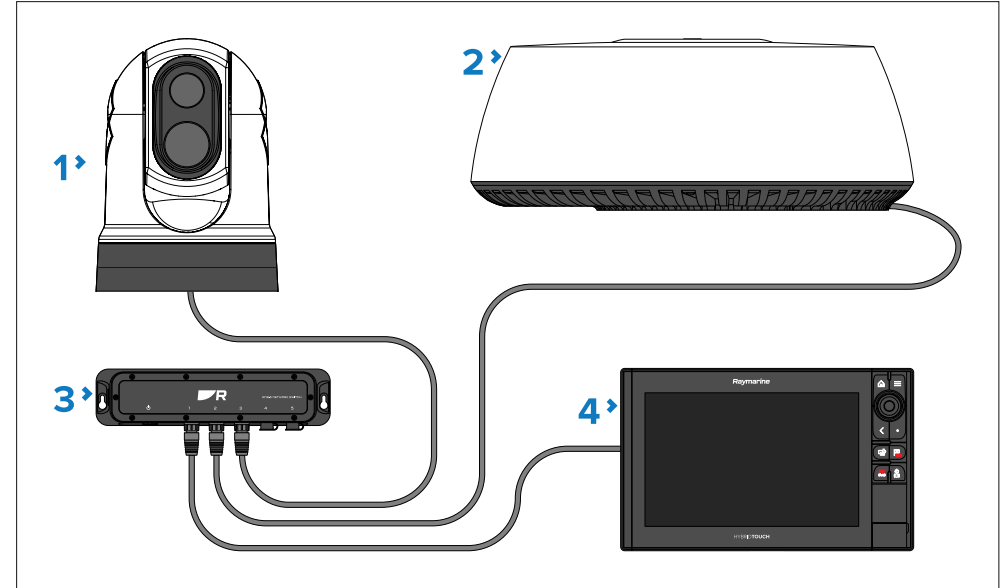
8.2 Typical system

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

Note:

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

Example: typical system



1. Thermal camera.
2. Radar scanner.
3. RNS-5 network switch.
4. Multifunction display.

Note:

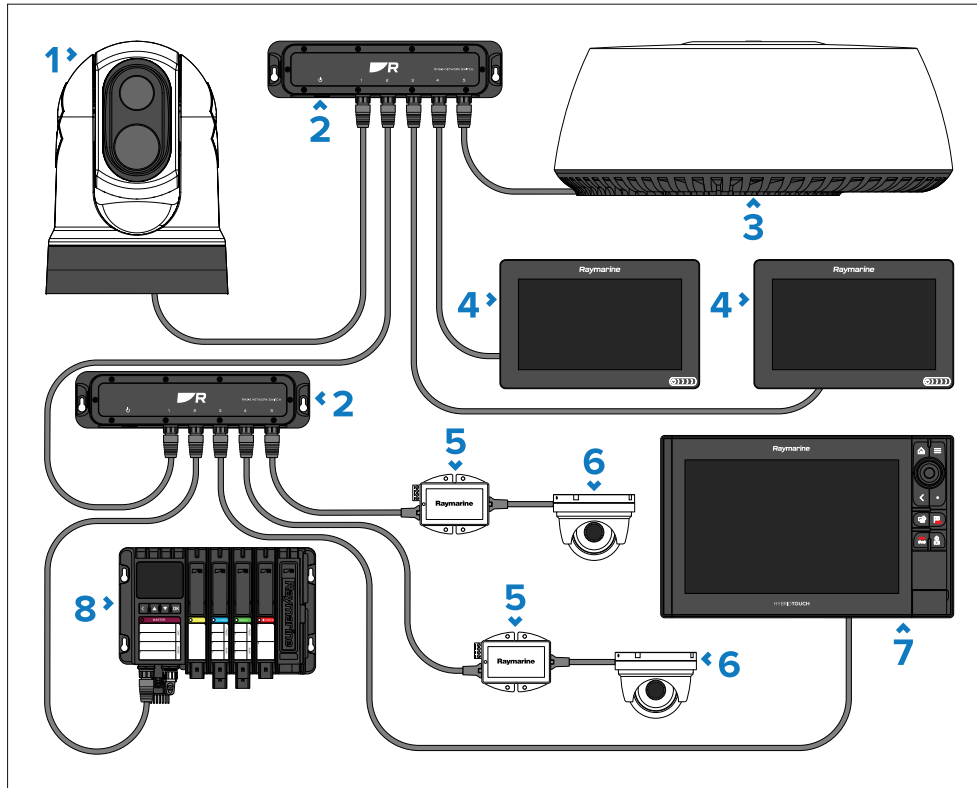
For information on how to connect your products, refer to the following sections:

- [p.24 – Cables and connections – General information](#)
- [p.29 – Network connections](#)
- [p.33 – Power connections](#)

For information on the available cables and accessories, refer to the following section: [p.48 – Spares and accessories](#)

8.3 Expanded system

Example: expanded system



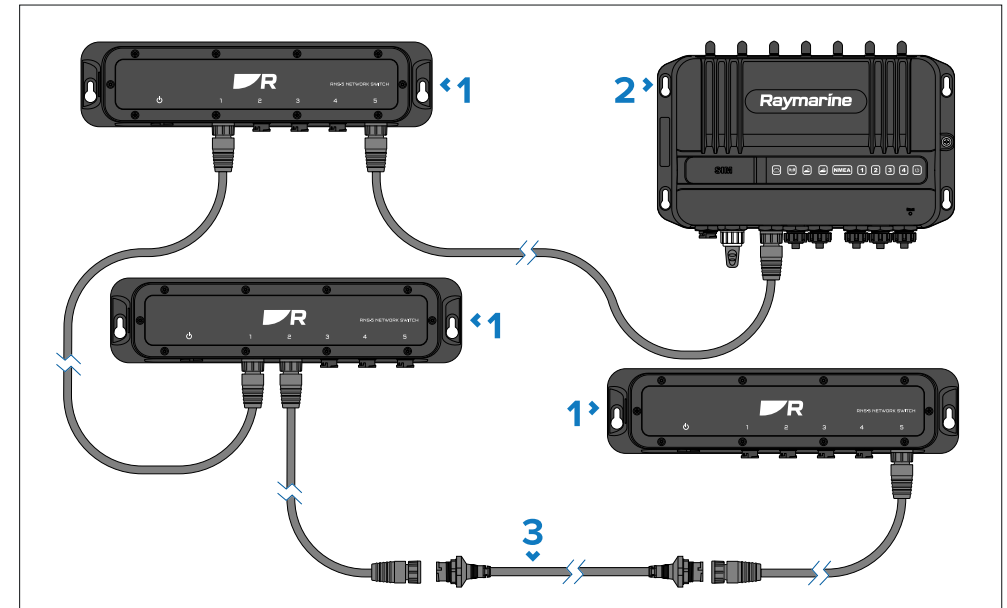
1. Thermal camera.
2. RNS-5 network switch.
3. Radar scanner.
4. Multifunction display.
5. PoE Injector.
6. IP Camera.
7. Multifunction display.
8. YachtSense™ Digital Control System.

8.4 Multiple switches

Systems with more than 5 devices will require more than one network switch. Network switches can be connected together (daisy-chained) for this purpose.

The network switch can be connected (daisy-chained) to another network switch via any of the connection ports.

Example: daisy-chain connection scenario



Note:

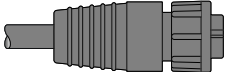
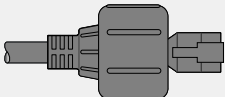

If daisy-chaining 4 or more network switches together within a system, it is recommended that one network switch is used as a central connection point. This will ensure that any adverse effects due to connection issues (such as faulty cabling or slow connection speeds) are minimized within your system.

1. RNS-5 Network Switch.
2. YachtSense™ Link Marine Router.
3. RayNet (male) to RayNet (male) adapter cable (A80162) (100 mm (3.94 in)). Suitable for joining (female) RayNet cables together for longer cable runs.

For further information on additional cabling options, refer to the following section: [p.48 — Spares and accessories](#)

8.5 Network cable connector types

There are 3 types of network cable connectors — RayNet, RJ45 (SeaTalkhs[®]), and RJ45.

Connector	Description
	RayNet
	RJ45 (SeaTalkhs [®]) for connection to (legacy) Raymarine equipment featuring a SeaTalkhs [®] connector.
	RJ45

8.6 SeaTalk^{hs}

SeaTalk^{hs} is a high speed ethernet based marine network which allows compatible equipment (such as devices with a RayNet or RJ45 SeaTalkhs[®] connector) to communicate rapidly and share large amounts of data.

Information shared via the SeaTalk^{hs} network includes:

- Shared cartography (between compatible displays).
- Digital radar data.
- Sonar data.

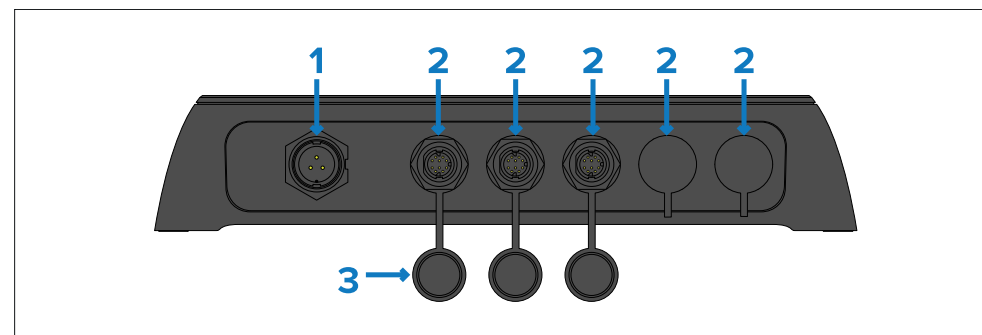
8.7 Connections overview

RNS-5 network switch connections.

Note:

The network switch is supplied with protective caps fitted to the RayNet connection ports.

The protective caps should remain in place until connections are made. If a port is not required then the protective cap should not be removed.



1. 3-pin power connection port.
2. RayNet network connection port (10/100/1000 Mbits/s).
3. Protective cap.

Note:

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

- [p.29 — Network connections](#)
- [p.33 — Power connections](#)

CHAPTER 9: NETWORK CONNECTIONS

CHAPTER CONTENTS

- 9.1 Equipment connections — page 30
- 9.2 RayNet cable connections — page 30
- 9.3 RJ45 (SeaTalkhs[®]) cable connections — page 31
- 9.4 RJ45 cable connections — page 31
- 9.5 Network cable extensions — page 32

9.1 Equipment connections

Equipment is connected to the network switch using either a RayNet cable or a RayNet to RJ45, or RJ45 (SeaTalkhs®) adapter cable.

The following section provides examples of 3 different connection scenarios that may be applicable when connecting your equipment to the RNS-5 Network Switch:

1. Connection to equipment featuring RayNet connectors:
[p.30 — RayNet cable connections](#)
2. Connection to equipment featuring RJ45 (SeaTalkhs®) connectors:
[p.31 — RJ45 \(SeaTalkhs®\) cable connections](#)
3. Connection to equipment featuring RJ45 connectors:
[p.31 — RJ45 cable connections](#)

9.2 RayNet cable connections

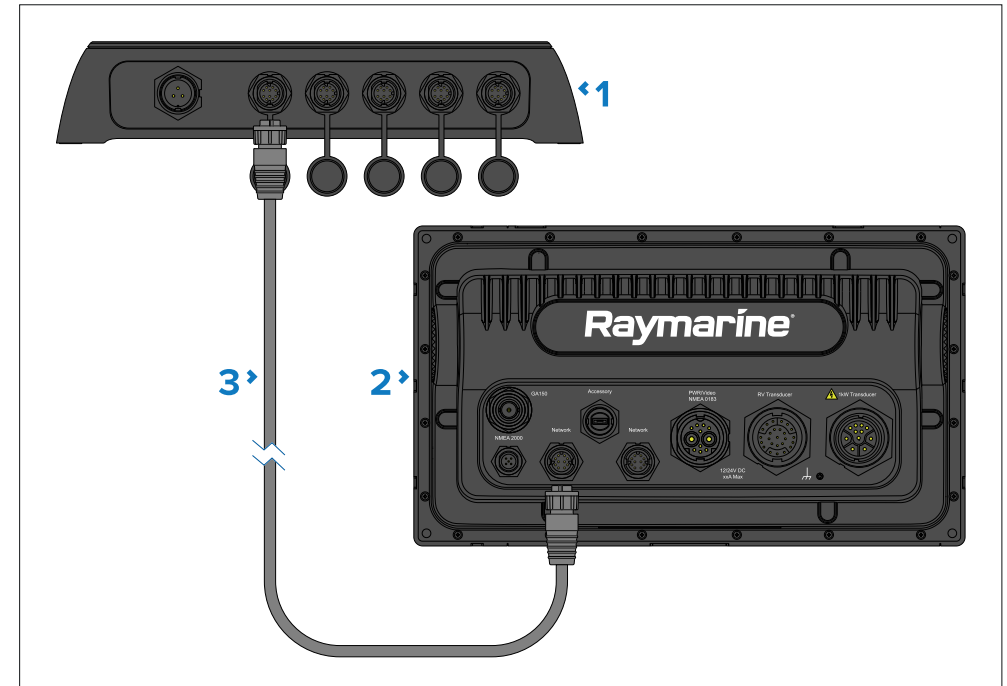
Connecting the RNS-5 network switch to Raymarine® equipment featuring a RayNet connector.

Required cabling / connectors:

- RayNet (female) to RayNet (female) cable (**not supplied**).

For further information on the cabling required, refer to the following section:
[p.50 — RayNet to RayNet cables and connectors](#)

Example: RayNet cable connection scenario



1. RNS-5 network switch.
2. Raymarine® equipment with a RayNet connector.
3. RayNet (female) to RayNet (female) network cable (**not supplied**).

9.3 RJ45 (SeaTalkhs®) cable connections

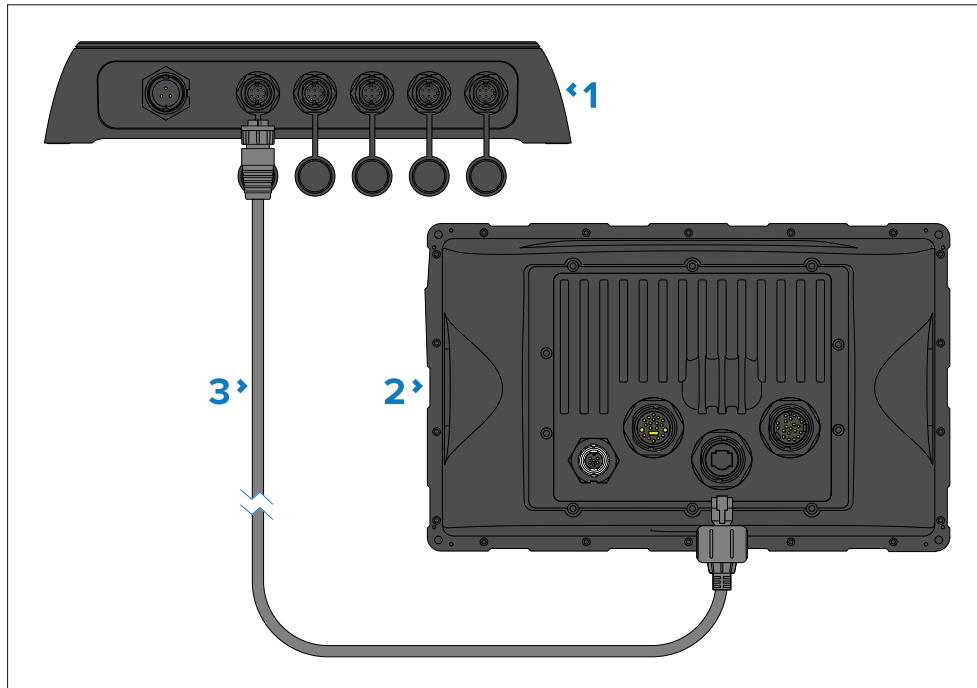
Connecting the RNS-5 network switch to Raymarine® equipment featuring an RJ45 (SeaTalkhs®) connector.

Required cabling / connectors:

- RayNet (female) to RJ45 (SeaTalkhs®) (male) adapter cable (**not supplied**).

For further information on the cabling required, refer to the following section:
[p.51 – RayNet to RJ45 adapter cables](#)

Example: RJ45 (SeaTalkhs®) cable connection scenario



1. RNS-5 network switch.
2. Raymarine® SeaTalkhs® equipment featuring an RJ45 (SeaTalkhs®) connector, such as C-Series Widescreen, E-Series Widescreen, G-Series and E-Series Classic multifunction displays.
3. RayNet (female) to RJ45 (SeaTalkhs®) waterproof plug (male) adapter cable (**not supplied**).

9.4 RJ45 cable connections

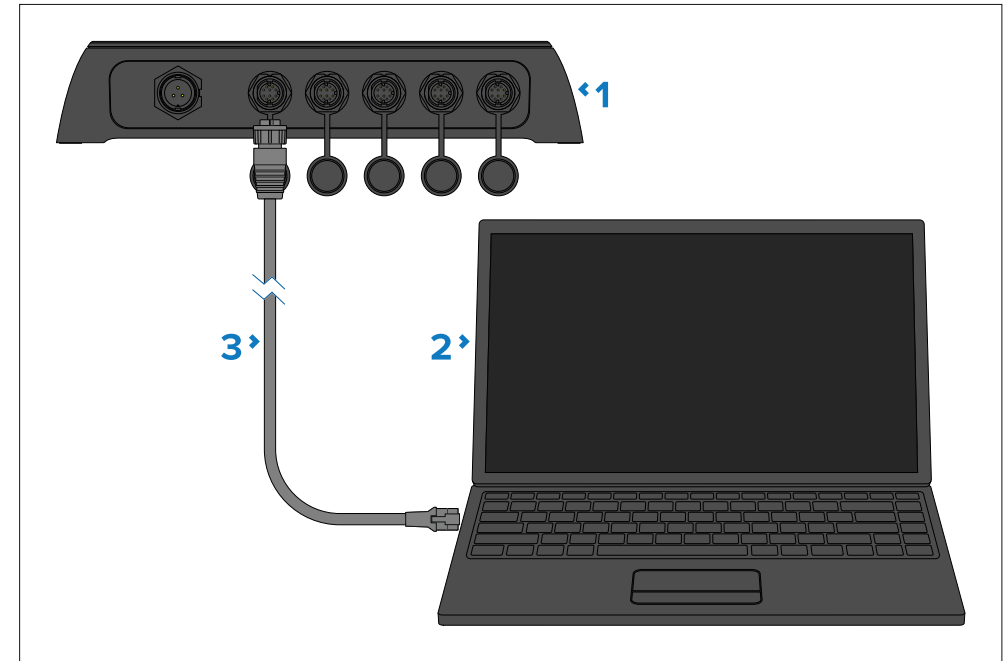
Connecting the RNS-5 network switch to equipment featuring an RJ45 ethernet connector.

Required cabling / connectors:

- RayNet (female) to RJ45 (male) adapter cable (**not supplied**).

For further information on the cabling required, refer to the following section:
[p.51 – RayNet to RJ45 adapter cables](#)

Example: RJ45 cable connection scenario



1. RNS-5 network switch.
2. Equipment featuring an RJ45 ethernet connector, such as a PC or laptop.
3. RayNet (female) to RJ45 plug (male) adapter cable (**not supplied**).

9.5 Network cable extensions

If you wish to extend the length of a network cable connected to your product, you can refer to the following section for further information:

p.48 — Spares and accessories

CHAPTER 10: POWER CONNECTIONS

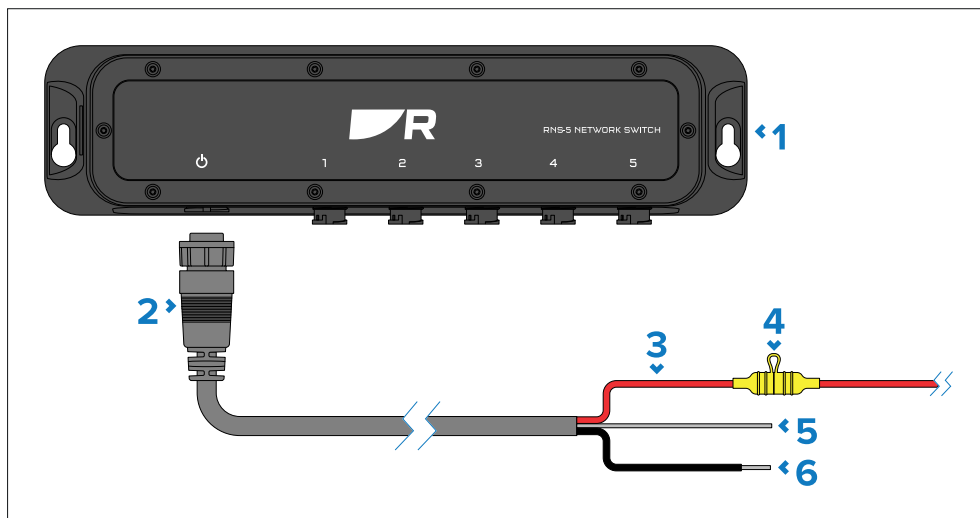
CHAPTER CONTENTS

- 10.1 Power connection — page 34
- 10.2 Power distribution — page 34
- 10.3 Power cable extension (12 / 24 V systems) — page 36
- 10.4 Power cable drain wire connection — page 37

10.1 Power connection

The power for the network switch is provided directly by a 12 V or 24 V power source.

The network switch is supplied with a power cable with bare stripped wires, suitable for direct connection to a 12 V or 24 V power supply:



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

Fuse ratings

Inline fuse rating	Thermal breaker rating
2 A	3 A

Note:

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

10.2 Power distribution

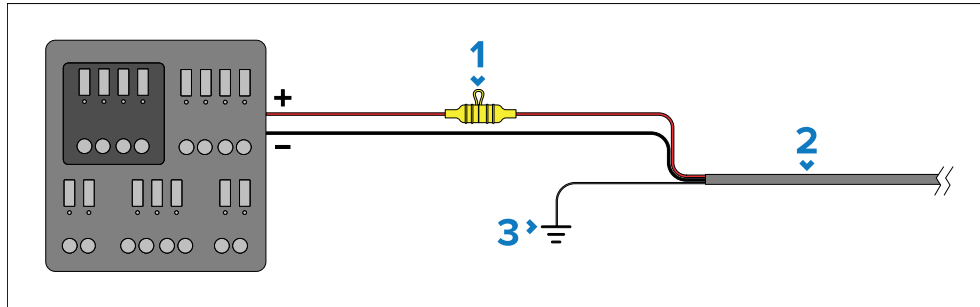
Recommendations and best practice for the power connection of products supplied with a drain wire as part of the supplied power cable.

- 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:

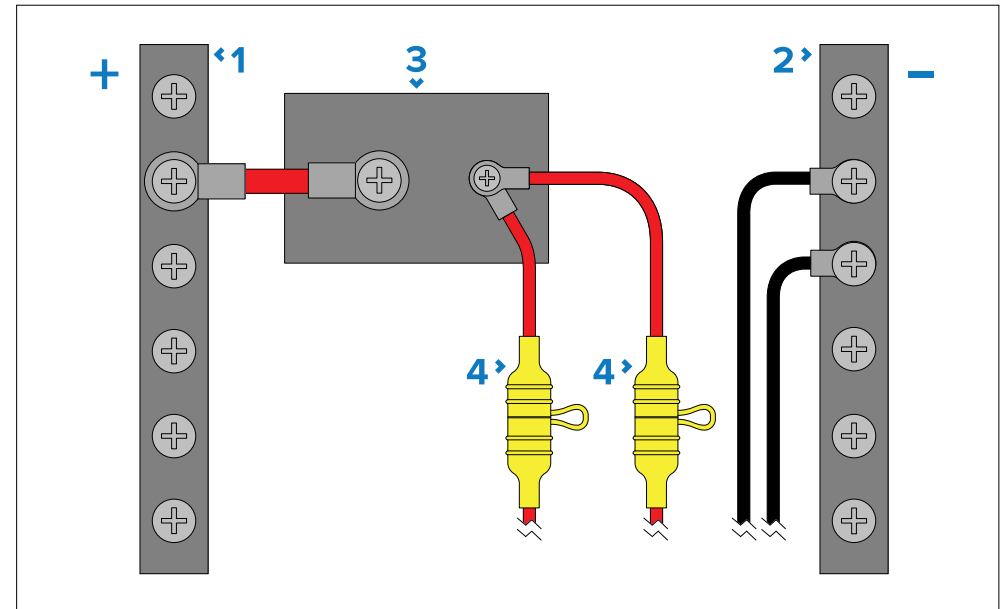
- When planning and wiring, take into consideration other products in your system, some of which (e.g. sonar modules) may place large power demand peaks on the vessel's electrical system, which may impact the voltage available to other products during the peaks.
- The information provided below is for 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: <i>Inline fuse and thermal breaker ratings</i> .
2	Product power cable.
3	Drain wire connection point.

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



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: <i>Inline fuse and thermal breaker ratings</i> .

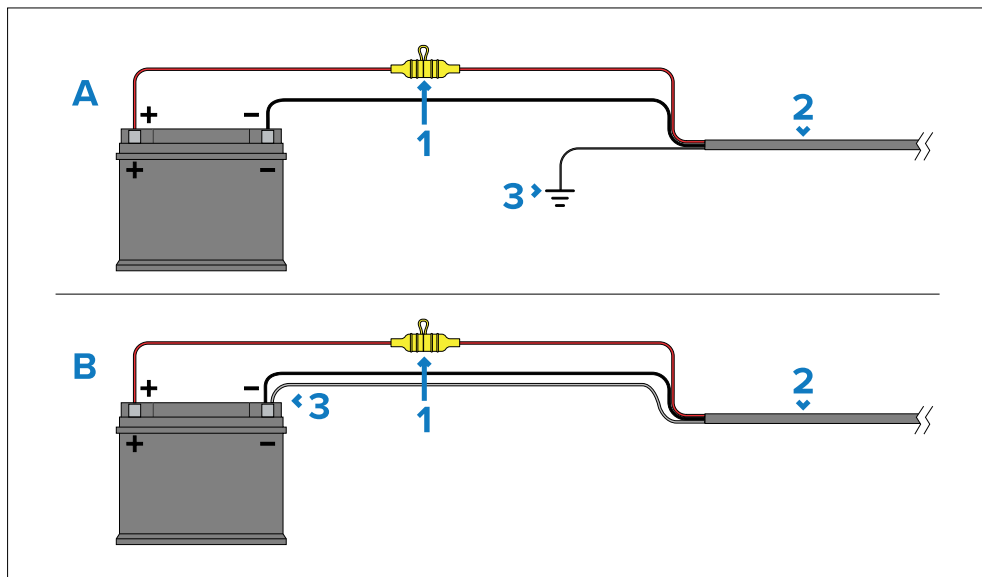
Important:

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

Implementation — direct connection to battery

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

- The power cable supplied with your product includes a drain wire, which must be connected to the vessel's common RF ground (if available), or the battery's negative terminal.
- 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: <i>Inline fuse and thermal breaker ratings</i> .
2	Product power cable.
3	Drain wire connection point.

Battery connection scenario A:

Suitable for a vessel with a common RF ground point. In this scenario, 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

10.3 Power cable extension (12 / 24 V systems)

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

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

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

Important:

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

Important:

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

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

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

10.4 Power cable drain wire connection

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

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

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

The dc power system should be either:

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

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

CHAPTER 11: TROUBLESHOOTING

CHAPTER CONTENTS

- [11.1 Troubleshooting — page 39](#)
- [11.2 Power up troubleshooting — page 39](#)
- [11.3 LED diagnostics — page 39](#)

11.1 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.

11.2 Power up troubleshooting

Before troubleshooting problems with your power connection, ensure that you have followed the power connection guidance provided in the product's installation instructions and performed a power cycle/reboot of the device. The troubleshooting information below can be used if you are experiencing problems with powering up your product.

Blown fuse / tripped breaker

1. Check the fuse, located inline with the power cable. Ensure that it has the correct rating (refer to *Connections* chapter), as an under-rated fuse can affect the power supplied to the product. If the fuse has blown, replace with a new fuse.
2. Check the condition of relevant / additional fuses and breakers and connections; replace if necessary.
3. 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 fully inserted into the unit 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 power cable near to the connector to see if this causes the unit to re-boot/lose power; replace if necessary.

4. Check the vessel's battery voltage, the condition of the battery terminals and power supply cables, ensuring connections are secure, clean and free from corrosion; replace if necessary.

Incorrect power connection

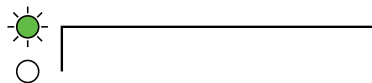
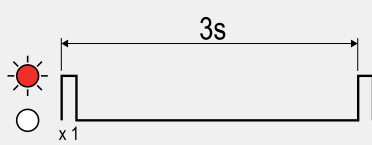

The power supply may be wired incorrectly, ensure the installation instructions have been followed.

Power source insufficient





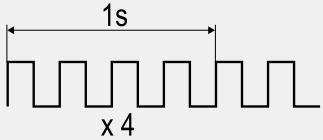




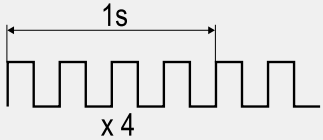


Check that your power supply (battery or distribution panel) is providing a minimum of 10.8 V to each component in the system.

11.3 LED diagnostics

Power port LED

LED Indication	LED Status and required action
	(Green) Powered up / Ok <ul style="list-style-type: none"> • Normal operation — no user action is required.
	(Red) Fault <ul style="list-style-type: none"> • Consider contacting your local dealer or Raymarine® Product Support. For Raymarine® Product Support contact details, refer to the following section: p.44 – Raymarine product support and servicing
	(No color) No power <ul style="list-style-type: none"> • Refer to the advice found within the following section: p.39 – Power up troubleshooting

Port speed / activity LEDs (1 / 2 / 3 / 4 / 5)

LED Indication	LED Status and required action
 	<p><u>(Green) 1,000 Mbits/s Ethernet Active (no transfer)</u></p> <ul style="list-style-type: none"> • Normal operation — no user action is required.
  	<p><u>(Green) 1,000 Mbits/s Ethernet Active (transferring)</u></p> <ul style="list-style-type: none"> • Normal operation — no user action is required.
 	<p><u>(Amber) 10/100 Mbits/s Ethernet Active (no transfer)</u></p> <ul style="list-style-type: none"> • Normal operation — no user action is required.
  	<p><u>(Amber) 10/100 Mbits/s Ethernet Active (transferring)</u></p> <ul style="list-style-type: none"> • Normal operation — no user action is required.
 	<p><u>(No color) No network activity detected</u></p> <ul style="list-style-type: none"> • Check the cable connection for the port. • Check any additional connections. • Check that the unit connected to the switch is powered on. • Check that the unit connected to the switch is currently transferring data. This can be confirmed by performing an action on the multifunction display that will initiate data transfer for the relevant unit — for example, if you suspect a problem with the port corresponding to a connected radar scanner, range in or out in the radar application to initiate data activity.

CHAPTER 12: MAINTENANCE

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- 12.1 Service and maintenance — page 42
- 12.2 Routine equipment checks — page 42
- 12.3 Product cleaning — page 42

12.1 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.

12.2 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.

12.3 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.

CHAPTER 13: TECHNICAL SUPPORT

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- 13.1 Raymarine product support and servicing — page 44
- 13.2 Diagnostic product information — page 45
- 13.3 Learning resources — page 45

13.1 Raymarine product support and servicing

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

Product information

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

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

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

Servicing and warranty

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

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

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

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

United States (US):

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

Web support

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

- **Manuals and Documents** — <http://www.raymarine.com/manuals>
- **Technical support forum** — <http://forum.raymarine.com>
- **Software updates** — <http://www.raymarine.com/software>

Worldwide support

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

- Help desk: <https://raymarine.custhelp.com/app/ask>

- Tel: +44 (0)1329 246 777

United States (US):

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

Australia and New Zealand (Raymarine subsidiary):

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

France (Raymarine subsidiary):

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

Germany (Raymarine subsidiary):

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

Italy (Raymarine subsidiary):

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

Spain (Authorized Raymarine distributor):

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

Netherlands (Raymarine subsidiary):

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

Sweden (Raymarine subsidiary):

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

Finland (Raymarine subsidiary):

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

Norway (Raymarine subsidiary):

- E-Mail: support.no@raymarine.com
- Tel: +47 692 64 600

Denmark (Raymarine subsidiary):

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

Russia (Authorized Raymarine distributor):

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

13.2 Diagnostic product information

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

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

1. Sending detailed product information to the Raymarine® product support team, in the event of a problem or fault with your product. The information can be exported to a MicroSD card, and you can then copy the file for the purposes of emailing it to the product support team. For contact details, refer to: [p.43 – Technical support](#)
2. Maintaining detailed off-boat records. This is particularly useful for vessels that have multiple Raymarine® products installed.

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

13.3 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>

Technical support

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 14: TECHNICAL SPECIFICATION

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- 14.1 Physical specification — page 47
- 14.2 Power specification — page 47
- 14.3 Network specification — page 47
- 14.4 Environmental specification — page 47
- 14.5 Conformance specification — page 47

14.1 Physical specification

Specification	
Length:	286 mm (11.26 in)
Width:	72.6 mm (2.86 in)
Height:	55.5 mm (2.19 in)
Port separation distance:	16.7 mm (0.65 in)
Weight:	0.36 kg (0.79 lbs)

14.2 Power specification

Specification	
Nominal supply voltage:	12 V / 24 V dc
Operating voltage range:	10.8 V to 31.2 V dc
Power consumption:	3 W (Maximum) @ 12 V
Current:	< 600 mA (nominal) @ 12 V
Inline fuse rating:	2 A
Thermal breaker rating:	3 A

14.3 Network specification

Specification	
Network connection ports:	5x waterproof RayNet connection ports (10/100/1000 Mbits/s)
IEEE Standard:	Conforms to IEEE 802.3at

14.4 Environmental specification

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

14.5 Conformance specification

Specification	
Approvals:	<ul style="list-style-type: none">• EN 60945:2002 (Europe, Australia New Zealand)• EN ISO 8846:2017• ICES-003 (Canada)• CFR47 Part 15 (USA)• IACS section E10 (Japan / China)• EMC Directive 2014/30/EU
Product markings:	<ul style="list-style-type: none">• UKCA• CE• Australian Tick• WEEE Directive

CHAPTER 15: SPARES AND ACCESSORIES

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- 15.1 Spares — page 49
- 15.2 Accessories — page 50

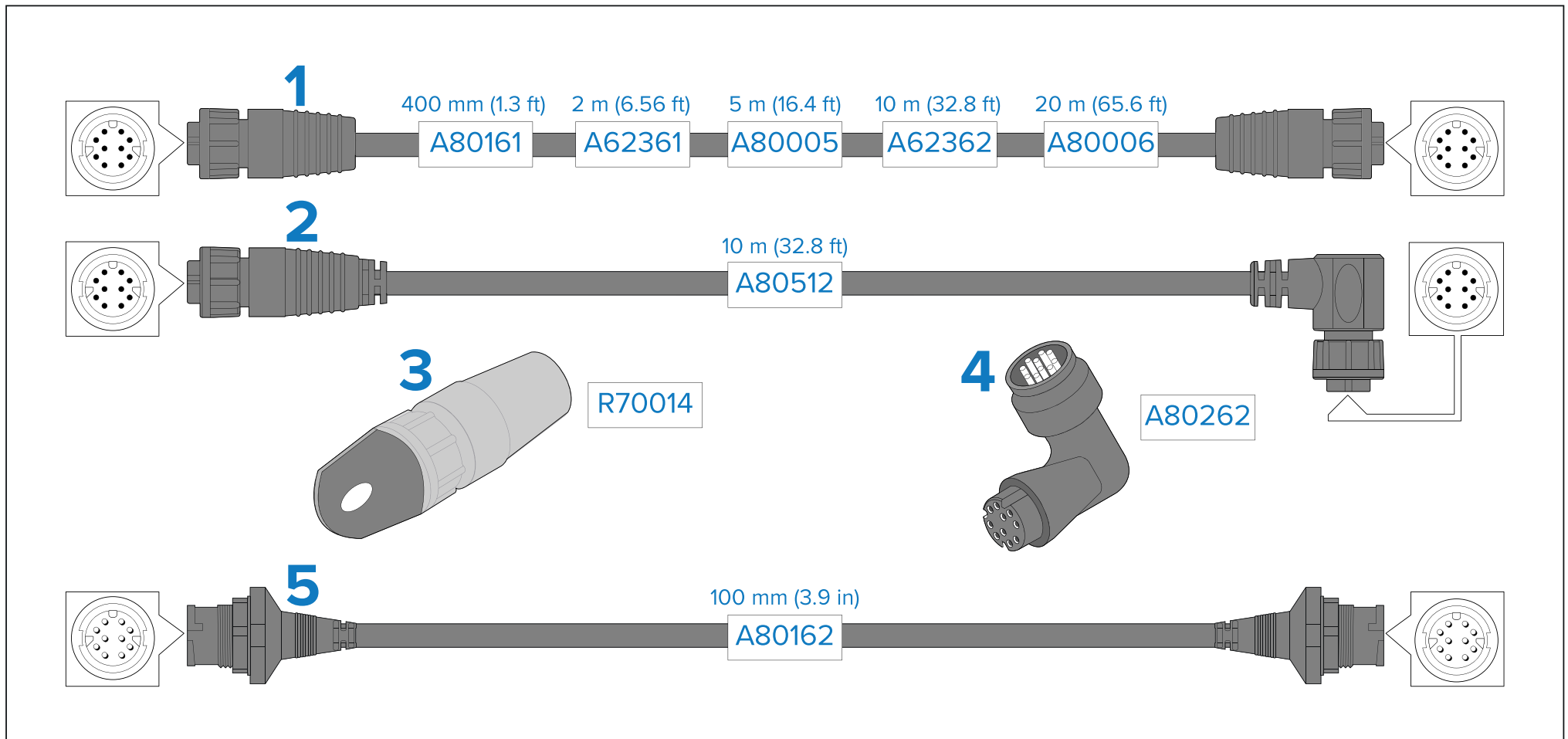
15.1 Spares

The following spares are available for your product:

- 1.5 m (4.9 ft) Power cable — **A80346**

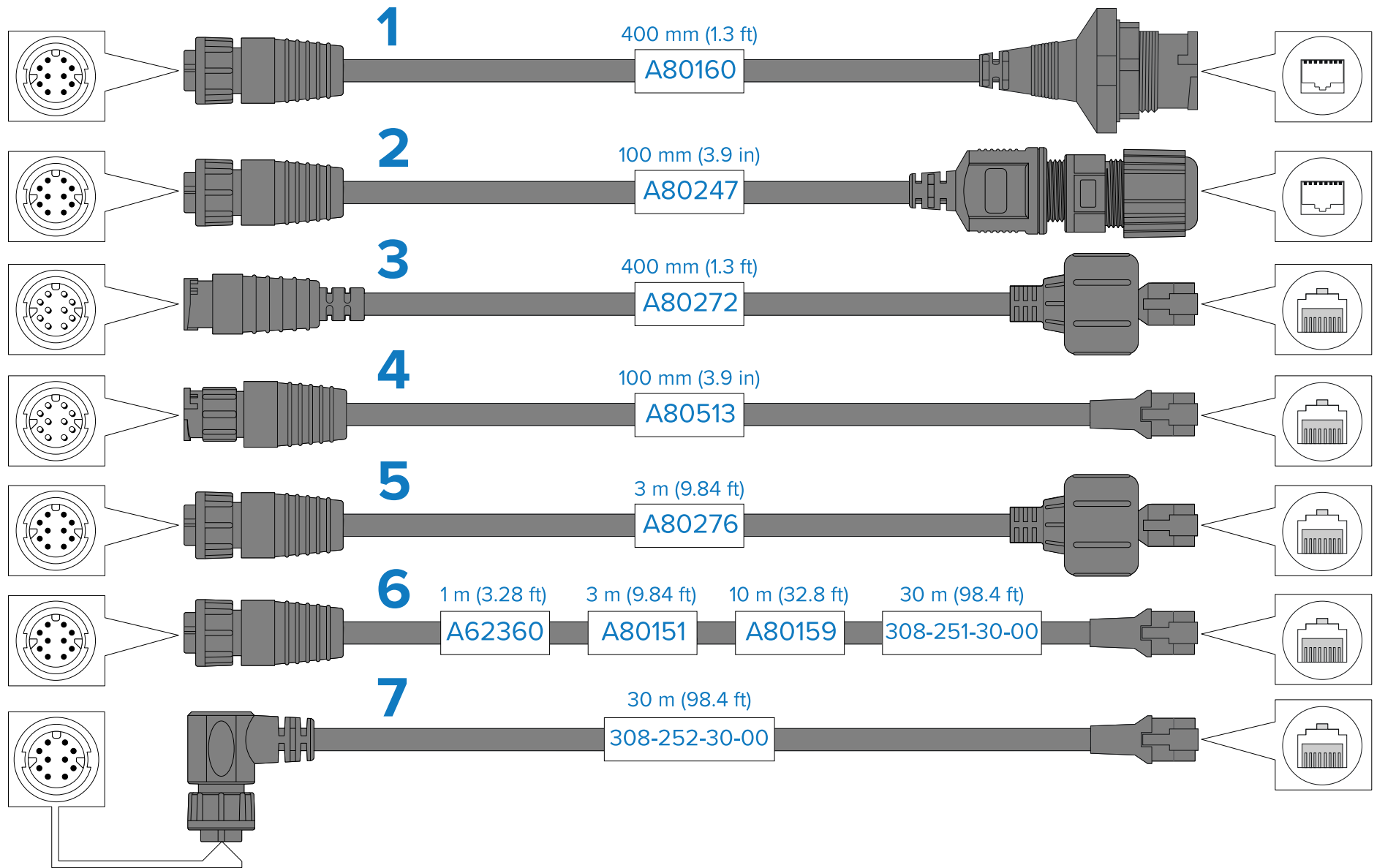
15.2 Accessories

RayNet to RayNet cables and connectors



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

RayNet to RJ45, 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.

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