



QUANTUM Radar

INSTALLATION INSTRUCTIONS



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BY **FLIR**







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Software updates

Important: Check the Raymarine website for the latest software releases for your product.

www.raymarine.com/software

Product handbooks

The latest versions of all English and translated handbooks are available to download in PDF format from the website www.raymarine.com. Please check the website to ensure you have the latest handbooks.

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ENGLISH

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Chapter 1: Important information

Certified Installation

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



Warning: Product installation and operation

- This product must be installed and operated in accordance with the instructions provided. Failure to do so could result in personal injury, damage to your vessel and/or poor product performance.
- Raymarine recommends certified installation by a Raymarine approved installer. A certified installation qualifies for enhanced product warranty benefits. Contact your Raymarine dealer for further details, and refer to the separate warranty document packed with your product.



Warning: Potential ignition source

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

Warning: Positive ground systems

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



Warning: Power supply voltage

Connecting this product to a voltage supply greater than the specified maximum rating may cause permanent damage to the unit. Refer to the *Technical specification* section for voltage rating.



Warning: Switch off power supply

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



Caution: Power supply protection

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

Warning: High voltages

This product may contain high voltages. Do NOT remove any covers or otherwise attempt to access internal components, unless specifically instructed in the documentation provided.





Warning: Radio frequency radiation hazard

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

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

Caution: Service and maintenance

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



Transmitted power density levels

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

IEEE statement

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

ICNIRP Guidelines

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

Water ingress

Water ingress disclaimer

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

Disclaimer

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

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



EMC installation guidelines

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

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

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

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

- Raymarine equipment and cables connected to it are:
 - At least 1 m (3 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 7 ft (2 m).
 - More than 2 m (7 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.

Important information



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

Compass safe distance

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

When choosing a suitable location for the product you should aim to maintain the maximum possible distance from any compasses. Typically this distance should be at least 1 m (3 ft) in all directions. However for some smaller vessels it may not be possible to locate the product this far away from a compass. In this situation, when choosing the installation location for your product, ensure that the compass is not affected by the product when it is in a powered state.

Declaration of conformity

Raymarine UK Ltd. declares that this product is compliant with the essential requirements of R&TTE directive 1999/5/EC.

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

Connections to other equipment

Requirement for ferrites on non-Raymarine cables

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





Product disposal

Dispose of this product in accordance with the WEEE Directive.



The Waste Electrical and Electronic Equipment (WEEE) Directive requires the recycling of waste electrical and electronic equipment.

Warranty registration

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

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

IMO and SOLAS

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



Radar licensing

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

FCC Notice - Radar

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

Technical accuracy

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



Chapter 2: Document and product information

Chapter contents

- 2.1 Document information on page 12
- 2.2 Parts supplied on page 13
- 2.3 Quantum Radome product overview on page 14





2.1 Document information

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

The document includes information to help you:

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

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

Applicable products

This document is applicable to the following products:

	Part number	Name	Description
	E70210	Quantum Radome	Quantum radar scanner with 10 m power cable

Document conventions

The following conventions are used throughout this document when referring to:

Type	Example	Convention
Procedures for performing specific tasks using the product's user interface.	Select Set-Up .	The term "Select" is used to refer to the action of: • Touchscreen control — using your finger to select a menu option or item on the screen. • Physical buttons — Highlighting an item using the navigational buttons and confirming the selection by pressing the OK button.
Procedures for navigating menu hierarchies.	1. The internal sonar module is turned off from the Fishfinder application menu: Menu > Set-up > Sounder Set-up > Internal Sounder. 2. The internal GPS can be switched off from the Set-up menu: Menu > Set-up > GPS Set-up > Internal GPS.	Menu hierarchies are used in this document to provide a quick summary on how to access a particular function or menu option.



Document illustrations

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

All images are provided for illustration purposes only.

Product documentation

The following documentation is applicable to your product:

Description	Part number
Quantum Radome Installation instructions Installation of a Quantum radar scanner and connection to a wider system of marine electronics.	87209 / 88055
Quantum Radome Mounting template Mounting diagram for surface mounting a Quantum radar scanner.	87257
Lighthouse MFD Operation Instructions Details the operation of the Radar application for a Series, c Series, e Series, and eS Series multifunction displays.	81360

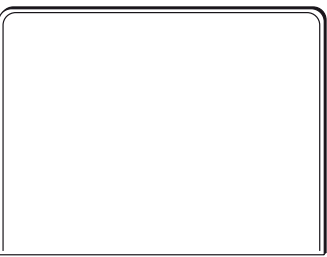
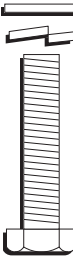
Operation instructions

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

Document and product information

2.2 Parts supplied

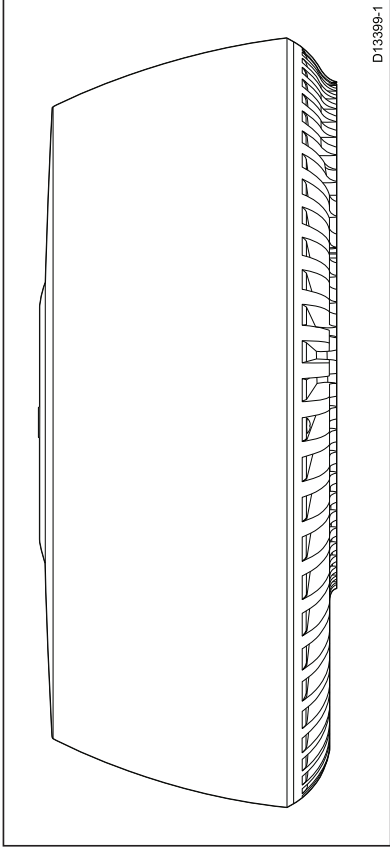
The following items are supplied with your product.

Item	Description	Quantity
	Quantum Radome	1
	10 m (33 ft) Power cable	1
	Documentation pack (including mounting template)	1
	M8 mounting bolts with spring washers and flat washers	4



2.3 Quantum Radome product overview

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



The Quantum Radome has the following features:

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

- 12 V or 24 V operation.
- Waterproof to IPX 6.

Multiple Quantum Radar scanners

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

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



Chapter 3: Planning the installation

Chapter contents

- 3.1 Installation checklist on page 16
- 3.2 Required additional components on page 16
- 3.3 Compatible multifunction displays on page 17
- 3.4 Tools required on page 18
- 3.5 Typical systems on page 18
- 3.6 Scanner Position on page 21
- 3.7 Product dimensions on page 23





3.1 Installation checklist

Installation includes the following activities:

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

Schematic diagram

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

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

Warnings and cautions

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

3.2 Required additional components

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

- Compatible Raymarine multifunction display. Refer to [3.3 Compatible multifunction displays](#) for a list of compatible multifunction displays.
- Optional data cable. Refer to [Chapter 4 Cables and connections](#) for suitable cables and adaptors for existing cable installations. (The Quantum Radome is WiFi-enabled, and can be operated without a fixed data cable.)

Retain your WiFi password

To connect to the radar using WiFi (wireless), you will need to know the unit's SSID, and WiFi pass key (password).

Both the SSID and WiFi pass key are provided on the radar scanner packaging, and are also shown on the serial number label on the underside of the unit. You may wish to make a separate note of this information (kept in a secure location). You should also keep the radar scanner packaging in a safe place for future reference.



3.3 Compatible multifunction displays

This product is compatible with only the following LightHouse powered Raymarine multifunction displays.

- a Series, c Series, e Series, eS Series.
- gS Series.

Multifunction display software requirements

The operation of this product requires that your Raymarine LightHouse-powered MFD is running LightHouse software version 16 or later.

Note: The latest MFD software can be obtained by visiting www.raymarine.com/software.

Software updates

The software running on the product can be updated.

- Raymarine periodically releases software updates to improve product performance and add new features.
- You can update the software for your product using a connected and compatible multifunction display.
- Refer to www.raymarine.com/software/ for the latest software updates and the software update procedure for your product.
- If in doubt as to the correct procedure for updating your product software, refer to your dealer or Raymarine technical support.



Caution: Installing software updates

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

Ensure that the unit has a reliable power supply and that the update process is not interrupted.

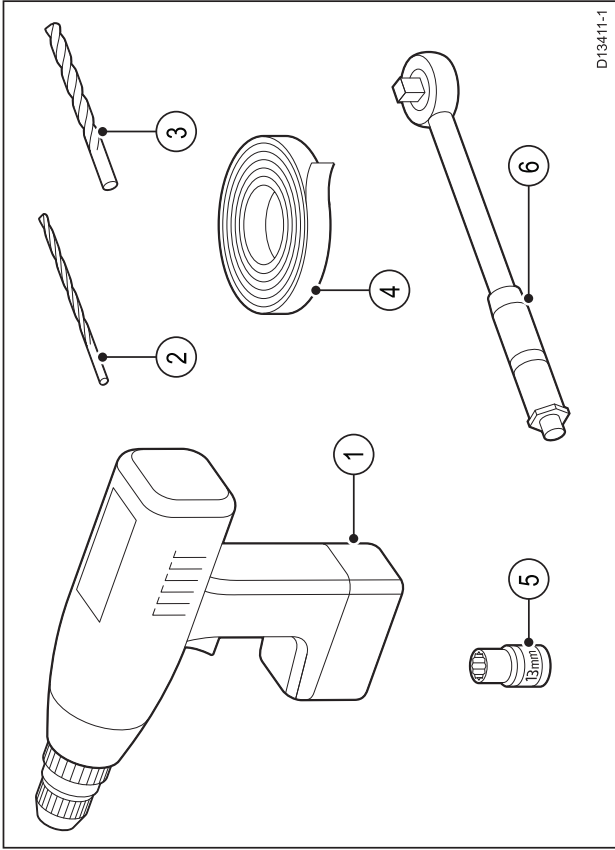
Damage caused by incomplete updates are not covered by Raymarine warranty.

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



3.4 Tools required

Product installation requires the following tools:



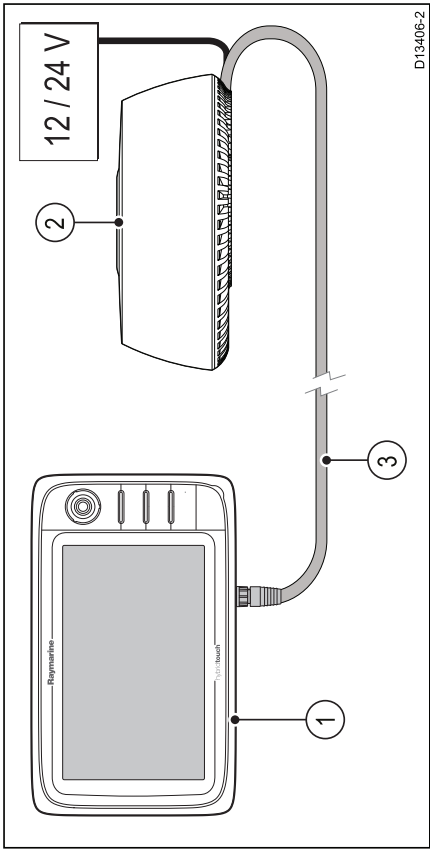
Item number	Description	Quantity
1	Power drill	1
2	3 mm drill bit	1
3	10 mm drill bit	1
4	Adhesive tape	1
5	13 mm socket	1
6	Torque wrench	1

3.5 Typical systems

Note: The following illustrations show the various products that can be connected in a typical system.

- For information on how to connect the products, refer to the [Chapter 4 Cables and connections](#) section.
- For information on available cables and accessories, refer to the [Chapter 10 Spares and accessories](#) section.

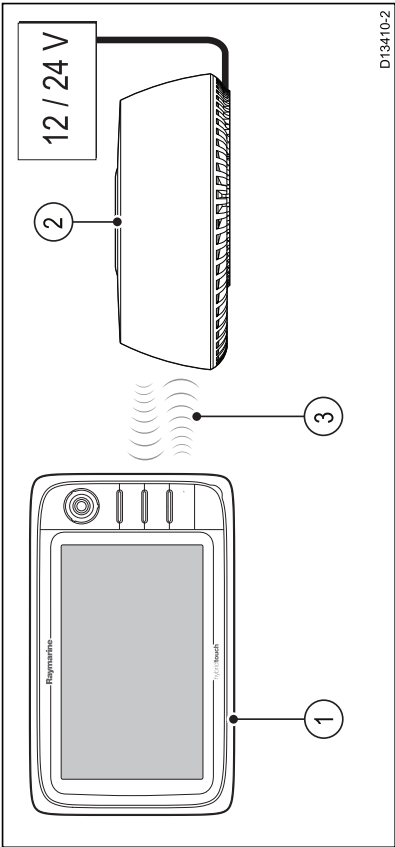
Example: basic radar system (wired data connection)



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



Example: basic radar system (wireless data connection)

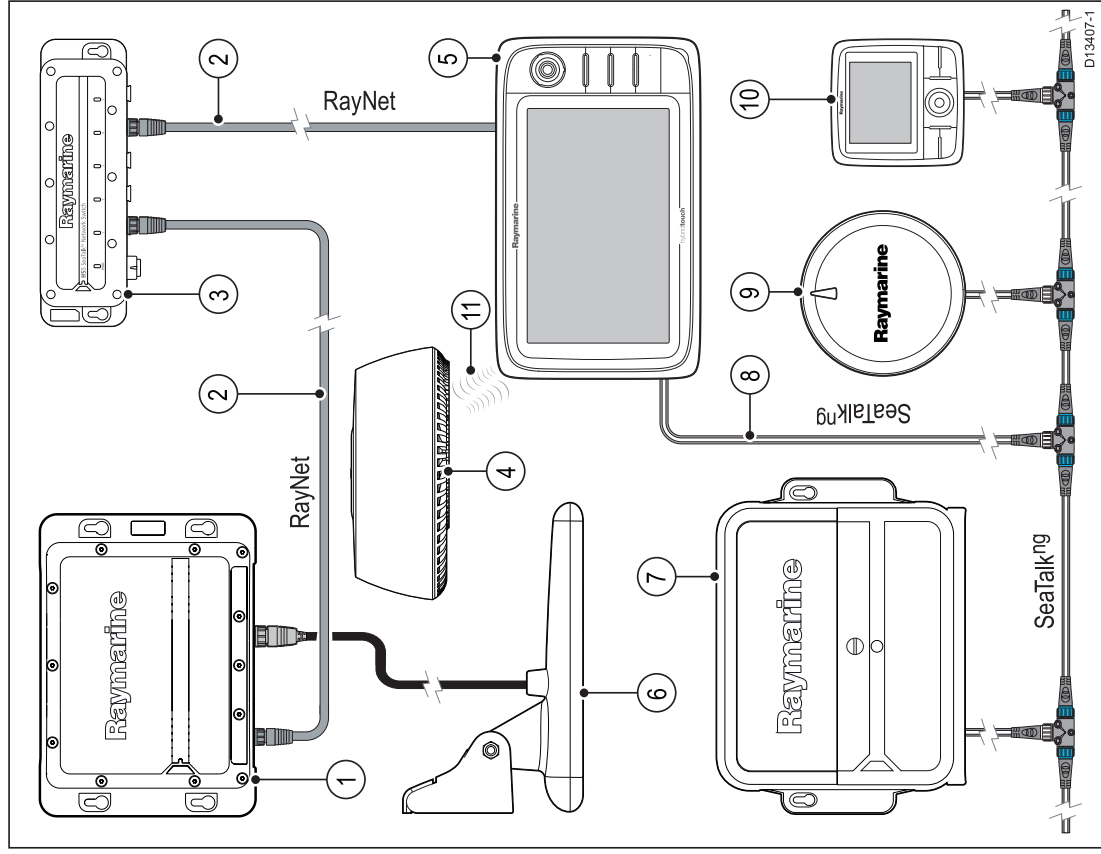


Item	Description
1	Multifunction display
2	Quantum Radome
3	WiFi datalink





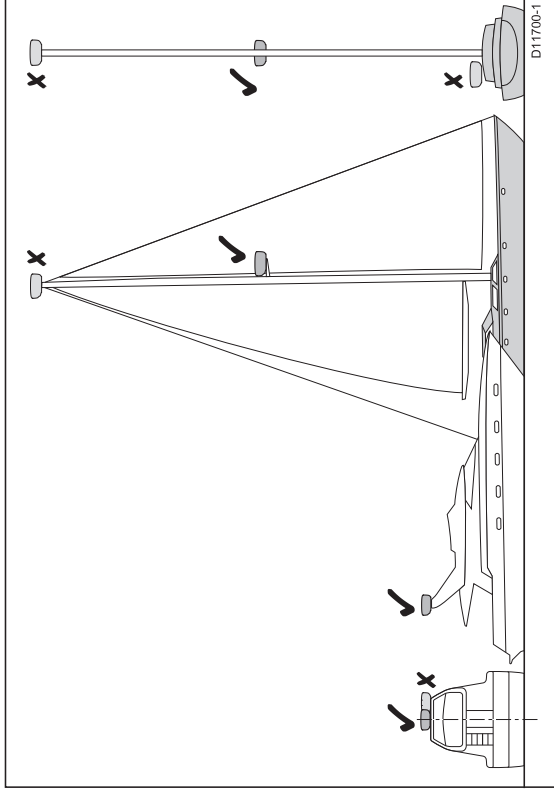
Example: expanded system (power cables not shown)





3.6 Scanner Position

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



The scanner must also be mounted where it is:

- Above head height.
- Easily accessible.
- As near as possible to the boat's centerline.
- On a rigid and stable platform, capable of securely supporting the scanner under seagoing conditions.
- Clear of large objects such as the flybridge, large engine stacks, searchlights, horns, masts etc. (see [Shadow areas and false echoes](#) for additional information)
- Clear of heat and fumes.

Planning the installation



- At least 1 m (3 ft) from a magnetic compass or other scanners.

Shadow areas and false echoes

Mount the radar scanner away from large structures or equipment, such as engine stacks, searchlights, horns, or masts. These objects may cause shadow areas and false echoes. For example, if you mount the radar scanner on a mast, echoes from other targets may be reflected from the mast. Wet sails may also cause shadow areas, so radar performance may be reduced in the rain. It is particularly important to avoid shadow areas near the bow. Raising or even lowering the radar scanner may help to reduce these effects.

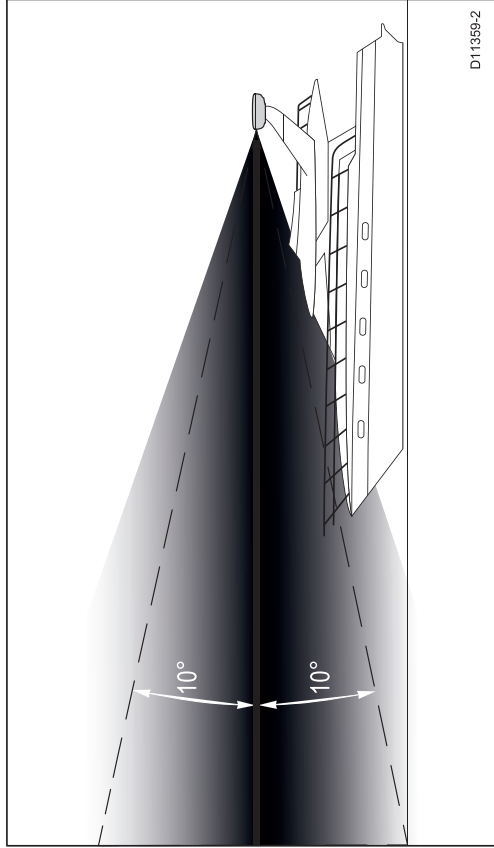
In shadow areas beyond the obstruction there will be a reduction of the beam intensity. There may be a blind sector if the beam intensity is not sufficient to obtain an echo from an object. This may occur even at close range. For this reason the angular width and relative bearing of any shadow area must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

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

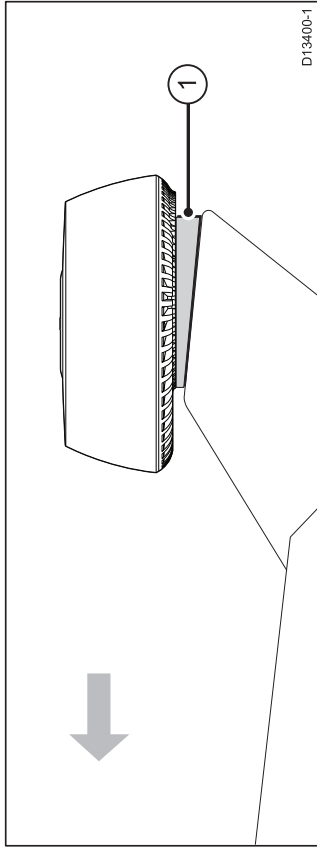
Radar scanner mounting angle

Ensure the radar scanner rotates parallel to the water line.

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



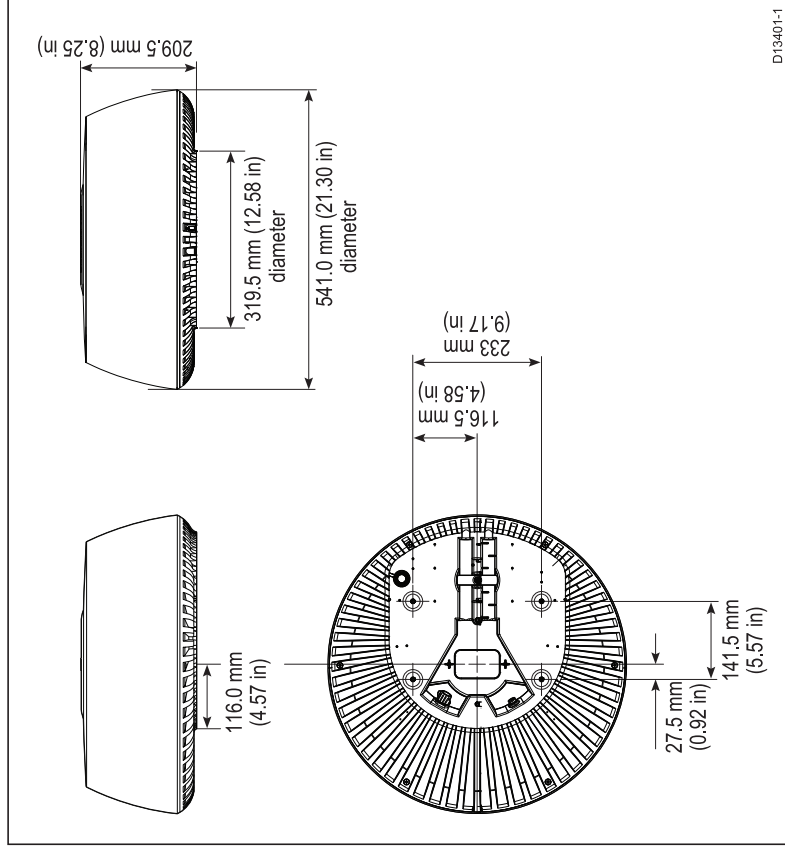
Planing hull vessels, and some displacement hull vessels, adopt a higher bow angle when the vessel is at cruising speed. This may raise the radar's main radiation angle, and can cause poor detection of nearby targets. It may be necessary to compensate for the bow rise to ensure optimum target detection.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



Item	Description
1	Wedge or washers



3.7 Product dimensions







Chapter 4: Cables and connections

Chapter contents

- 4.1 General cabling guidance on page 26
- 4.2 Connections overview on page 27
- 4.3 Power connection on page 29
- 4.4 Network connection on page 32





4.1 General cabling guidance

Cable types and length

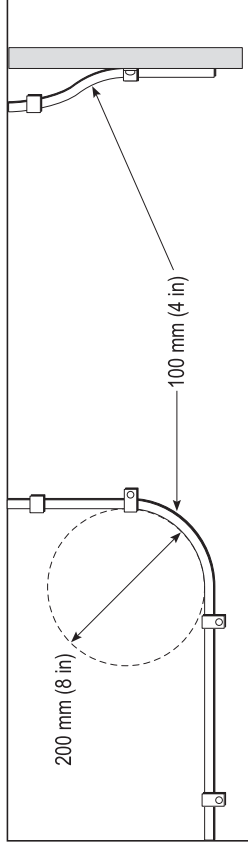
It is important to use cables of the appropriate type and length

- Unless otherwise stated use only standard cables of the correct type, supplied by Raymarine.
- Ensure that any non-Raymarine cables are of the correct quality and gauge. For example, longer power cable runs may require larger wire gauges to minimize voltage drop along the run.

Routing cables

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

- Do NOT bend cables excessively. Wherever possible, ensure a minimum bend diameter of 200 mm (8 in) / minimum bend radius of 100 mm (4 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 tie-wraps or lacing twine. Coil any extra 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,
- antennae.

Strain relief

Ensure adequate strain relief is provided. Protect connectors from strain and ensure they 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 all data cables are properly shielded that the cable shielding is intact (e.g. hasn't been scraped off by being squeezed through a tight area).

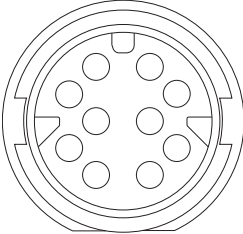
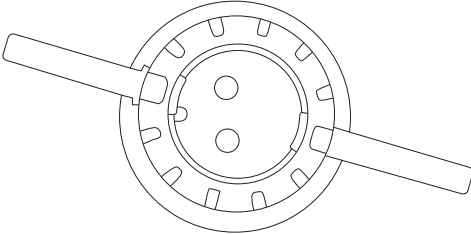
Suppression ferrites

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



4.2 Connections overview

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

Connector	Connects to:	Suitable cables
	RayNet network or device. Not required if connecting using WiFi.	Refer to the Chapter 10 Spares and accessories section.
	12 V / 24 V power supply.	Supplied with your product.





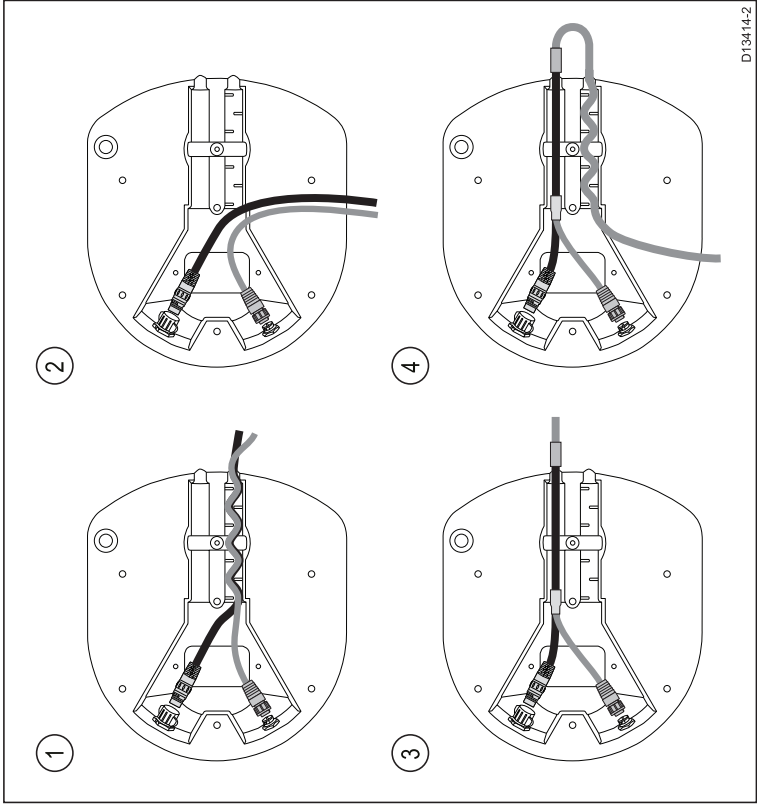
Making connections

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

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

1. Ensure that the vessel's power supply is switched off.
2. Ensure that the multifunction display being connected to the scanner has been installed in accordance with the installation instructions supplied with that device.
3. Ensure the power connector locking collar on the scanner is in the unlocked position.
4. Route the power cable and optional data cable within the scanner base, as shown in the following illustration. Cable routing depends on whether you mount the scanner on a platform or on

a pole, and on whether you are using a Y-adapter to connect to an existing combined power-data radar cable.



Item	Description
1	Platform mount; separate power and data cables. Route both cables (or just the power cable if the data cable is absent) through the narrower zig-zag channel.
2	Pole mount; separate power and data cables. Route both cables (or just the power cable if the data cable is absent) directly away from the base of the scanner and into the pole.

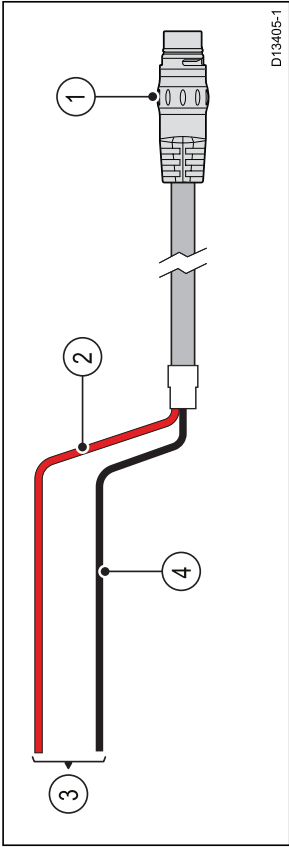


Item	Description
3	Platform mount; Y-adapter connected to existing combined power-data cable. Route the Y-adapter tail through the wider channel. The connector between the combined power-data cable and the Y-adapter tail can also be positioned within the scanner base, inside the wider channel (not illustrated).
4	Pole mount; Y-adapter connected to existing combined power-data cable. Route the combined power-data cable from the pole, through the narrower zig-zag channel, then back into the wider channel. Connect the Y-adapter tail within the wider channel.

5. Ensure that the power cable connector is orientated so that the notch lines up with the guide in the connector.
6. Push the power cable connector all the way into the scanner connector.
7. Rotate the locking collar clockwise until in the locked position (2 clicks).
8. Push the optional data cable fully onto the corresponding connector on the scanner.
9. If you are using a Y-adapter, make the final connection between the adapter and the existing combined power-data radar cable.



4.3 Power connection



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

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



Warning: Grounding not required

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





Power cable extension

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

- The power cable for each unit in your system should be run as a separate, single length of 2-wire cable from the unit to the vessel's battery or distribution panel.
- Raymarine recommends a **minimum** wire gauge of 14AWG (2.08 mm²) for any length of cable extension.
- For all lengths of extension to the power cable, ensure there is a continuous **minimum** voltage at the product's power connector of 10.8 V with a fully flat battery at 11 V.

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

Power distribution

Recommendations and best practice.

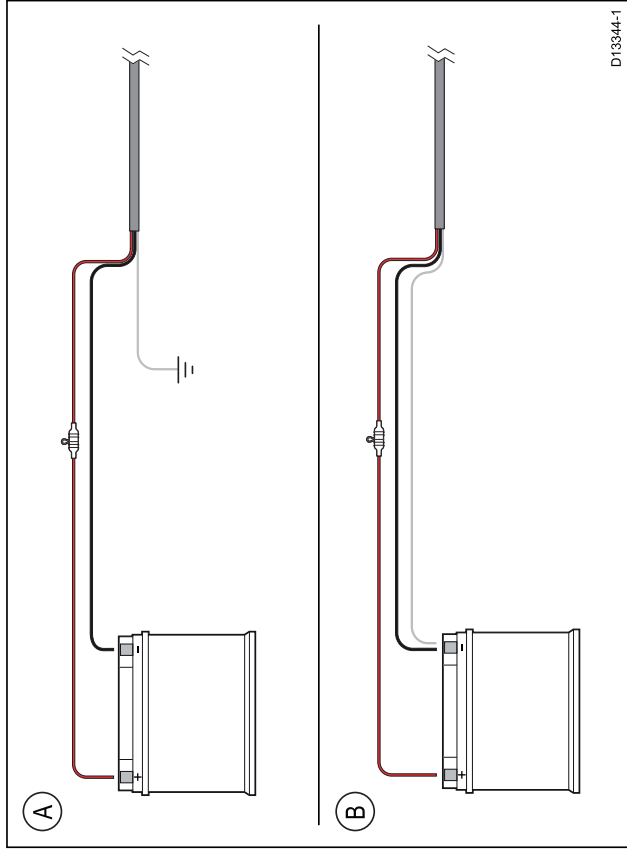
- The product is supplied with a power cable. Only use the power cable supplied with the product. Do NOT use a power cable designed for, or supplied with, a different product.
- Refer to the *Power connection* section for more information on how to identify the wires in your product's power cable, and 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.

Note: 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 Raymarine dealer or a suitably qualified professional marine electrician.

Implementation — direct connection to battery

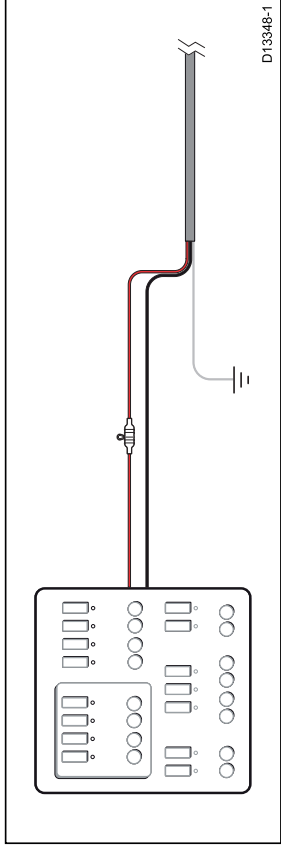
- The power cable supplied with your product may be connected directly to the vessel's battery, via a suitably rated fuse or breaker.
- The power cable supplied with your product may NOT include a separate drain wire. If this is the case, only the power cable's red and black wires need to be connected.
- If the supplied power cable is NOT fitted with an 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.



A	Battery connection scenario A: suitable for a vessel with a common RF ground point. In this scenario, if your product's power cable is supplied with a separate drain wire then it should be connected to the vessel's common ground point.
B	Battery connection scenario B: suitable for a vessel without a common grounding point. In this case, if your product's power cable is supplied with a separate drain wire then it should be connected directly to the battery's negative terminal.



Implementation — connection to distribution panel



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

Important: Be aware that the suitable fuse rating for the thermal breaker or fuse is dependent on the number of devices you are connecting.

Grounding

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





More information

Raymarine recommends 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

In-line fuse and thermal breaker ratings

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

In-line fuse rating	Thermal breaker rating
5 A	3 A (if only connecting one device)

Note:

- The suitable fuse rating for the thermal breaker is dependent on the number of devices you are connecting. If in doubt consult an authorized Raymarine dealer.
- Your product's power cable may have a fitted in-line fuse, if not then you must add an in-line fuse / breaker to the positive wire of your products power connection.



Warning: Grounding not required

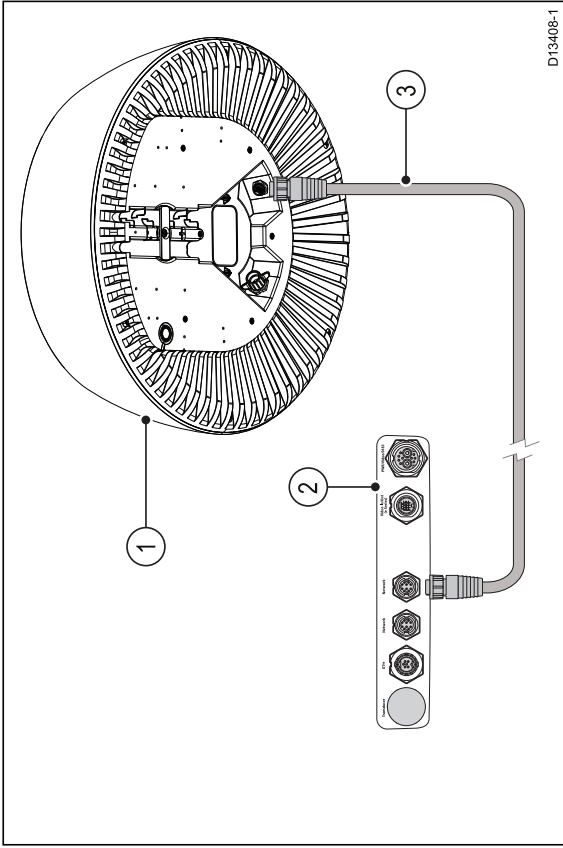
This product is fully insulated and does NOT require separate grounding.

4.4 Network connection

The scanner must be connected to a compatible Raymarine multifunction display. Once connected, the multifunction display can display radar echo data to be viewed.

Wired (RayNet) multifunction display connection

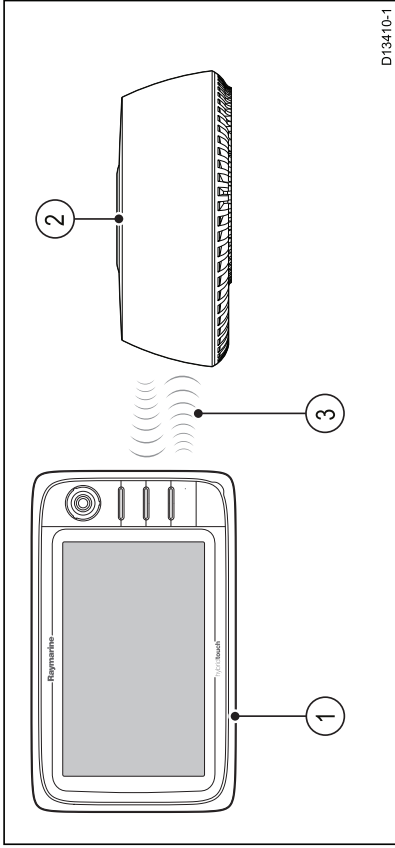
Scanner connected to a multifunction display using a RayNet cable.



Item	Description
1	Quantum Radome.
2	Connector panel for compatible Raymarine multifunction display.
3	RayNet data cable.

WiFi multifunction display connection

Scanner connected to a multifunction display using WiFi.

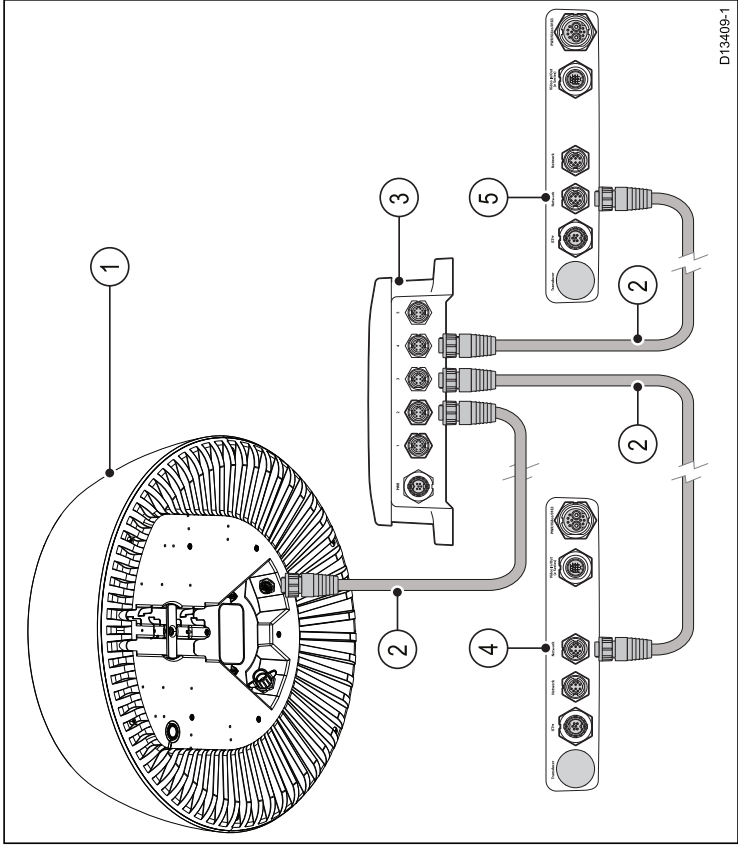


Item	Description
1	Compatible Raymarine multifunction display with WiFi capability.
2	Quantum Radome.
3	WiFi datalink.

Refer to the [Switch on & initial setup](#) section , and to your MFD documentation for further information about setting up the WiFi connection between your MFD and the Quantum scanner.

Multiple multifunction display configuration

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



Item	Description
1	Quantum radome.
2	RayNet cable.
3	RayNet network switch.
4	Connector panel for compatible Raymarine multifunction display.
5	Connector panel for additional compatible Raymarine multifunction display.

For details on available network hardware and cables refer to [Chapter 10 Spares and accessories](#).

