RS130 GPS

Installation instructions

Raymarine®

Trademark and patents notice

Autohelm, hsb², RayTech Navigator, Sail Pilot, SeaTalk, SeaTalk^{NG}, SeaTalk^{HS} and Sportpilot are registered trademarks of Raymarine UK Limited. RayTalk, Seahawk, Smartpilot, Pathfinder and Raymarine are registered trademarks of Raymarine Holdings Limited.

FLIR is a registered trademark of FLIR Systems, Inc. and/or its subsidiaries.

All other trademarks, trade names, or company names referenced herein are used for identification only and are the property of their respective owners.

This product is protected by patents, design patents, patents pending, or design patents pending.

Fair Use Statement

You may print no more than three copies of this manual for your own use. You may not make any further copies or distribute or use the manual in any other way including without limitation exploiting the manual commercially or giving or selling copies to third parties.
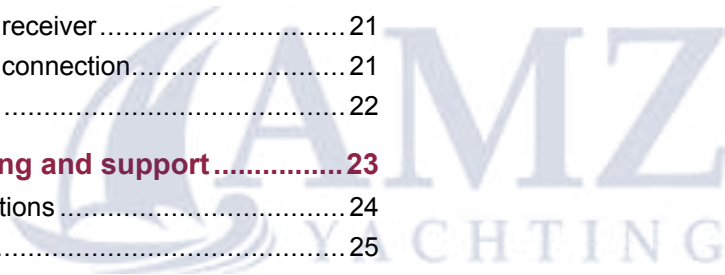
Contents

Chapter 1: Introduction

Handbook information

This handbook describes how to install the Raymarine RS130 GPS Receiver as part of a marine electronics installation.

This handbook includes information to help you:

- plan your installation and ensure you have all the necessary equipment;
- install and connect the RS130 as a part of your system of Raymarine electronics;
- conduct checks to ensure that the RS130 has been installed correctly;
- obtain support if required.

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

Safety notices

⚠️ **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.

⚡ **Warning: Switch off power supply**

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

⚠️ **Warning: Potential ignition source**

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

⚠️ **Warning: Product grounding**

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

Important information

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.

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.

Water ingress

Water ingress disclaimer

Although the waterproof rating capacity of this product meets the IPX6 standard, 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.

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.

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. Whilst the WEEE Directive does not apply to some Raymarine products, we support its policy and ask you to be aware of how to dispose of this product.

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.

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.

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.

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 fitted with suppression ferrites. These are important for correct EMC performance. 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 authorized dealers.

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.

Chapter 2: Planning the installation

Chapter contents

2.1 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.

GPS system overview

The GPS receiver provides GPS data to a number of different SeaTalkng devices, including multifunction displays and Instruments. It can also provide GPS data to SeaTalk devices via the optional SeaTalk1 to SeaTalkng converter.

The GPS receiver must be connected to a SeaTalkng system that includes at least one of the following devices:

• SeaTalkng multifunction display.

• G-Series processor unit.

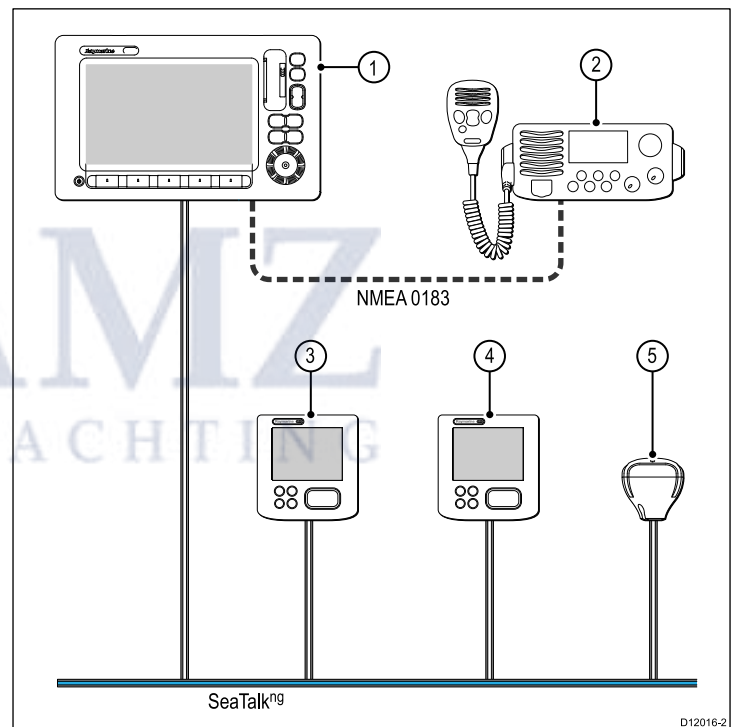• SeaTalkng instrument.

• SeaTalk1 to SeaTalkng converter.

2.2 SeaTalkng GPS systems — examples

Example: Basic GPS system featuring a SeaTalkng multifunction display and instrument
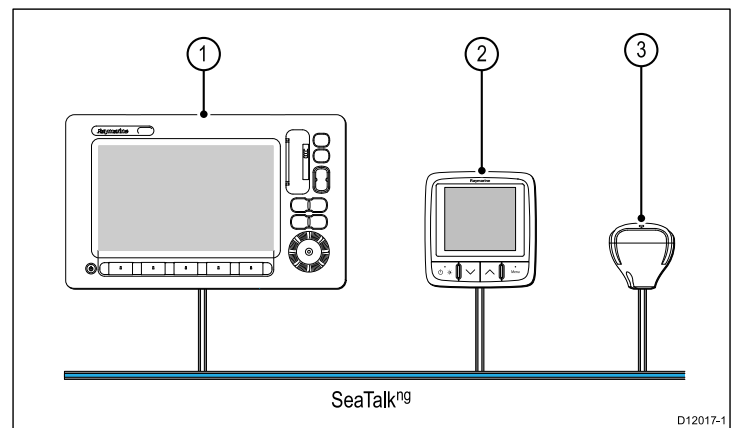
1. SeaTalkng Multifunction display.

2. SeaTalkng Instrument.

3. SeaTalkng GPS receiver.

Example: Extended GPS system featuring a SeaTalkng multifunction display

1. SeaTalkng Multifunction display.

2. NMEA 0183 DSC VHF radio.

3. SeaTalkng Instrument.
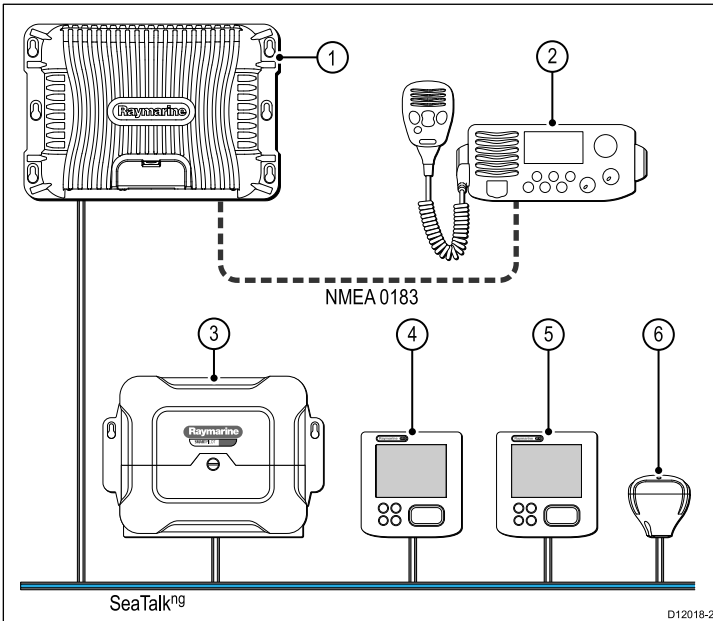
4. SeaTalkng Instrument.

5. SeaTalkng GPS receiver.

Example: Extended GPS system featuring a G-Series processor unit

1. SeaTalkng G-Series GPM processor unit.

2. NMEA 0183 DSC VHF radio.

3. SeaTalkng SPX course computer.

4. SeaTalkng Instrument.

5. SeaTalkng Instrument.

6. SeaTalkng GPS receiver.

Example: Extended GPS system featuring a SeaTalkng multifunction display and SeaTalk1 instrument
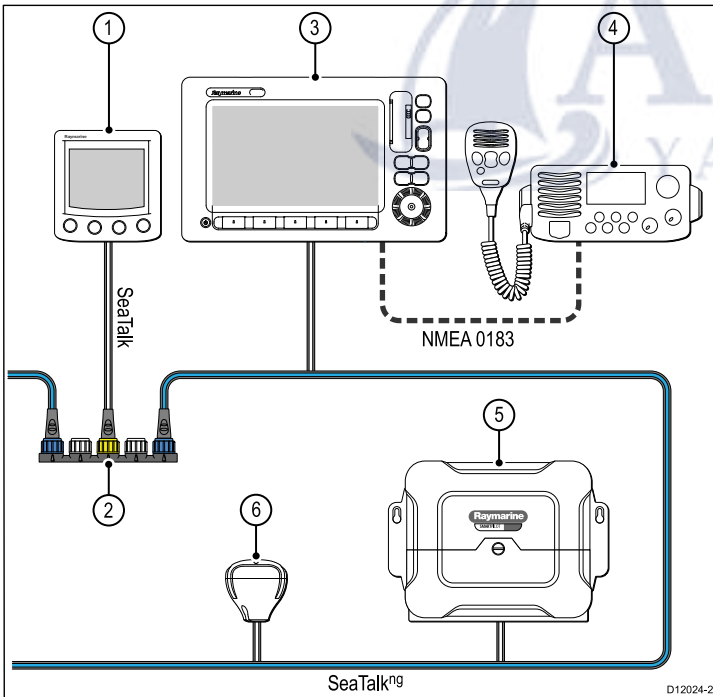
1. SeaTalk1 instrument (via SeaTalk to SeaTalkng adaptor cable).

2. SeaTalk1 to SeaTalkng converter.

3. SeaTalkng Multifunction display.

4. NMEA 0183 DSC VHF radio.

5. SeaTalkng SPX course computer.

6. SeaTalkng GPS receiver.

2.3 Seatalkng

SeaTalkng (Next Generation) is an enhanced protocol for connection of compatible marine instruments and equipment. It replaces the older SeaTalk and SeaTalk2 protocols.

SeaTalkng utilizes a single backbone to which compatible instruments connect using a spur. Data and power are carried within the backbone. Devices that have a low draw can be powered from the network, although high current equipment will need to have a separate power connection.

SeaTalkng is a proprietary extension to NMEA 2000 and the proven CAN bus technology. Compatible NMEA 2000 and SeaTalk / SeaTalk2 devices can also be connected using the appropriate interfaces or adaptor cables as required.

2.4 Parts and accessories

Parts supplied
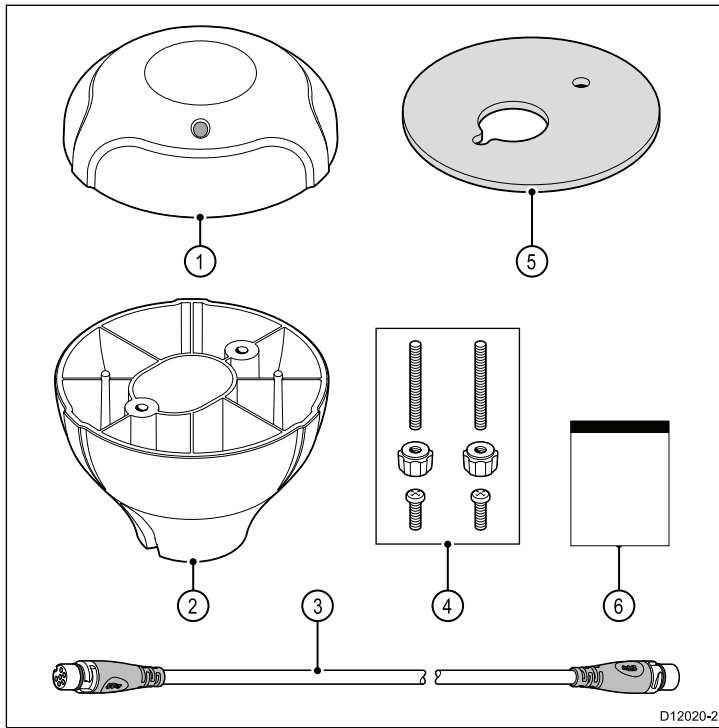
1. GPS receiver.

2. Pole mount kit.

3. SeaTalk^{ng} spur cable (6 meters).

4. Screw pack, consisting of:

   • Studs (quantity: 2)

   • Thumb nuts (quantity: 2)

   • Screws (quantity: 2)

5. Flush mount gasket.

6. Mounting template.

Optional accessories

You may also require the following:

• **SeaTalk^{ng} inline terminator** — useful for long cable runs. An example scenario is a SeaTalk^{ng} GPS receiver mounted on a radar arch. In this example, you can run the backbone up the arch and then connect the spur directly to the extreme end of the backbone using the inline terminator. This removes the need for a T-piece connector and a separate terminator, making it easier to achieve a long cable run.

Chapter 3: Cables and connections

Chapter contents

3.1 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).
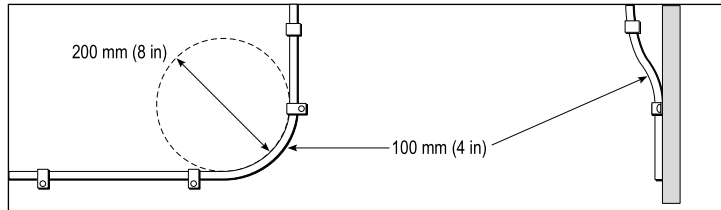
- Protect all cables from physical damage and exposure to heat. Use trunking or conduit where possible. Do NOT run cables through bilges or doorways, or close to moving or hot objects.

- 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).

3.2 SeaTalkng connection overview

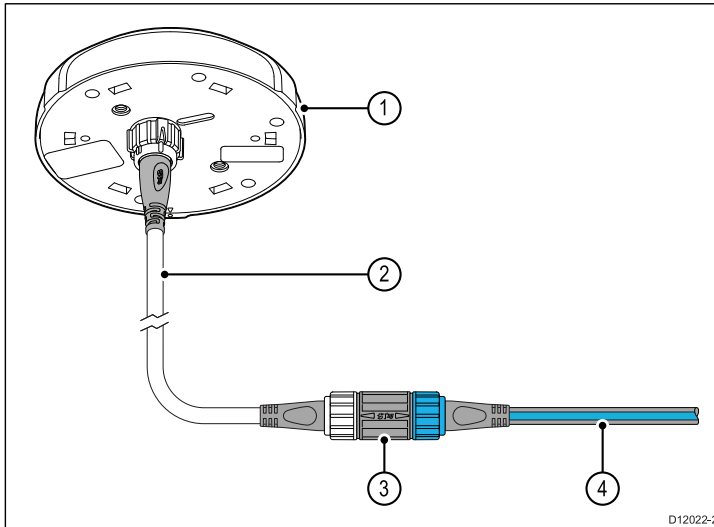Use the supplied SeaTalkng spur cable to connect the GPS receiver to a SeaTalkng backbone.
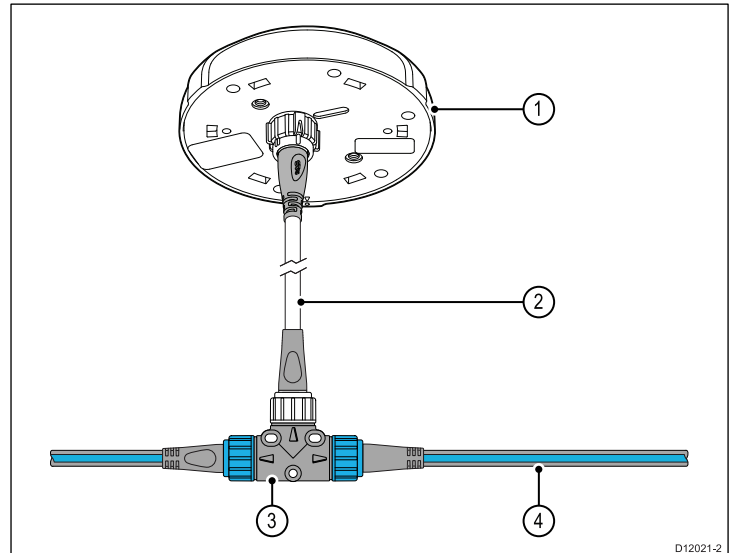
1. SeaTalkng GPS receiver.

2. SeaTalkng spur cable.

3. SeaTalkng T-piece. You can also use a 5-way connector block instead of a T-piece.

4. SeaTalkng backbone.

Note: A terminator must be fitted at each end of the SeaTalkng backbone.

3.3 SeaTalk^ng connection overview — long cable runs

Use the optional SeaTalk^ng inline terminator to connect the GPS receiver's spur cable directly to the extreme end of the SeaTalk^ng backbone using the inline terminator. This removes the need for a T-piece connector and a separate terminator, making it easier to achieve a long cable run.

1. SeaTalk^ng GPS receiver.
2. SeaTalk^ng spur cable.
3. SeaTalk^ng inline terminator.
4. SeaTalk^ng backbone.

3.4 NMEA 2000 connection overview

Use the optional SeaTalk^ng to DeviceNet adaptor cable to connect the GPS receiver to a NMEA 2000 system.
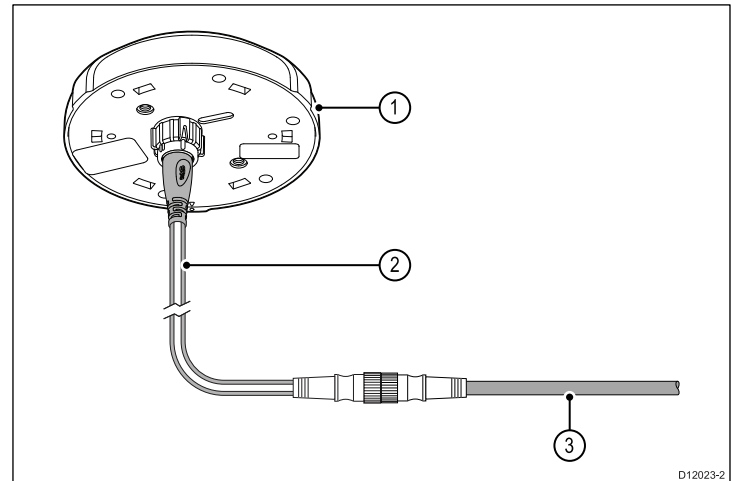
1. SeaTalk^ng GPS receiver.
2. SeaTalk^ng to DeviceNet adaptor cable (male or female version as appropriate).
3. DeviceNet cable.

3.5 SeaTalk^{ng} cabling components

SeaTalk^{ng} cabling components and their purposes.

Connection / Cable	Notes
Backbone cable (various lengths)	The main cable carrying data. Spurs from the backbone are used to connect SeaTalk^{ng} devices.
T-piece connector	Used to make junctions in the backbone to which devices can then be connected.
Terminator	Required at either end of the backbone.
Inline terminator	Used to connect a spur cable directly to the end of a backbone; useful for longer cable runs.
Spur cable	Used to connect devices to the backbone. Devices may be daisy chained or connected directly to the T-pieces.
SeaTalk^{ng} 5–way connector	Used to branch, split, or make additional connections in SeaTalk or SeaTalk^{ng} networks.
Blanking plug	Inserted into unused spur connector positions in a 5-way connector or T-piece.

3.6 SeaTalk^{ng} cables and accessories

SeaTalk^{ng} cables and accessories for use with compatible products.

Description	Part No	Notes
Backbone Kit	A25062	Includes: • 2 x 5 m (16.4 ft) Backbone cable • 1 x 20 m (65.6 ft) Backbone cable • 4 x T-piece • 2 x Backbone terminator • 1 x Power cable
SeaTalk^{ng} 0.4 m (1.3 ft) spur	A06038	
SeaTalk^{ng} 1 m (3.3 ft) spur	A06039	
SeaTalk^{ng} 3 m (9.8 ft) spur	A06040	
SeaTalk^{ng} 5 m (16.4 ft) spur	A06041	
SeaTalk^{ng} 0.4 m (1.3 ft) backbone	A06033	
SeaTalk^{ng} 1 m (3.3 ft) backbone	A06034	
SeaTalk^{ng} 3 m (9.8 ft) backbone	A06035	
SeaTalk^{ng} 5 m (16.4 ft) backbone	A06036	
SeaTalk^{ng} 9 m (29.5 ft) backbone	A06068	
SeaTalk^{ng} 20 m (65.6 ft) backbone	A06037	
SeaTalk^{ng} to bare ends 1 m (3.3 ft) spur	A06043	
SeaTalk^{ng} to bare ends 3 m (9.8 ft) spur	A06044	
SeaTalk^{ng} Power cable	A06049	
SeaTalk^{ng} Terminator	A06031	
SeaTalk^{ng} T-piece	A06028	Provides 1 x spur connection
SeaTalk^{ng} 5–way connector	A06064	Provides 3 x spur connections
SeaTalk to SeaTalk^{ng} converter	E22158	Allows the connection of SeaTalk devices to a SeaTalk^{ng} system.
SeaTalk^{ng} Inline terminator	A80001	Provides direct connection of a spur cable to the end of a backbone cable. No T-piece required.
SeaTalk^{ng} Blanking plug	A06032	
SeaTalk (3 pin) to SeaTalk^{ng} adaptor cable 0.4 m (1.3 ft)	A06047	
SeaTalk2 (5 pin) to SeaTalk^{ng} adaptor cable 0.4 m (1.3 ft)	A06048	
DeviceNet adaptor cable (Female)	A06045	Allows the connection of NMEA 2000 devices to a SeaTalk^{ng} system.

Description	Part No	Notes
DeviceNet adaptor cable (Male)	A06046	Allows the connection of NMEA 2000 devices to a SeaTalk^ng system.
DeviceNet adaptor cable (Female) to bare ends.	E05026	Allows the connection of NMEA 2000 devices to a SeaTalk^ng system.
DeviceNet adaptor cable (Male) to bare ends.	E52027	Allows the connection of NMEA 2000 devices to a SeaTalk^ng system.

3.7 Power connection

The power for the GPS receiver is provided by the SeaTalk^ng system.

- The SeaTalk^ng GPS receiver must be connected to a SeaTalk^ng backbone, via a SeaTalk^ng 5–way connector block, T-piece connector, or inline terminator.

- The SeaTalk^ng system requires only ONE 12 V power source. This can be provided by:

  – A battery.

  – A Raymarine course computer, via a SeaTalk system or a SeaTalk^ng system.

  If your vessel has a 24 V supply a suitable voltage convertor is required.

- The power source must be protected by a 5 A fuse or a circuit breaker providing equivalent protection.

- SeaTalk^ng cables carry both data and power signals. The power is supplied to the GPS receiver via the spur cable.

- Refer to the SeaTalk^ng reference manual for more information on general SeaTalk^ng power requirements.
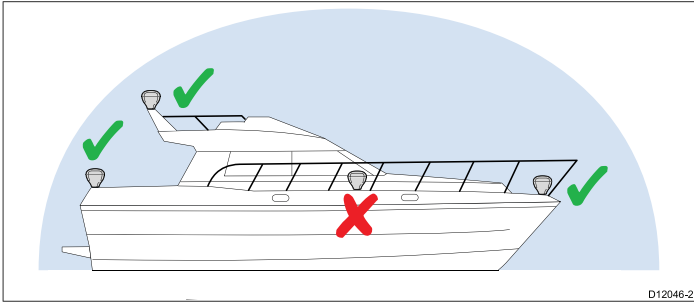
Chapter 4: Installation

Chapter contents

4.1 Location requirements

When planning the installation location, consider the following:

- The GPS receiver is waterproof, and appropriate for above decks mounting.

- Choose a location that provides the most unobstructed view of the sky in all directions:

- Do NOT mount the GPS receiver at the top of a mast.

- The GPS receiver should be mounted at least 1 m (3 ft) away from devices that may cause interference, such as motors, generators, VHF radio units and other transmitters / receivers.

- Ensure the GPS receiver is NOT mounted in the path of the beam emitted from any radar scanner units.
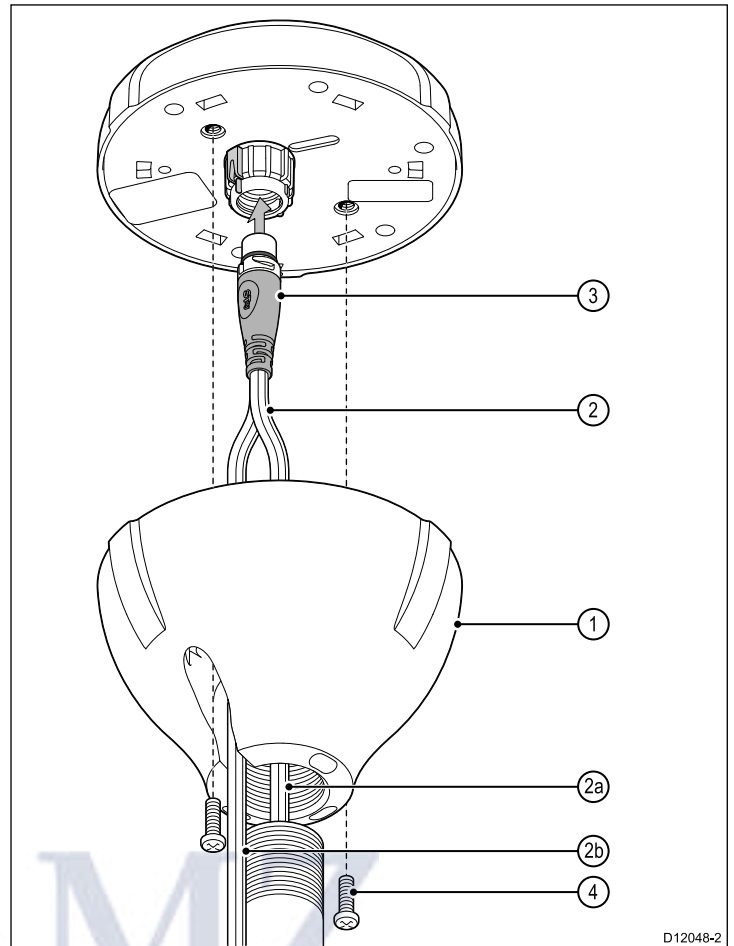
GPS receiver mounting options

There are 3 different mounting options for the GPS receiver.

- Pole mount.
- Flush mount.
- Rail mount.

4.2 Pole mounting the GPS receiver

Pole mounting requires a pole with a 1 inch 14 TPI thread. The thread must not exceed 20 mm in length.

1. Securely attach the pole mount base to a suitable pole.
2. Pass the cable and connector through either:
   - 2a) the center of the pole mount bracket and the pole; or
   - 2b) the cable exit hole alongside the center hole.
3. Attach the connector securely to the plug in the base of the unit.
4. Secure the receiver to the pole mount base using the screws provided.

4.3 Flush mounting the GPS receiver

D12047-2
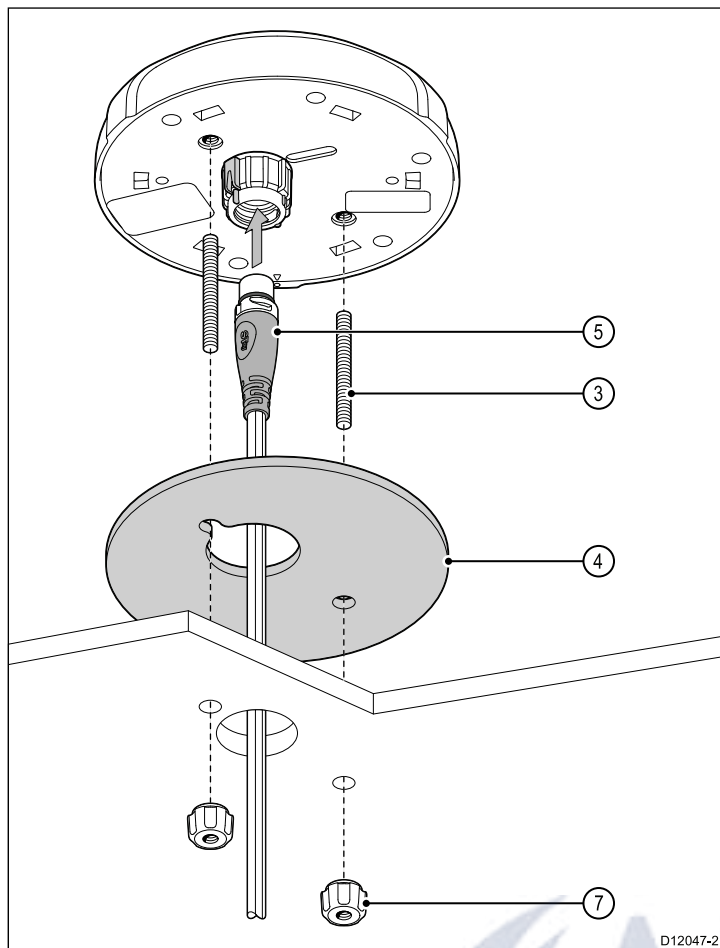
1. Use the supplied mounting template to mark the 2 fixing holes and the center hole.
2. Drill the holes using the drill sizes shown on the supplied template.
3. Screw the 2 fixing studs into the underside of the receiver unit.
4. Place the waterproof gasket into position on the underside of the receiver.
5. Attach the connector securely to the plug in the base of the unit and pass the cable through the center hole on the mounting surface.
6. Carefully position the receiver so that the mounting studs pass through the holes in the mounting surface.
7. Secure the receiver to the mounting surface using the two thumb nuts (these should be hand-tight only).

Rail mounting the GPS receiver

1. Obtain a suitable rail mounting bracket from your dealer. It must have a 1 inch 14 TPI thread.
2. Secure the rail mounting bracket to the GPS receiver.
3. Secure the bracket to a suitable rail.
4. Route the cable along the rail and secure with cable ties.

4.4 GPS receiver SeaTalkng connection

Secure the SeaTalk[ng] plug into the GPS receiver connector.

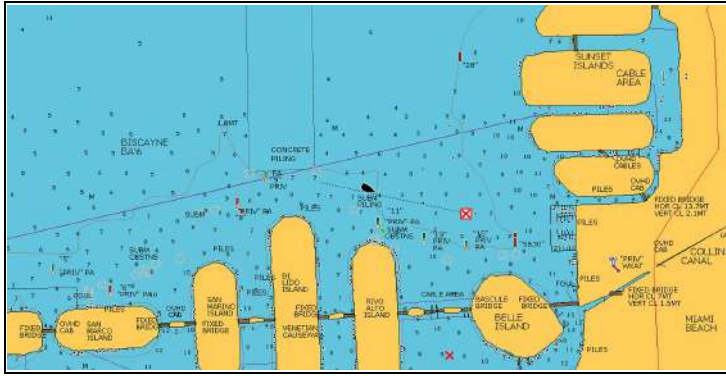1. Rotate collar to the UNLOCKED position.

D12049-2
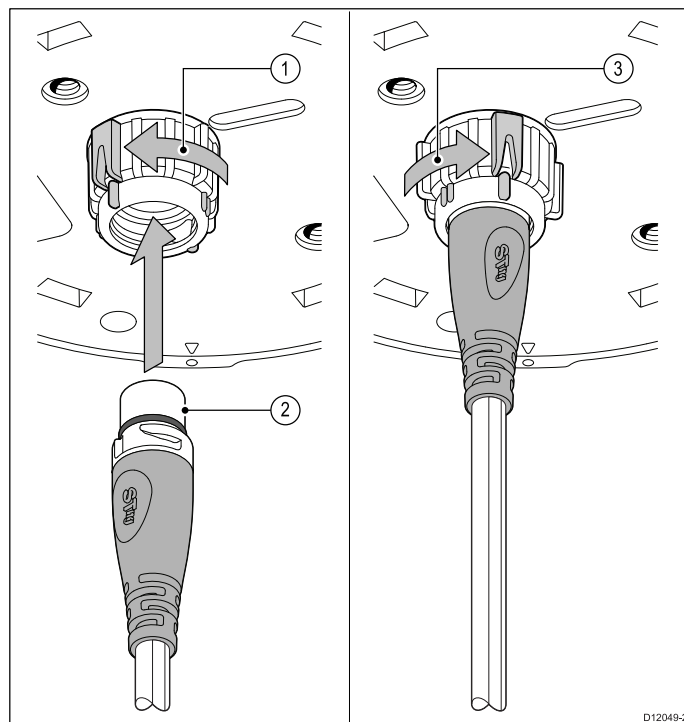
2. Ensure cable end connector is correctly orientated, then fully insert.
3. Rotate collar clockwise until it snaps into the LOCKED position.

4.5 Checking GPS operation

You can check that the GPS is functioning correctly using the chart application.

1. Select the Chart page.

2. Check the screen.

   With the chart displayed, you should see:

   Your boat position (indicates a GPS fix). Your current position is represented by a boat symbol or solid circle. Your position is also displayed in the data bar under VES POS.

   A solid circle on the chart indicates that neither heading nor Course Over Ground (COG) data is available.

> **Note:** Raymarine recommends that you check the displayed vessel position in the chart application against your actual proximity to a known charted object. GPS receivers typically have an accuracy of between 5 and 15 m.

> **Note:** A GPS Status screen is available within the Setup menu of Raymarine multifunction displays. This provides satellite signal strength and other relevant information.

Chapter 5: Troubleshooting and support

Chapter contents

5.1 GPS receiver LED indications

The LED on the GPS receiver indicates status information for diagnostic purposes.

LED activity (based on 1000 ms (1 second) cycle)				LED state description	Status Description
Off	**Red** 🔴	**Orange** 🟠	**Green** 🟢		
1000 ms	0 ms	0 ms	0 ms	Off	No power.
900 ms	100 ms	0 ms	0 ms	Short flash red	Power supply outside nominal voltage range.
500 ms	500 ms	0 ms	0 ms	Long flash red	Unit is being upgraded or is unable to boot.
0 ms	500 ms	500 ms	0 ms	Continuously alternating long flash red, long flash orange	Unit unable to communicate using SeaTalk^{ng}.
0 ms	500 ms	0 ms	500 ms	Continuously alternating Long flash red, long flash green	No GPS signal.
900 ms	0 ms	100 ms	0 ms	Short flash orange	No GPS fix.
900 ms	0 ms	0 ms	100 ms	Short flash green	Normal operation.
1 ms	333 ms	333 ms	333 ms	Continuously alternating red, orange, green	Unit is in test mode.

5.2 GPS troubleshooting

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

Problem	Possible causes	Possible solutions
"No Fix" GPS status icon is displayed.	Geographic location or prevailing conditions preventing satellite fix.	Check periodically to see if a fix is obtained in better conditions or another geographic location.
	GPS connection fault.	Ensure that external GPS connections and cabling are correct and fault free.
	External GPS antenna in poor position. For example: • Below decks. • Close proximity to transmitting equipment such as VHF radio.	Ensure GPS antenna has a clear view of the sky.
	GPS installation problem.	Refer to the installation instructions.

Note: A GPS Status screen is available within the Setup menu of Raymarine multifunction displays. This provides satellite signal strength and other relevant information.

5.3 Raymarine customer support

Raymarine provides a comprehensive customer support service. You can contact customer support through the Raymarine website, telephone and email. If you are unable to resolve a problem, please use any of these facilities to obtain additional help.

Web support

Please visit the customer support area of our website at:

www.raymarine.com

This contains Frequently Asked Questions, servicing information, e-mail access to the Raymarine Technical Support Department and details of worldwide Raymarine agents.

Telephone and email support

In the USA:

• **Tel:** +1 603 324 7900

• **Toll Free:** +1 800 539 5539

• **Email:** Raymarine@custhelp.com

In the UK, Europe, the Middle East, or Far East:

• **Tel:** +44 (0)13 2924 6777

• **Email:** ukproduct.support@raymarine.com

Product information

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

• Product name.

• Product identity.

• Serial number.

• Software application version.

You can obtain this product information using the menus within your product.

Appendix A Technical specification

Nominal supply voltage	12 or 24 V dc **Note:** SeaTalkng must be connected to 12 V systems only. 24 V support is provided for compatibility with future system configurations.
Operating voltage range	-10% to +30% of nominal supply range
Power consumption	50 mA max.
Environmental	**Installation environment** • Operating temperature: -25 ℃ to +55 ℃ (-13 ℉ to 131 ℉) • Storage temperature: -25 ℃ to +70 ℃ (-13 ℉ to 158 ℉) • Relative humidity: max 93% • Waterproof to IPX6
Conformance	• Europe: 2004/108/EC • Australia and New Zealand: C-Tick, Compliance Level 2
Supported connection protocols	• SeaTalkng • NMEA 2000 (certified) (via DeviceNet adaptor)
LEN (refer to SeaTalkng Reference manual for more information)	1
Signal acquisition	Multiple parallel channel receiver (C/A code)
Channels	50
Sensitivity	High sensitivity — acquisition down to -162 dBm
Satellite Differential Type	• WAAS (United States) • EGNOS (Europe) • MSAS (Japan) • GAGAN (India)
Differential acquisition	Automatic
Position accuracy (95%)	< 15 m
Position accuracy with SDGPS (95%)	< 5 m
Speed accuracy (95%)	< 0.3 kt
Time to first fix from cold start	< 2 minutes (< 45 seconds typical)
Geodetic Datum	WGS84

Raymarine®

A FLIR COMPANY

CE

www.raymarine.com