LightHouse II
Release 10

gS Series

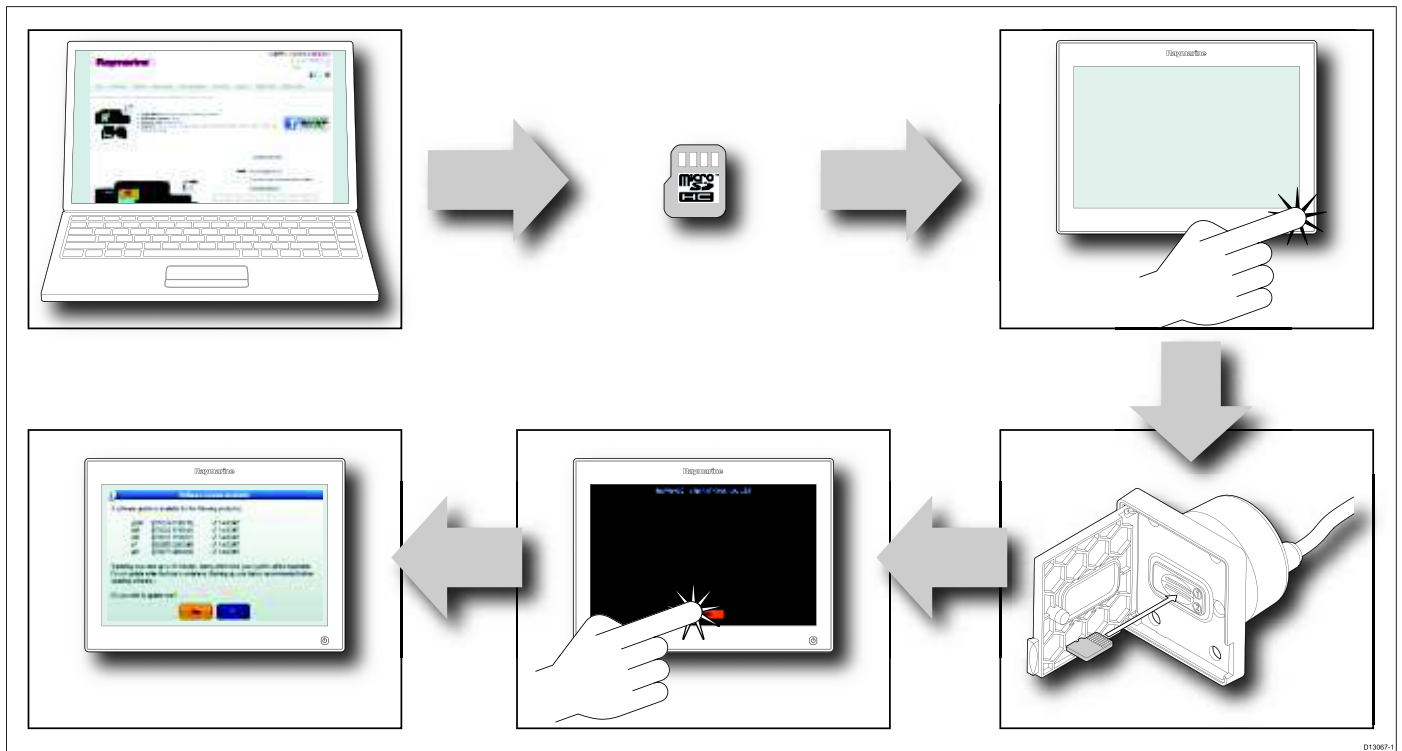## Installation and operation instructions

INNOVATION • QUALITY • TRUST

Raymarine®

Update your product software

Raymarine regularly updates its product software to bring you new features or fix existing issues.

- Before using your product for the first time, visit www.raymarine.com/software to obtain the latest software for your product.

- Certain combinations of old and new software on a networked Raymarine system may cause compatibility problems. To obtain the latest features for your product and ensure compatibility with other Raymarine equipment in your system, update the software for all your Raymarine products to the latest version.

- Visit the website on a regular basis to ensure you are always using the latest software for all your Raymarine products.

- To identify the current software version of your MFD and any connected devices, from the **Homescreen**, select **Set-up > Maintenance > Diagnostics > Select Device**.

- For instructions on how to update the software for your Raymarine products, refer to www.raymarine.com/software.

- Before upgrading MFD software, always backup your MFD user data and settings to an empty memory card (NOT chart card). For instructions on how to do this, refer to the Saving user data and user settings section of this document.

Note: The illustration above shows a non-chart MicroSD card being inserted into card slot 2 of the RCR-2 card reader (this assumes that a chart card is in slot 1). If you decide to insert the non-chart MicroSD card in card slot 1 instead, the card contacts must be facing DOWN.

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.

Software updates

Check the website www.raymarine.com for the latest software releases for your product.

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.

Contents

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.

> ⚠️ **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: High voltages**
>
> This product contains high voltages. Do NOT remove any covers or otherwise attempt to access internal components, unless specifically instructed in this document.

> ⚠️ **Warning: Product grounding**
>
> Before applying power to this product, ensure it has been correctly grounded, in accordance with the instructions in this guide.

> ⚠️ **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: FCC Warning (Part 15.21)**
>
> Changes or modifications to this equipment not expressly approved in writing by Raymarine Incorporated could violate compliance with FCC rules and void the user's authority to operate the equipment.

> ⚠️ **Warning: Radar scanner safety**
>
> Before rotating the radar scanner, ensure all personnel are clear.

> ⚠️ **Warning: Radar transmission safety**
>
> The radar scanner transmits electromagnetic energy. Ensure all personnel are clear of the scanner when the radar is transmitting.

> ⚠️ **Warning: Sonar operation**
>
> - NEVER operate the sonar with the vessel out of the water.
> - NEVER touch the transducer face when the sonar is powered on.
> - SWITCH OFF the sonar if divers are likely to be within 7.6 m (25 ft) of the transducer.

> ⚠️ **Warning: Touchscreen display temperature**
>
> If the display is mounted in an above-decks location that will be exposed to prolonged periods of direct sunlight, the touchscreen may get very hot. In such conditions, Raymarine recommends that you avoid using the touchscreen:
>
> - For HybridTouch displays, use the unit's physical buttons instead.
> - For touch-only displays, use an external keypad (for example, the RMK-9) instead.

> ⚠️ **Warning: Touchscreen display**
>
> Exposure to prolonged rain may cause erroneous touch performance, in these situations keep touch activity to a minimum and wipe the screen with a dry non-abrasive cloth before using the touchscreen.

Product operation in high temperatures

At extreme temperatures, the unit can become very hot, especially the internal components.

To protect the internal components, the unit automatically reduces the performance of the main processor to prevent it from overheating. When this occurs, you may notice a slight degradation in the performance of the unit, in terms of responsiveness to user operation.

This is expected behavior, designed to protect the unit from the adverse effects of excessive heat.

> ⚠️ **Caution: Mounting surface requirements**
>
> This product is heavy. To prevent potential damage to the product and / or your vessel, observe the following BEFORE installing the product:
>
> - Refer to the weight information provided in the technical specification for this product and ensure that the intended mounting surface is suitable for bearing the weight.
> - If the mounting surface is not suitable for the product weight, you may need to reinforce the mounting surface.
> - If in doubt, refer to a professional marine equipment installer for further guidance.

> ⚠️ **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: Care of chart and memory cards**
>
> To avoid irreparable damage to and / or loss of data from chart and memory cards:
>
> - DO NOT save data or files to a card containing cartography as the charts may be overwritten.
> - Ensure that chart and memory cards are fitted the correct way around. DO NOT try to force a card into position.
> - DO NOT use a metallic instrument such as a screwdriver or pliers to insert or remove a chart or memory card.

Class 1 (3.84 W)	Class 2 (6.49 W)	Class 3 / Class 0 (12.95 W)	Total power used
1		1	16.79 W
	1	1	19.44 W

Note: A class 0 device shall be assigned the same power allocation as a class 3 device.

Note: If a PoE device is connected that will take the total assigned power over 20 W the device will not be powered.

TFT Displays

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

Water ingress

Water ingress disclaimer

Although the waterproof rating capacity of this product meets the stated 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.

Disclaimers

This product (including the electronic charts) is intended to be used only as an aid to navigation. It is designed to facilitate use of official government charts, not replace them. Only official government charts and notices to mariners contain all the current information needed for safe navigation, and the captain is responsible for their prudent use. It is the user's responsibility to use official government charts, notices to mariners, caution and proper navigational skill when operating this or any other Raymarine product. This product supports electronic charts provided by third party data suppliers which may be embedded or stored on memory card. Use of such charts is subject to the supplier's End-User Licence Agreement included in the documentation for this product or supplied with the memory card (as applicable).

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.

This product uses digital chart data, and electronic information from the Global Positioning System (GPS) which may contain errors. Raymarine does not warrant the accuracy of such information and you are advised that errors in such information may cause the product to malfunction. 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 chart data or information utilized by the product and supplied by third parties.

Memory cards and chart cards

MicroSD memory cards can be used to back up / archive data (e.g. Waypoint, and Tracks). Once data is backed up to a memory card old data can be deleted from the system, creating capacity for new data. The archived data can be retrieved at any time. Chart cards provide additional or upgraded cartography.

It is recommended that your data is backed up to a memory card on a regular basis. Do NOT save data to a memory card containing cartography.

Compatible cards

The following types of MicroSD cards are compatible with your display:

Caution: Ensure card reader door is securely closed

To prevent water ingress and consequent damage to the product, ensure that the card reader door is firmly closed.

Caution: Sun covers

• To protect your product against the damaging effects of ultraviolet (UV) light, always fit the sun covers when the product is not in use.

• Remove the sun covers when travelling at high speed, whether in water or when the vessel is being towed.

Caution: Cleaning

When cleaning this product:

• Do NOT wipe the display screen with a dry cloth, as this could scratch the screen coating.

• Do NOT use abrasive, or acid or ammonia based products.

• Do NOT use a jet wash.

Power over Ethernet (PoE)

This product can supply Power over Ethernet (PoE) to class 1, 2 and 3 devices. The product can output a maximum of 20 Watts for consumption by PoE devices.

The PoE class denotes the power range of the PoE device.

PoE Class	Power range	Class description
Class 1	0.44 W to 3.84 W	Very low power
Class 2	3.84 W to 6.49 W	Low power
Class 3	6.49 W to 12.95 W	Mid power
Class 0	0.44 W to 12.95 W	-

Note: The product will not provide power to class 4 devices.

The product can power up to 3 devices using the available network / PoE ports as long as the combined max power of the PoE devices does not exceed 20 watts.

When a PoE device is connected it is interrogated to establish if the device is PoE and if so what class of device it is. The max power for that class of device is then assigned to that port (e.g. class 2 = 6.49 W) and deducted from the remaining power output.

The table below shows acceptable configurations of PoE devices.

Class 1 (3.84 W)	Class 2 (6.49 W)	Class 3 / Class 0 (12.95 W)	Total power used
1			3.84 W
2			7.68 W
3			11.52 W
	1		6.49 W
	2		12.98 W
	3		19.47 W
1	1		10.33 W
2	1		14.17 W
1	2		16.82 W
		1	12.95 W

- Micro Secure Digital Standard-Capacity (MicroSDSC)
- Micro Secure Digital High-Capacity (MicroSDHC)

> **Note:**
> - The maximum supported memory card capacity is 32 GB.
> - MicroSD cards must be formatted to use either the FAT or FAT 32 file system format to enable use with your MFD.

Speed class rating

For best performance it is recommended that you use Class 10 or UHS (Ultra High Speed) class memory cards.

Chart cards

Your product is pre-loaded with electronic charts (worldwide base map). If you wish to use different chart data, you can insert compatible chart cards into the unit's memory card reader.

Use branded chart cards and memory cards

When archiving data or creating an electronic chart card, Raymarine recommends the use of quality branded memory cards. Some brands of memory card may not work in your unit. Please contact customer support for a list of recommended cards.

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.

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

RF exposure

This transmitter with its antenna is designed to comply with FCC / IC RF exposure limits for general population / uncontrolled exposure. The WiFi / Bluetooth antenna is mounted behind the front facia on the left hand side of the screen. It is recommended to maintain a safe distance of at least 1 cm from the left hand side of the screen.

FCC

Compliance Statement (Part 15.19)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

FCC Interference Statement (Part 15.105 (b))

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio / TV technician for help.

Industry Canada

This device complies with Industry Canada License-exempt RSS standard(s).

Operation is subject to the following two conditions:

1. This device may not cause interference; and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

This Class B digital apparatus complies with Canadian ICES-003.

Industry Canada (Français)

Cet appareil est conforme aux normes d'exemption de licence RSS d'Industry Canada.

Son fonctionnement est soumis aux deux conditions suivantes:

1. cet appareil ne doit pas causer d'interférence, et
2. cet appareil doit accepter toute interférence, notamment les interférences qui peuvent affecter son fonctionnement.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Japanese approvals

In the frequency band used for this device, campus radio stations (radios stations that require a license) and specified low power radio stations (radio stations that do not require license) for mobile identification and amateur radio stations (radio stations that require license) used in industries such as microwave ovens, scientific, medical equipment devices and production line of other factories are also being operated.

1. Before using this device, please make sure that campus radio stations and specified low power radio stations for mobile identification and amateur radio stations are not being operated nearby.

2. In case there is any case of harmful interference to campus radio stations for mobile identification caused by this device, please immediately change the frequency used or stop the transmission of radio waves and then consult about the measures to avoid interference (for example, the installation of partitions) through the contact information below.

3. Besides, when in trouble, such as when there is any case of harmful interference to specified low power radio stations for mobile identification or amateur radio stations caused by this device, please consult through the following contact information.

Contact information: Please contact your local authorized Raymarine dealer.

Third party software license agreements

This product is subject to certain third party software license agreements as listed below:

• GNU — LGPL/GPL

• JPEG libraries

• OpenSSL

• FreeType

The license agreements for the above can be found on the website www.raymarine.com and on the accompanying documentation CD if supplied.

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.

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

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.

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.

Pixel defect policy

In common with all TFT units, the screen may exhibit a few wrongly-illuminated ("dead") pixels. These may appear as black pixels in a light area of the screen or as colored pixels in black areas.

If your display exhibits MORE than the number of wrongly-illuminated pixels allowed (refer to the product *technical specification* for details), please contact your local Raymarine service center for further advice.

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.

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 Handbook information

This handbook contains important information regarding your multifunction display.

The handbook is for use with gS Series multifunction displays.

About this handbook

This handbook describes how to operate your multifunction display in conjunction with compatible electronic cartography and peripheral equipment.

It assumes that all peripheral equipment to be operated with it is compatible and has been correctly installed. This handbook is intended for users of varying marine abilities, but assumes a general level of knowledge of display use, nautical terminology and practices.

Software revision

Raymarine regularly updates product software to add new features and improve existing functionality.

This handbook covers multifunction display software version — LightHouse II Release 10.
Please refer to the *Software Releases* section for details on software releases.
Check the Raymarine website to ensure you have the latest software and user manuals. www.raymarine.com.

Handbooks

The following handbooks are applicable to your multifunction display:

gS Series Handbooks

Description	Part number
Mounting and getting started guide	88017
Installation and operation handbook	81344
gS95 Mounting template	87173
gS125 Mounting template	87171
gS165 Mounting template	87172
RCR-2 Mounting template	87186

Additional handbooks

Description	Part number
SeaTalkng reference manual	81300
RMK-9 Installation and operations instructions	81351

All documents are available to download as PDFs from www.raymarine.com

User manuals Print Shop

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

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

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

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

Note:

- Accepted methods of payment for printed manuals are credit cards and PayPal.

- Printed manuals can be shipped worldwide.

- Further manuals will be added to the Print Shop over the coming months for both new and legacy products.

- Raymarine user manuals are also available to download free-of-charge from the Raymarine website, in the popular PDF format. These PDF files can be viewed on a PC / laptop, tablet, smartphone, or on the latest generation of Raymarine multifunction displays.

2.2 Product information

The following Raymarine multifunction display variants are available. gS series Displays are touchscreen displays which have HybridTouch functionality when paired with a remote keypad.

Model	Part number
gS95	E70124
gS95 inverted	E70183
gS125	E70125
gS125 inverted	E70184
gS165	E70126
gS165 inverted	E70185

Refer to the Optimum viewability section for details on standard vs inverted displays.

HybridTouch overview

If your multifunction display features HybridTouch, this enables you to operate the unit using the touchscreen and the physical buttons.

A HybridTouch display has physical buttons which can be used in addition to the touchscreen. Touchscreen only multifunction displays (which do not have physical buttons) can be connected to a remote keypad which allows HybridTouch functionality.

All functions can be accessed using the touchscreen. However, there may be situations (such as rough sea conditions) when it is not appropriate to use the touchscreen. In these situations, Raymarine strongly recommends that you activate the touch lock and use the physical buttons to operate your multifunction display.

Touchscreen overview

The touchscreen provides an alternative to using physical buttons to control your multifunction display.

All functions can be accessed using the touchscreen

Note: Raymarine strongly recommends that you familiarize yourself with touch operations while your vessel is anchored or moored. You may find it helpful to use the simulator mode (accessible from **Homescreen > Set-up > System Settings**) in these situations.
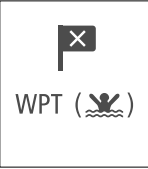
2.3 Handbook conventions

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

Type	Example	Convention
Icons		The term "**select**" is used in procedures involving icons to refer to the action of selecting an on-screen icon, either using touch or physical buttons: • **Touch** — Press your finger on the icon to select. • **Physical buttons** — Use the **Joystick** to highlight the icon and press the **Ok** button.
Menus		The term "**select**" is used in procedures involving menus to refer to the action of selecting a menu item, either using touch or physical buttons: • **Touch** — Press your finger on the icon to select. • **Physical buttons** — Use the **Joystick** to highlight the icon and press the **Ok** button.
		The term "**scroll**" is used in procedures involving menus and dialogs to refer to the action of scrolling a list or menu, either by touch or physical buttons: • **Touch** — Press your finger on the menu and slide up or down to scroll. • **Physical buttons** — Turn the Rotary control clockwise or anti—clockwise to scroll. .
Applications		The term "**select**" is used in procedures involving applications to refer to the action of selecting a location, object or target on-screen using touch or physical buttons: • **Touch** — Press and hold your finger on a location to select, or • **Touch** — Press and release your finger on an object or target. • **Physical buttons** — Use the **Joystick** to highlight the location, object or target and press the **Ok** button.
Numeric adjust controls		The term "**adjust**" is used in procedures involving numerical adjust controls to refer to the action of changing the numeric value using touch or physical buttons: • **Touch** — Press your finger on the up or down arrow to increase or decrease the numeric value. • **Physical buttons** — Use the **Rotary control** to increase or decrease the numeric value. With the Numeric adjust control displayed you can also select on the **keypad** icon or press and hold the **Ok** button to open a numeric keypad to enter a new value for the setting.
Slider bar controls		The term "**adjust**" is used in procedures involving slider bar controls to refer to the action of changing the associated numeric value using touch or physical buttons: • **Touch** — Press your finger on the up or down arrow to increase or decrease the numeric value. • **Physical buttons** — Use the **Rotary control** to increase or decrease the numeric value.

Waypoint (MOB) button / icon

Depending on the multifunction display variant there will be either a Waypoint (MOB) button or an on-screen icon.

WPT button		• c Series
	WPT ( )	• e Series
		• RMK-9 keypad
WPT icons	/	• a Series
		• gS Series

Throughout this manual the term: Select **WPT**, refers to pressing the physical **WPT** button or pressing the on-screen **WPT** icon.

Touch and non-touch operations

This handbook applies to both touch and non-touch operations.

This handbook uses icons to identify whether a particular task is specifically a touch or a non-touch operation. Where a task does not have a touch or non-touch icon then the task can be performed using either.

	Touch (Touchscreen operation) — Touch operations apply to multifunction displays which have a touchscreen.
	Non-touch (physical button operation) — Non-touch operations apply to multifunction displays with physical buttons or multifunction displays that have a remote keypad connected and paired to it.

Chapter 3: Planning the installation

Chapter contents

3.1 System integration

Your multifunction display is compatible with a wide range of marine electronics devices.
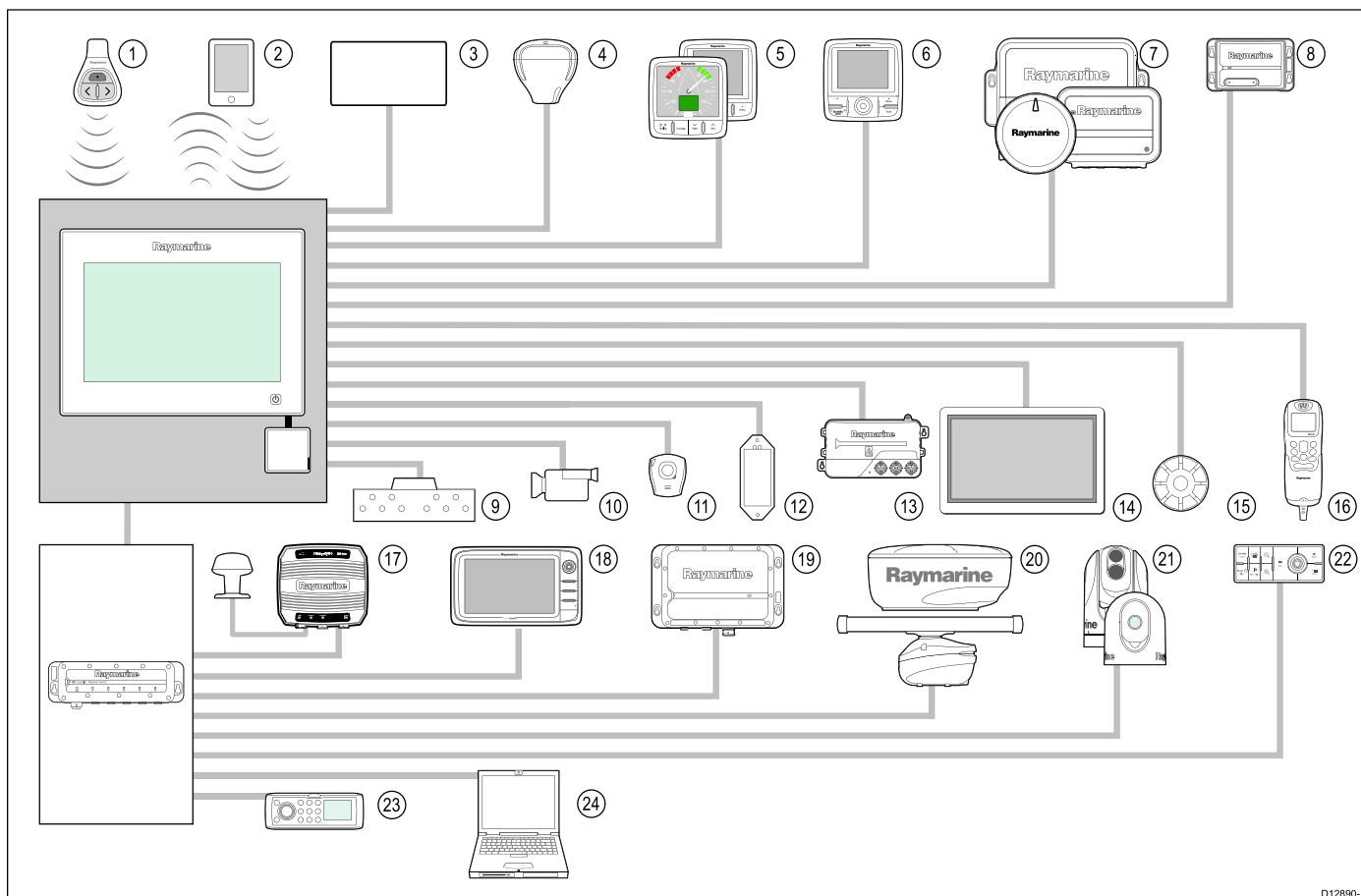
D12890-1

The display uses a number of protocols to transfer data between the various devices in your system. The following table details which devices may be connected to your display, and the type of connections (in terms of protocols and physical interfaces):

Item	Device Type	Maximum quantity	Suitable Devices	Connections
1	Remote control	1 per multifunction display.	Raymarine RCU-3	Bluetooth
2	Smartphone / Tablet device	1 per multifunction display.	For Raymarine wireless video streaming and remote control apps: • Apple iPhone 4 (or later) or iPad 2 (or later) • Android device with minimum 1GHz processor and running android 2.2.2 (or later) • Amazon Kindle Fire For chartplotter sync with Navionics Marine app: • Apple iPhone or iPad. • Android-compatible smartphone or tablet. For media player control: • Any Bluetooth-enabled device that supports Bluetooth 2.1+ EDR power class 1.5 (supported profile: AVRCP 1.0)	• Chartplotter sync with Navionics Marine app: Wi-Fi. • Video streaming and remote control: Wi-Fi. • Media player control: Bluetooth 2.1+ EDR power class 1.5 (supported profile: AVRCP 1.0) or later.
3	Vessel tank sensors — third-party	• Up to 3 x fuel. • 1 x fresh water. • 1 x waste water. • 1 x sewage. • 1 x bait / fish.	Third-party NMEA 2000 interfaces.	NMEA 2000 (via optional DeviceNet adaptor cables).

Item	Device Type	Maximum quantity	Suitable Devices	Connections
4	GPS (external) — Raymarine	1	Any combination of the following: • RS130. • Raystar125 GPS. • Raystar125+ GPS (via optional SeaTalk to SeaTalk^{ng} converter).	SeaTalk, SeaTalk^{ng}, or NMEA 0183.
5	Instruments — Raymarine	As determined by SeaTalk^{ng} bus bandwidth and power loading.	SeaTalk^{ng}: • i50 Depth, Speed, or Tridata • i60 Wind, CH Wind • i70. • ST70+. • ST70+ keypads. • ST70. SeaTalk (via optional SeaTalk to SeaTalk^{ng} converter): • i40 Wind, Speed, Depth, or Bidata. • ST40 Wind, Speed, Depth, Rudder, or Compass. • ST60+ Wind, Speed, Depth, Rudder, or Compass.	SeaTalk, SeaTalk^{ng}.
6	Pilot control heads — Raymarine	As determined by SeaTalk or SeaTalk^{ng} bus bandwidth and power loading, as appropriate.	SeaTalk^{ng}: • p70. • p70R. • ST70+. (SeaTalk^{ng} course computer only.) • ST70. (SeaTalk^{ng} course computer only.) SeaTalk (via optional SeaTalk to SeaTalk^{ng} converter): • ST6002. • ST7002. • ST8002.	SeaTalk, SeaTalk^{ng}.
7	Course computer — Raymarine	1	SeaTalk^{ng}: • Evolution autopilots. • All SPX course computers. SeaTalk (via optional SeaTalk to SeaTalk^{ng} converter): • ST1000. • ST2000. • S1000. • S1. • S2. • S3.	SeaTalk, SeaTalk^{ng}, or NMEA 0183.
8	AIS — Raymarine	1	• AIS 350. • AIS 650. • AIS 950 • AIS 250. • AIS 500.	SeaTalk^{ng}, or NMEA 0183.
8	AIS — third-party	1	Third-party NMEA 0183–compatible AIS Class A or Class B receiver / transceiver.	NMEA 0183
9	Vessel trim tabs — third-party	1 pair	Third-party NMEA 2000 interfaces.	NMEA 2000 (via optional DeviceNet adaptor cables).
10	Video / camera	2	Composite PAL or NTSC video source.	BNC connectors.

Item	Device Type	Maximum quantity	Suitable Devices	Connections
10	IP camera	Multiple **Note:** Only 1 IP camera can be viewed at a time.	Third party IP camera **Note:** IP cameras must be able to assign IP address via DHCP and allow unauthenticated, anonymous ONVIF access.	Via SeaTalk^{hs} network.
11	Lifetag (Man overboard alert)	1 basestation	All Raymarine Lifetag basestations.	SeaTalk (via optional SeaTalk to SeaTalk^{ng} converter)
12	Engine interface — Raymarine	1 per engine CAN bus	ECI	SeaTalk^{ng}.
12	Engine interface — third-party	1	Third-party NMEA 2000 interfaces.	NMEA 2000 (via optional DeviceNet adaptor cables).
13	Transducers and sensors — Raymarine	1	Analog transducers: • Wind. • Speed. • Depth.	SeaTalk^{ng} (via iTC-5 converter).
13	Transducers and sensors — Airmar	1	• DT800 Smart Sensor. • DST800 Smart Sensor. • PB200 weather station.	SeaTalk^{ng} (via optional iTC-5 converter).
14	Video Output	1	External display.	HDMI
15	Auxiliary alarm	1	as supplied	Connected using the Video in / Alarm connector.
16	DSC VHF radio — Raymarine	1	SeaTalk^{ng}: • Ray260 • Ray260 AIS NMEA 0183: • Ray49 • Ray55 • Ray218 • Ray240	
17	Raymarine Sirius marine weather / satellite radio receiver (North America only)	1	SeaTalk^{hs}: • SR150. • SR100. • SR6. SeaTalk^{ng}: • SR50.	SeaTalk^{hs}, SeaTalk^{ng}.
18	Additional multifunction display(s) — Raymarine	5	SeaTalk^{hs} (recommended): • a Series multifunction displays. • c Series multifunction displays. • e Series multifunction displays. • gS Series multifunction displays. **Note:** You can connect Raymarine multifunction displays using NMEA 0183 or SeaTalk^{ng} but not all functions are supported. **Note:** Visit www.raymarine.com to download the latest software version for your display.	SeaTalk^{hs}.

Item	Device Type	Maximum quantity	Suitable Devices	Connections
18	Additional multifunction display(s) — third-party	• Connections to multifunction display NMEA outputs: 4. • Connections to multifunction display NMEA inputs: 2	NMEA 0183–compatible chartplotters and multifunction displays.	NMEA 0183
19	Fishfinder (Sonar Module) — Raymarine	1	• CP450C • CP300 • CP100	SeaTalk^{hs}.
20	Radar — Raymarine	1	All Raymarine Non-HD Digital Radomes and HD or SuperHD radar scanners. **Note:** Please ensure your radar scanner is using the latest software version.	SeaTalk^{hs}.
21	Thermal camera — Raymarine	1	• T200 Series • T300 Series • T400 Series • T800 Series • T900 Series	SeaTalk^{hs} (for control), BNC connector (for video).
22	Remote keypad	Multiple	• RMK-9	SeaTalk^{hs}
23	Fusion entertainment systems	Multiple	Fusion 700 series entertainment systems: • MS-IP700 • MS-AV700	SeaTalk^{hs}
24	PC / laptop	1	Windows-compatible PC or laptop running Raymarine Voyager planning software.	SeaTalk^{hs}

3.2 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.

3.3 System Limits

The following limits apply to the number of system components that can be connected in a Raymarine multifunction display system.

Component	Maximum
Maximum number of SeaTalk^{hs} devices	25
Maximum number of SeaTalk^{ng} devices	50
Raymarine multifunction displays.	10

3.4 Multiple data sources (MDS) overview

Installations that include multiple instances of data sources can cause data conflicts. An example is an installation featuring more than one source of GPS data.

MDS enables you to manage conflicts involving the following types of data:

- GPS Position.
- Heading.
- Depth.
- Speed.
- Wind.

Typically this exercise is completed as part of the initial installation, or when new equipment is added.

If this exercise is NOT completed the system will automatically attempt to resolve data conflicts. However, this may result in the system choosing a source of data that you do not want to use.

If MDS is available the system can list the available data sources and allow you to select your preferred data source. For MDS to be available all products in the system that use the data sources listed above must be MDS-compliant. The system can list any products that are NOT compliant. It may be necessary to upgrade the software for these non-compliant products to make them compliant. Visit the Raymarine website (www.raymarine.com) to obtain the latest software for your products. If MDS-compliant software is not available and you do NOT want the system to automatically attempt to resolve data conflicts, any non-compliant product(s) can be removed or replaced to ensure the entire system is MDS-compliant.

3.5 Identifying your display variant

To discover which model display you have follow the steps below:

From the homescreen:

1. Select **Set-up**.
2. Select **Maintenance**.
3. Select **Diagnostics**.
4. Select **Select Device**.
5. Search the Network column for the **'This Device'** entry.
6. The Device column for this record will list the model of your display.

3.6 Networking constraints

Raymarine's 3rd generation LightHouse powered multifunction displays (a Series, c Series, e Series and gS Series) can be networked together.

General

- Multifunction displays should be connected together using SeaTalkhs.

- Multifunction displays can also be connected via SeaTalkng or NMEA 0183, but not all functions are supported.

- All networked a Series, c Series and e Series displays must contain software version 4.xx or later.

- All networked gS series displays must contain software version 7.xx or later.

> **Note:** The a Series cannot be networked using NMEA 0183.

Master / repeater operation

- Any network featuring more than 1 multifunction display must have 1 of the displays designated as the data master.

- The data master display will receive data through NMEA 0183 and / or SeaTalkng, and bridge the data over SeaTalkhs to other networked displays.

Homescreen sharing

- When networked multifunction displays can share a homescreen.

Cartography sharing

- The cartography contained on chart cards is always used in preference to embedded cartography when a chart card is inserted into a card slot.

- Chart card cartography can be shared between multifunction displays.

Radar operation

- Multifunction Displays support the use of 1 radar scanner at a time.

- The data supplied by a connected radar scanner is repeated to any networked displays.

Sonar / DownVision™ operation
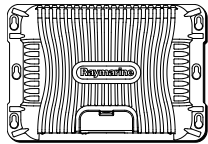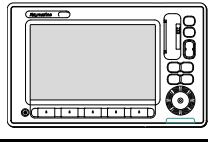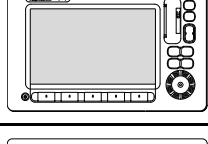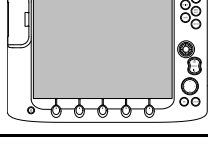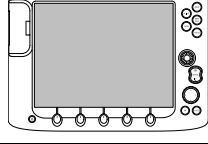
- You can connect an external sonar module unit to the multifunction display via the SeaTalkhs network.

- Sonar and DownVision™ variant multifunction displays include an internal sonar module which enables direct connection to a compatible transducer.

- You can have multiple active sonar modules (internal and external) on a network. You must select the sonar module / channel you want to use from the Fishfinder application menu.

- The data supplied by the sonar module is repeated to all networked displays.

> **Note:** All multifunction displays must have LightHouse II Release 10.xx software or later to enable multiple sonar support.

Incompatible displays

If you connect a multifunction display to your system that is not compatible a warning message will be displayed until you disconnected the incompatible device from your network.

3rd generation multifunction displays are not compatible with the following Raymarine displays:

Product Image	Multifunction display	Generation
	G-Series	2nd generation
	E-Series Widescreen	2nd generation
	C-Series Widescreen	2nd generation
	E-Series Classic	1st generation
	C-Series Classic	1st generation

3.7 Typical systems

The illustrations below show examples of possible system configurations.

For more details on compatible devices please refer to 3.1 System integration.

Example: Basic system
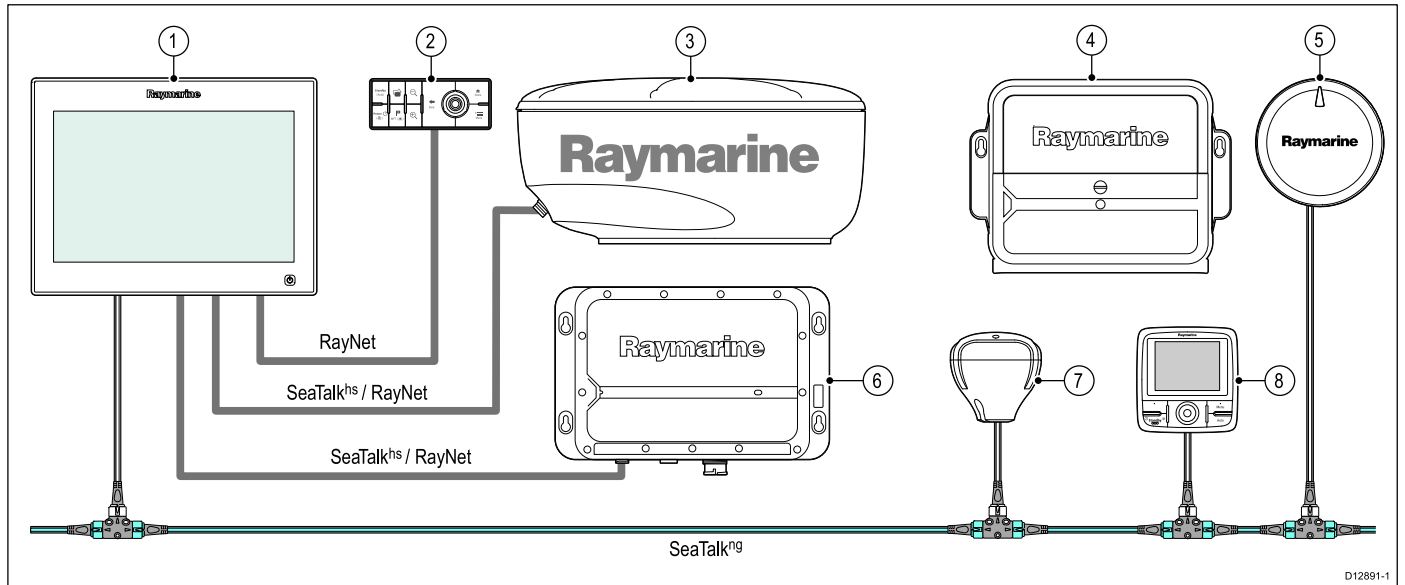
1. Multifunction display.
2. RMK-9 remote keypad.
3. Radar scanner.
4. Actuator Control Unit (ACU).
5. Attitude Heading Reference Sensor (AHRS).
6. Sonar module.
7. GPS receiver.
8. SeaTalk^{ng} pilot controller (optional).

Example: Expanded system
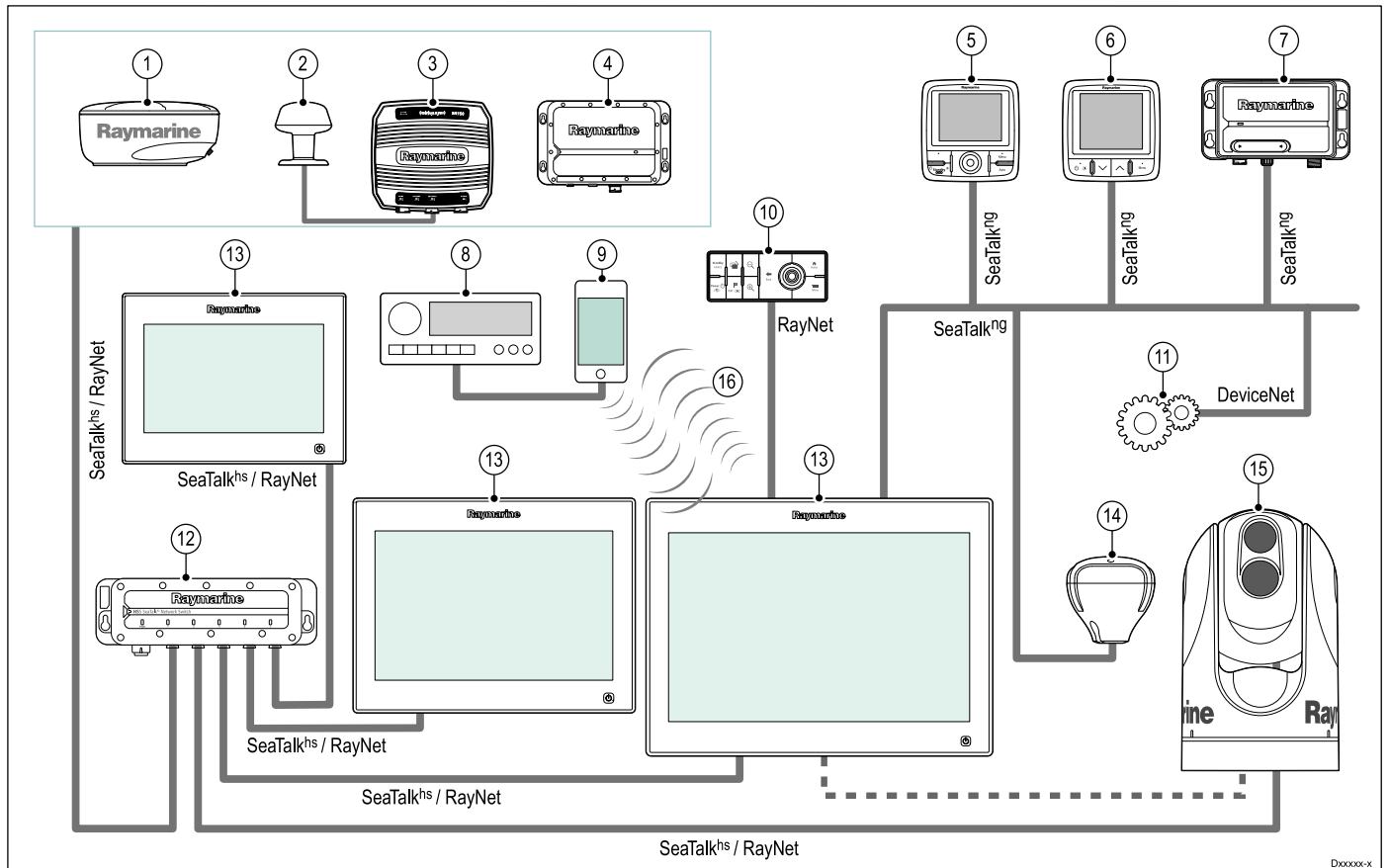
1. Radar scanner.
2. Weather sensor.
3. Sirius weather receiver.

4. Sonar module.

5. SeaTalk^{ng} Pilot controller.

6. SeaTalk^{ng} Instrument display.

7. AIS receiver / transceiver.

8. Audio system.

9. Smartphone / tablet.

10. Remote keypad.

11. DeviceNet spur (for NMEA 2000 devices).

12. Network switch.

13. Multifunction display.

14. GPS receiver.

15. Thermal camera.

16. Wireless connection.

3.8 System protocols

Your Multifunction Display can connect to various instruments and displays to share information and so improve the functionality of the system. These connections may be made using a number of different protocols. Fast and accurate data collection and transfer is achieved by using a combination of the following data protocols:

- SeaTalk^{hs}
- SeaTalk^{ng}
- NMEA 2000
- SeaTalk
- NMEA 0183

Note: You may find that your system does not use all of the connection types or instrumentation described in this section.

SeaTalk^{hs}

SeaTalk^{hs} is an ethernet based marine network. This high speed protocol allows compatible equipment to communicate rapidly and share large amounts of data.

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

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

Seatalk^{ng}

SeaTalk^{ng} (Next Generation) is an enhanced protocol for connection of compatible marine instruments and equipment. It replaces the older SeaTalk and SeaTalk^2 protocols.

SeaTalk^{ng} 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.

SeaTalk^{ng} is a proprietary extension to NMEA 2000 and the proven CAN bus technology. Compatible NMEA 2000 and SeaTalk / SeaTalk^2 devices can also be connected using the appropriate interfaces or adaptor cables as required.

NMEA 2000

NMEA 2000 offers significant improvements over NMEA 0183, most notably in speed and connectivity. Up to 50 units can simultaneously transmit and receive on a single physical bus at any one time, with each node being physically addressable. The standard was specifically intended to allow for a whole network of marine electronics from any manufacturer to communicate on a common bus via standardized message types and formats.

SeaTalk

SeaTalk is a protocol which enables compatible instruments to connect to each other and share data.

The SeaTalk cable system is used to connect compatible instruments and equipment. The cable carries power and data and enables connection without the need for a central processor.

Additional instruments and functions can be added to a SeaTalk system, simply by plugging them into the network. SeaTalk equipment can also communicate with other non-SeaTalk equipment via the NMEA 0183 standard, provided a suitable interface is used.

NMEA 0183

The NMEA 0183 Data Interface Standard was developed by the National Marine Electronics Association of America. It is an international standard to enable equipment from many different manufacturers to be connected together and share information.

The NMEA 0183 standard carries similar information to SeaTalk. However it has the important difference that one cable will only carry information in one direction. For this reason NMEA 0183

is generally used to connect a data receiver and a transmitter together, e.g. a compass sensor transmitting heading to a radar display. This information is passed in 'sentences', each of which has a three letter sentence identifier. It is therefore important when checking compatibility between items that the same sentence identifiers are used some examples of which are:

- VTG - carries Course and Speed Over Ground data.
- GLL - carries latitude and longitude.
- DBT - carries water depth.
- MWV - carries relative wind angle and wind speed data.

NMEA Baud rates

The NMEA 0183 standard operates at a number of different speeds, depending upon the particular requirement or equipment capabilities. Typical examples are:

- 4800 baud rate. Used for general purpose communications, including FastHeading data.
- 38400 baud rate. Used for AIS and other high speed applications.

3.9 Data master

Any system containing more than one networked multifunction display must have a designated data master.

The data master is the display which serves as a primary source of data for all displays, it also handles all external sources of information. For example the displays may require heading information from the autopilot and GPS systems, usually received through a SeaTalk^{ng} or NMEA connection. The data master is the display to which the SeaTalk, NMEA and any other data connections are made, it then bridges the data to the SeaTalk^{hs} network and any compatible repeat displays. Information shared by the data master includes:

- Cartography
- Routes and waypoints
- Radar
- Sonar
- Data received from the autopilot, instruments, the engine and other external sources.

Your system may be wired for redundancy with data connections made to repeat displays. However these connections will only become active in the event of a fault and/or reassignment of the data master.

In an autopilot system which does not contain a dedicated pilot control head the Data master also acts as the control for the autopilot.

3.10 Parts supplied

The following parts are supplied with your product.

D12886-2
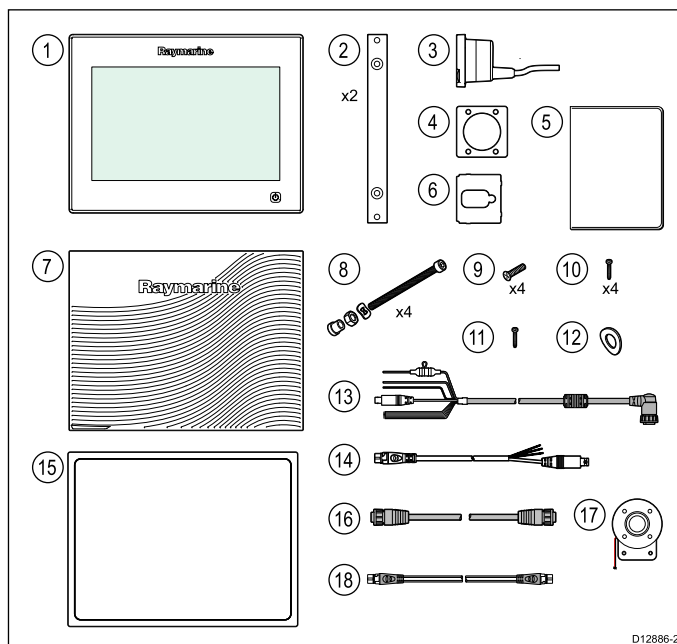
1	Multifunction display.
2	2 x Display mounting brackets.
3	RCR-2 Remote Card Reader.
4	Mounting gasket for RCR-2.
5	Document pack.
6	RCR-2 inlay card x 2
7	Sun cover.
8	4 x securing bolts, washers and feet.
9	4 x Bracket fixings (M5 x 25 countersunk screws for gS125 and gS165, M5 x 25 pan head screws for gS95).
10	4 x RCR-2 fixings (M5 x 60 screws).
11	M5 x 10 pan head screw (only supplied with gS125 and gS165).
12	M5 Wavy washer (for additional grounding strap)
13	1.5 m (4.9 ft) Power / Data cable.
14	2 m (6.6 ft) Video / Alarm cable.
15	Display mounting gasket.
16	2 m (6.6 ft) RayNet cable.
17	Auxiliary alarm.
18	1m (3.28 ft) SeaTalk^{ng} spur cable.

3.11 Tools required for installation
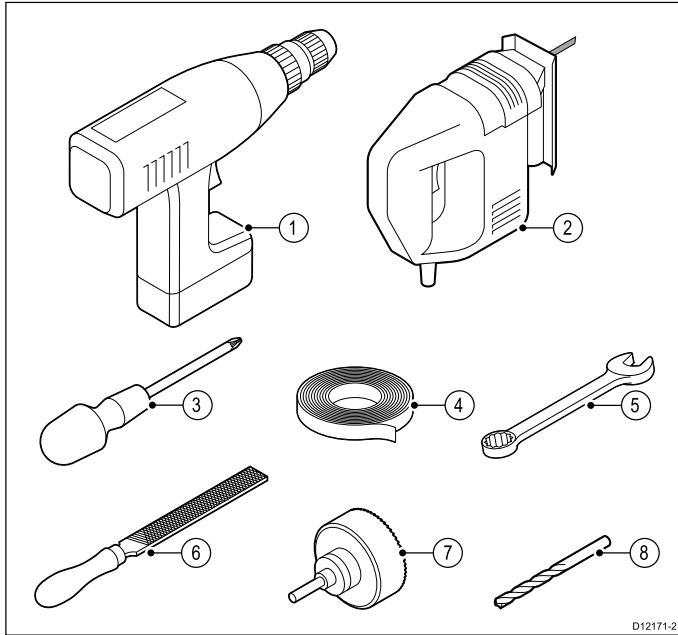
1. Power drill.

2. Jigsaw.

3. Pozidrive screwdriver.

4. Adhesive tape.

5. Spanner for surface mounting or bracket mounting fixings.

6. File.

7. Hole saw for flush mounting (For hole saw size refer to your product's mounting template).

8. Drill bit for surface mounting or flush mounting.

Additional tools for Flush mounting

For best results when flush mounting the displays it is recommended that a router is used to cut out the rebate.

3.12 Selecting a location

⚠️ **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).

General location requirements

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

Key factors which can affect product performance are:

- **Ventilation**

  To ensure adequate airflow:

  – Ensure that product is mounted in a compartment of suitable size.

  – Ensure that ventilation holes are not obstructed. Allow adequate separation of all equipment.

  Any specific requirements for each system component are provided later in this chapter.

- **Mounting surface**

  Ensure product is adequately supported on a secure surface. Do not mount units or cut holes in places which may damage the structure of the vessel.

- **Cabling**

  Ensure the product is mounted in a location which allows proper routing, support and connection of cables:

  – Minimum bend radius of 100 mm (3.94 in) unless otherwise stated.

  – Use cable clips to prevent stress on connectors.

  – If your installation requires multiple ferrites to be added to a cable then additional cable clips should be used to ensure the extra weight of the cable is supported.

- **Water ingress**

  The product is suitable for mounting both above and below decks. Although the unit is waterproof, it is good practice to locate it in a protected area away from prolonged and direct exposure to rain and salt spray.

- **Electrical interference**

  Select a location that is far enough away from devices that may cause interference, such as motors, generators and radio transmitters / receivers.

- **Power supply**

  Select a location that is as close as possible to the vessel's DC power source. This will help to keep cable runs to a minimum.

Caution: Mounting surface requirements

This product is heavy. To prevent potential damage to the product and / or your vessel, observe the following BEFORE installing the product:

- Refer to the weight information provided in the technical specification for this product and ensure that the intended mounting surface is suitable for bearing the weight.

- If the mounting surface is not suitable for the product weight, you may need to reinforce the mounting surface.

- If in doubt, refer to a professional marine equipment installer for further guidance.

Viewing angle considerations

As display contrast, color and night mode performance are all affected by the viewing angle, Raymarine recommends you temporarily power up the display when planning the installation, to enable you to best judge which location gives the optimum viewing angle.

Optimum viewing angle

Raymarine multifunction displays can be viewed from wide angles top to bottom and left to right. However there are a number of factors that can affect user experience, it is because of these factors that Raymarine recommends a narrower optimum viewing angle that should be taken into consideration before installing the product. The display is viewable outside of the optimum viewing angle but the best user experience is achieved when viewing within this angle.

LCD displays usually have a greater viewing from the top than from the bottom this is known as 12 o'clock orientation. To account for all installation scenarios gS Series multifunction displays are available in the standard 12 O'clock orientation and an inverted orientation which provides better viewing from the bottom than the top known as 6 O'clock orientation.

The viewing angles and the optimum viewing angle for the gS Series multifunction displays are shown below.

Standard orientation

	gS95 (12 O'clock)		gS125 (12 O'clock)		gS165 (12 O'clock)	
	Viewing angle	Optimum viewing	Viewing angle	Optimum viewing	Viewing angle	Optimum viewing
Top / Bottom	80 / 60	70 / 10	80 / 60	70 / 10	70 / 70	70 / 10
Left / Right	80 / 80	60 / 60	80 / 80	60 / 60	80 / 80	60 / 60

Inverted orientation

	gS95 INV (6 O'clock)		gS125 INV (6 O'clock)		gS165 INV (6 O'clock)	
	Viewing angle	Optimum viewing	Viewing angle	Optimum viewing	Viewing angle	Optimum viewing
Top / Bottom	60 / 80	10 / 70	60 / 80	10 / 70	70 / 70	10 / 70
Left / Right	80 / 80	60 / 60	80 / 80	60 / 60	80 / 80	60 / 60

The following diagram shows multifunction displays at various installation angles and the effect this has on user experience depending of whether a standard (illustrations on the left) or an inverted (illustrations on the right) display is used.

Optimum viewing angle

gS Display · gS INV Display

0°

+45°

+90°

-45°
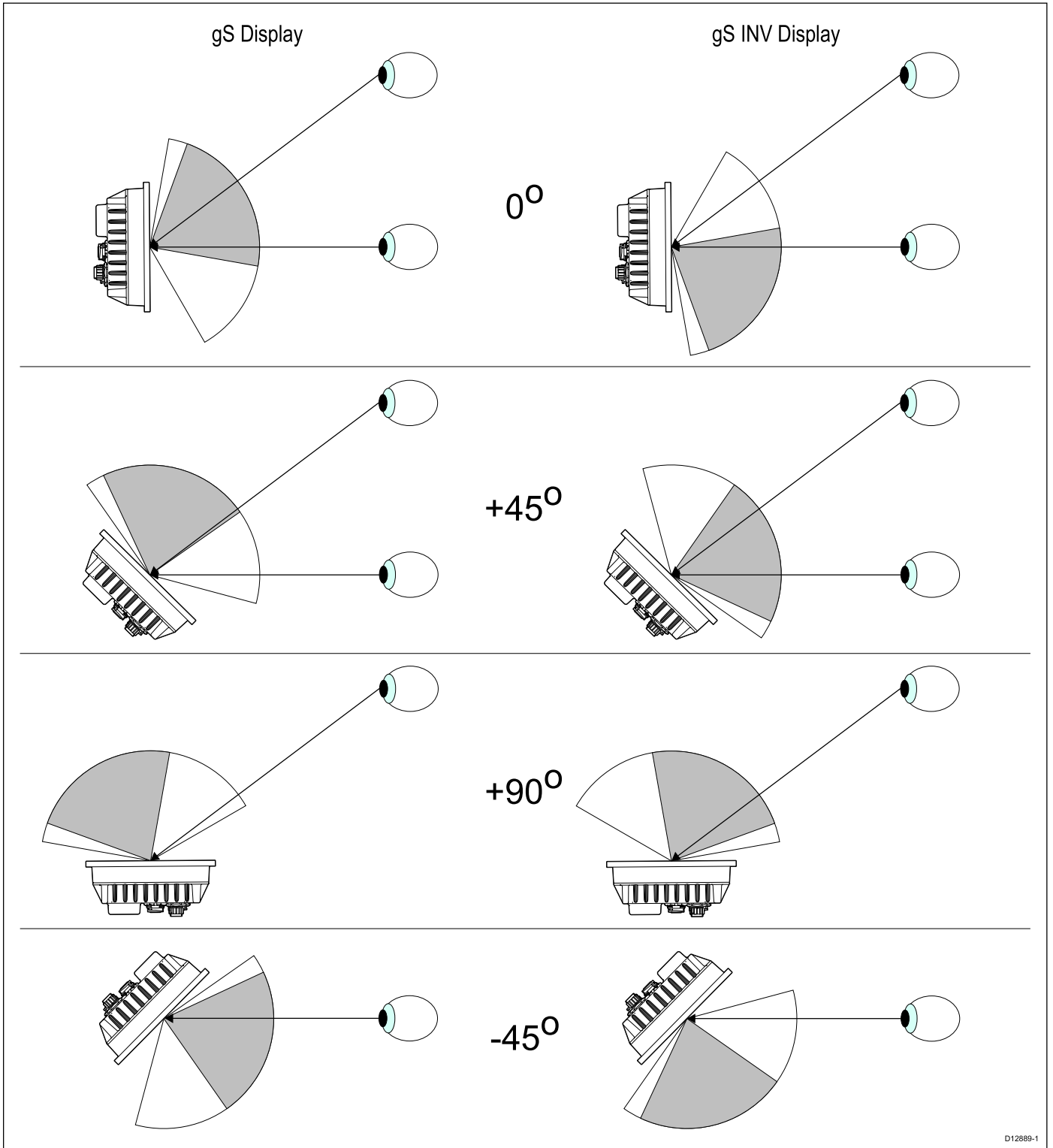
D12889-1

	Optimum viewing
	Viewing angle

Compass safe distance

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

When choosing a suitable location for the multifunction display you should aim to maintain the maximum possible distance between the display and 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 display this far away from a compass. In this situation, the following figures provide the minimum safe distance that should be maintained between the display and any compasses.

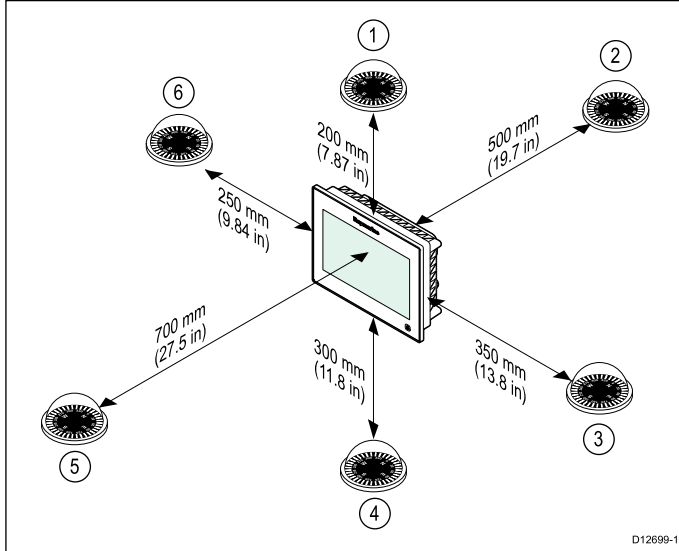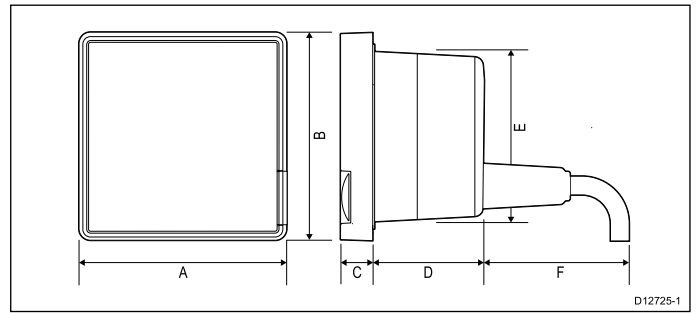| Item	Compass position in relation to display	Minimum safe distance from display
1	Top	200 mm (7.87 in.)
2	Rear	500 mm (19.7 in.)
3	Right-hand side	350 mm (13.8 in.)
4	Underside	300 mm (11.8 in.)
5	Front	700 mm (27.5 in.)
6	Left-hand side	250 mm (9.84 in.)

Product dimensions

	gS95	gS125	gS165
A	246.8 mm (9.7 in)	311.8 mm (12.3 in)	383.2 mm (15 in)
B	188.2 mm (7.4 in)	237.1 mm (9.3 in)	284.7 mm (11.2 in)
C	170.8 mm (6.7 in)	219.8 mm (8.7 in)	267.4 mm (10.5 in)
D	8 mm (0.3 in)	8 mm (0.3 in)	8 mm (0.3 in)
E	69 mm (2.72 in)	70 mm (2.75 in)	69 mm (2.72 in)
F	91 mm (3.6 in)	91 mm (3.6 in)	91 mm (3.6 in)

Card reader dimensions

A	55 mm (2.17 in)
B	55 mm (2.17 in)
C	8.5 mm (0.33 in)
D	36 mm (1.4 in)
E	39.2 mm (1.5 in)
F	90 mm (3.5 in)

Chapter 4: Cables and connections

Chapter contents

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.

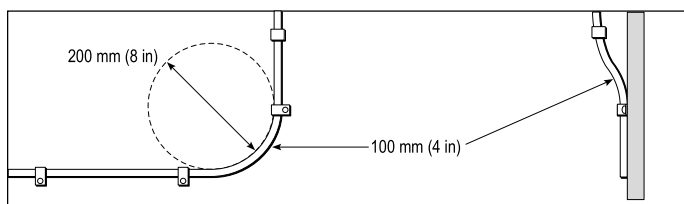- Do NOT bend cables excessively. Wherever possible, ensure a minimum bend diameter of 200 mm (8 in) / minimum bend radius of 100 mm (4 in).

- 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).

Cable suppression ferrites

To ensure optimum EMC performance and to comply with applicable EMC regulations the cables supplied with this product include suppression ferrites.

Two additional suppression ferrites are included for use when connecting additional RayNet cables (not supplied) to the display.

Fit a ferrite to each additional RayNet cable as shown below:
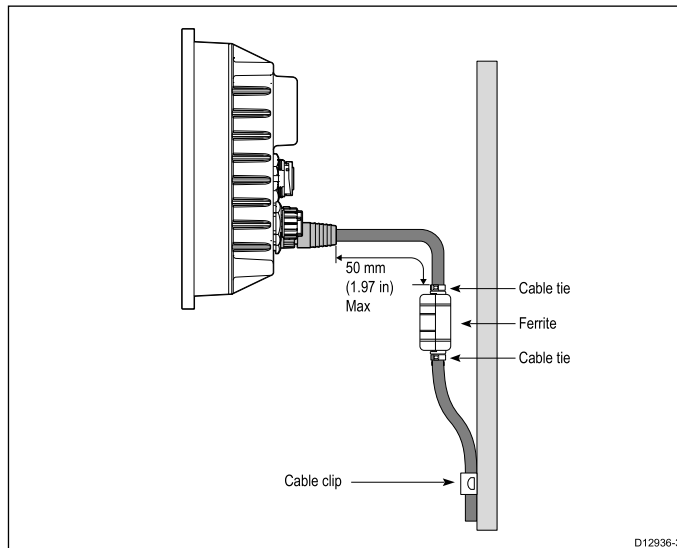
If you need to remove a ferrite for any reason, ensure it is replaced in its original location before using the product.

4.2 gS95 / gS125 / gS165 Connections overview

Details of the connections available on the multifunction display are shown below.
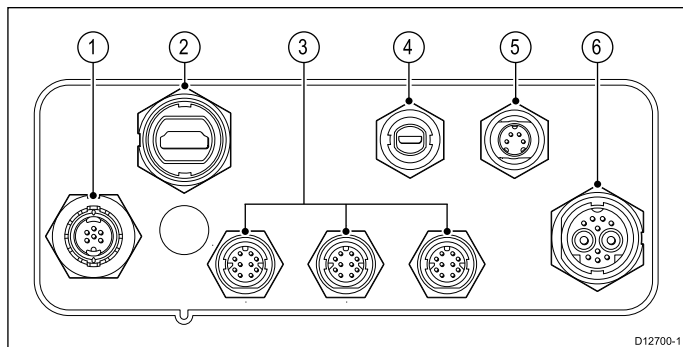
1	SeaTalkng
2	HDMI
3	3 x RayNet SeaTalkhs
4	Card reader
5	Video in / Alarm Out
6	Power / NMEA 0183 / Video in

4.3 Power connection
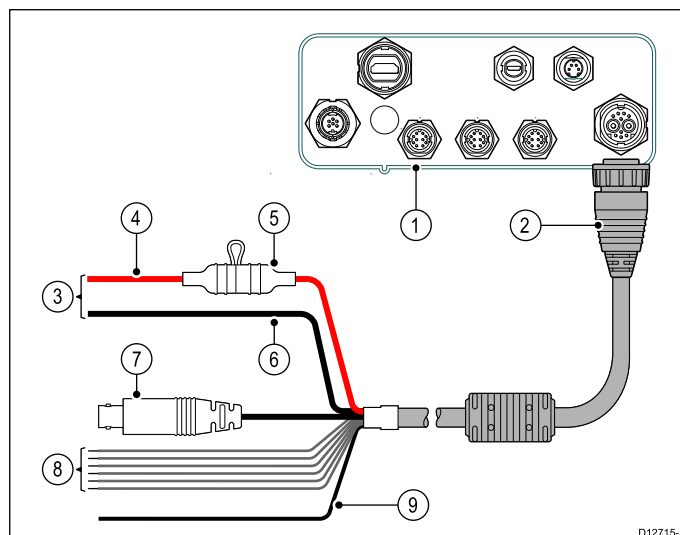
1. Multifunction display connections.
2. Power and data cable.
3. Connection to 12/24 V power supply.
4. Red cable (positive).
5. Fuse.
6. Black cable (negative).
7. Video input cable.
8. NMEA 0183 data cables.
9. Ground (drain) wire (thin black wire; must be connected to RF ground point).

Power distribution

Raymarine recommends that all power connections are made via a distribution panel.

- All equipment must be powered from a breaker or switch, with appropriate circuit protection.

> ⚠ **Warning: Product grounding**
>
> Before applying power to this product, ensure it has been correctly grounded, in accordance with the instructions in this guide.

Grounding — Dedicated drain wire

The power cable supplied with this product includes a dedicated shield (drain) wire for connection to a vessel's RF ground point.

It is important that an effective RF ground is connected to the system. A single ground point should be used for all equipment. The unit can be grounded by connecting the shield (drain) wire of the power cable to the vessel's RF ground point. On vessels without an RF ground system the shield (drain) wire should be connected directly to the negative battery terminal.

The dc power system should be either:

- Negative grounded, with the negative battery terminal connected to the vessel's ground.

- Floating, with neither battery terminal connected to the vessel's ground

> ⚡ **Warning: Positive ground systems**
>
> Do not connect this unit to a system which has positive grounding.

Power cable

The display is supplied with a combined power and data multi cable, this can be extended if required.

Power cables available

Cable	Part number	Notes
1.5 m (4.9 ft) Straight power and data cable	R62379	
1.5 m (4.9 ft) Right angled power and data cable	R70029	

Cable extension

The following restrictions apply to any extension to the power cable:

• Cable must be of a suitable gauge for the circuit load.

• Each unit should have its own dedicated power cable wired back to the distribution panel.

Total length (max)	Supply voltage	Cable gauge (AWG)
0–5 m (0–16.4 ft)	12 V	18
	24 V	20
5–10 m (16.4–32.8 ft)	12 V	14
	24 V	18
10–15 m (32.8–49.2 ft)	12 V	12
	24 V	16
15–20 m (49.2–65.5 ft)	12 V	12
	24 V	14

Note: These distances are for a 2 wire power cable run from the battery to the display (approximately the distance from the battery to the display). To calculate the round trip length, double the figure stated here.

Breakers, fuses and circuit protection (12 / 24 V systems)

The power cable includes an in-line fuse. It is recommended that you fit an additional thermal breaker or fuse at the distribution panel.

Fuse and breaker rating

Power supply voltage	Fuse rating	Thermal breaker rating
12 / 24 V	15 A in-line fuse fitted within power cable.	15 A (if only connecting one device).

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

Distribution panel connection

It is recommended that your product is wired through your vessel's distribution panel via a thermal breaker or fuse.
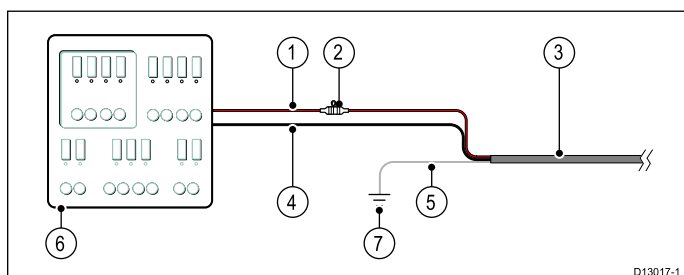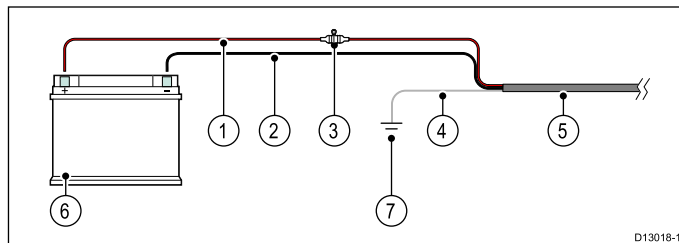

1. Vessel power supply positive (+)

2. In-line fuse. (If your products power cable does not have a built in fuse then an in-line fuse should be fitted.)

3. Product power cable

4. Vessel power supply negative (-)

5. * Drain wire

6. Vessel distribution panel

7. * Vessel RF ground point connection

Note: * Only applicable to products that include a drain wire on the product's power cable.

Battery connection with RF ground

If your vessel does not have a distribution panel then your product may be wired directly to the battery with the drain wire connected to the vessel's RF ground point.

1. Vessel power supply positive (+)

2. Vessel power supply negative (-)

3. In-line fuse (If your products power cable does not have a built in fuse then an in-line fuse should be fitted.)

4. * Drain wire

5. Product power cable

6. Vessel battery

7. * Vessel RF ground point connection

Note: * Only applicable to products that include a drain wire on the product's power cable.

Battery connection with no RF ground

If your vessel does not have a distribution panel or an RF ground point then your product may be wired directly to the battery with the drain wire also connected to the battery's negative terminal.
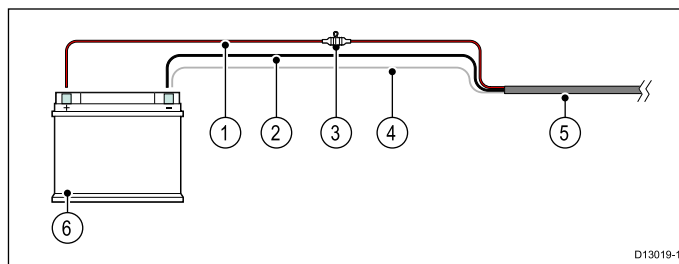

1. Vessel power supply positive (+)

2. Vessel power supply negative (-)

3. In-line fuse (If your products power cable does not have a built in fuse then an in-line fuse should be fitted.)

4. * Drain wire connected to vessel negative power supply.

5. Product power cable

6. Vessel battery

Note: * Only applicable to products that include a drain wire on the product's power cable.

Sharing a breaker

Where more than 1 piece of equipment shares a breaker you must provide protection for the individual circuits. E.g. by connecting an in-line fuse for each power circuit.
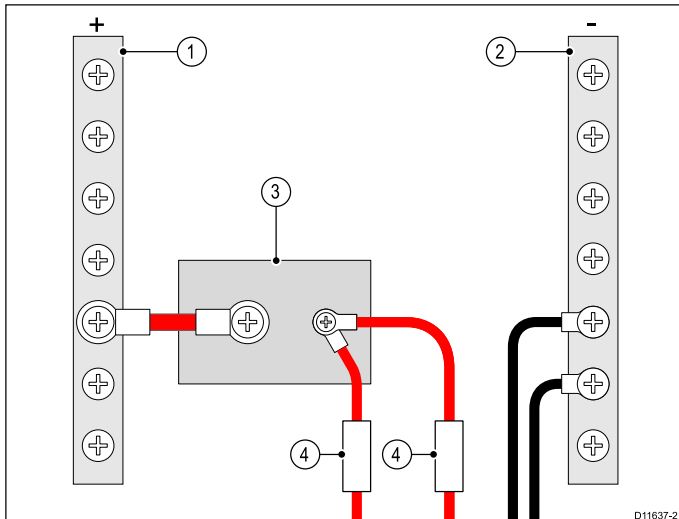
1	Positive (+) bar
2	Negative (-) bar
3	Circuit breaker
4	Fuse

Where possible, connect individual items of equipment to individual circuit breakers. Where this is not possible, use individual in-line fuses to provide the necessary protection.

Touchscreen interference

In exceptional circumstances, due to the proximity of certain electronic equipment that may be on the vessel the touchscreen may become unresponsive due to electrical interference.

In the unlikely event of this occurring the interference can be suppressed by adding a grounding strap (not supplied) to the rear case of the multifunction display.

The grounding strap should be connected to the vessel's RF ground point, or where no ground point exists to the negative terminal of the vessel's power supply. The minimum recommended cable thickness to be used for the grounding strap is 14AWG.

Note: On a gS95 the grounding points are the same holes used for the mounting bracket securing bolts.

The grounding strap should be fitted as shown below.
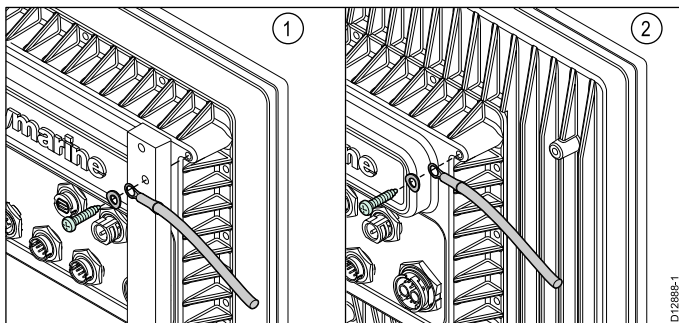
1	Fitting grounding strap to a gS95.
2	Fitting grounding strap to a gS125 or gS165.

An extra screw and washer has been provided for the gS125 and gS165 to secure the grounding strap to the rear case.

The grounding strap can be connected to any of the locations shown below.
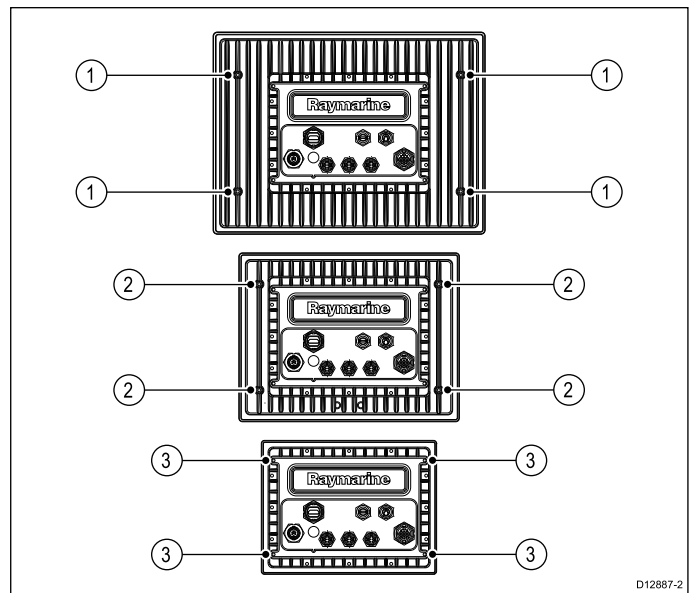
1	gS165 grounding strap points
2	gS125 grounding strap points
3	gS95 grounding strap points

Note:

All 4 holes contain plastic screws. The plastic screws should be removed as follows:

- **gS95** — ALL 4 plastic screws must be removed to enable attaching the mounting brackets.
- **gS125 / gS165** — The plastic screw should be removed ONLY from the location you want to use for the grounding strap point.

Do not use the plastic screws for attaching mounting brackets or the ground strap.

4.4 Card reader connection

The card reader must be connected directly to the dedicated card reader connector on the rear of the display.

Note: Do not use cable extensions when connecting the card reader to the display.

D12698-1
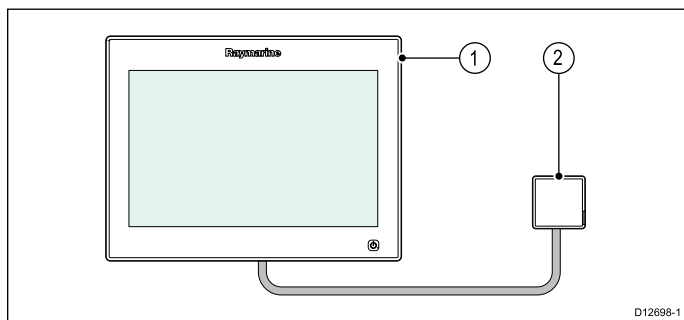
- Multifunction display.
- Card reader.

Note: The card reader must be connected directly to the display.

4.5 Auxiliary alarm connection

The auxiliary alarm (supplied) can be connected to the Video in / Alarm out connector of the multifunction display.

D12806-2
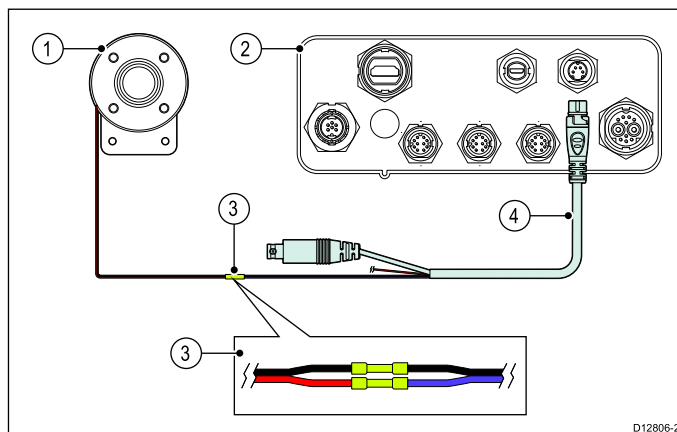
1. Auxiliary alarm (supplied).
2. Multifunction display rear connector panel.
3. Connection — Wires should be connected **Black** to **Black** and **Red** to **Purple**.
4. Video In / Alarm out cable (supplied).

The auxiliary alarm to cable connection should be made using suitable connectors (e.g. crimps). To prevent damage due to water ingress ensure the connection is watertight.

4.6 Network connections

You can connect a number of digital devices to your multifunction display using the Network connector(s) at the rear of the unit. A typical network of digital devices may include:

• Up to 6 Raymarine multifunction displays.

• SeaTalk^{hs} and RayNet digital devices such as a sonar module and radar scanner.

• Ethernet devices such as IP cameras.

Your multifunction display includes 3 network connectors which also provide Power over Ethernet (PoE). Networks requiring additional network connections will require a Raymarine network switch.

Typical SeaTalk^{hs} network

1. gS Series multifunction display.

2. Remote keypad (PoE).

3. Thermal camera (PoE).

4. Sonar module.

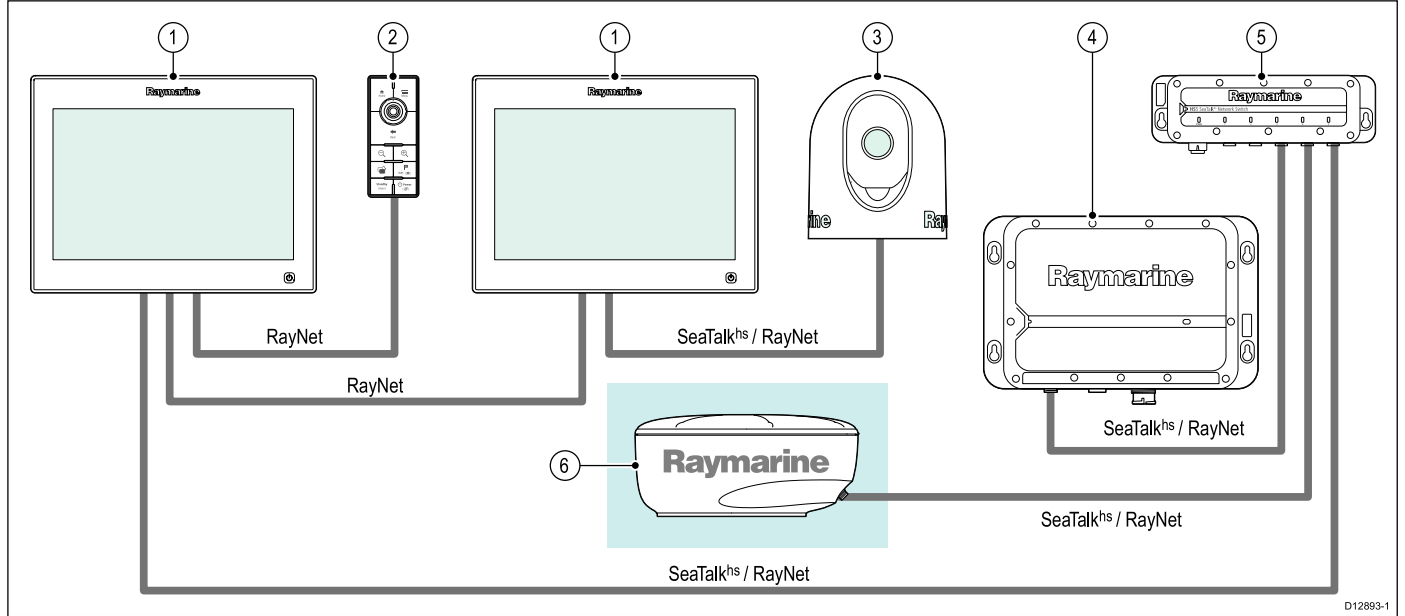5. Network switch.

6. Radar scanner.

In the example above both the Remote control and thermal camera are supplied Power over Ethernet (PoE) by the gS displays.

Note: The RayNet cable supplied with the display includes a suppression ferrite. 2 additional suppression ferrites are supplied with the display, these must be used on any additional network connections.

Power over Ethernet (PoE)

This product can supply Power over Ethernet (PoE) to class 1, 2 and 3 devices. The product can output a maximum of 20 Watts for consumption by PoE devices.

The PoE class denotes the power range of the PoE device.

PoE Class	Power range	Class description
Class 1	0.44 W to 3.84 W	Very low power
Class 2	3.84 W to 6.49 W	Low power
Class 3	6.49 W to 12.95 W	Mid power
Class 0	0.44 W to 12.95 W	-

Note: The product will not provide power to class 4 devices.

The product can power up to 3 devices using the available network / PoE ports as long as the combined max power of the PoE devices does not exceed 20 watts.

When a PoE device is connected it is interrogated to establish if the device is PoE and if so what class of device it is. The max power for that class of device is then assigned to that port (e.g. class 2 = 6.49 W) and deducted from the remaining power output.

The table below shows acceptable configurations of PoE devices.

Class 1 (3.84 W)	Class 2 (6.49 W)	Class 3 / Class 0 (12.95 W)	Total power used
1			3.84 W
2			7.68 W
3			11.52 W
	1		6.49 W
	2		12.98 W
	3		19.47 W
1	1		10.33 W
2	1		14.17 W
1	2		16.82 W
		1	12.95 W
1		1	16.79 W
	1	1	19.44 W

Note: A class 0 device shall be assigned the same power allocation as a class 3 device.

Note: If a PoE device is connected that will take the total assigned power over 20 W the device will not be powered.

Network cable connector types

There are 2 types of network cable connector — SeaTalk[hs] and RayNet.

	SeaTalk[hs] connector — used for connecting SeaTalk[hs] devices to a Raymarine network switch via SeaTalk[hs] cables.
	RayNet connector — used for connecting Raymarine network switches and SeaTalk[hs] devices to the multifunction display via RayNet cables. Also required for connecting a crossover coupler if only one device is being connected to the display's Network connector.

Keypad connection

The keypad can be connected directly to a multifunction display's network connector or via a network switch. Multiple keypads can be connected to a system. Each keypad can be used to control up to 4 multifunction displays. If the network does not provide Power over Ethernet (PoE) then the keypad must be powered separately.
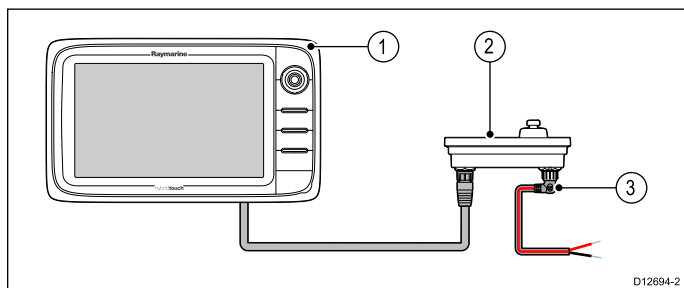
Direct connection — gS Series multifunction display
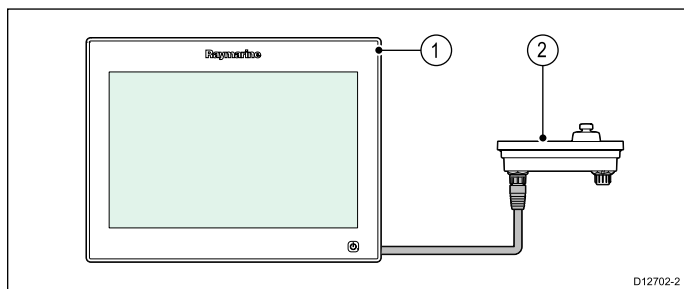
1. gS Series multifunction display.
2. Keypad.

When connecting the keypad directly to a gS Series multifunction display the keypad is supplied with PoE, from the multifunction display.
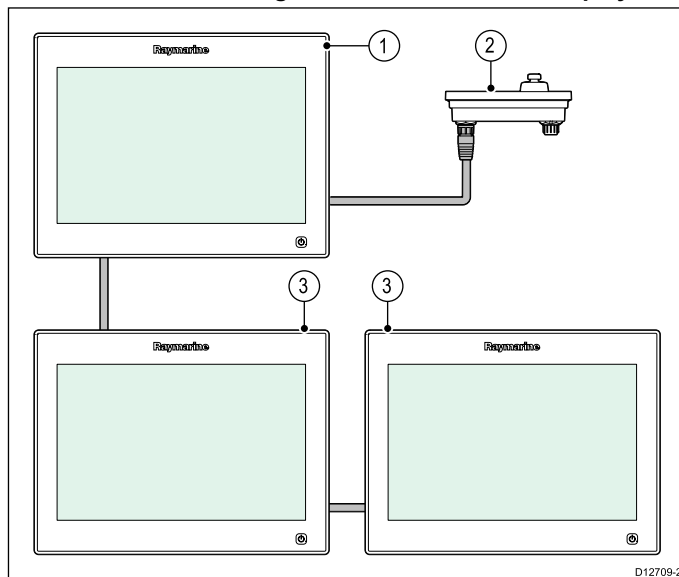
Direct connection — Raymarine multifunction display

1. Multifunction display.
2. Keypad.
3. Right angled power cable.

When connecting the keypad directly to a New a Series, New c Series or New e Series multifunction display the keypad is not supplied with PoE, and so requires power using the alternate power connector.

Network connection — gS Series multifunction displays

1. gS Series multifunction display (supplying PoE to the keypad).
2. Keypad.
3. Networked gS Series multifunction displays.

When connecting the keypad to a gS Series multifunction display network the keypad is supplied with PoE.

Network connection — Raymarine multifunction displays
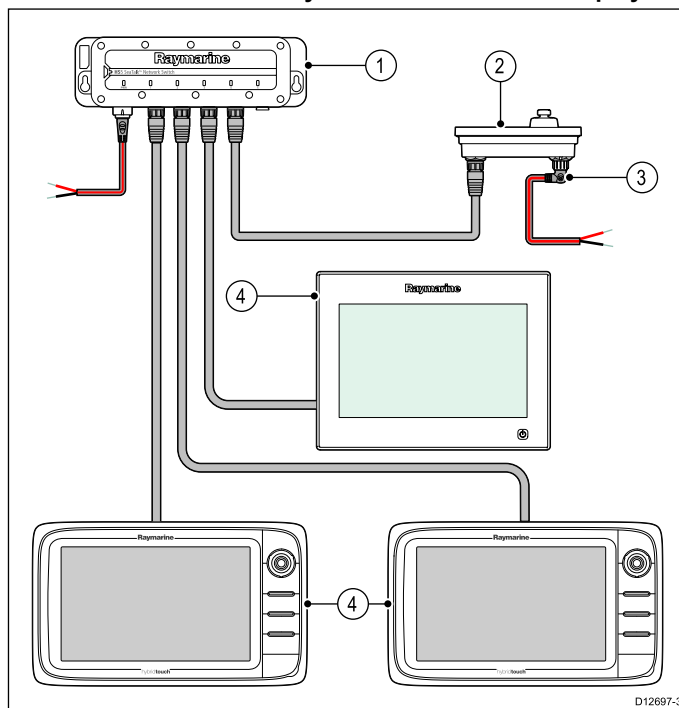
1. Network switch.
2. Keypad.
3. Right angled power cable.
4. Networked multifunction displays.

When connecting the keypad to a network switch the keypad requires a separate power supply using the alternate power connector.

Once connected the keypad must be paired with the each multifunction display you want to control using the keypad.

Radar connection

The multifunction display is compatible with Raymarine Non-HD digital radomes and HD / SuperHD radar scanners. The scanner is connected using over SeaTalk[hs].

The radar is usually connected via a Raymarine network switch. On smaller systems (with only 3 network devices) the radar may be connected directly to the display.

Radar connected using Raymarine network switch
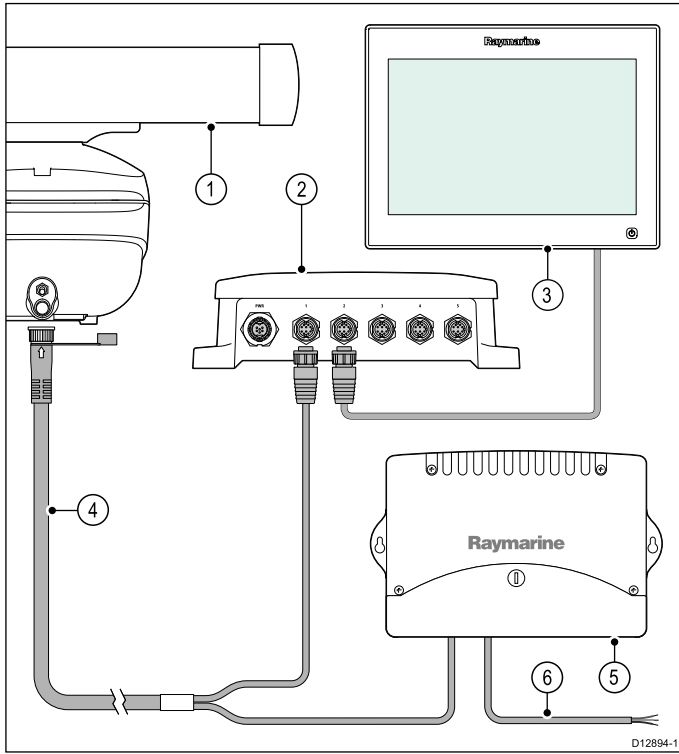
1. Radar scanner.

2. Raymarine network switch.

3. gS multifunction display.

4. RayNet radar cable.

5. VCM (Voltage Converter Module) — **required for Open Arrays**.

6. Power connection.

Radar connected directly to the display

1. Radar scanner

2. Multifunction display rear connector panel.

3. RayNet Radar cable.

4. Connection to power supply — **Open array scanners require a VCM (Voltage Converter Module).**

Radar cable extension

For longer cable runs a radar power and data digital cable extension is required.

RJ45 SeaTalkhs Radar cable connection

To connect a Radar using an RJ45 SeaTalkhs radar cable additional accessories are required.

1. RJ45 SeaTalkhs Radar cable.

2. RayNet to RJ45 SeaTalkhs adaptor cable.

3. SeaTalkhs crossover coupler.
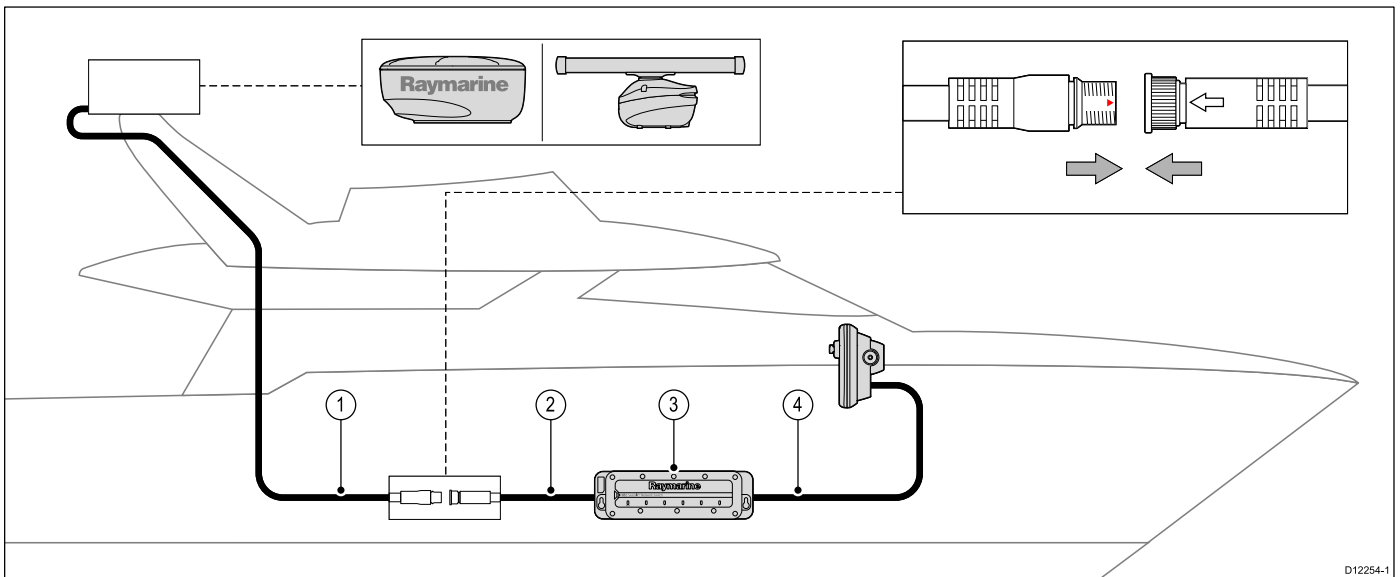
1. Radar extension cable.

2. Radar power and data digital cable.

3. Raymarine network switch (or crossover coupler if connecting radar directly to display).

4. RayNet cable (or RayNet to SeaTalk^{hs} cable if connecting via crossover coupler).

Note: The extension cable connects to the radar scanner.

Note: The power connection is NOT shown in the diagram. If using an Open Array scanner a VCM (Voltage Converter Module) must be connected between the scanner and the power supply.

Digital radar cables

You will need a dedicated radar power and data digital cable and appropriate network cables to connect your scanner to your system.

Connection	Required cable
Radar scanner to power supply and Raymarine network switch.	Power and data digital cable. For longer cable runs, extensions are available in a variety of lengths.
Raymarine network switch to multifunction display.	Network cables, available in a variety of cable lengths.

SeaTalk^{hs} Radar power and data digital cables

These cables contain the wires for a scanner's power and data connections.

Cable	Part number
RJ45 SeaTalk^{hs} 5 m (16.4 ft) Power and data digital cable	A55076D
RJ45 SeaTalk^{hs} 10 m (32.8 ft) Power and data digital cable	A55077D
RJ45 SeaTalk^{hs} 15 m (49.2 ft) Power and data digital cable	A55078D
RJ45 SeaTalk^{hs} 25 m (82.0 ft) Power and data digital cable	A55079D

Note: The maximum length for the radar power and data digital cable (including any extensions) is 25 m (82 ft).

RayNet Radar power and data digital cables

These cables contain the wires for a scanner's power and data connections.

Cable	Part number
RayNet 5 m (16.4 ft) Power and data digital cable	A80227
RayNet 10 m (32.8 ft) Power and data digital cable	A80228

Cable	Part number
RayNet 15 m (49.2 ft) Power and data digital cable	A80229
RayNet 25 m (82.0 ft) Power and data digital cable	A80230

Note: The maximum length for the radar power and data digital cable (including any extensions) is 25 m (82 ft).

Radar power and data digital extension cables

These cables extend the power and data digital cables for a scanner's power and data connections.

Cable	Part number
2.5 m (8.2 ft) Power and data digital cable	A92141D
5 m (16.4 ft) Power and data digital cable	A55080D
10 m (32.8 ft) Power and data digital cable	A55081D

Note: The maximum length for the radar power and data digital cable (including any extensions) is 25 m (82 ft).

Sonar module connection

A sonar connection is required for fishfinder applications.

The multifunction display can be used with the following sonar modules:

- CP450C
- CP300
- CP100

Note: You must ensure that the cable ends connected into the display and sonar module have a locking / weather-tight mechanism.

Direct sonar module connection

On smaller systems (with only 3 network devices) the sonar module may be connected directly to the display.

D12896-1

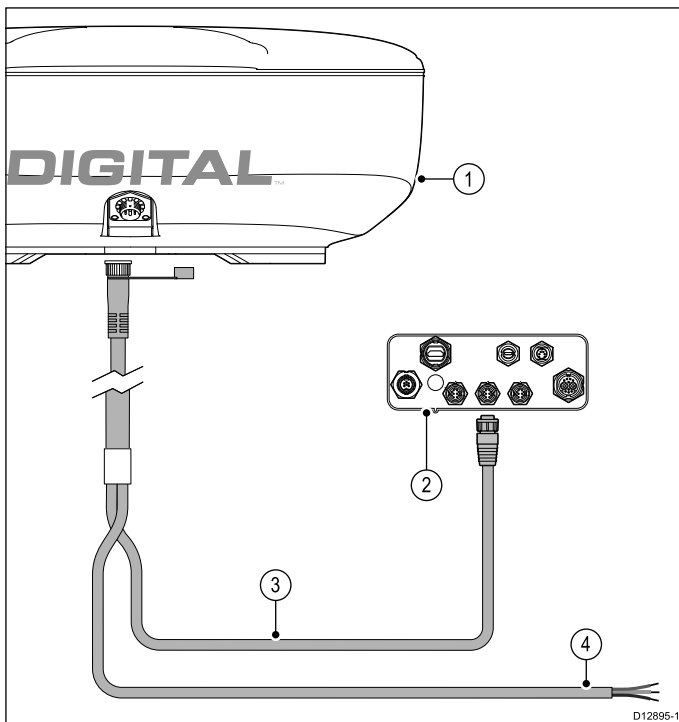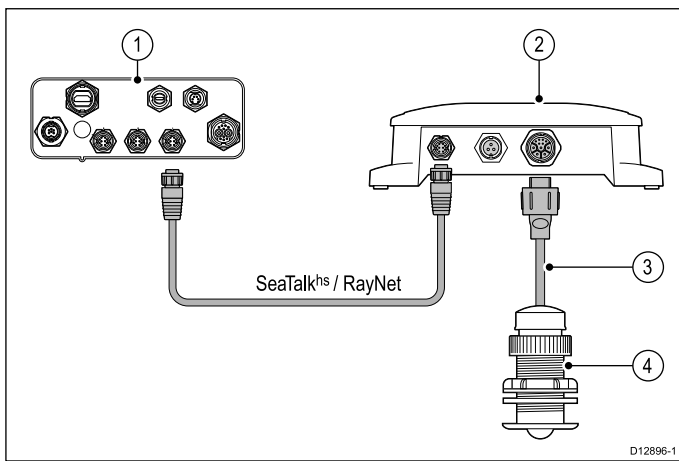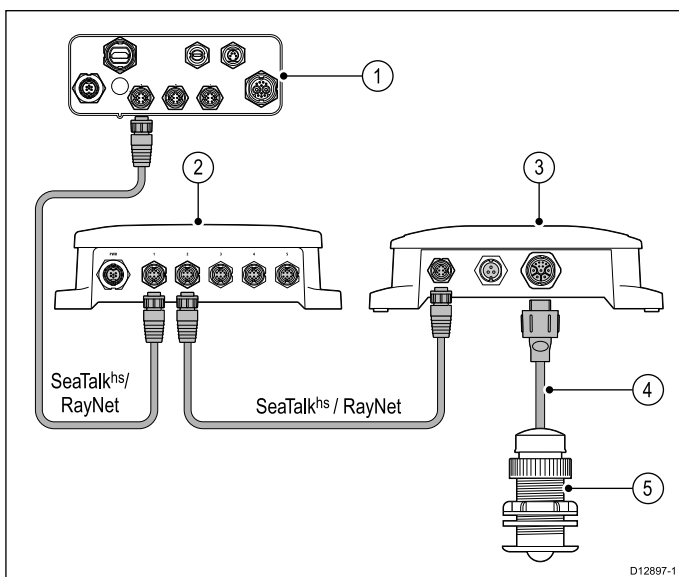1. Multifunction display rear connector panel.

2. Sonar module.

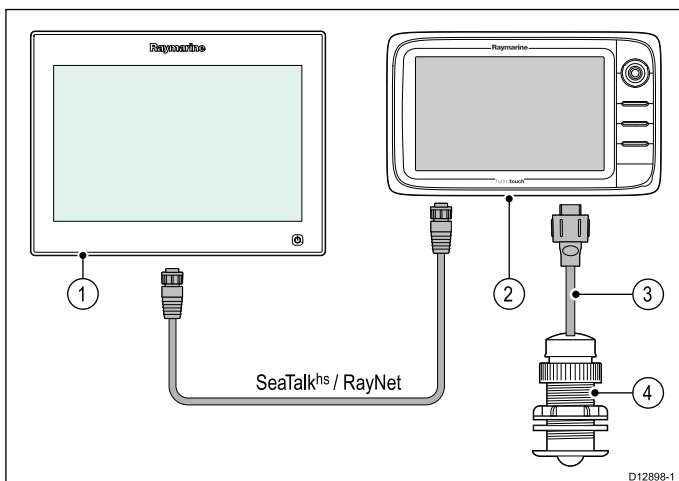3. Sonar transducer cable.

4. Sonar transducer.

Sonar module connection using a network switch

D12897-1

1. Multifunction display rear connector panel.

2. Network switch.

3. Sonar module.

4. Sonar transducer cable.

5. Sonar transducer.

Sonar variant multifunction display connection

The gS Series multifunction display can also be networked to Raymarine multifunction display that has a built-in sonar module.
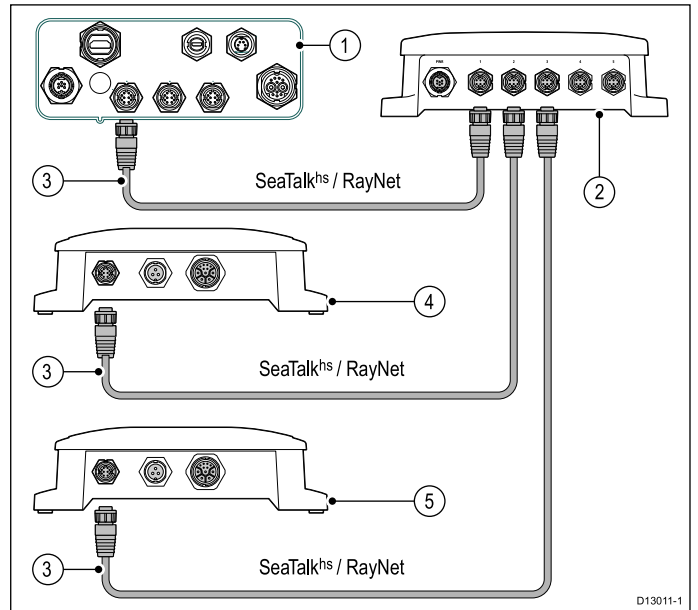

D12898-1

1. gS multifunction display.

2. Sonar Variant multifunction display (e.g. e97).

3. Sonar transducer cable.

4. Sonar transducer.

Multiple sonar modules

Up to 3 sonar modules can be connected on the same network, you must select which sonar module you want to use as only 1 sonar module can be viewed on the multifunction display at any one time.

D13011-1

1. Multifunction display rear connector panel.

2. network switch.

3. RayNet network cables.

4. CP450C CHIRP sonar module

5. CP100 DownVision™ sonar module

Sonar variant multifunction displays

The table below details which multifunction display variants feature a built-in sonar module and can be connected directly to compatible sonar transducers.

Non-sonar variants	Sonar variants	DownVision variants
a65	a67	a68
a65 Wi-Fi	a67 Wi-Fi	a68 Wi-Fi
a75	a77	a78
a75 Wi-Fi	a77 Wi-Fi	a78 Wi-Fi
e7	e7D	
c95	c97	
c125	c127	
e95	e97	
e125	e127	
e165		

Thermal camera connection

You can connect a thermal camera to your gS Series multifunction display.

The camera is usually connected via a Raymarine network switch. If you want to use the optional Joystick Control Unit (JCU) with the camera this must also be connected to the network switch. A composite video connection is required between the camera and the multifunction display.

T200 Series thermal camera direct connection

D12840-1
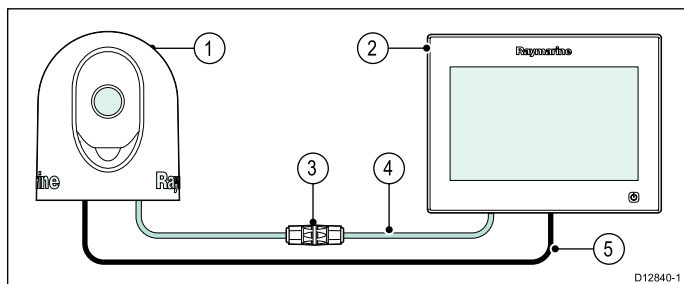
1. T200 Series fixed mount thermal camera.
2. Multifunction display.
3. Ethernet coupler.
4. RayNet to RJ45 SeaTalk^{hs} adaptor cable.
5. Video cable.

When connecting a T200 Series thermal camera to a gS Series multifunction display the camera can be supplied Power over Ethernet (PoE) by the display.

Refer to the Power over Ethernet (PoE) section for details on PoE assignment.

T300 / T400 Series thermal camera connection.
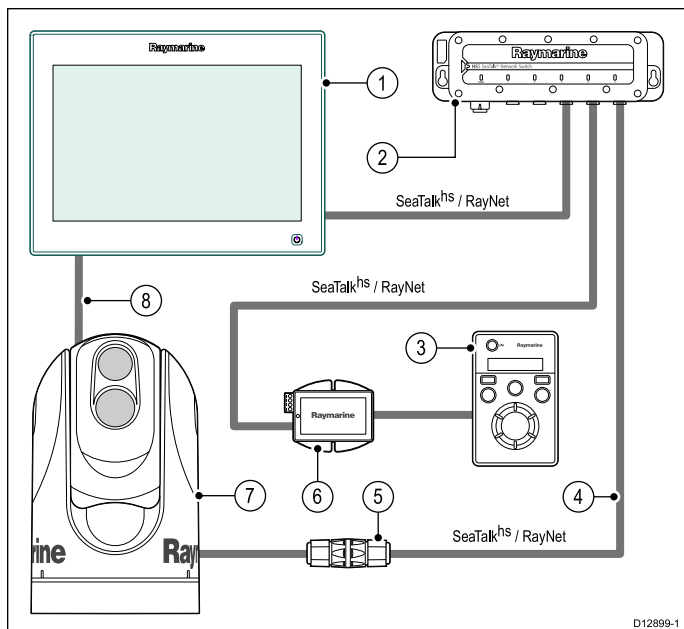

D12899-1

1. Multifunction display.
2. Network switch.
3. Joystick Control Unit (JCU) (optional).
4. RJ45 SeaTalk^{hs} to RayNet cable.
5. Ethernet coupler.
6. PoE injector (only required if using the optional JCU).
7. Thermal camera.
8. Video cable.

Important notes

• You can control the thermal camera using your multifunctional display. The Joystick Control Unit (JCU) is optional, but can be used in conjunction with the multifunctional display to control the thermal camera if required.

• "Dual payload" thermal cameras include 2 independent lenses; 1 for thermal (infrared) and 1 for visible light. If you only have 1 display you should only connect the video cable labelled "VIS / IR" (visible light / infrared) to the display. If you have 2 or more displays you should connect 1 cable to each display.

• You can only view the thermal camera image on the multifunction display to which the camera is physically connected. If you want to view the thermal camera image on more than 1 display you must obtain a suitable third-party video distribution unit.

• For further information regarding the camera's installation (including connections and mounting), refer to the installation instructions that accompany the camera.

Thermal camera cables

Cabling requirements for thermal cameras.

Camera to network switch

A network patch cable is required to connect the camera to the network switch. The connection is made between the camera cable tail and the network switch via the coupler (supplied with the camera). Network patch cables are available in a variety of lengths.

Joystick Control Unit (JCU)

An Ethernet (with power) cable is used to connect the JCU. The JCU is supplied with a 7.62 m (25 ft) Ethernet cable for this connection. If you require a different length contact your dealer for suitable cables.

Power over Ethernet (PoE) injector to network switch

A network patch cable is required for connecting the PoE injector to the network switch. Network patch cables are available in a variety of lengths.

Video cables

Video cables are not supplied with the product. Please contact your dealer for suitable cables and adaptors.

Raymarine recommends the use of a BNC terminated RG59 75ohm (or better) coaxial cable.

IP Camera connections

You can connect IP cameras to your multifunction display.

Note: Compatible IP cameras must be able to be configured to:

• automatically assign an IP address via DHCP prior to connecting to your multifunction display or network.

• allow unauthenticated, anonymous ONVIF access.

Please refer to the instructions supplied with your IP camera for configuration details.

Note: Your multifunction display must be powered up before power is applied to any networked IP cameras, this is to enable your multifunction display to assign the IP camera(s) a valid IP address.

IP camera(s) can be connected directly to a network connector on your multifunction display.


D12900-1
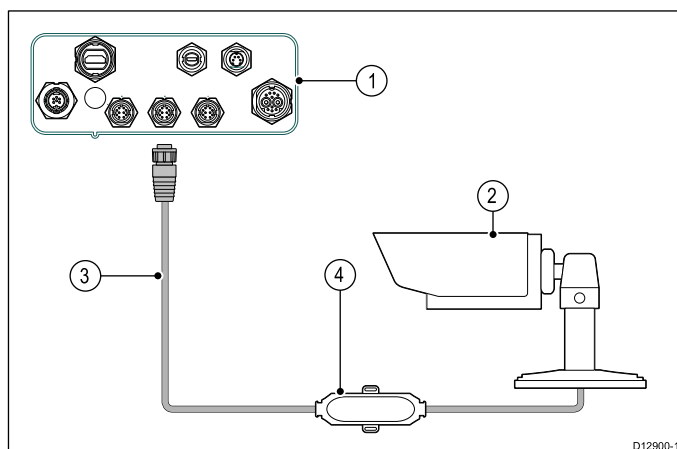
Item	Description
1	Multifunction display rear connector panel.
2	IP camera.
3	RJ45 SeaTalk^{hs} to RayNet adaptor cable.
4	SeaTalk^{hs} cross over coupler.

Note:

The gS Series multifunction displays can provide Power over Ethernet (PoE) to compatible IP cameras.

Refer to the Power over Ethernet (PoE) section for details on PoE assignment.

You can also connect multiple IP cameras via the SeaTalk^hs network
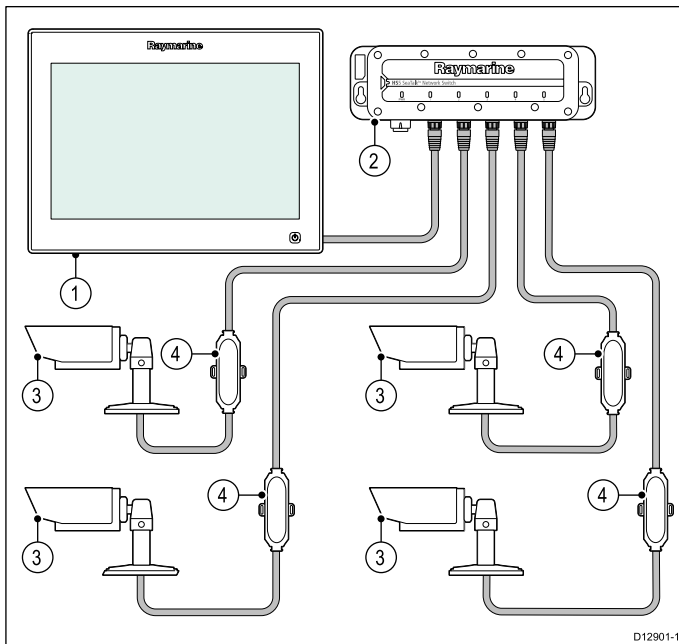
Item	Description
1	Multifunction display.
2	Network switch.
3	IP cameras
4	SeaTalk^hs cross over couplers

Note: Network switches do not provide PoE, connected cameras must have their own power supply.

Note: If your IP camera(s) are not detected by your multifunction display, try power cycling the IP camera(s) whilst leaving your multifunction display powered up.

Weather receiver connection

You can connect a Sirius XM weather receiver to your multifunction display.
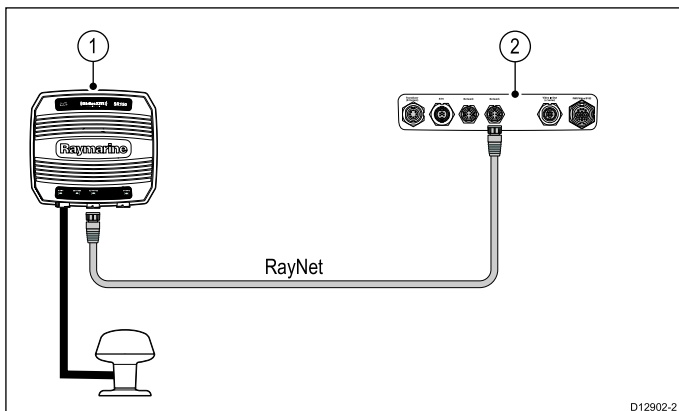
1. Raymarine weather receiver.
2. Multifunction display.

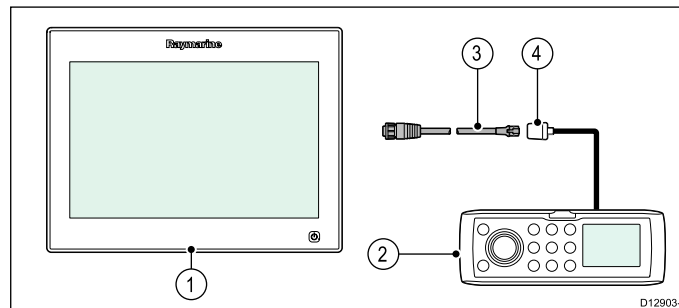The weather receiver can also be connected to a Raymarine network switch.

For information on connecting an SR50 using SeaTalk^ng please refer to *82257 – SR50 operation* which can be downloaded from the Raymarine website: www.raymarine.com.

Fusion link connection

You can connect a Fusion 700 series marine entertainment system to your multifunction display.

Direct connection

1. Multifunction display.
2. Fusion system.
3. RayNet to SeaTalk^hs adaptor cable.
4. Fusion ethernet connector.

Direct connection with networked multifunction displays
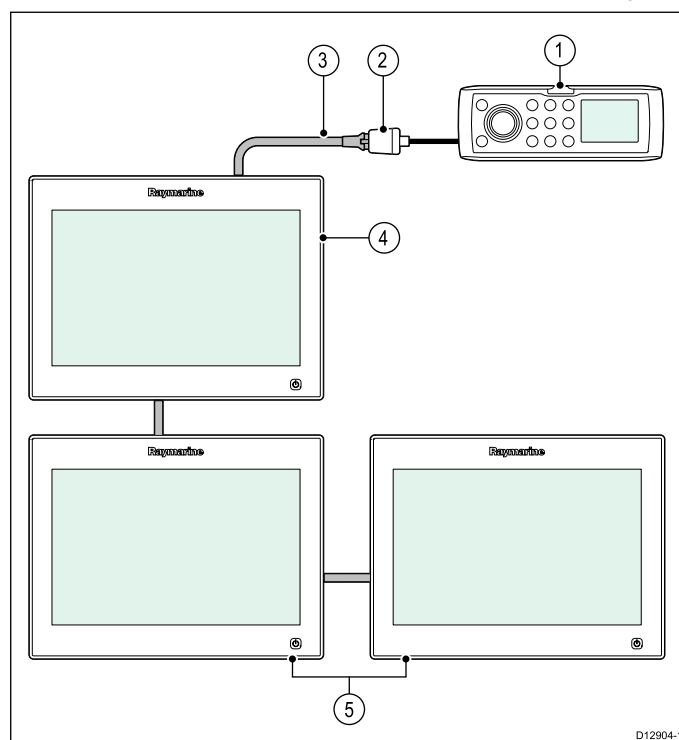
1. Fusion system.
2. Fusion ethernet connector.
3. RayNet to SeaTalk^hs adaptor cable.
4. Directly connected multifunction display.
5. Networked multifunction displays.

Note: The Fusion entertainment system can be controlled by a directly connected multifunction display or by a networked multifunction display.

Network connection

D12905-1

1. Network switch.
2. Fusion system.
3. RayNet to SeaTalk^{hs} adaptor cable.
4. Fusion ethernet connector.
5. Second Fusion system (the multifunction display can be connected to multiple Fusion entertainment systems).
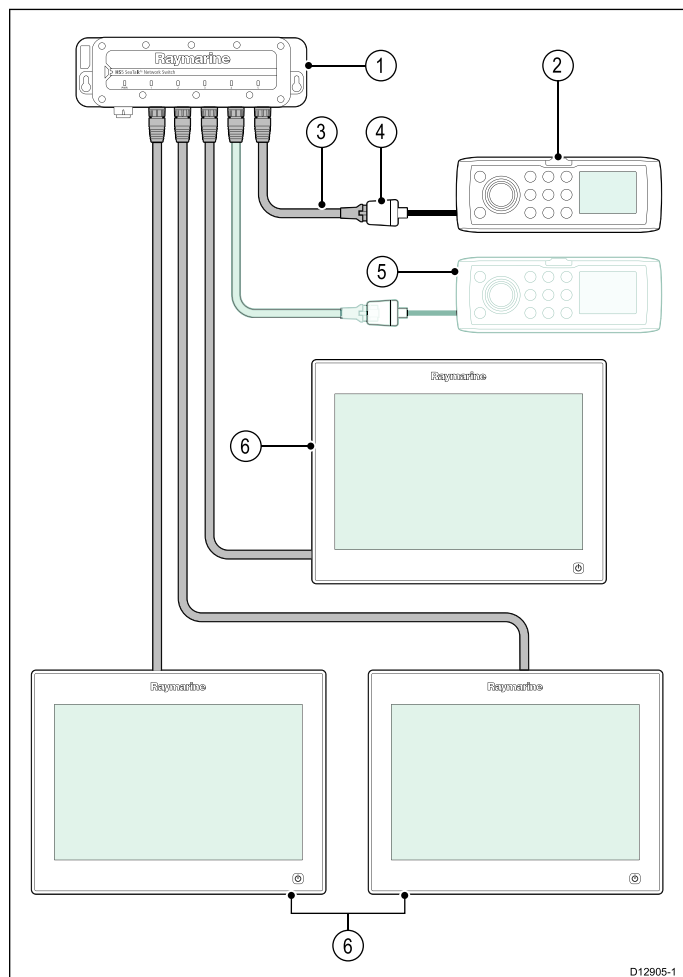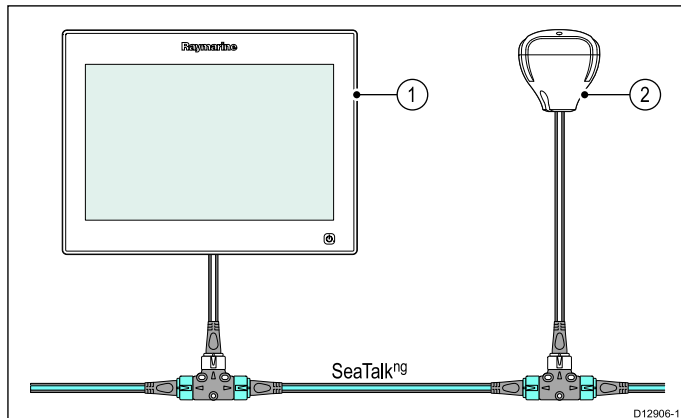6. Networked multifunction displays.

Note: The Fusion entertainment system can be controlled by any compatible networked multifunction display when connected using a network switch.

4.7 GPS connection

The multifunction display can be connected to a GPS receiver, using SeaTalkng or NMEA 0183.

GPS connection — SeaTalkng

1. Multifunction display.
2. SeaTalkng GPS receiver.

GPS connection — NMEA 0183
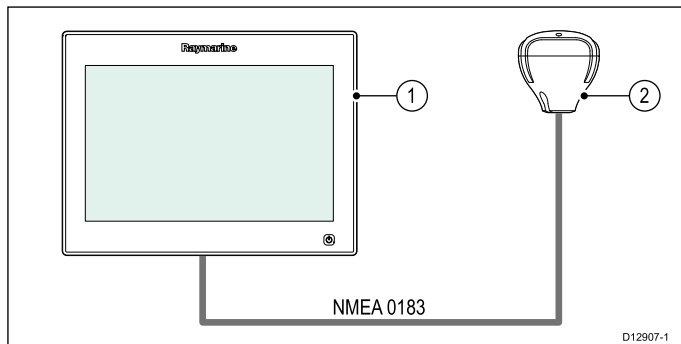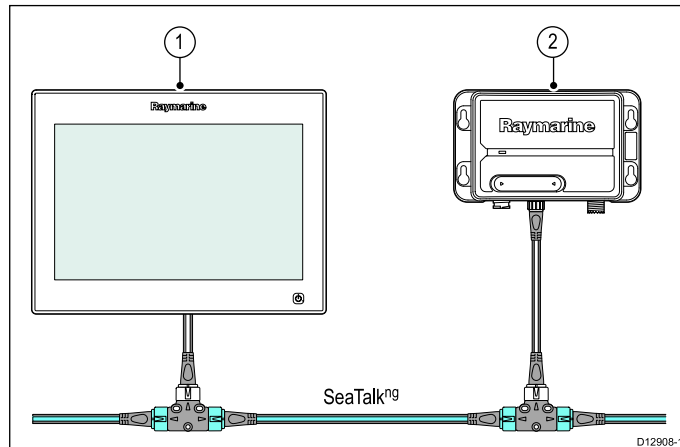

1. Multifunction display.
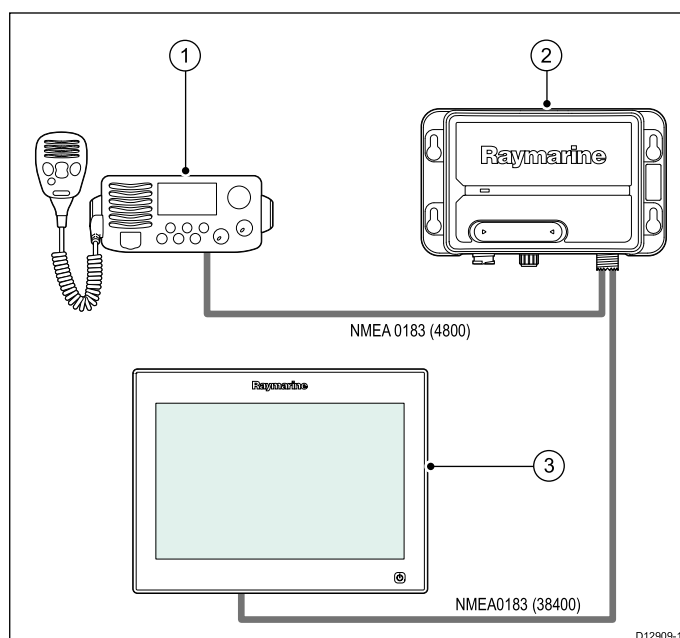2. NMEA 0183 GPS receiver.

4.8 AIS connection

A compatible AIS can be connected using SeaTalkng or NMEA 0183.

Connection using SeaTalkng

1. Multifunction display.
2. SeaTalkng AIS receiver / transceiver.

Connection using NMEA 0183

1. VHF radio.
2. AIS unit.
3. Multifunction display.

4.9 Fastheading connection

If you wish to use MARPA (radar target acquisition) functions on your multifunction display you need either:

- An autopilot connected to the multifunction display via SeaTalkng or NMEA 0183. The compass is connected to the course computer and calibrated via the pilot control head; or:

- A Raymarine or third-party fastheading sensor connected to the multifunction display via NMEA 0183.

> **Note:** Please contact your dealer or Raymarine technical support for more information.

4.10 SeaTalkng connections

The display can connect to a SeaTalkng network.

The display can use SeaTalkng to communicate with:

- SeaTalkng instruments (for example, i70).
- SeaTalkng pilot control head (for example, p70).
- SeaTalkng autopilots (for example, Evolution autopilots or SmartPilot SPX course computer).
- SeaTalk equipment via the optional SeaTalk to SeaTalkng converter.
- NMEA 2000 equipment via optional DeviceNet adaptor cables.

Typical SeaTalkng system
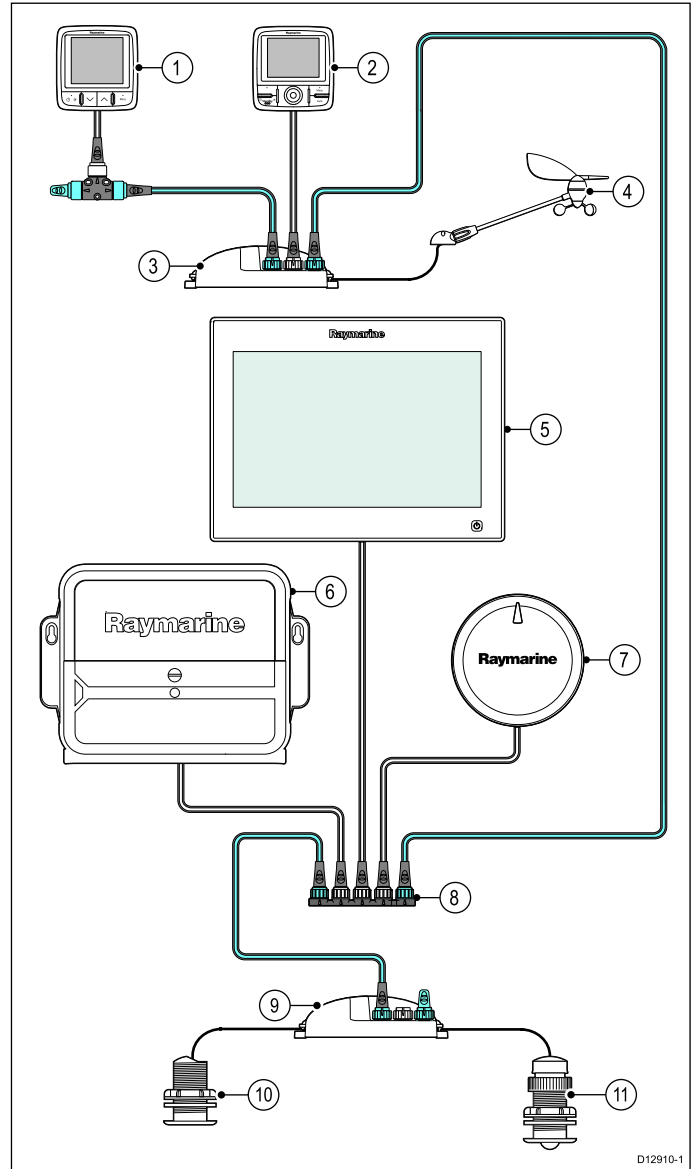
1. SeaTalkng instrument — for example, i70.
2. SeaTalkng pilot control head — for example, p70.
3. iTC-5 converter.
4. Wind transducer.
5. Multifunction display.
6. Actuator Control Unit (ACU).
7. EV unit.
8. SeaTalkng 5 Way block.
9. iTC-5 converter.
10. Depth transducer.
11. Speed transducer.

SeaTalkng power requirements

The SeaTalkng bus requires a 12 V power supply.

Power may be provided from:

- Raymarine equipment with a regulated 12 V power supply (for example, a SmartPilot SPX course computer); or:

- Other suitable 12 V power supply.

> **Note:** SeaTalkng does NOT supply power to multifunction displays and other equipment with a dedicated power supply input.

4.11 NMEA 2000 connection

The display can receive data from NMEA 2000 devices (e.g. data from compatible engines). The NMEA 2000 connection is made using SeaTalkng and appropriate adaptor cables.

You can EITHER:

- Use your SeaTalkng backbone and connect each NMEA 2000 device on a spur, OR

- connect the display on a spur into an existing NMEA 2000 backbone.

> **Important:** You cannot have 2 backbones connected together.

Connecting NMEA 2000 equipment to the SeaTalkng backbone
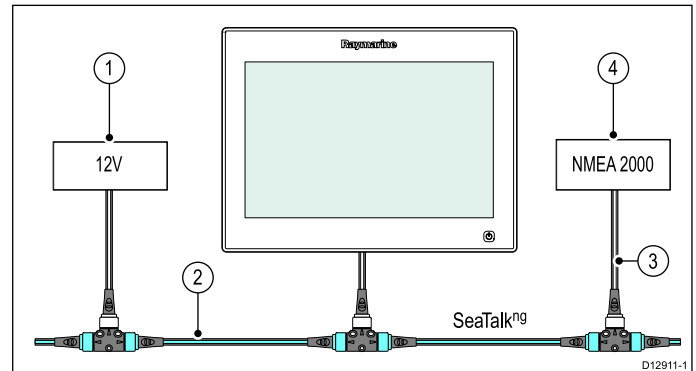
1. 12 V supply into backbone.

2. SeaTalkng backbone.

3. SeaTalkng to DeviceNet adaptor cable.

4. NMEA 2000 equipment.

Connecting the display to an existing NMEA 2000 (DeviceNet) backbone
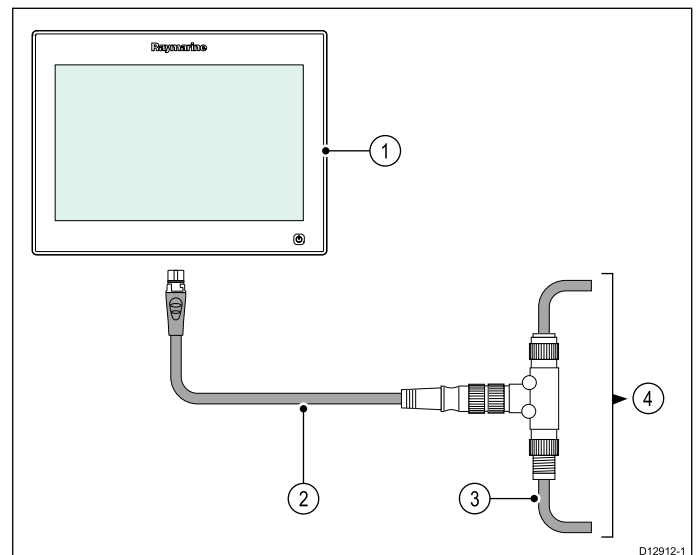
1. Multifunction display.

2. SeaTalkng to DeviceNet adaptor cable.

3. DeviceNet backbone.

4. NMEA 2000 equipment.

4.12 SeaTalk connection

You can connect SeaTalk devices to your multifunction display using the optional SeaTalk to SeaTalk^{ng} converter.

1. SeaTalk device.

2. SeaTalk to SeaTalk^{ng} converter.

3. Multifunction display.

4.13 NMEA 0183 connection

NMEA 0183 devices can be connected to the multifunction display using the power and data cable.

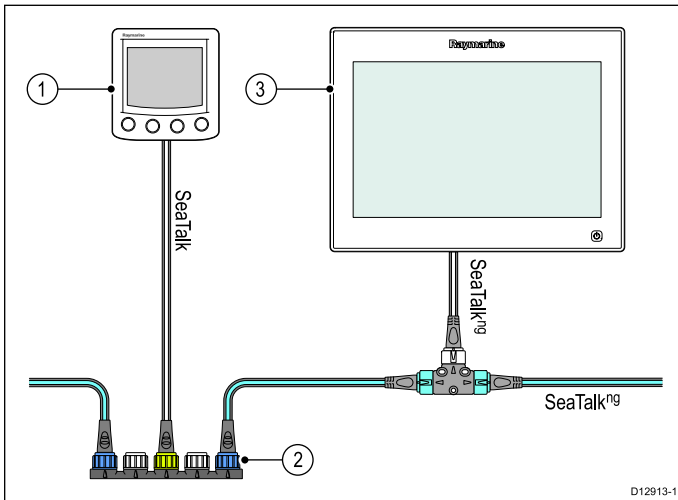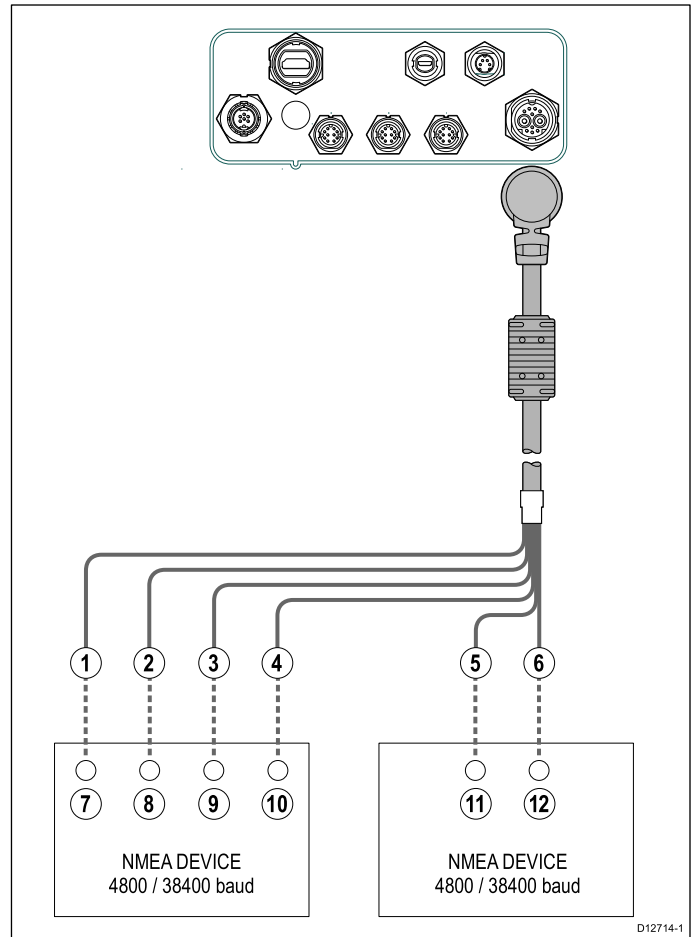NMEA 0183 devices are connected using the supplied power and data cable.

The display has 2 NMEA 0183 ports:

• **Port 1**: Input and output, 4800 or 38400 baud rate.

• **Port 2**: Input only, 4800 or 38400 baud rate.

Note: The baud rate you want to use for each port input must be specified in the System Settings menu (**Homescreen: > Set-up > System Settings > NMEA Set-up > NMEA Input Port**).

Note: For Port 1, both the input and output communicate at the same baud rate. For example, if you have one NMEA 0183 device connected to the display's Port 1 INPUT, and another NMEA 0183 device connected to the display's Port 1 OUTPUT, both NMEA devices must be using the same baud rate.

You can connect up to 4 NMEA 0183 devices to the display's NMEA 0183 OUTPUT (Port 1). You can connect a total of 2 NMEA 0183 devices to the display's NMEA 0183 INPUT ports.

Item	Device	Cable color	Port	Input / output	Positive (+) / negative (-)
1	Multifunction display	White	1	Input	Positive
2		Green	1	Input	Negative
3		Yellow	1	Output	Positive
4		Brown	1	Output	Negative
5		Orange / white	2	Input	Positive
6		Orange / green	2	Input	Negative

Item	Device	Cable color	Port	Input / output	Positive (+) / negative (-)
7	NMEA device	*	*	Output	Positive
8		*	*	Output	Negative
9		*	*	Input	Positive
10		*	*	Input	Negative
11	NMEA device	*	*	Output	Positive
12		*	*	Output	Negative

Note: *Refer to instructions provided with the NMEA device.

NMEA 0183 cable

You can extend the NMEA 0183 wires within the supplied power and data cable.

Data cable extension

| Total length (max)	Cable
Up to 5 m	High quality data cable: • 2 x twisted pair with overall shield. • 50 to 75 pF/m capacitance core to core.

4.14 Camera / Video connections

A camera or a video device can be connected directly your multifunction display using the video connector on the power and data cable or using the dedicated Video / alarm connector.

Examples of video sources that you can connect to the display include:

• Video camera.

• Thermal camera.

• DVD player.

• Portable digital video player.

Power / Data cable video input
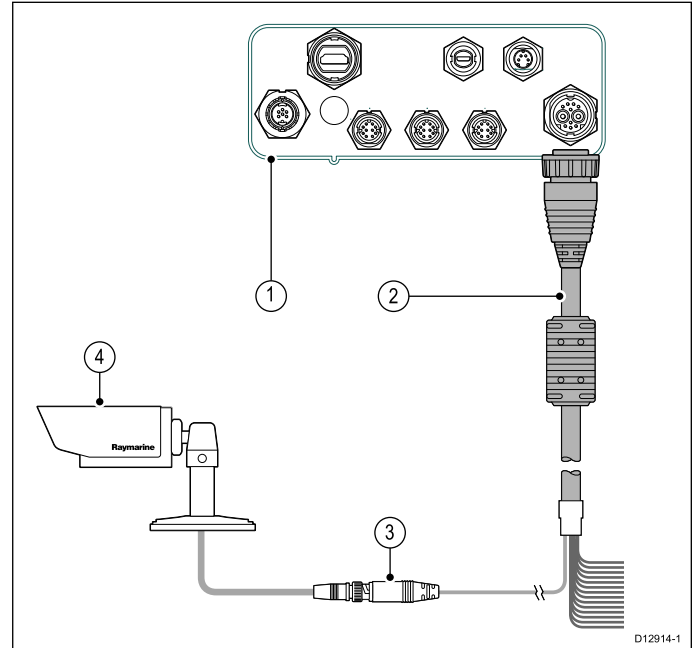
1. Multifunction display rear connector panel.

2. Power and data cable.

3. BNC video input connector .

4. Video source (e.g. video camera).

Video / alarm connector video input
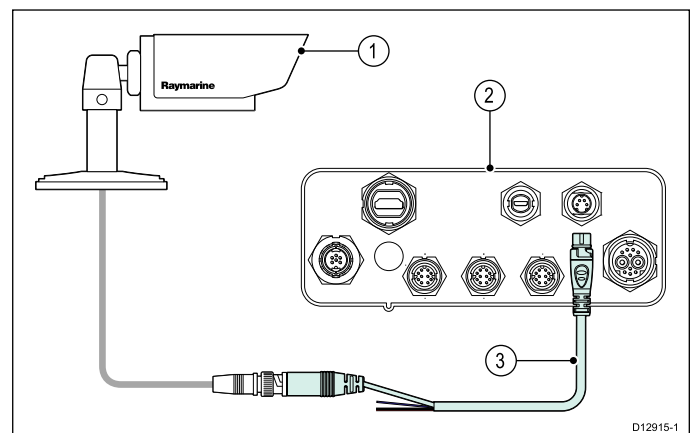
1. Video source (e.g. video camera).

2. Multifunction display rear connector panel.

3. Video / alarm cable (supplied).

Note: To listen to a movie's audio track, any connected DVD or digital video player will require speakers to be connected to the players audio output.

4.15 HDMI video output

The HDMI cable is used to output a gS multifunction display's screen to an external display.

D12916-1

1. External display (See note below).

2. Multifunction display rear connector panel.

3. Raymarine 5 m (16.4 ft) HDMI video output cable (A80219)

> **Note:**
>
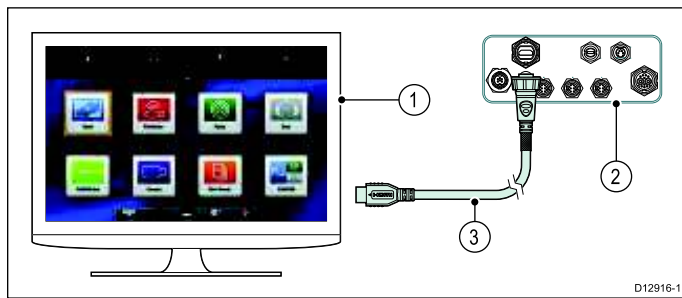> 1. The external display you are connecting to must support the 720p standard to enable you to view the multifunction display screen on the external display. The multifunction display's video output resolution is fixed at 720p.
>
> 2. The HDMI cable must only be connected to an external display that is electrically isolated from the vessel's dc power supply (i.e the screen and the 0V of the external display's HDMI connector must not have a direct connection to the vessel's dc power supply).
>
> For further assistance please contact Raymarine technical support.

4.16 Media player connection

You can use your multifunction display to wirelessly control a Bluetooth-compatible media player (such as a smartphone).

The media player must be compatible with the Bluetooth AVRCP protocol (version 2.1 or higher).

D12917-1
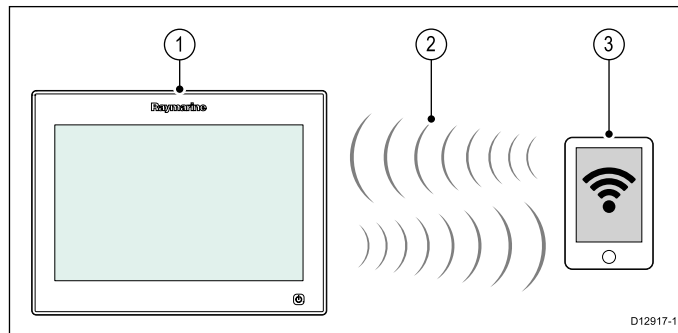
1. Multifunction display.

2. Bluetooth connection.

3. Bluetooth-compatible media player.

To use this feature you must first:

- Enable Bluetooth in the System Settings on the multifunction display.
- Enable Bluetooth on the media player device.
- Pair the media player device with the multifunction display.
- Enable Audio Control in the System Settings on the multifunction display.

You can also connect an RCU-3 remote and assign the shortcut key to Start/Stop audio playback

> **Note:** If your media player does not include built-in speakers it may be necessary to connect the media player's audio output to an external audio system or a pair of headphones. For more information refer to the instructions that accompany the media player device.

Enabling Bluetooth

With the homescreen displayed:
1. Select **Set-up**.
2. Select **System Settings**.
3. Select **Wireless Connections**.
4. Select **Bluetooth > On**.

Pairing a Bluetooth media player

With the homescreen displayed and Bluetooth turned on:
1. Select **Set-up**.
2. Select **System Settings**.
3. Select **Wireless Connections**.
4. Select **New Bluetooth Connection**.

   A message is displayed prompting you to put your media player device into discovery mode.
5. Ensure Bluetooth is enabled on your external media player device and ensure it is ready to be paired. For more information, consult the instructions that accompany the device.
6. On the multifunction display, select **OK** in the message dialog.

   The multifunction display will search for active Bluetooth devices.
7. Select **Stop Discovery** when your device appears in the list.
8. Select the media player device in the list.

   A pairing request message is displayed on the external media device.
9. On the external media device, select Pair (or equivalent) to accept the pairing request message.

   The multifunction display shows a message asking you to confirm the Pairing code.
10. If the pairing code displayed on the multifunction display matches the code displayed on the external media device,

select **Ok** on the multifunction display. If the code does NOT match, repeat steps 4 to 8.

11. If the pairing was successful the multifunction display will confirm the pairing.

    The external media device is now paired with the multifunction display.

Enabling audio control

With the homescreen displayed:

1. Select **Set-up**.
2. Select **System Settings**.
3. Select **Wireless Connections**.
4. Select **Connection Manager**.
5. Select the media player device in the list.
6. Select **Audio Control > On**.

Media player controls

Touchscreen multifunction displays enable you to use the on-screen media player controls to control the audio playing on your external media player.

1. Touch this icon to display the audio controls.
2. Previous track.
3. Play track.
4. Pause track.
5. Next track.

Selecting **Back** will hide the audio controls.

Media player controls using a remote control

You can control audio wirelessly using a Raymarine RCU-3 remote control unit.

The Shortcut key on the RCU-3 must be set to Start/Stop audio playback, refer to the *Using a Remote control* section for further details.

1. Press **UP** arrow for next track.
2. Press **DOWN** arrow for previous track.
3. Press **SHORTCUT** button to play/pause audio.

Unpairing a Bluetooth device

If you are experiencing problems when attempting to use a Bluetooth device with the multifunction display it may be necessary to unpair the device (and any other paired Bluetooth devices) and then retry the pairing procedure.

With the homescreen displayed:

1. Select **Set-up**.

2. Select **System Settings**.
3. Select **Wireless Connections**.
4. Select **Connection Manager**.
5. Select the media player device in the list.
6. Select **Unpair / Forget this device**.

4.17 Bluetooth remote control connection

You can control the multifunction display wirelessly using a Raymarine remote control unit.

The remote control uses a Bluetooth wireless connection.

D12918-1
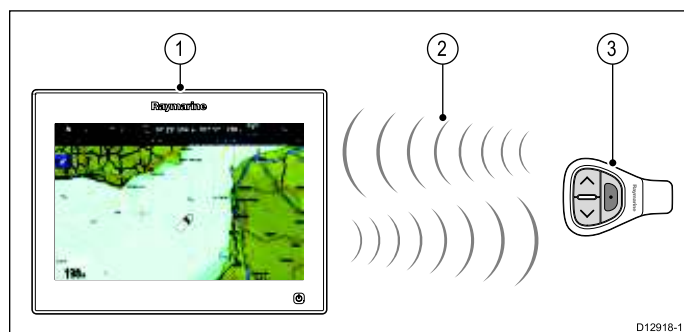
1. Multifunction display.
2. Bluetooth connection.
3. Raymarine Bluetooth remote control (for example, RCU-3).

To use the remote control you must first:

• Enable Bluetooth in the System Settings on the multifunction display.

• Pair the remote control unit with the multifunction display.

Operating principles

Remote control operating principles.

• Only 1 multifunction display may be operated by a remote control unit at any one time. You cannot pair a multifunction display to more than 1 remote control at the same time.

• The 3 buttons on the remote control unit have different functions depending on the CONTEXT in which you are using it. For example, in the chart application the buttons control different functions than they do in the homescreen.

• All functions are accessed using a combination of the 3 buttons. For some functions you must press a button MOMENTARILY. You can also HOLD a button for continuous response (for example, continuous ranging in the chart application).

• The main methods of operation involve the use of the **UP** and **DOWN** "arrow" buttons to highlight different on-screen options. The **SHORTCUT** button is used to select (execute) them.

• During the pairing process you must define which of the arrow buttons you want to be the "UP" button.

• The **SHORTCUT** button is customizable and can be configured to operate one of a number of functions, using the System Settings menu on your multifunction display.

Pairing the remote and configuring the UP and DOWN buttons

The remote control unit must be "paired" with the multifunction display that you want to control. On your multifunction display, with the homescreen displayed:

1. Select **Set-up**.
2. Select **System Settings**.
3. Select **Wireless Connections**.
4. Select **Bluetooth > On**.
5. Select **New Bluetooth Connection**.
   A pop-up message will be displayed to confirm that the device you are connecting to is discoverable.
6. Select **Ok** to confirm.
   A list of discovered devices is displayed.
7. On your **remote control unit**, hold down the UP and DOWN buttons together for 10 seconds.
8. Select the remote control unit in the list of devices.

9. When prompted, press the arrow button on your remote that you wish to be configured as the UP button. The other arrow button will automatically be configured as the DOWN button.

If the pairing was successful a "Pairing Success" message will be displayed. If a "Pairing Failure" or "Pairing Timeout" message is displayed, repeat steps 1 to 8.
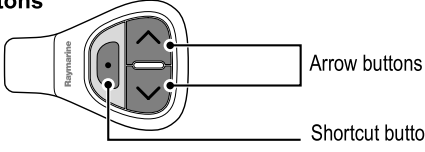
Customizing the SHORTCUT button

On your multifunction display, with the homescreen displayed:

1. Select **Set-up**.
2. Select **System Settings**.
3. Select **External Devices**.
4. Select **Remote Control**.
5. Select **Customize shortcut key**.
6. Select the function that you want to assign to the **SHORTCUT** key.

4.18 Remote control functions

Buttons — Arrow buttons / Shortcut button

Range — or

Pair

Select

D12051-2

|	Button	Application where function available:				
Default functions:		Chart	Radar	Fishfinder	Weather	Homescreen
Range / zoom.	• Press UP or DOWN arrow for momentary response. • **Hold** UP or DOWN arrow for continuous response.	✔	✔	✔	✔	✘
Open homescreen.	Shortcut: **Hold**	✔	✔	✔	✔	✘
Select application in homescreen (in left-to-right, top-to-bottom order).	• Press UP or DOWN arrow for momentary response. • **Hold** UP or DOWN arrow for continuous response.	✘	✘	✘	✘	✔
Toggle menu items and options in dialogs and prompts (in left-to-right, top-to-bottom order).	• Press UP or DOWN arrow for momentary response. • **Hold** UP or DOWN arrow for continuous response.	✔	✔	✔	✔	✔
Place waypoint at vessel position.	Shortcut	✔	✔	✔	✔	✘
Media player control (requires a Bluetooth media player paired to the multifunction display).	• Press UP / DOWN arrow for next / previous track. • Press SHORTCUT button for play / pause.	✔	✔	✔	✔	✔
Customizable functions:						
Open homescreen.	SHORTCUT	✔	✔	✔	✔	✘
Switch active application (only available when multiple applications are displayed).	SHORTCUT	✔	✔	✔	✔	✘

Reconnecting the RCU

1. When you pair the RCU-3 with a multifunction display a wireless connection is established.
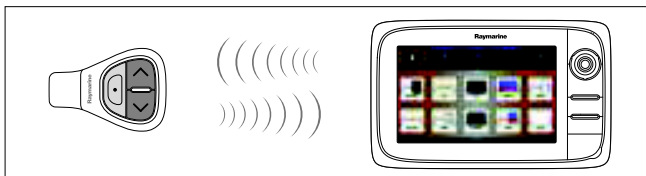
2. When you power off the multifunction display it loses its connection with the RCU-3 after 10 minutes.
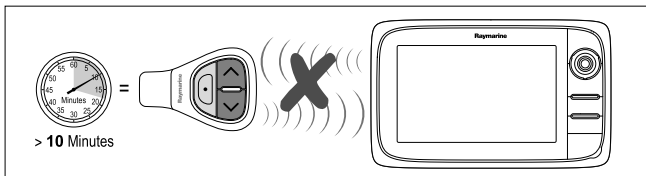
3. To restore the connection between the 2 units, press and hold any button on the RCU-3 for at least 3 seconds.
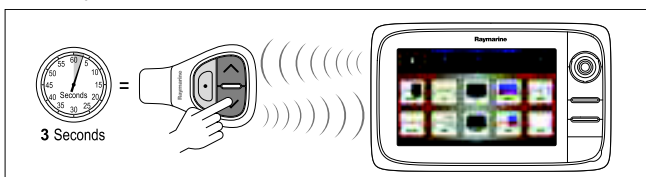
Note: You will also need to reconnect the RCU-3 as described above if you disable and then re-enable the Bluetooth connection on the multifunction display at any time.

4.19 WiFi connections

Raymarine mobile app connection

You can use compatible tablet and smartphone devices as a wireless repeat display or remote control for your multifunction display.

Raymarine apps allow you to stream and / or control, remotely what you see on your multifunction display to a compatible device, using a Wi-Fi connection.
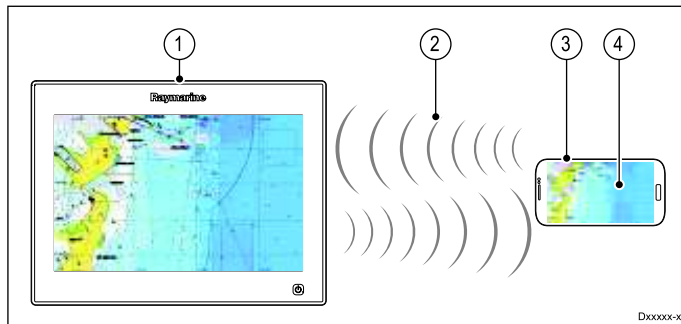
To use this feature you must first:

• Ensure your device is compatible with the app you wish to use.

• Download and install the relevant Raymarine app, available from the relevant market store.

• Enable Wi-Fi in the System Settings on the multifunction display.

• Enable Wi-Fi on your compatible device.

• Select the Raymarine Wi-Fi connection from the list of available Wi-Fi networks on your compatible device.

• Enable the relevant Mobile app in the System Settings menu on the multifunction display.

> **Note:** The multifunction display acts as a Wi-Fi access point. If your device already connects to an access point for e-mail and internet you must revert your access point back to regain access to e-mails and internet.

Navionics chartplotter sync connection

You can wirelessly synchronize waypoints and routes between the multifunction display and a tablet or smartphone device.

1. Multifunction display.

2. Wi-Fi connection.

3. Tablet / smartphone.

4. Navionics Marine app.

To use this feature you must first:

• Download and install the Navionics Marine app, available from the relevant app store.

• Enable Wi-Fi in the System Settings on the multifunction display.

• Enable Wi-Fi on your tablet / smartphone.

• Select the Raymarine Wi-Fi connection from the list of available Wi-Fi networks on your tablet / smartphone.
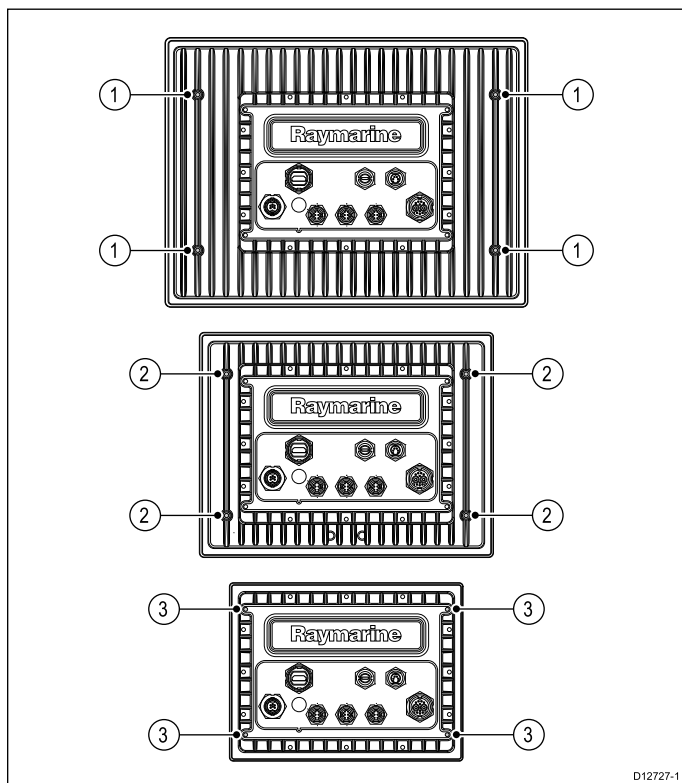
Chapter 5: Mounting

Chapter contents

5.1 Bracket mounting hole locations

The location of the bracket mounting holes on each display variant is shown below.

D12727-1

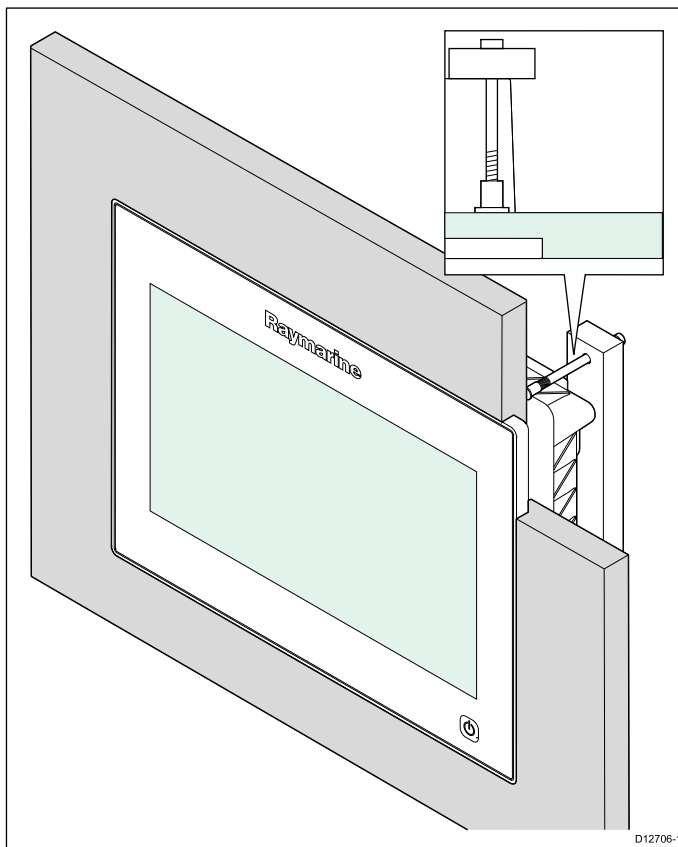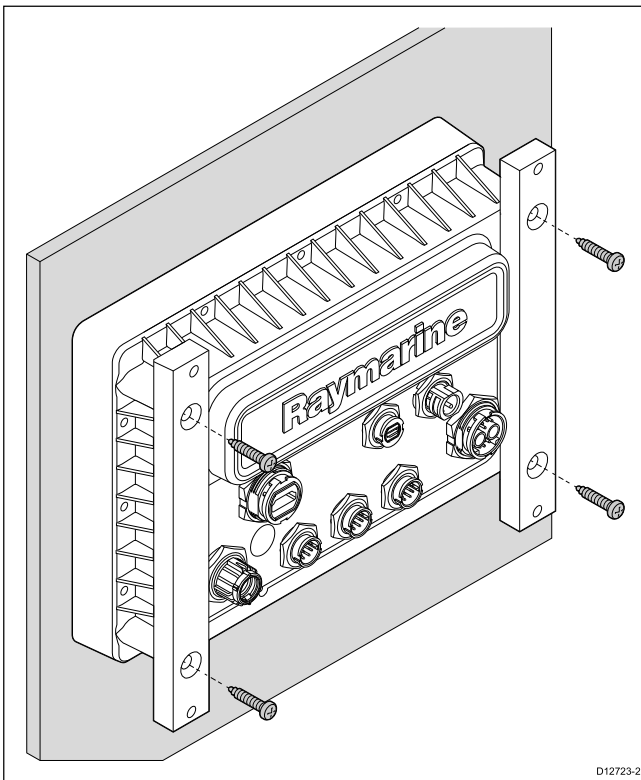| 1	gS165 bracket mounting hole locations
2	gS125 bracket mounting hole locations
3	gS95 bracket mounting hole locations

5.2 Flush mounting the display

For flush mounting you must rebate the mounting surface.

D12706-1

1. Check the selected location for the unit. A clear, flat area with suitable clearance behind the panel is required.
2. Before modifying the mounting surface, refer to the dimensions supplied in this document to ensure there is enough space for the display and all cables.
3. Fix the supplied mounting template to the selected location, using masking or self-adhesive tape.
4. Using a suitable hole saw (the size and position is indicated on the template), make a hole in each corner of the cut-out area.
5. Using a suitable saw, cut along the inside edge of the rear casing cut-out line indicated on the template.
6. Follow the rebate cut-out line on the template to cut a rebate around the hole with a depth of 8.5 mm (0.33 in), to accept the display.
7. Ensure that the unit fits into the removed area and then remove any rough edges.
8. Affix the supplied gasket onto the rear of the display and press firmly onto the flange.
9. Connect the power, data and other cables to the unit.
10. Attach the supplied mounting brackets to the rear of the display using the supplied fixings, as shown in the diagram below. Use one bracket for each side of the display.

D12723-2

Note: Refer to the 5.1 Bracket mounting hole locations section for details of the location of the bracket mounting holes on the rear of your display.

11. Secure the display using the provided mounting fixings (bolt, washer, lock nut and foot. In 4 locations.

Depending on the thickness of the mounting surface the washer and lock nut may be located:

1. between the mounting bracket and mounting feet (as shown in (1) and (2) below, or

2. after the mounting bracket as shown in (3) and (4) below.
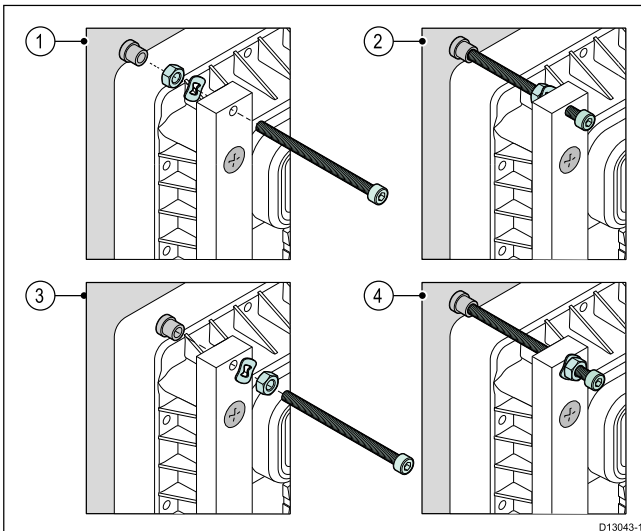
D13043-1

12. Using a suitable allen key, tighten the bracket mounting bolts so that the feet are tight against the rear of the mounting surface.

13. Using a suitable sized wrench tighten the lock nut against the washer and the mounting bracket to lock in position.

The lock nut should be tightened sufficiently to securely hold the display in position. Do not overtighten.

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

Flush mounting the card reader

For flush mounting you must rebate the mounting surface to accommodate chart reader housing.
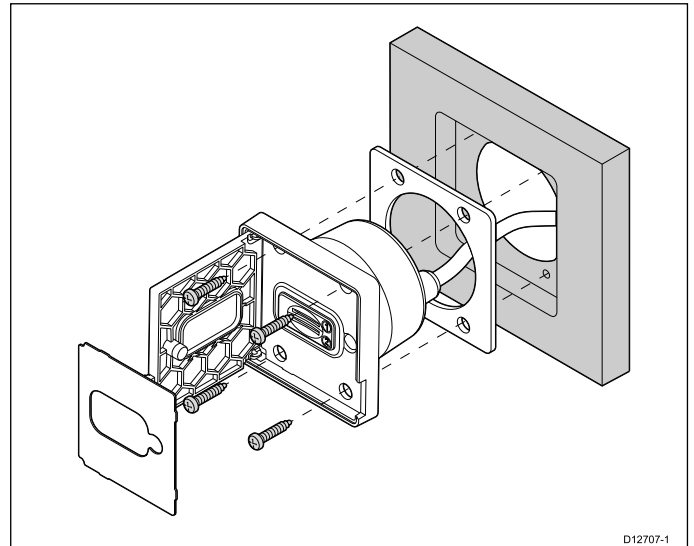

D12707-1

1. Check the selected location for the unit. A clear, flat area with suitable clearance behind the panel is required.

2. Before modifying the mounting surface, refer to the dimensions supplied in this document to ensure there is enough space for the unit and cable.

3. Fix the supplied mounting template to the selected location, using masking or self-adhesive tape.

4. Drill 4 holes as indicated on the mounting template to accept the fixings.

5. Using a 40 mm (1.6 in) hole cutter, drill out the cut-out area identified on the mounting template.

6. Follow the rebate cut-out line on the template to cut a rebate around the hole with a depth of 8.5 mm (0.33 in), to accept the unit.

7. Ensure that the card reader fits into the removed area and then remove rough edges.

8. Affix the supplied gasket onto the rear of the card reader and press firmly onto the flange.

9. Feed the cable through the hole and connect to the multifunction display's card reader connector.

10. Place the card reader into the rebate and secure using the fixings provided.

11. Insert the card reader label over the top of the card reader slots so that the mounting screw locations are covered.

Note: The appropriate tightening torque and drill bit size to use depends on the thickness of the mounting surface and the type of material it is made from.

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

5.3 Surface mounting the display

1. Check the selected location for the unit. A clear, flat area with suitable clearance behind the panel is required.

2. Before modifying the mounting surface, refer to the dimensions supplied in this document to ensure there is enough space for the display and all cables.

3. Fix the supplied mounting template to the selected location, using masking or self-adhesive tape.

4. Using a suitable hole saw (the size and position is indicated on the template), make a hole in each corner of the cut-out area.

5. Using a suitable saw, cut along the inside edge of the rear casing cut-out line indicated on the template.

6. Ensure that the unit fits into the removed area and then remove any rough edges.
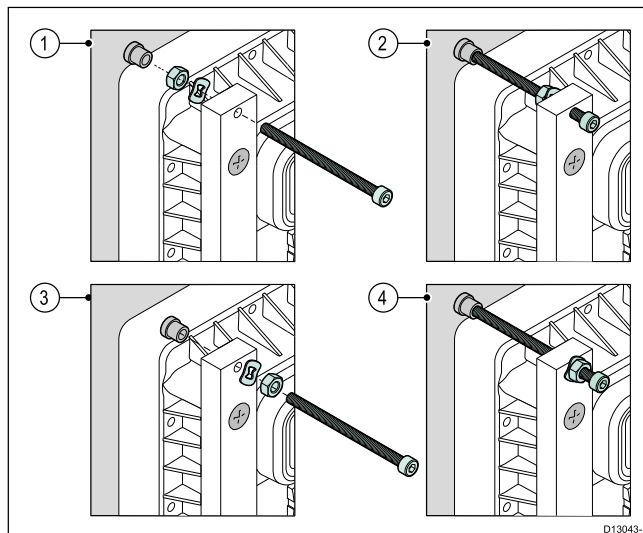

D12696-1
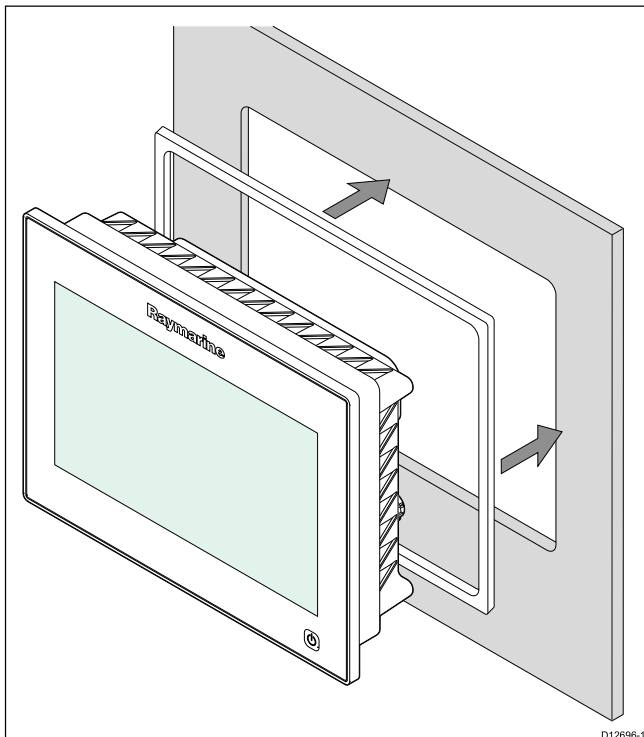
7. Affix the supplied gasket onto the rear of the display and press firmly onto the flange.

8. Connect the power, data and other cables to the unit.

9. Attach the supplied mounting brackets to the rear of the display using the supplied fixings, as shown in the diagram below. Use one bracket for each side of the display.
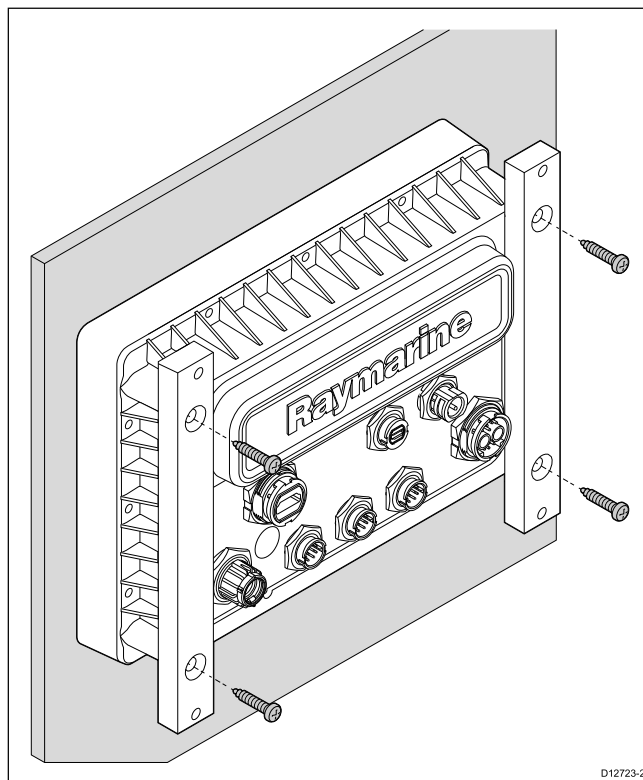
D12723-2

> **Note:** Refer to the section for details of the location of the bracket mounting holes on the rear of your display.

10. Secure the display using the provided mounting fixings (bolt, washer, lock nut and foot. In 4 locations.

    Depending on the thickness of the mounting surface the washer and lock nut may be located:

    1. between the mounting bracket and mounting feet (as shown in (1) and (2) below, or

   2. after the mounting bracket as shown in (3) and (4) below.

D13043-1

11. Using a suitable allen key, tighten the bracket mounting bolts so that the feet are tight against the rear of the mounting surface.

12. Using a suitable sized wrench tighten the lock nut against the washer and the mounting bracket to lock in position.

    The lock nut should be tightened sufficiently to securely hold the display in position. Do not overtighten.

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

Surface mounting the card reader
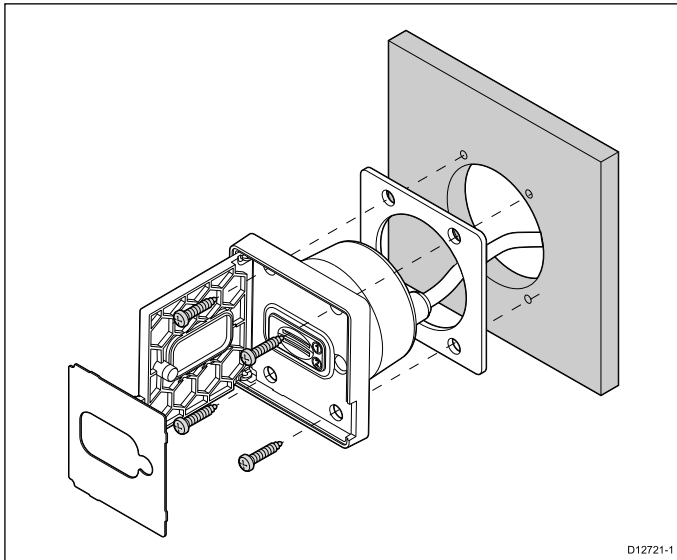
1. Check the selected location for the unit. A clear, flat area with suitable clearance behind the panel is required.
2. Before modifying the mounting surface, refer to the dimensions supplied in this document to ensure there is enough space for the unit and cable.
3. Fix the supplied mounting template to the selected location, using masking or self-adhesive tape.
4. Drill 4 holes as indicated on the mounting template to accept the fixings.
5. Using a 40 mm (1.6 in) hole cutter, drill out the cut-out area identified on the mounting template.
6. Ensure that the card reader fits into the removed area and then remove rough edges.
7. Affix the supplied gasket onto the rear of the card reader and press firmly onto the flange.
8. Feed the cable through the hole and connect to the multifunction display's card reader connector.
9. Secure using the fixings provided.
10. Insert the card reader label over the top of the card reader slots so that the mounting screw locations are covered.

Note: The appropriate tightening torque and drill bit size to use depends on the thickness of the mounting surface and the type of material it is made from.

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

Chapter 6: Getting started

Chapter contents

6.1 Display power

Powering the display on

1. Press the **POWER** button on the display.
2. Select **Accept** to acknowledge the disclaimer message.

Powering the display off

1. Press and hold the **POWER** button until the countdown reaches zero.

Note: If the **POWER** button is released before the countdown reaches zero, the power off is cancelled.

Standby (PowerSave) mode

In PowerSave mode all functions of the multifunction display remain active, but the unit is placed into a low power state. PowerSave mode is automatically cancelled when an alarm event occurs.

Note: To ensure user safety the PowerSave feature will not be available if:

- any connected radars are switched on
- the multifunction display is providing autopilot control in a system without a dedicated pilot head and the autopilot is engaged.
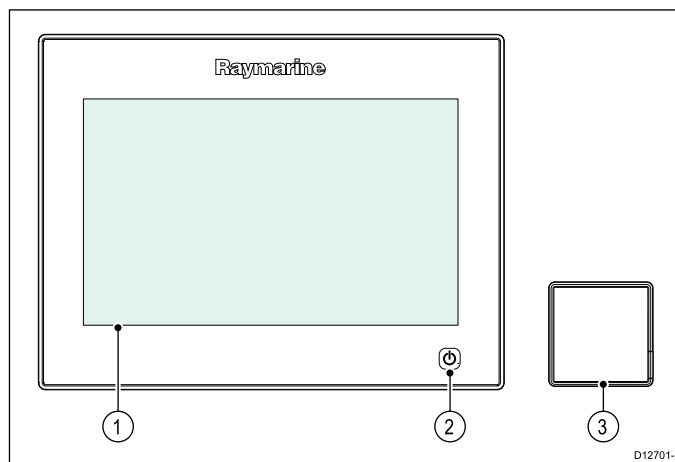
Enabling PowerSave mode

To enable PowerSave mode follow the steps below.

1. Ensure any radars connected to the system are switched off.
2. Press the **POWER** button.

   The shortcuts menu is displayed.
3. Select **PowerSave Mode**.

   The multifunction displays is now in PowerSave mode.
4. You can wake the unit from PowerSave mode at anytime by pressing the **Power** button or any button on a connected keypad.

Note: PowerSave mode is automatically cancelled if an alarm event occurs.

6.2 Controls

	Description	Functions
1	**Touchscreen**	Touch the screen to operate functions, including all menu operations.
2	**Power**	• Press once to switch the unit ON. • Once powered on, press the Power button again to adjust the brightness, perform a screen capture, access Powersave mode or access the power controls for external devices. • Press and hold to switch the unit OFF. • If an integrated pilot is engaged, press and hold put the autopilot into STANDBY mode.
3	**Card reader**	Open the card door to insert or remove a MicroSD card. There are 2 card slots (labelled 1 and 2), used for electronic charts and archiving waypoint, route, track and settings data.

Keypad controls

Connecting the keypad allows you to control your multifunction display remotely.
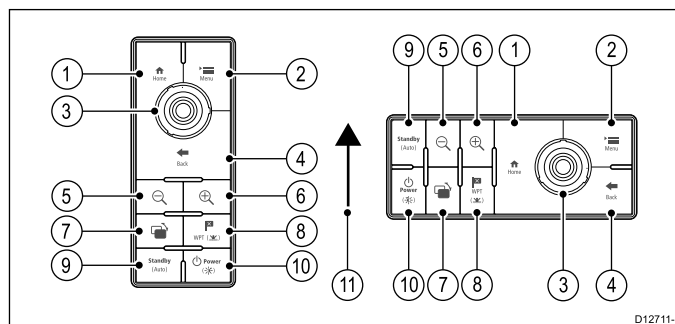
1. **Home** — press to return to the homescreen.
2. **Menu** — accesses menus. Press again to close menus.
3. **UniControl** — provides a rotary control and a joystick with an OK push button for using menus and applications.
4. **Back** — press to return to a previous menu or dialog level.
5. **Range Out** — press to range out.
6. **Range In** — press to range in.
7. **Switch Active** — press to switch the active pane, or to switch the active multifunction display (in multiple display systems).
8. **WPT / MOB** — press and release to access the waypoint options. Press again to place a waypoint. Press and hold to place a Man Overboard (MOB) marker at your current position.
9. **Standby (Auto)** — press to disengage integrated autopilot, press and hold to activate Auto mode on integrated autopilot.
10. **Power** — see table below:

| Configuration	Display State	Momentary press	Press and hold
1 Multifunction display	Off	Power on*	—
	On	Open shortcuts page	Power down
Multiple multifunction displays	All displays Off	Power on all displays*	—
	All displays On	Open shortcuts page on active display	Power down all displays
	1 Display On and 1 display Off	Open shortcuts page on active display	Power down active display

Note: * Only applicable to gS Series displays. New a Series, New c Series and New e Series displays cannot be powered on using the keypad.

Note: In a multiple display configuration where displays are in different states the displays that are turned off can only be turned on using the power button on the display.

11. Joystick Up direction.

UniControl

Non-touch, HybridTouch and the remote keypad include a UniControl which consists of Rotary, Joystick and a push button control.

D12180-1
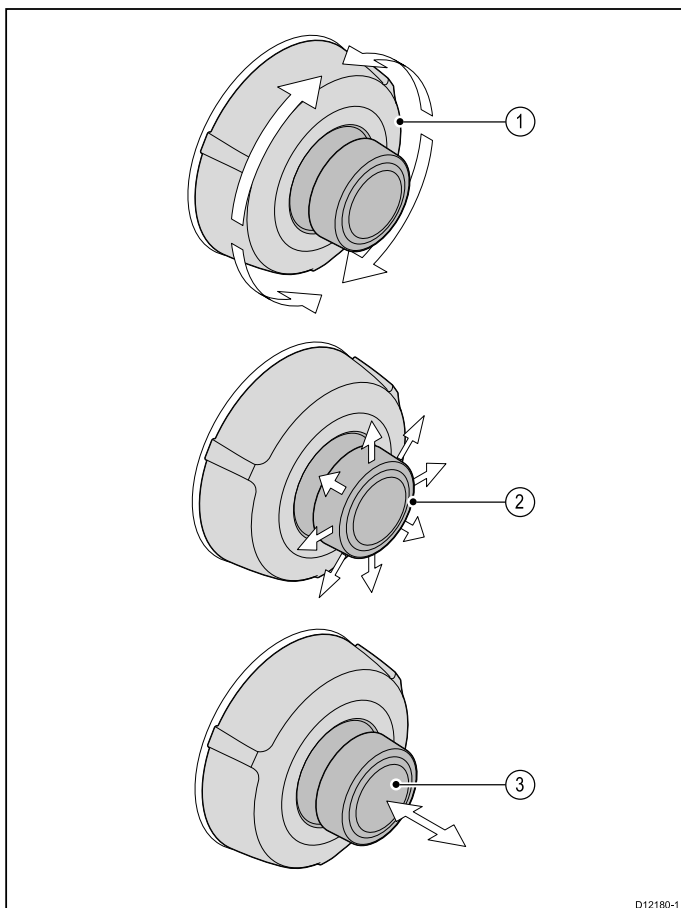
1. **Rotary** — use this to select menu items, move the on-screen cursor, and adjust the range in the chart and radar applications.

2. **Joystick** — use this to move the cursor position in applications, pan up, down, left and right in the chart, weather and fishfinder applications or to cycle through datapages in the data application.

3. **OK** button — push the end of the joystick to confirm a selection or entry.

Touch icons

Touchscreen multifunction displays can use the **BACK** and **CLOSE** icons to move between the different levels of menus available in each application.

	Back — go back one level (same effect as pressing the **BACK** button).
	Close — close all open menus (same effect as pressing the **MENU** button).

Using the cursor

The cursor is used to move around the screen.

	The cursor appears on the screen as a white cross.
	If the cursor has not been moved for a short period of time, it changes to a circle with a cross in it, to make it easier to locate on the screen.
	The cursor is context-sensitive. When it is placed over an object such as a waypoint or chart feature, it changes color and a label or information associated with the object is displayed.

List of cursor labels

Label	Feature	Application
A/B	Ruler line	Chart
AIS	AIS target	Chart
COG	Course Over Ground vector	Chart
CTR	Center of radar	Radar
FLT	Floating EBL/VRM	Radar
GRD	Guard zone	Radar
HDG	Heading vector	Chart
MARPA	MARPA target	Radar
MOB	Man Over Board marker	Chart, Radar
POS	Vessel's position	Chart
RTE	Route leg	Chart
SHM	Ship's Heading Marker	Radar
TIDE	Tide indicator	Chart
TRACK	Track line	Chart
VRM/EBL	VRM and EBL, 1 or 2	Radar
WIND	Wind indicator	Chart
WPT	Waypoint	Chart, Radar

6.3 Homescreen overview — Touch only displays

The Homescreen provides a central point of access for your display's applications, data and settings.

- The Homescreen provides quick access to your data (waypoints, routes, tracks, images and videos) and backup settings.
- The Homescreen consists of a number of Homescreen pages. Swipe the screen left or right with your finger to scroll through the available Homescreen pages.
- Each Homescreen page consists of a number of icons. Applications are started by selecting the relevant icon.

D12580-3

Screen item	Description
1	**Waypoint** — select the icon to access the waypoint list. Select and hold on the icon to place a Man Overboard (MOB) marker at your vessel's current position.
2	**My Data** — this icon enables you to centrally manage your data including route, track, and waypoint lists. You can also access saved pictures and videos and backup settings.
3	**Customize** — select this icon to configure application pages and display preferences.
4	**Set-up** — select this icon to access the system set-up menus.
5	**Icon** — each icon represents an application page. A page can display multiple applications simultaneously.
6	**Status bar** — the status icons confirm the status of externally-connected equipment, including GPS, AIS, radar, sonar and autopilot units.

Accessing the homescreen

The homescreen can be accessed from any application.

To access the homescreen follow the steps below:

1. Select the homescreen icon on-screen.

Databar status symbols

The status symbols on the databar confirm whether the appropriate connections to your system have been made.

The symbols show the status for the following:

- Radar scanner.
- AIS receiver / transceiver.
- Sonar module.
- GPS receiver.
- Autopilot.

Autopilot status symbols

The autopilot status is indicated in the databar.

Symbol	Description
	Autopilot is in Standby mode.
	Autopilot is in Track mode.
	Autopilot is in Auto mode.
	No autopilot detected.
	Autopilot alarm active.
	Dodge mode is active.
	Fish mode is active.
	Autopilot calibration.
	Power steering active.
	Wind Vane mode is active.

Radar scanner status symbols

The radar scanner power mode status is indicated in the databar.

Symbol	Radar power mode	Description
	Transmit (TX)	Rotating icon, signifying that the scanner is on and transmitting. When SCANNER is set to ON, select this mode to activate the scanner. This is the usual mode of operation.
	Standby (STBY)	Static icon, indicating that the scanner is on but not transmitting, and the antenna is not rotating. The scanner does not transmit and the radar data is removed from the screen. This is a power-save mode used when the radar is not needed for short time periods. When you return to transmit mode, the magnetron does not need to warm up again. This is the default mode.

Symbol	Radar power mode	Description
	Off	Scanner powered off when radar not required, but display is in use for other applications, such as the chart. When selected, the system counts down. During this time you cannot re-power the scanner.
	Timed Transmit	Scanner switches between on/transmitting, and standby mode. Scanner goes into power save mode when constant use of radar is not required.

GPS status symbols

The GPS receiver status is indicated in the databar.

Symbol	Description
	A GPS receiver is connected and has obtained a fix.
	A GPS receiver is not connected, or cannot obtain a fix.

AIS status symbols

AIS status is indicated by a symbol in the databar.

Symbol	Description
	AIS unit is switched on and operating.
	AIS currently unavailable.
	AIS unit is switched off, or not connected.
	AIS unit is in Silent Mode.
	AIS unit is in Silent Mode, with active alarms.
	AIS unit is connected and switched on, but has active alarms.
	AIS unit is connected and switched on, but the dangerous and lost alarm is disabled.

Sonar status symbols

The sonar status is indicated in the databar.

Symbol	Description
	Symbol animated: the sonar module is connected and transmitting.
	Symbol static: the sonar module is connected but not transmitting.
	Symbol greyed-out: the sonar module is not connected, or is not detected.

6.4 Pages

Pages are used to display applications.

Pages are accessed using the icons on the Homescreen. Each page can display more than 1 application.

- You can set up and display up to 4 applications per page using a c Series, e Series or gS Series (except for the e7 and e7D) multifunction display.

- The a Series and the e7 / e7D multifunction displays can only set up and show up to 2 applications per page.

- The a series and the e7 / e7D can however show up to 4 application per page if they are sharing the Homescreen of a multifunction display which already has pages with up to 4 applications set up.

Pages can be customized, enabling you to group your applications into different pages, each designed for a specific purpose. For example, you could have a page that includes the chart and fishfinder applications, suitable for fishing, and another page that includes the chart and data applications, which would be suitable for general sailing.

	Icon for a page featuring a single application.
	Icon for a page featuring multiple applications.

You can also define the layout for each page, which determines how the applications are arranged on the screen.

Setting the Power-up page

You can setup your multifunction display to show a page instead of the Homescreen at power up.

Form the Homescreen:

1. Select **Customize**.
2. Select **Display Preferences**.
3. Select **Starting page**.

   A list of options is displayed

   - Homescreen — Homescreen is displayed after power-up.
   - Last page — The page last viewed is displayed after power-up
   - Choose page — The page you select will be displayed after power-up

4. If selecting Choose page the Homescreen is displayed.

5. Select the icon for the page you want displayed when the display is turned on.

The starting page setting applies to each individual display and is not automatically shared on networked displays.

Changing an existing page on the homescreen

With the homescreen displayed:
1. Select **Customize**.
2. Select **Homescreen**.
3. Select **Edit Page**.
4. Select the page icon that you want to change.
   The Customize menu options are displayed.
5. Select the appropriate page layout (for example, "Splitscreen").
6. Select the application(s) you want to display on the page, either by selecting the relevant menu item or dragging it over to the displayed page.
7. Select **Finish**.
   The Rename Page dialog is displayed.
8. Use the on-screen keyboard to name the page, then select **Save**.

Changing an empty page

With the homescreen displayed:
1. Select **Customize**.
2. Select **Homescreen**.
3. Select **Edit Page**.
4. Select an empty page icon (labelled "Customize").
   The Customize menu options are displayed.
5. Select the appropriate page layout (for example, "Splitscreen").
6. Select the application(s) you want to display on the page, either by selecting the relevant menu item or dragging it over to the displayed page.
7. Select **Finish**.
   The Rename Page dialog is displayed.
8. Use the on-screen keyboard to name the page, then select **Save**.

Moving a page on the homescreen

With the homescreen displayed:
1. Select the **Customize** icon.
2. Select **Homescreen**.
3. Select **Swap Page**.
4. Select the page icon that you want to move.
5. Select the page icon that you want to swap positions with.
   The page icon is moved to the new position.

Renaming a page on the homescreen

With the homescreen displayed:
1. Select the **Customize** icon.
2. Select **Homescreen**.
3. Select **Rename Page**.
4. Select the page that you want to rename.
   The on-screen keyboard is displayed.
5. Using the on-screen keyboard, enter the new name for the page.
6. Select SAVE.

Deleting a page from the homescreen

With the homescreen displayed:
1. Select the **Customize** icon.
2. Select **Homescreen**.
3. Select **Delete Page**.
4. Select the page that you want to delete.
   The page is deleted.

Resetting the homescreen to default settings

With the homescreen displayed:
1. Select the **Customize** icon.
2. Select **Homescreen**.

3. Select **Reset**.

   A warning message is displayed asking for confirmation.

4. Select **Yes** to reset the homescreen to the default range of pages, or **No** to cancel the operation.

6.5 Applications

|	
	Chart application — provides a 2D or 3D graphical view of your charts to help you navigate. Waypoint, route, and track functions enable you to navigate to a specific location, build and navigate routes, or record where you've been. Chart cards provide higher levels of detail and 3D views.
	Fishfinder application — with a transducer and a sonar variant multifunction display or compatible Sonar Module, you can use the fishfinder application to help you accurately distinguish between different sizes of fish, bottom structure, and underwater obstacles. You can also view sea depth and temperature data and mark points of interest such as fishing spots or wrecks.
	Radar application — with a suitable radar scanner, you can use the radar application to track targets and measure distances and bearings. A number of automatic gain presets and color modes are provided to help you get the best performance from your radar scanner.
	Data application — view system and instrument data on your multifunction display, for a range of compatible instruments. Use the joystick or touchscreen to scroll through the available data pages.
	Weather application — (North America only). With a suitable weather receiver connected to your system, the weather application overlays historical, live, and forecasted weather graphics on a world map.
	Thermal cam application — view and control a thermal camera using a compatible multifunction display.
	Camera application — view a video or camera source on your multifunction display.
	Doc Viewer — view pdf documents stored on a MicroSD card.
	FUSION Link application — link to and control a compatible Fusion entertainment system from your multifunction display.
	Sirius Audio application — control Sirius radio from your multifunction display.
	User Manual — Opens the English version of the product user manual stored on the display. To open translated user manuals stored on memory card use the Doc Viewer.

6.6 Splitscreen controls

When viewing a page with more than 1 application displayed you can switch applications from the splitscreen view to fullscreen view.

Example 1 — Splitscreen page
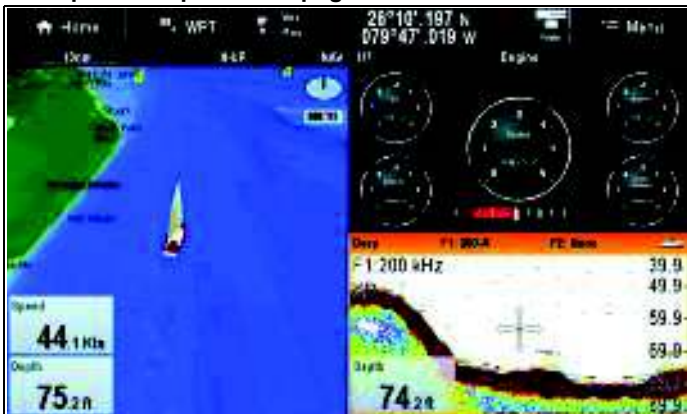
Example 2 — Fishfinder application expanded to Fullscreen
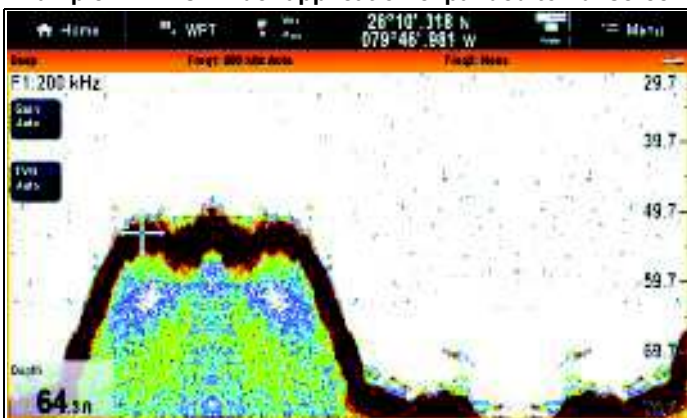
Selecting the active window

When viewing a splitscreen page you can select the active application and view it fullscreen by following the steps below.

With a page featuring multiple applications displayed:

1. Touch anywhere inside the application you want to make active.

   A border appears around the application, indicating that it is active.
2. Select **Menu**.
3. Select **Fullscreen** to view the active application in fullscreen, or
4. Select **Splitscreen** to return to the splitscreen view.

Selecting the active window using Non-touch controls

When viewing a splitscreen page you can select the active application and view it fullscreen using the MFD's physical buttons or a remote keypad.

With a page featuring multiple applications displayed:

1. Press the [ ] **Switch Active** button.

   The active pane pop up is displayed:
2. Press the **Switch Active Pane** button or use the **Rotary control** to cycle the active application.
3. Use the **Range in** or **Range out** controls to switch the active application between splitscreen and fullscreen views.

Switching the active pane or display using the keypad

The Switch Active button is used to switch the active pane on a multi application page and / or to switch the active display.

With multiple displays connected and / or a multiple application page displayed:

Cycle sequence
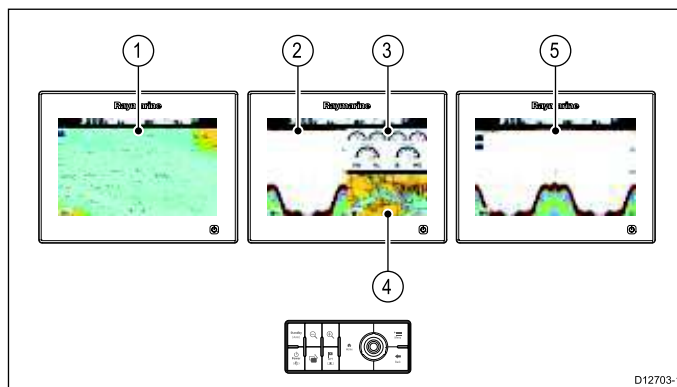
1. Press the **Switch Active** button to enter switch mode.
2. Use the **Rotary Control** to cycle through the available panes and / or displays.

   The keypad will cycle through displays in the order in which they were paired. On multi application pages the Range buttons can be used to switch the active application between full and splitscreen.
3. Press the **Back** button or the **Switch Active** button to exit switch mode.

6.7 Screen overview

D12196-2

Screen item	Description
1	**Home** — select the **Home** icon to access the homescreen.
2	**Databar** — provides information about your vessel and its environment. The position and type of information in the databar can be customized from the **Homescreen > Customize > Databar Set-up** menu, if required.
3	**Menu** — the menu options are specific to the application that you are currently using.
4	**Pop-up menu** — menu options are displayed when the Menu is selected.
5	**Pop-up messages** — alert you to a situation (such as an alarm), or unavailable function. Pop-up messages may require a response from you — for example, select **OK** to silence alarms.
6	**Dialogs** — enable data to be selected, edited or entered. Use in many common functions — for example, editing a waypoint.
7	**Context menu** — provides information and options specific to each application.
8	**Status bar** — provides information specific to each application. This information cannot be edited or moved.

Menus

Menus enable you configure settings and preferences.
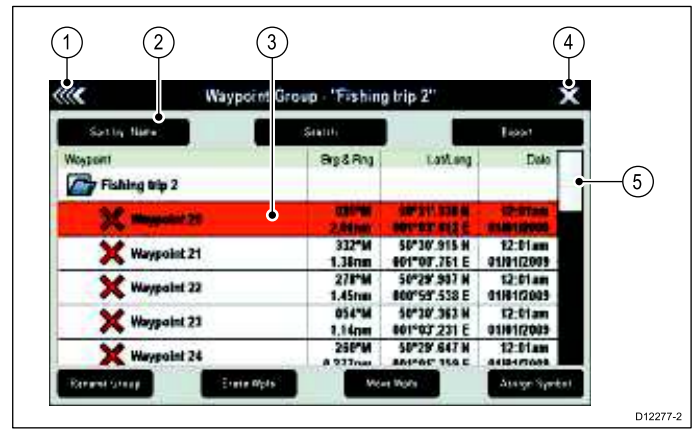
Menus are used in the:

- **Homescreen** — to configure your multifunction display and externally-connected equipment.
- **Applications** — to configure the settings for that particular application.

D12281-4

Screen item	Description
1	**Back** — On displays with a touchscreen you can press the onscreen **<<** (back) icon to go back to a previous menu. On non-touchscreen displays or HybridTouch displays use the **Back** button.
2	**Close** — On displays with a touchscreen you can press the onscreen **X** (close) icon to go back to a previous menu. On non-touchscreen displays or HybridTouch displays use the **Back** button to back out of the menu structure.
3	**Selected menu option** — the menu option currently selected will be highlighted.
4	**Scroll bar** — indicates that further menu items are available by scrolling the menu. On displays with a touchscreen to scroll through the available menu items, press and hold your finger on the menu and drag it up or down. On non-touchscreen displays or HybridTouch displays use the **Rotary control**.
5	**On / Off switch** — On displays with a touchscreen you can select onscreen menu items to switch features On or Off to enable or disable the function. On non-touchscreen displays or HybridTouch displays use the **OK** button to switch the function On or Off.

Dialogs

Dialogs are fullscreen menus that enable you to manage data items such as waypoints and routes.

D12277-2

Screen item	Description
1	**Back** • Displays with a touchscreen — Select the onscreen **Back** icon to go back to the previous menu. • Non–touchscreen or HybridTouch displays — Use the **Back** button to go back to the previous menu.
2	**Function icons** — Some dialogs include icons which can be selected to access additional functions. For example, in the Waypoint List dialog, the **Sort by** icon can be used to change how the waypoints list is sorted.
3	**Menu / List item** • Displays with a touchscreen — Momentarily touching an item automatically selects the item and displays the item options menu. • Non–touchscreen or HybridTouch displays — Use the **Rotary control** to highlight an item, and the **Ok** button to select it and display the item options menu.

Screen item	Description
4	**Close**
	• Displays with a touchscreen — Select the onscreen **Close** icon to close the dialog.
	• Non–touchscreen or HybridTouch displays — Use the **Back** button to close the dialog.
5	**Scroll bar**
	• Displays with a touchscreen — To scroll through the available items, press and hold your finger on the scroll bar and drag it up or down.
	• Non–touchscreen or HybridTouch displays — To scroll through the available menu items, use the **Rotary control**.

Shortcuts page

A number of useful functions can be accessed from the Shortcuts page.
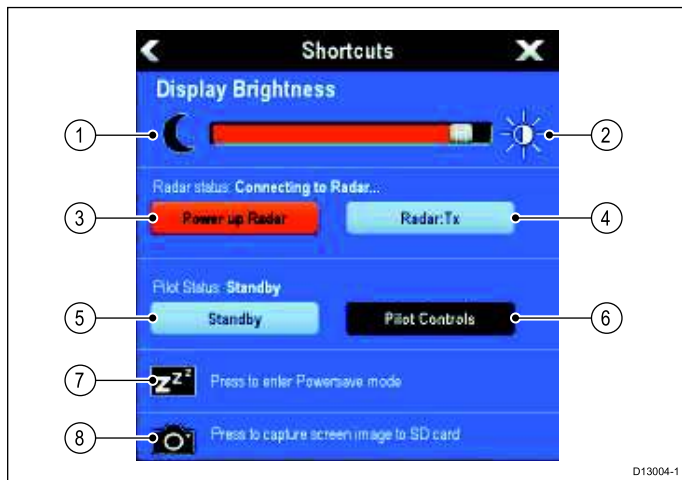
1	Decrease display brightness
2	Increase display brightness
3	Power up / Power down Radar
4	Radar standby / Radar transmit
5	Autopilot standby (during active navigation)
6	Display pilot control dialog
7	PowerSave mode
8	Screenshot / Screen capture

Edit dialogs

Edit dialogs enable you to edit the details of data items stored on your multifunction display, such as waypoints, routes, and tracks.

Selecting a text field displays the onscreen keyboard, which can be used to edit the details.

Editing information in dialogs

With the dialog displayed:
1. Select the field you want to edit.
   The onscreen keyboard is displayed:

2. Use the onscreen keyboard to make the changes.
3. Select **SAVE** to save the changes.

Entering special or accented characters

With the onscreen keyboard displayed:
1. Select the onscreen keyboard's **àèò** key.
2. Select the character you want to accent.
   The available accented characters are displayed above the text entry field.
3. For characters that have multiple available accents, use the character key to toggle between them.
4. Select the **àèò** key to enter the character.

Numeric menu items

Numeric menu items display numeric data and enables you to either select a predefined value or to increase and decrease the value as required.

Editing numerical settings

To edit numerical values you can use either the onscreen numeric adjust control, onscreen numeric keypad or the **Rotary Control** on a non-touch or HybridTouch display to increase or decrease numeric values.
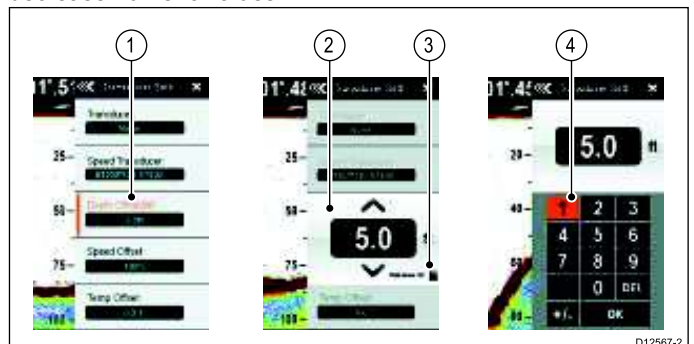
1. Select the numeric data field you want to edit.
   The numeric adjust control is displayed.
2. Adjust the setting to the required value using:
   i. The **Rotary control** — Non-touchscreen or HybridTouch displays, or