Raymarine®

RMK-10 KEYPAD

Installation and operation instructions

English (en-US)
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Software updates

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

Product documentation

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

Publication copyright

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Contents

Chapter 1: Important information

Warning: Product installation and operation

- This product must be installed and operated in accordance with the instructions provided. Failure to do so could result in personal injury, damage to your vessel and/or poor product performance.
- Raymarine highly recommends certified installation by a Raymarine approved installer. A certified installation qualifies for enhanced product warranty benefits. Register your warranty on the Raymarine website: www.raymarine.com/warranty

Warning: Potential ignition source

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

Warning: Product grounding

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

Warning: Positive ground systems

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

Warning: Switch off power supply

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

Caution: Power supply protection

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

Water ingress

Water ingress disclaimer

Although the waterproof rating capacity of this product meets the IPX6 standard, water intrusion and subsequent equipment failure may occur if the product is subjected to commercial high-pressure washing. Raymarine will not warrant products subjected to high-pressure washing.

Disclaimer

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

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

EMC installation guidelines

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

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

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

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

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

Note:

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

Declaration of conformity

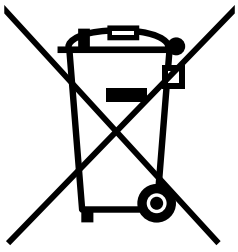
FLIR Belgium BVBA declares that this product is compliant with the essential requirements of EMC Directive 2014/30/EU.

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

Product disposal

Dispose of this product in accordance with the WEEE Directive.

The Waste Electrical and Electronic Equipment (WEEE) Directive requires the recycling of waste electrical and electronic equipment which contains materials, components and substances that may be hazardous and present a risk to human health and the environment when WEEE is not handled correctly.



Equipment marked with the crossed-out wheeled bin symbol indicates that the equipment should not be disposed of in unsorted household waste.
Local authorities in many regions have established collection schemes under which residents can dispose of waste electrical and electronic equipment at a recycling center or other collection point.
For more information about suitable collection points for waste electrical and electronic equipment in your region, refer to the Raymarine website: www.raymarine.eu/recycling.

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 Document information

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

The document includes information to help you:

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

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

Product documentation

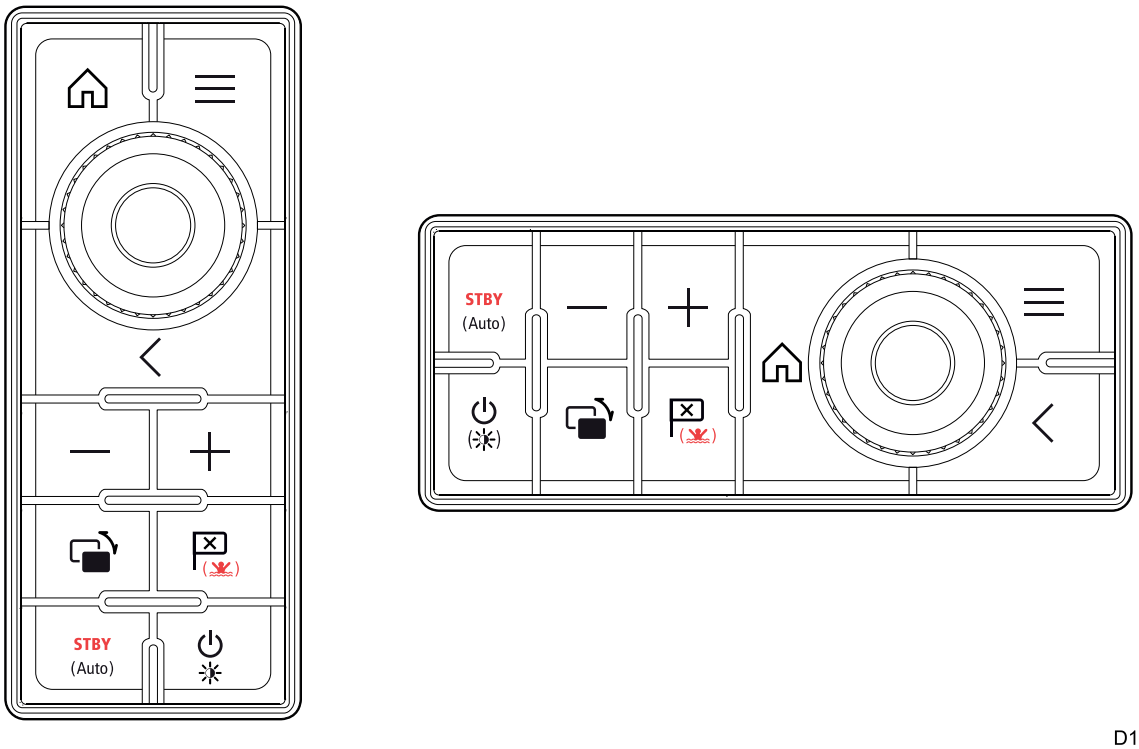
The following documentation is applicable to your product:

Description	Part number
Installation and operation instructions	**81367**
RMK-10 Mounting template	**87283**

2.2 Product overview

The **RMK-10** is a Remote Keypad for Raymarine multifunction displays (MFD). The keypad is a class 1 PoE (Power Over Ethernet) device and can be powered either using a suitable network connection, that is providing PoE, or directly using the dedicated Alternate power connector. The keypad includes an internal buzzer that is used to repeat key press beeps and MFD alarms.

The keypad can be mounted in landscape or portrait orientation.



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Part number	Description
A80438	**RMK-10 — Portrait orientation** When ordering **A80438** only the portrait keypad mat is supplied.
T70293	**RMK-10 — Landscape orientation** When ordering **T70293** both orientation keypad mats are supplied.

Compatibility

The **RMK-10** is compatible with the following LightHouse™ powered MFDs.

- Axiom
- Axiom+
- Axiom Pro
- Axiom XL
- a Series
- c Series
- e Series
- eS Series
- gS Series

2.3 Software updates

The software running on the product can be updated.

- Raymarine periodically releases software updates to improve product performance and add new features.
- The software on many products can be updated using a connected and compatible multifunction display (MFD).
- Refer to www.raymarine.com/software/ for the latest software updates and the software update procedure for your specific product.

Important:

- To prevent potential software-related issues with your product, always follow the relevant update instructions carefully and in the sequence provided.
- If in doubt as to the correct procedure for updating your product software, refer to your dealer or Raymarine technical support.

Caution: Installing software updates

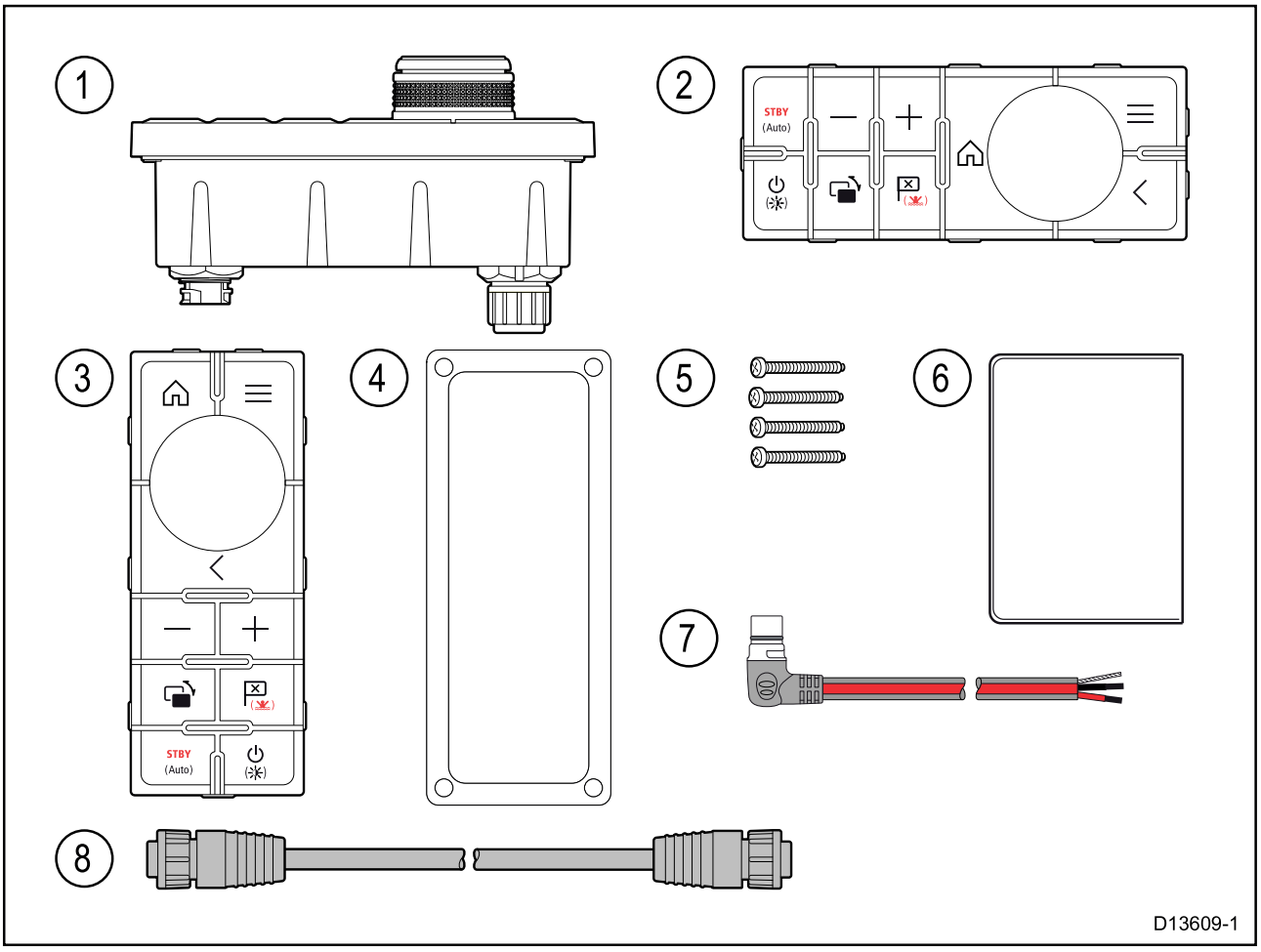
- The software update process is carried out at your own risk. Before initiating the update process ensure you have backed up any important files.
- Ensure that the unit has a reliable power supply and that the update process is not interrupted.
- Damage caused by an incomplete update is not covered by Raymarine warranty.
- By downloading the software update package, you agree to these terms.

Chapter 3: Parts supplied

Chapter contents

3.1 Parts supplied

The parts supplied with the keypad are shown below.



1. **RMK-10** keypad
2. Landscape keypad mat

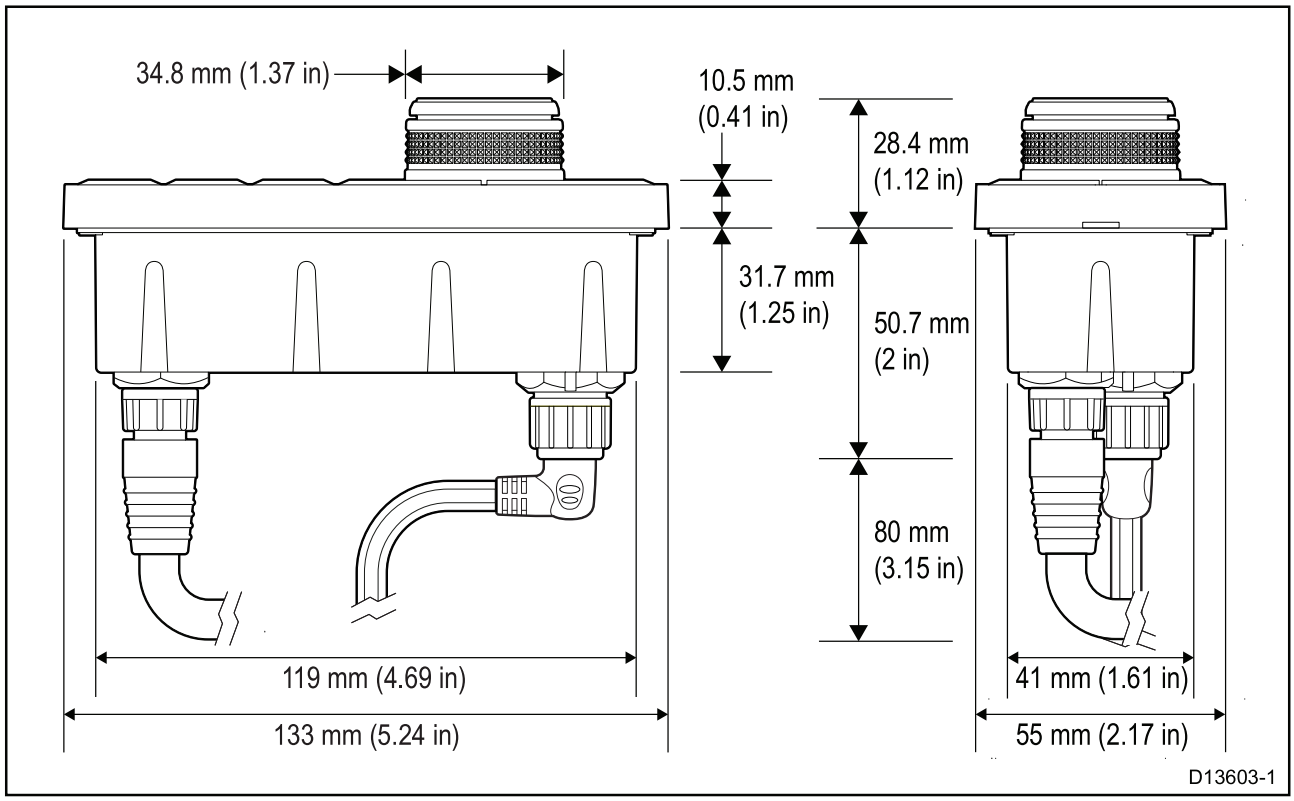
Note: The Landscape keypad mat is only supplied with **T70293**

3. Portrait keypad mat (supplied fitted to the unit)
4. Mounting gasket
5. 4 x mounting fixings
6. Documentation pack
7. Right angled power cable 2 m (6.6 ft.)
8. RayNet network cable 2 m (6.6 ft.)

Chapter 4: Product dimensions

Chapter contents

4.1 Product dimensions



Dimension	Measurement
A	34.8 mm (1.37 in)
B	10.5 mm (0.41 in)
C	28.4 mm (1.12 in.)
D	31.7 mm (1.25 in.)
E	50.7 mm (2.00 in.)
F	80.0 mm (3.15 in.)
G	119.0 mm (4.69 in.)
H	133.0 mm (5.24 in.)
I	41.0 mm (1.61 in.)
J	55.0 mm (2.17 in.)

Chapter 5: Location requirements

Chapter contents

5.1 General location requirements

Important considerations when choosing a suitable location for your product.

This product is suitable for mounting above or below decks.

The product should be mounted where it will be:

- protected from physical damage and excessive vibration.
- well ventilated and away from heat sources.
- away from any potential ignition source such as an engine room, near fuel tanks or a gas locker.

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

- Access — there must be sufficient space to enable cable connections and to avoid tight cable bends.
- Diagnostics — the product must be mounted in a location where any diagnostics LED are easily visible.

Note: Not all products include a diagnostics LED. For more information refer to:Chapter 9 **System checks and troubleshooting**

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

5.2 Warnings and cautions

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

Chapter 6: Installation

Chapter contents

6.1 Installation checklist

Installation includes the following activities:

Installation Task

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

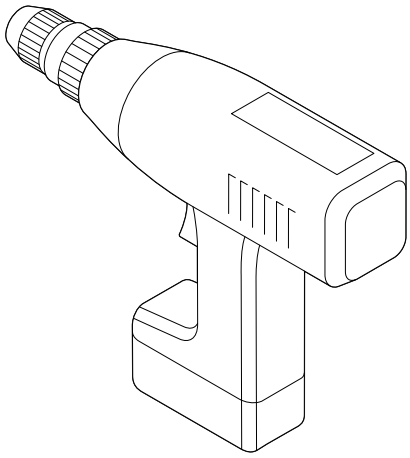
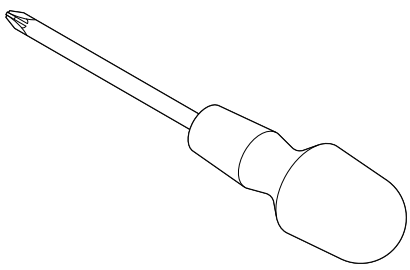
Schematic diagram

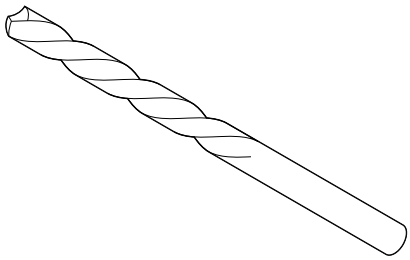
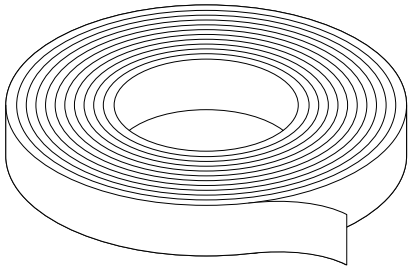
A schematic diagram is an essential part of planning any installation. It is also useful for any future additions or maintenance of the system. The diagram should include:

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

Tools required

Product installation requires the following tools:

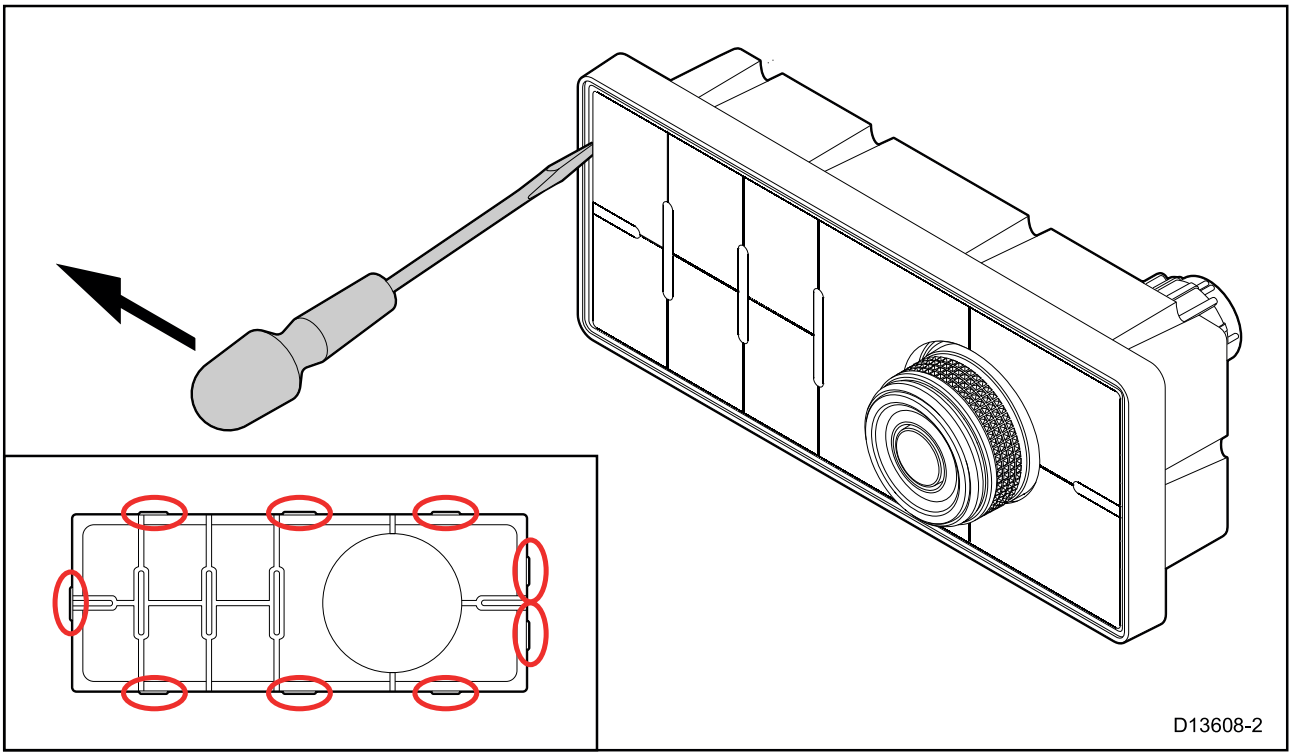
Item	Description	Quantity
	Power drill	1
	Pozidrive screwdriver	1

Item	Description	Quantity
	Drill bit of appropriate size*	1
	Adhesive tape	1

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

Removing the keypad mat

To gain access to the mounting hole locations, the keypad mat must be removed.



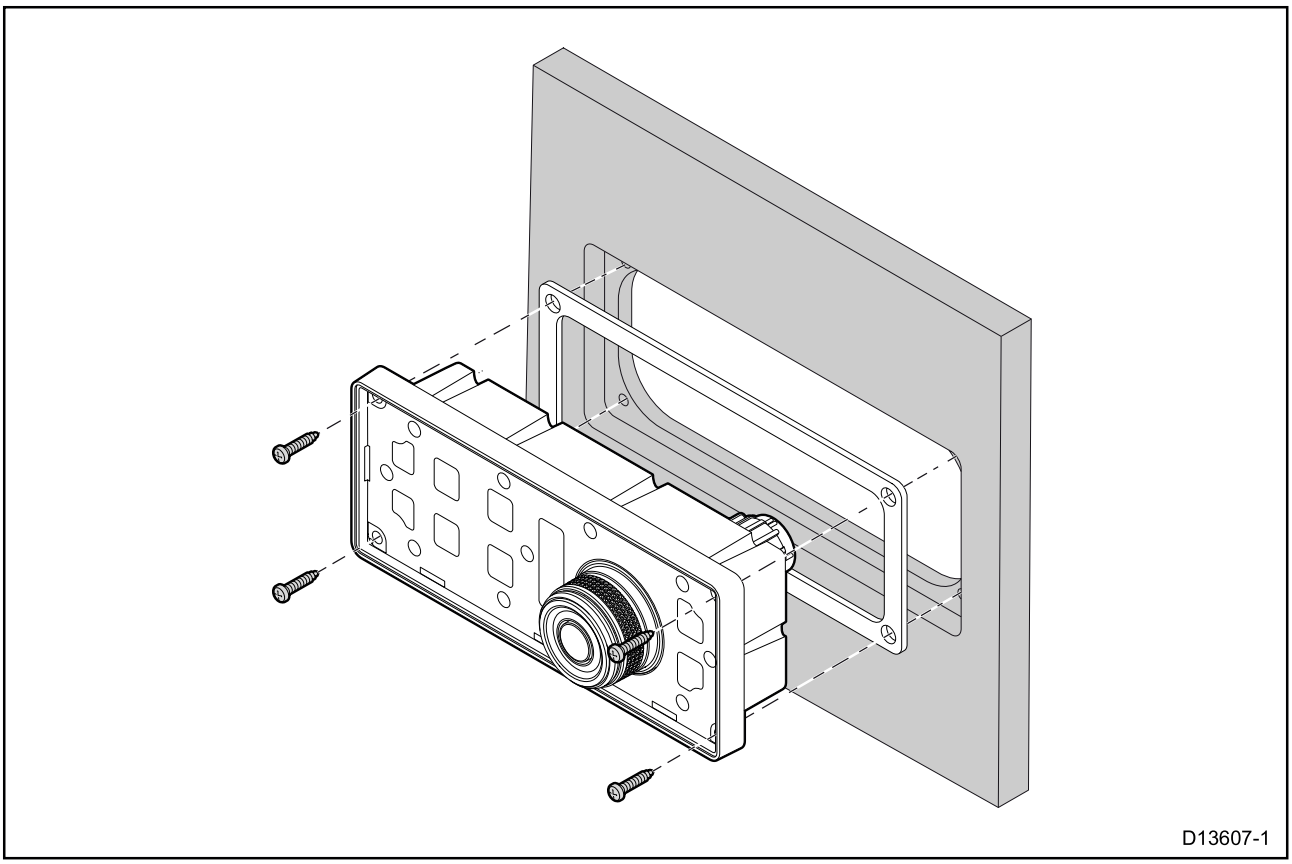
Tip To help prevent scratching the product, cover the tip of your screwdriver blade with a small piece of insulation tape.

1. Using a thin, flat bladed screwdriver insert the tip of the screwdriver into the gap between the edge of the keypad mat and the keypad housing, at a location between locking tabs.
2. Gently lever the keypad mat away from the keypad to release the keypad mat.

Take care not to bend the keypad mat during removal.

Flush mounting the keypad

Flush mounting provides a sleek installation where the product and dash are flush, with only the buttons and Rotary controller protruding from the dash. Flush mounting requires the mounting surface to be rebated.



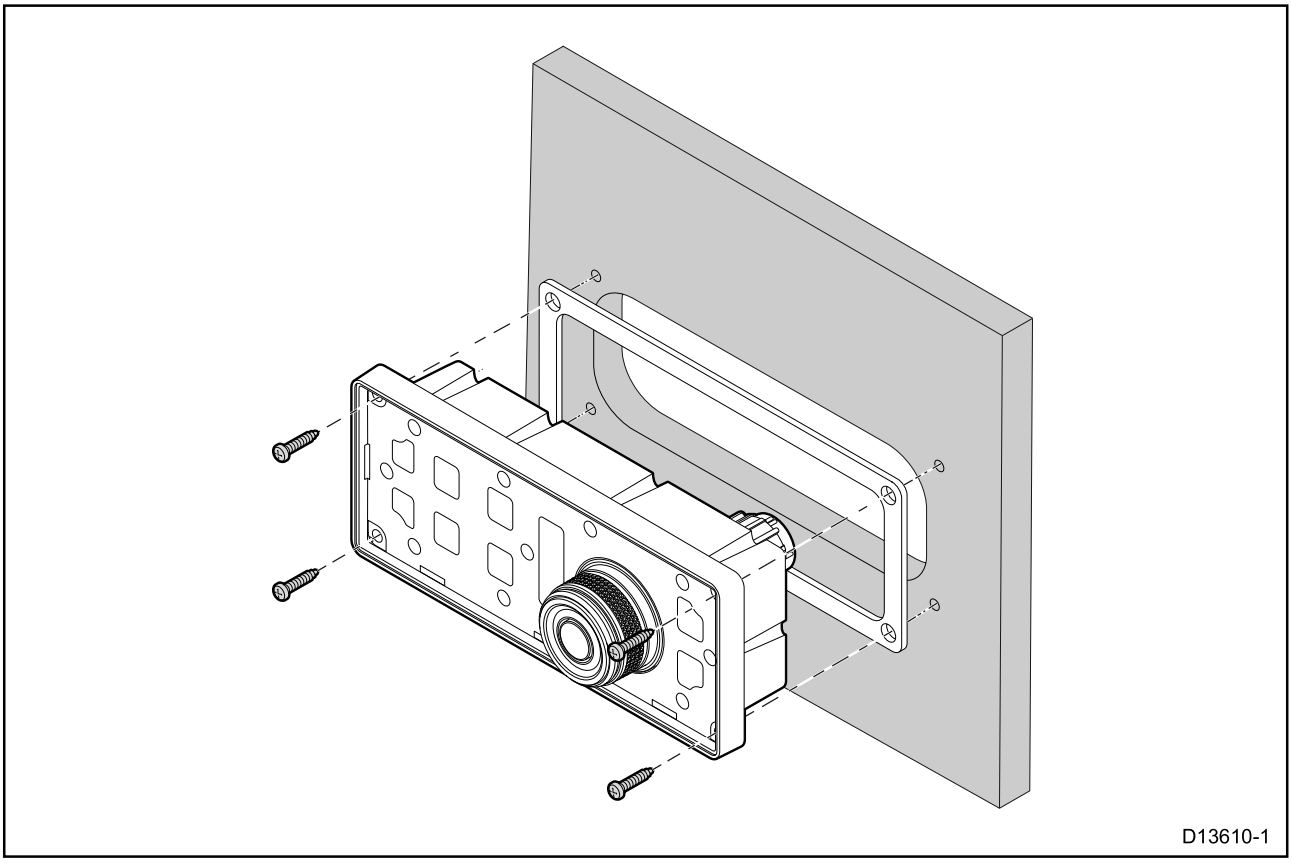
1. Check the selected location for the unit. A clear, flat area with suitable clearance behind the panel is required.
2. Before modifying the mounting surface, refer to the dimensions supplied in this document to ensure there is enough space for the unit and all cables.
3. Fix the supplied mounting template 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 suitable hole saw (the size and position is indicated on the template), make a hole in each corner of the cut-out area.
6. Using a suitable saw, cut along the inside edge of the cut-out line.
7. Using a Router, follow the Flush mount rebate line, to cut out a rebate to the specified rebate depth, as indicated on the template.
8. Ensure that the unit fits into the removed area and then remove rough edges.
9. Place the supplied gasket onto the rear of the keypad, ensuring the mounting holes are aligned.
10. Connect the relevant cables to the unit.
11. Place the keypad into the rebate and secure using the fixings provided.

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.

Surface mounting the keypad

Surface mounting provides a uniform installation where the products protrude, usually by the thickness of the bezel, from the mounting surface.



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 all cables.
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 suitable hole saw, make a hole in each corner of the cut-out area.
6. Using a suitable saw, cut along the inside edge of the cut-out line.
7. Ensure that the unit fits into the removed area and then remove rough edges.
8. Place the supplied gasket onto the rear of the keypad, ensuring the mounting holes are aligned.
9. Connect the relevant cables to the unit.
10. Secure using the fixings provided.

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.

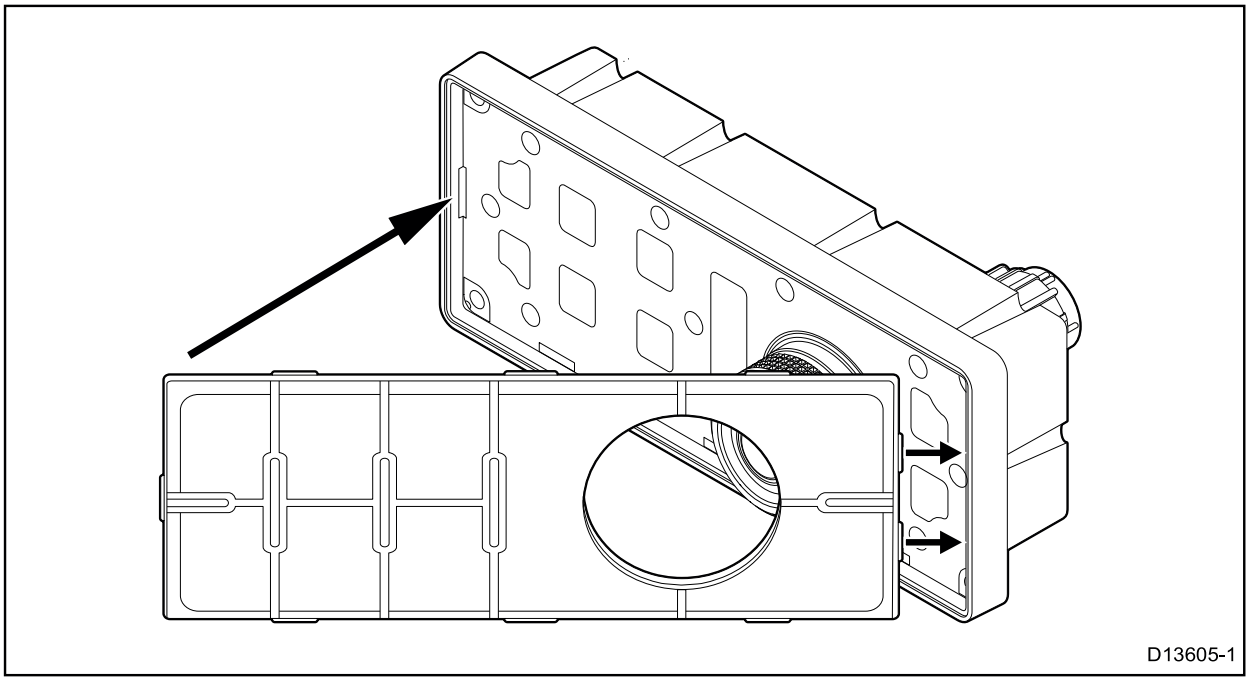
Fitting the keypad mat

Your keypad can be installed in portrait or landscape orientation. Keypad mats are available for each orientation.

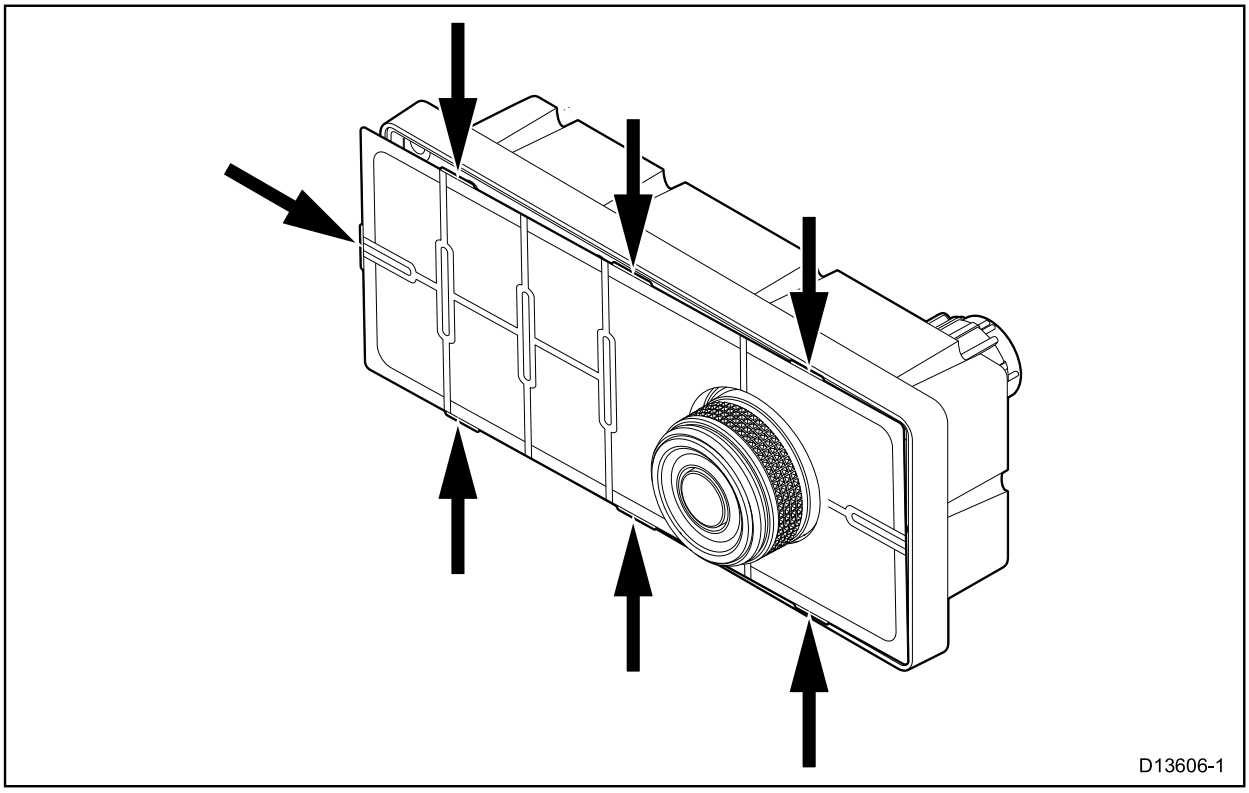
- You should fit the keypad mat that matches your chosen mounting orientation.
- You should only fit the keypad mat after the unit has been secured to the mounting surface.

1. Ensure the keypad mat is orientated correctly.

2. Slide the keypad mat's shorter edge, with the 2 locking tabs, into the end of the keypad that has 2 notches to accept the tabs.



3. Close the opposite end of the keypad mat into the keypad, ensuring that the tab slides into the notch provided. Push all of the tabs on the longer sides into their notches (you should hear a click as each tab engages).



Chapter 7: Cables and connections

Chapter contents

7.1 General cabling guidance

Cable types and length

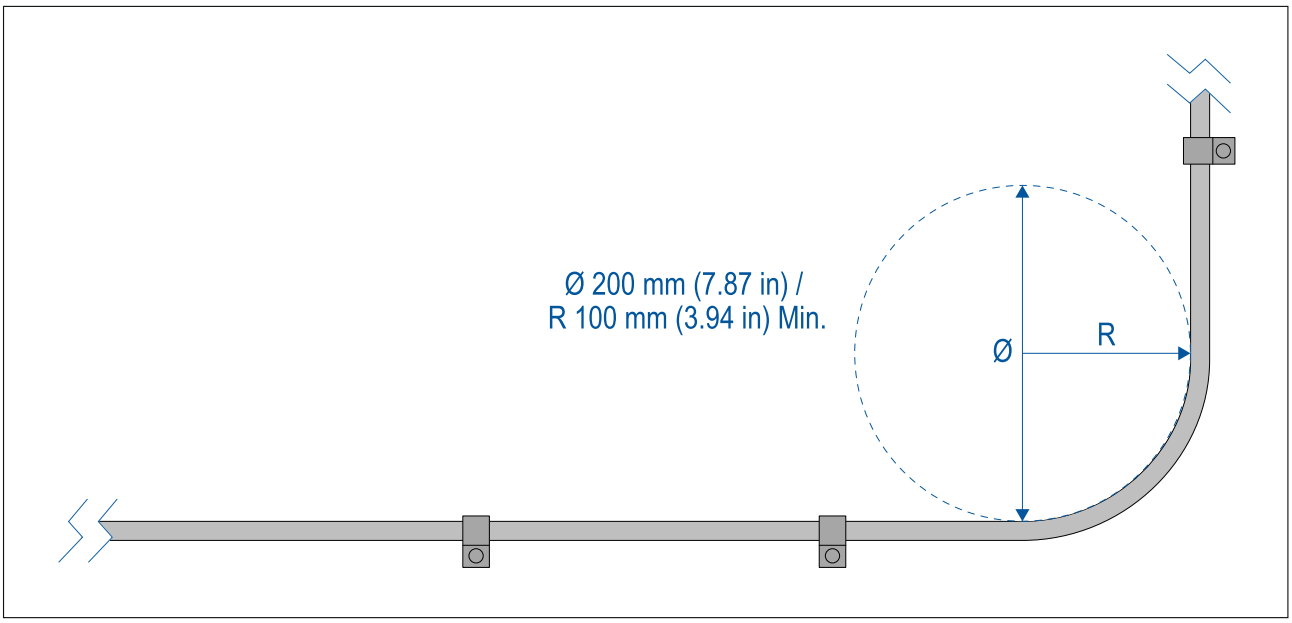
It is important to use cables of the appropriate type and length.

- Unless otherwise stated only use cables supplied by Raymarine.
- Where it is necessary to use non-Raymarine cables, ensure that they are of correct quality and gauge for their intended purpose. (e.g.: longer power cable runs may require larger wire gauges to minimize voltage drop along the run).

Cable routing

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

- Do NOT bend cables excessively. Wherever possible, ensure a minimum bend diameter (Ø) of 200 mm (7.87 in) / minimum bend radius (R) of 100 mm (3.94 in).



- Protect all cables from physical damage and exposure to heat. Use trunking or conduit where possible. Do NOT run cables through bilges or doorways, or close to moving or hot objects.
- Secure cables in place using cable clips or cable ties. Coil any excess cable and tie it out of the way.
- Where a cable passes through an exposed bulkhead or deckhead, use a suitable watertight feed-through.
- Do NOT run cables near to engines or fluorescent lights.
- Always route data cables as far away as possible from:
  - other equipment and cables,
  - high current carrying AC and DC power lines,
  - antennas.

Strain relief

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

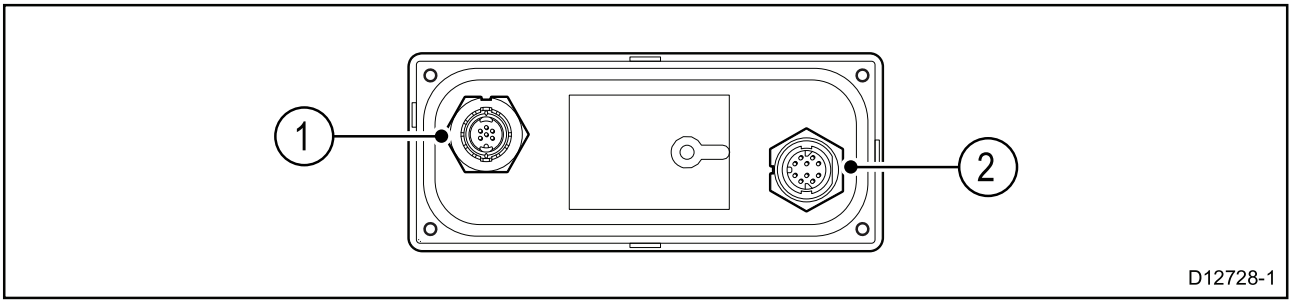
Cable shielding

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

Suppression ferrites

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

7.2 Connections overview



1. Alternate power connector
2. Network / PoE connector

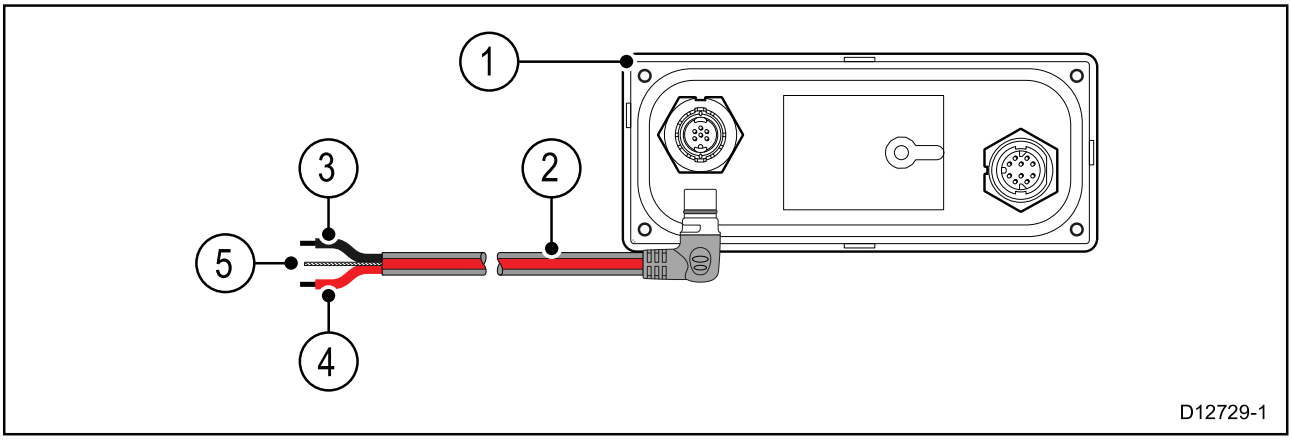
The alternate power connector is required when connecting to a network which does not support Power over Ethernet PoE. The alternate power connector must be connected directly to a power supply.

Note: Do not connect the alternate power connector to a SeaTalk ng network.

Note: Only use one power source. There is no need to connect the alternate power connector when the keypad is being supplied PoE.

7.3 Alternate power connection

When the keypad is not supplied Power over Ethernet (PoE) then the alternate power connection should be connected directly to a 12 V dc or 24 V dc power supply.



1. Keypad
2. Right angled power cable
3. Black negative wire
4. Red positive wire
5. Ground / shield wire

Warning: Product grounding

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

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

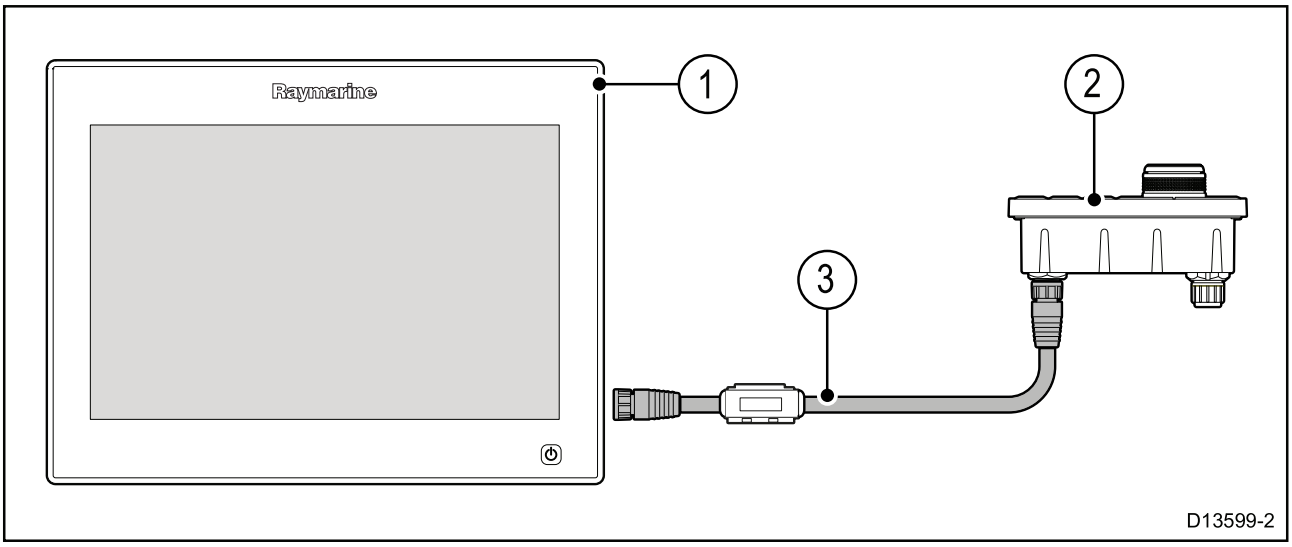
Do not connect this unit to a system which has positive grounding.

7.4 Keypad connections

The keypad can be connected directly to a multifunction display's (MFDs) network connector or via a network switch. Multiple keypads can be connected to a system. Each keypad can be used to control multiple MFDs. If the network is not providing Power over Ethernet (PoE) then the keypad must be separately powered using the alternate power connector.

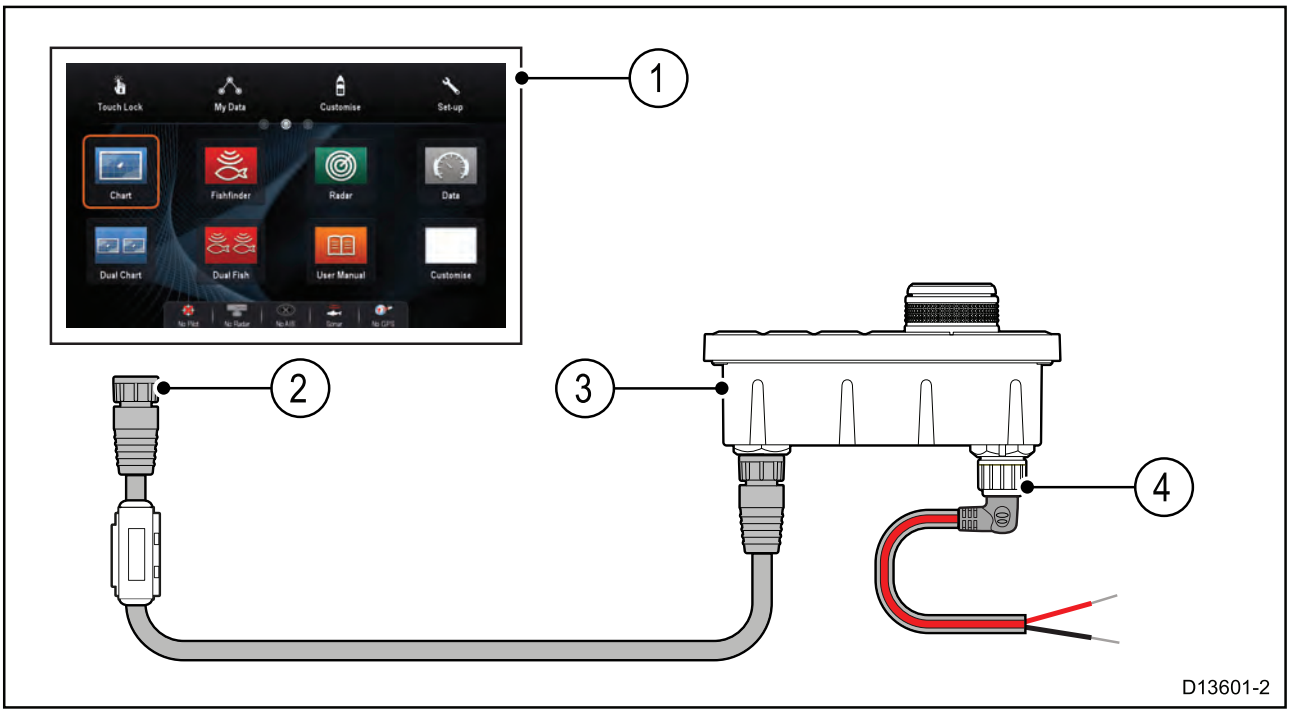
Note: When connecting the keypad to a gS Series or Axiom XL MFD, ensure that the supplied RayNet cable is connected with the suppression ferrite fitted on the end of the cable closest to the MFD.

Direct MFD connection with PoE



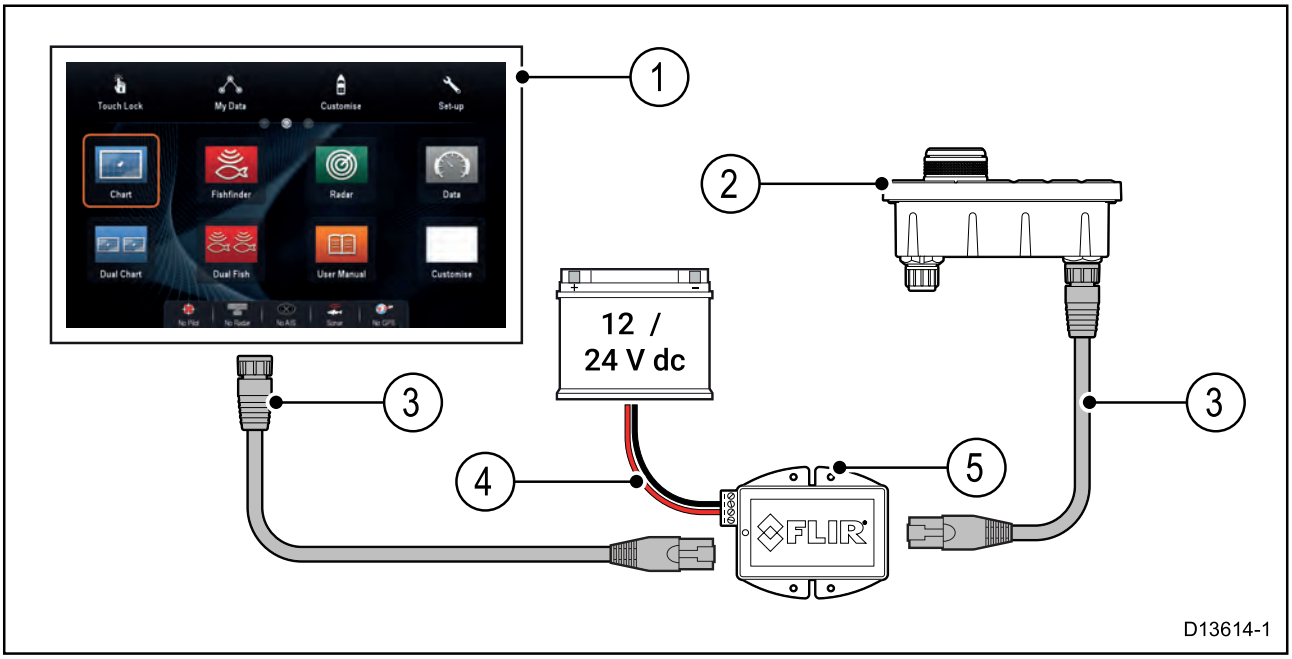
1. gS Series or Axiom XL (MFD providing PoE)
2. RMK keypad
3. RayNet network cable (with suppression ferrite fitted)

Direct MFD connection without PoE



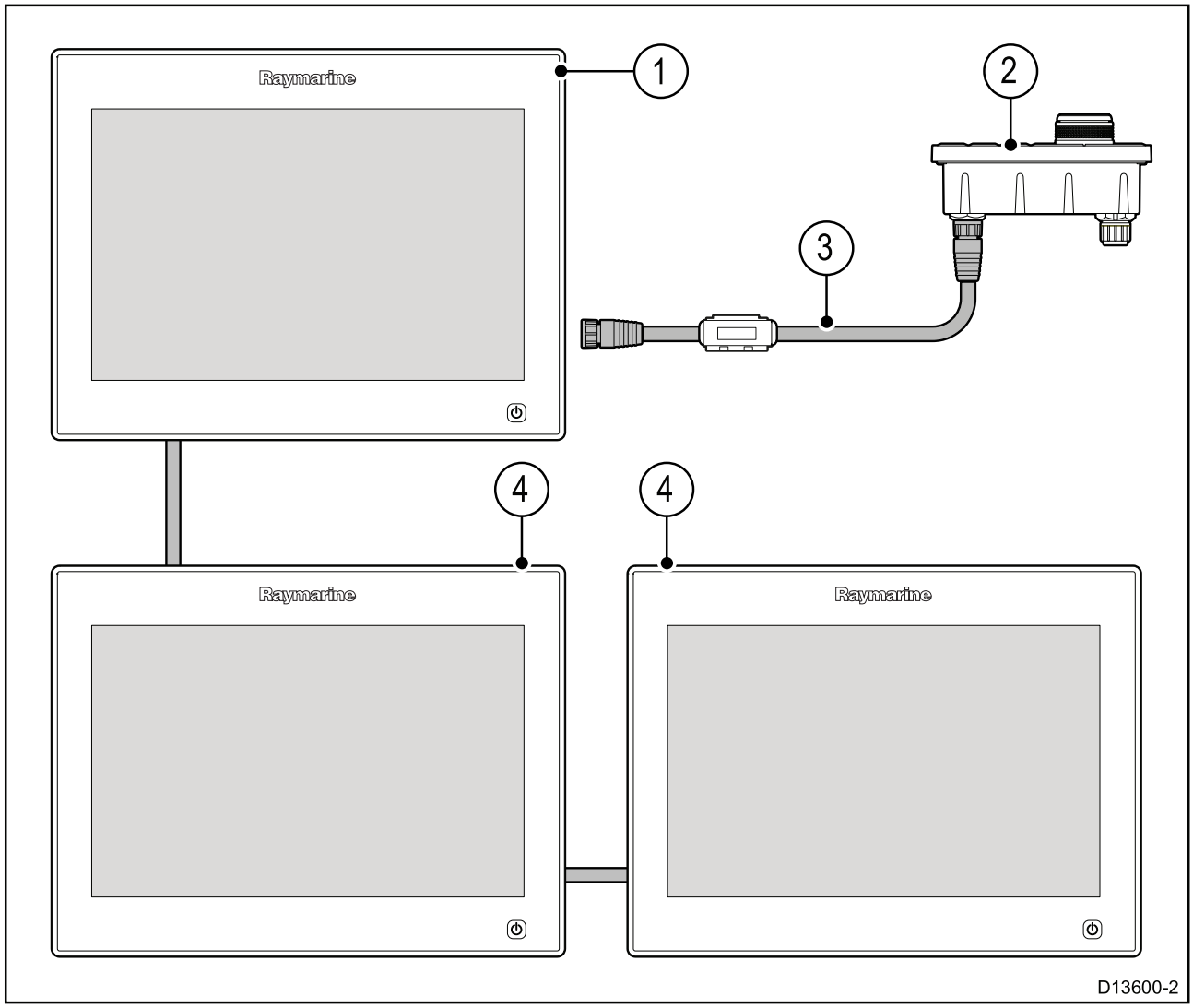
1. MFD
2. RayNet network cable
3. RMK keypad
4. Right-angled power cable (Connected to the alternate power connector.)

Direct MFD connection with PoE injector



1. MFD
2. RMK keypad
3. RayNet to RJ45 network cable (A62360, A80151 or A80159)
4. PoE injector power supply (12 / 24 V dc)
5. PoE injector (R32141)

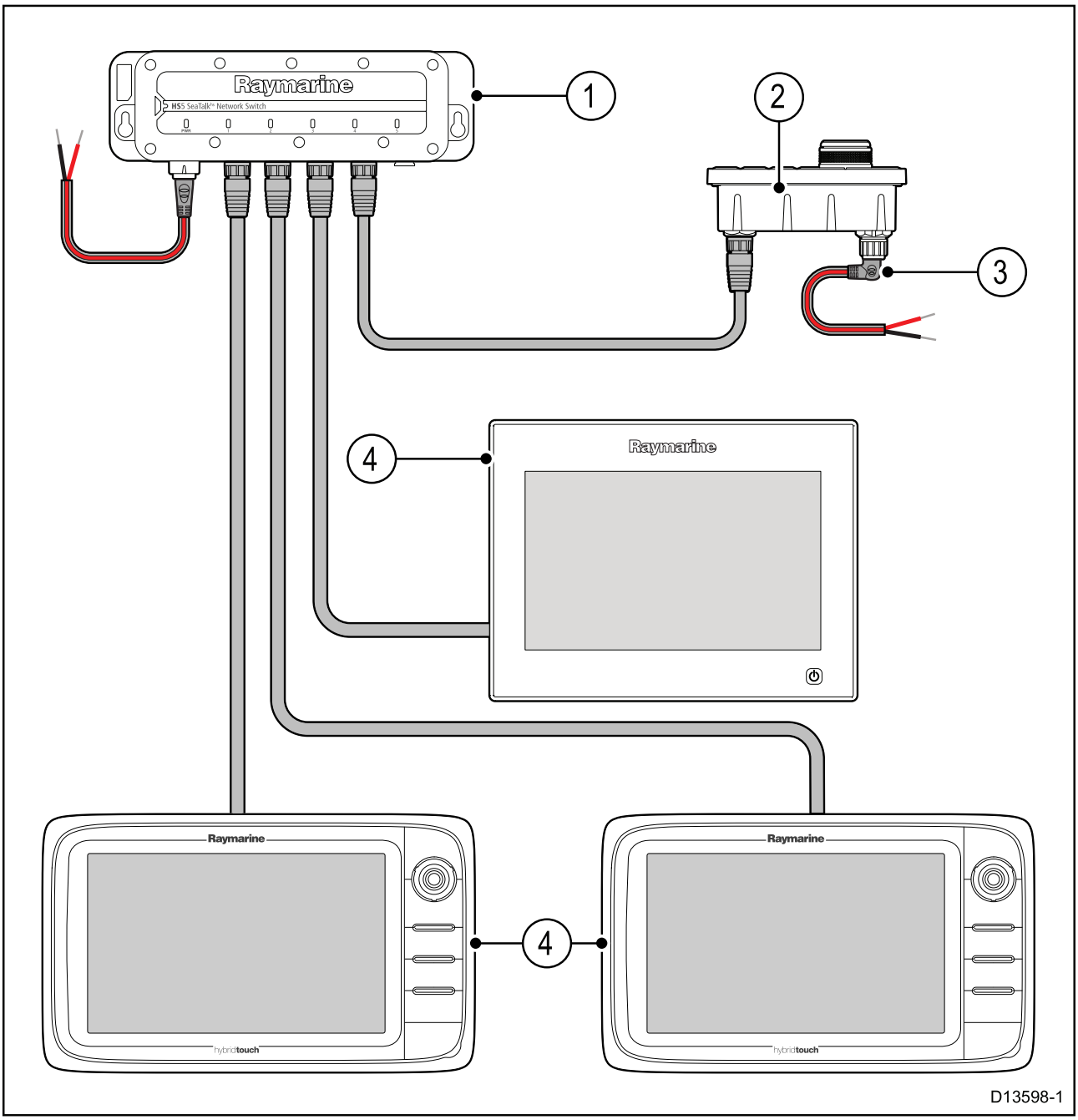
Network connection via MFD with PoE



1. gS Series or Axiom XL (MFD providing PoE)
2. RMK keypad
3. RayNet network cable (with suppression ferrite fitted)
4. Networked MFDs

Note: The keypad can be used to control networked MFDs even when the MFD it is connected to is switched off, as long as the MFD still has power supplied to it.

Network connection via network switch



In the illustration above a PoE injector could be used instead of the alternate power connection.

1. Network switch
2. RMK keypad
3. Right-angled power cable (Connected to the alternate power connector.)
4. Networked MFDs

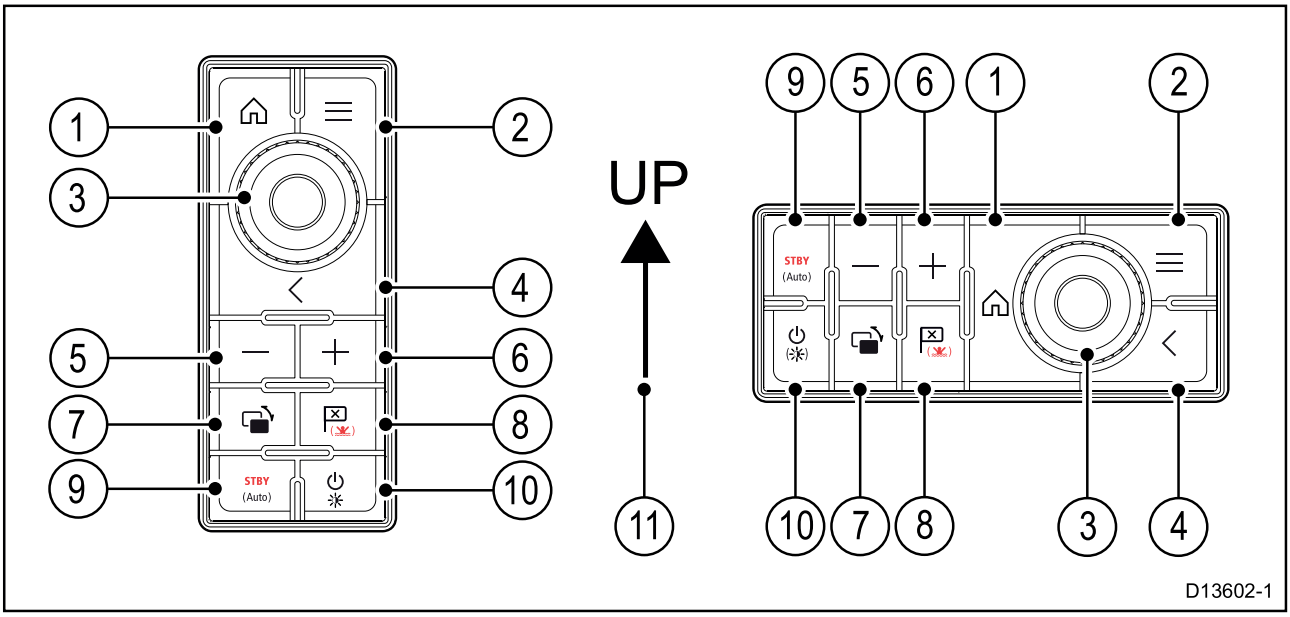
Note: Once connected the keypad must be paired with each MFD you want to control with the keypad.

Chapter 8: Operation

Chapter contents

8.1 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. **UniController** — provides a rotary control and a joystick that includes an OK push button for using menus and applications.
4. **Back** — press to return to a previous menu or dialog level.
5. **-** (Minus/Negative symbol) — press to range out.
6. **+** (Plus/Positive symbol) — press to range in.
7. **Active** — press to switch the active pane, or to switch the active multifunction display (in multiple display systems).
8. **Waypoint / 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
Single MFD	Off	Not applicable	Not applicable
	On	Open Shortcuts page	Power off / put into Standby
Multiple MFDs	All displays Off	Not applicable	Not applicable
	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:

- MFDs that are powered off must be switched back on using the MFD's **Power** button.
- LightHouse™ 2 MFDs in Power save mode can be woken by momentary press of the keypad's **Power** button.

11. Direction of Joystick Up.

8.2 Pairing the keypad

Each keypad can be paired with multiple MFDs and multiple keypads can be connected to the same system.

With the keypad connected to the MFD:

1. Select **External Keypad** from the External Devices menu: **homescreen** > **Set-up** > **System Settings** > **External Devices** > **External Keypad**.
2. Select **Pair Keypad**.
3. Press any button on the external keypad.
4. From the pop-up message select the orientation of the keypad.

   Either landscape or portrait orientations are available.

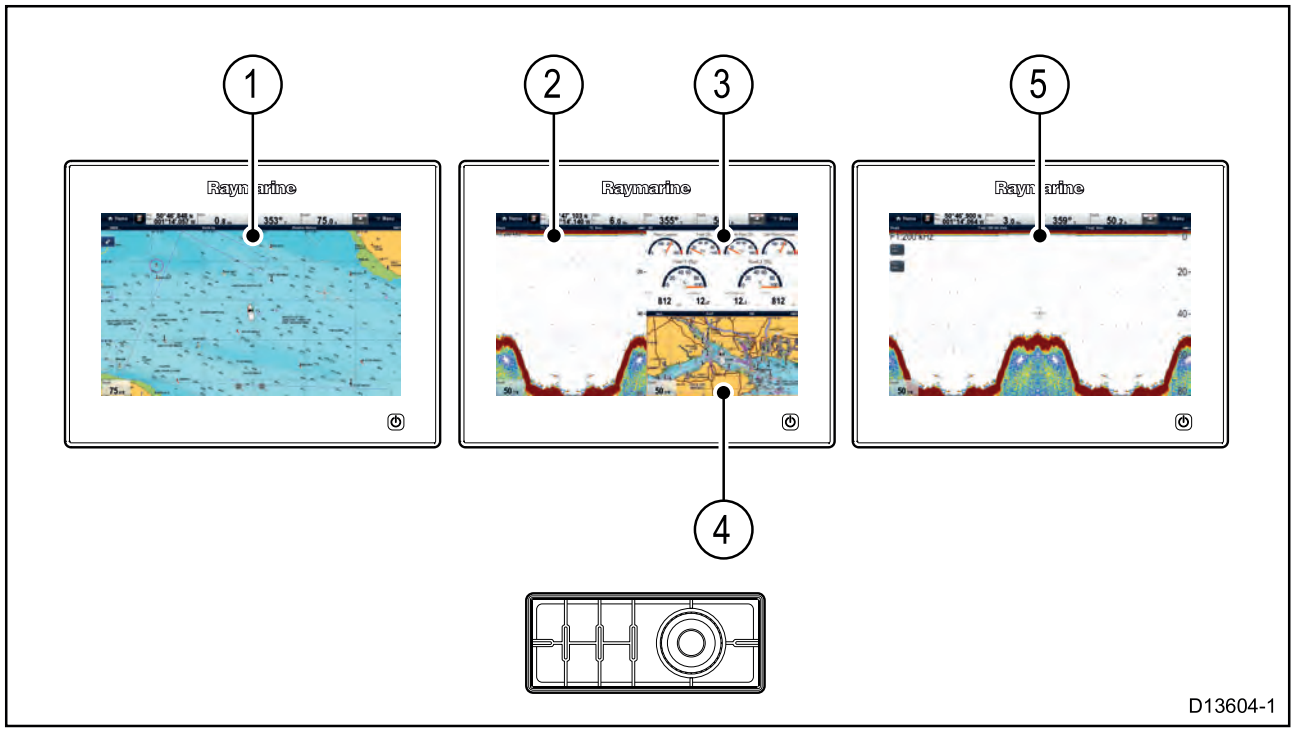
The keypad is now paired.

Switching the active pane or display using the keypad

The **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 **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 + and - buttons can be used to switch the active application between full and splitscreen.

3. Press the **Back** button or the **Active** button to exit switch mode.

Unpairing the keypad

The keypad can be unpaired from an individual display.

1. Select **External Keypad** from the External Devices menu: **homescreen** > **Set-up** > **System Settings** > **External Devices** > **External Keypad**.
2. Select **Clear Pairings**.
3. Select **Yes** to unpair the keypad with the display.

Unpairing from all displays

The keypad can be unpaired from all displays following the steps below.

1. Press and hold the **Range In** and **Range Out** buttons simultaneously for approximately 6 seconds.

   The keypad will sound a triple beep to signify it is now unpaired.

Determining the active display

You can determine which display is currently active.

1. Press the **Active** button.
   The Active pop-up is displayed on the screen or pane that is active.
2. Press the **Active** button again to close the Active pop-up.
   The active display remains the same.

Chapter 9: System checks and troubleshooting

Chapter contents

9.1 Keypad status

The keypad is backlit with LEDs. The LEDs are used to identify the status of the keypad.

Status	UniController LED ring	Keypad backlight
Keypad powered off or not paired	Off	Off
Keypad is powered on and paired	On	On
MFD is in PowerSave mode	Flashing	Off

The LED and keypad backlight brightness will change to match the paired MFD brightness. Refer to your MFD's *Operation instructions* for more information on shared brightness.

9.2 PoE troubleshooting

If you are experiencing connection issues with the remote keypad when powering the device via PoE, consider using the keypad's dedicated power connector to supply the power to the device.

Possible causes for connection issues are:

- Low or inconsistent voltage at the power supply to the MFD.
- Inadequate power or data cabling.
- If multiple devices are powered via PoE from the MFD, the power allocation for the PoE devices may be too high, either because there are too many device connected, or the total power consumption exceeds the supported allocation. Refer to the Power over Ethernet (PoE) topic in the MFD's Installation instructions document for more information on the PoE power allocation.

9.3 Power up troubleshooting

Product does not turn on or keeps turning off

Possible causes	Possible solutions
Blown fuse / tripped breaker.	1. Check condition of relevant fuses and breakers and connections, replace if necessary. (Refer to the *Technical Specification* section of your product's installation instructions for fuse ratings.) 2. If fuse keeps blowing check for cable damage, broken connector pins or incorrect wiring.
Poor / damaged / insecure power supply cable / connections	1. Check that the power cable connector is correctly orientated and fully inserted into the display connector and locked in position. 2. Check the power supply cable and connectors for signs of damage or corrosion, and replace if necessary. 3. With the display turned on, try flexing the power cable near to the display connector to see if this causes the unit to restart or lose power. Replace if necessary. 4. Check the vessel's battery voltage and the condition of the battery terminals and power supply cables, ensuring connections are secure, clean and free from corrosion. Replace if necessary. 5. With the product under load, using a multi-meter, check for high voltage drop across all connectors / fuses etc, and replace if necessary.
Incorrect power connection	The power supply may be wired incorrectly, ensure the installation instructions have been followed.

Product will not start up (restart loop)

Possible causes	Possible solutions
Power supply and connection	See possible solutions from the table above, entitled 'Product does not turn on or keeps turning off'.
Software corruption	1. In the unlikely event that the product's software has become corrupted, try downloading and installing the latest software from the Raymarine website. 2. On display products, as a last resort, attempt to perform a 'Power on Reset'. Be aware that this will delete all settings / presets and user data (such as waypoints and tracks), and revert the unit back to factory defaults.

Chapter 10: Maintenance

Chapter contents

10.1 Service and maintenance

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

10.2 Routine equipment checks

It is recommended that you perform the following routine checks, on a regular basis, to ensure the correct and reliable operation of your equipment:

- Examine all cables for signs of damage or wear and tear.
- Check that all cables are securely connected.

10.3 Product cleaning

Best cleaning practices.

When cleaning products:

- Switch off power supply.
- Use a clean damp cloth to wipe clean.
- Do NOT use: abrasive, acidic, ammonia, solvent or other chemical based cleaning products.
- Do NOT use a jet wash.

Chapter 11: Technical specification

Chapter contents

11.1 Technical specification

Power specification

PoE class	Class 1
Nominal supply voltage	• PoE: 48 V dc • Alternate power: 12 V / 24 V dc
Operating voltage range	• PoE: 44 V to 57 V dc • Alternate power: 9 V to 32 V dc
Power consumption	4 W Max with full keypad illumination

Environmental specification

Operating temperature	-25 ºC to +55 ºC (-13 ºF to 131 ºF)
Storage temperature	-30 ºC to +70 ºC (-22 ºF to 158 ºF)
Relative humidity	Maximum 93%
Waterproof rating	IPx6 & IPx7

Wired connections

Network / PoE	1 x RayNet 10/100 Mb/s connector
Alternate power	1 x Power connector (SeaTalkng ® style connector)

11.2 Compliance

The product has been tested to the relevant sections of the standards listed below.

Ethernet/PoE	• IEEE 802.3 • IEEE 802.3af (PoE)
EMC	• EN60945

Chapter 12: Technical support

Chapter contents

12.1 Raymarine product support and servicing

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

Product information

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

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

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

Servicing and warranty

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

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

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

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

United States (US):

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

Web support

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

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

Worldwide support

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

- Help desk: https://raymarine.custhelp.com/app/ask
- Tel: +44 (0)1329 246 777

United States (US):

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

Australia and New Zealand (Raymarine subsidiary):

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

France (Raymarine subsidiary):

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

Germany (Raymarine subsidiary):

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

Italy (Raymarine subsidiary):

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

Spain (Authorized Raymarine distributor):

- E-Mail: sat@azimut.es

- Tel: +34 96 2965 102

Netherlands (Raymarine subsidiary):

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

Sweden (Raymarine subsidiary):

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

Finland (Raymarine subsidiary):

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

Norway (Raymarine subsidiary):

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

Denmark (Raymarine subsidiary):

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

Russia (Authorized Raymarine distributor):

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

12.2 Learning resources

Raymarine has produced a range of learning resources to help you get the most out of your products.

Video tutorials

Raymarine official channel on YouTube:

- YouTube

LightHouse™ 3 tips and tricks:

- Raymarine website

Video Gallery:

- Raymarine website

Note:

- Viewing the videos requires a device with an Internet connection.
- Some videos are only available in English.

Training courses

Raymarine regularly runs a range of in-depth training courses to help you make the most of your products. Visit the Training section of the Raymarine website for more information:

- http://www.raymarine.co.uk/view/?id=2372

Technical support forum

You can use the Technical support forum to ask a technical question about a Raymarine product or to find out how other customers are using their Raymarine equipment. The resource is regularly updated with contributions from Raymarine customers and staff:

- http://forum.raymarine.com

Chapter 13: Spares and accessories

Chapter contents

13.1 Keypad spares and accessories

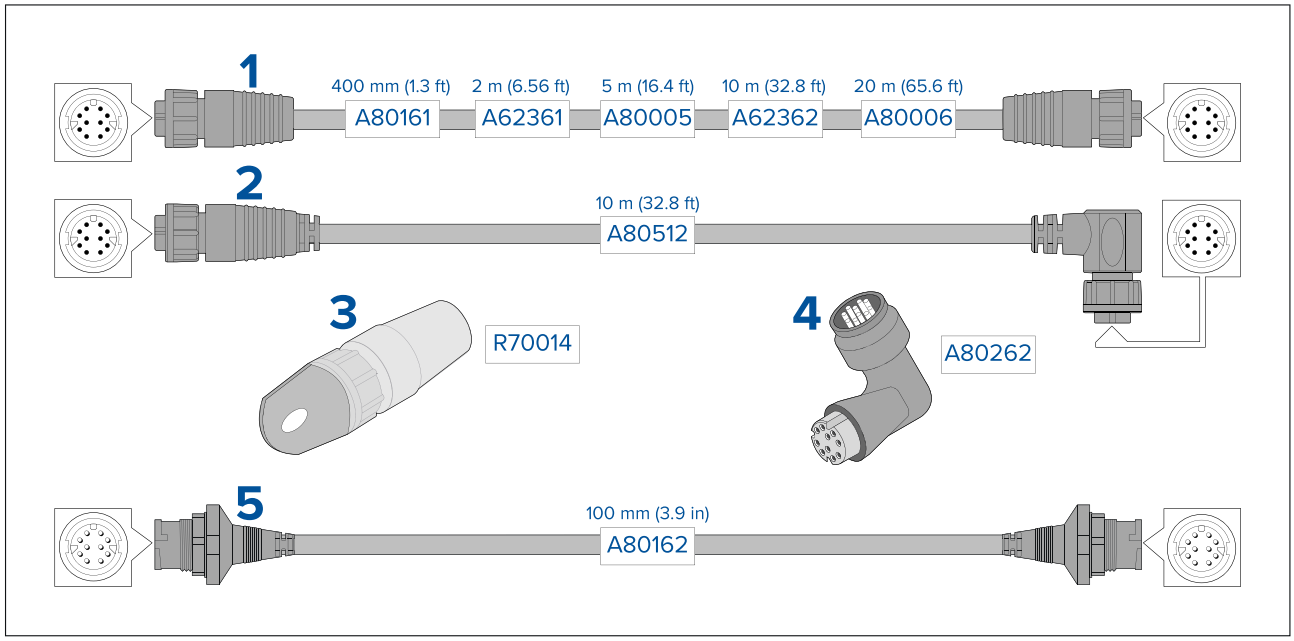
Spares

Item	Part number
Portrait keypad mat spare	R70509
Landscape keypad mat spare	R70508

Accessories

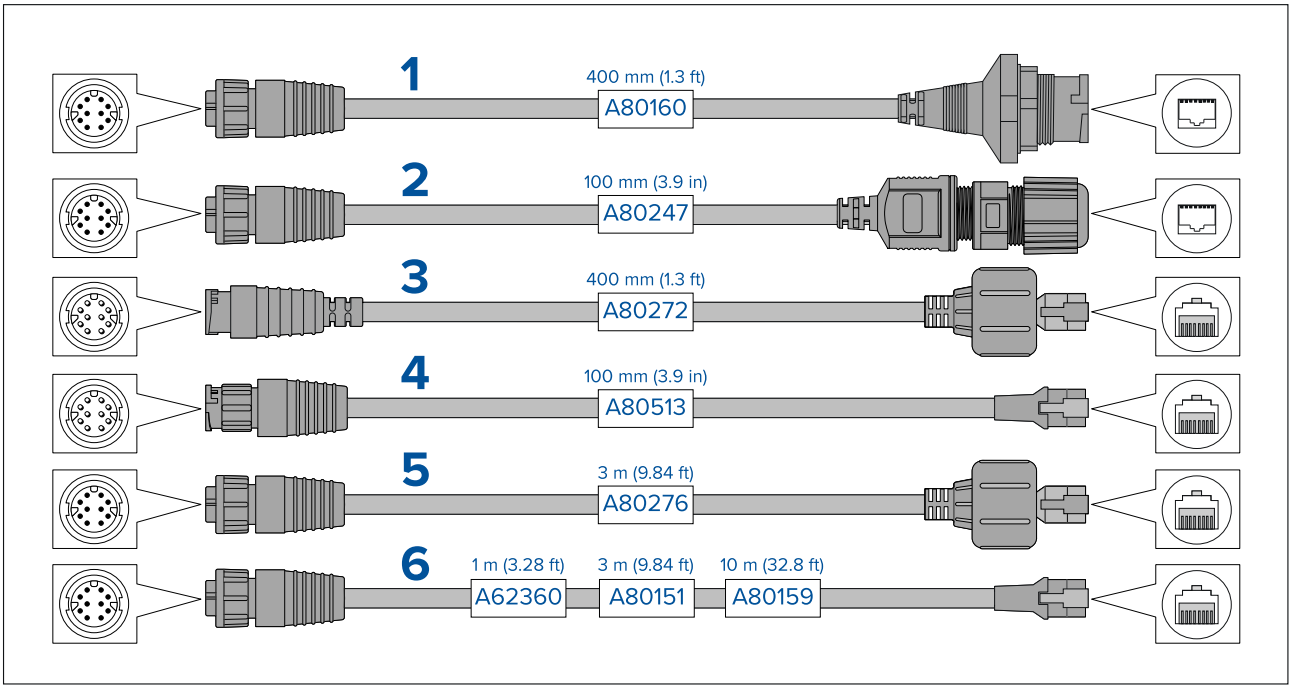
Item	Part number
Right angled 2 m (6.6 ft) power cable	A06070
Straight 2 m (6.6 ft) power cable	A06049

RayNet to RayNet cables and connectors



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

RayNet to RJ45 adapter cables



	Description
1	Adapter cable with a RayNet (female) socket on one end, and a waterproof (female) socket on the other end accepting the following cables with an RJ45 SeaTalkhs ® waterproof locking (male) plug: • A62245 (1.5 m). • A62246 (15 m).
2	Adapter cable with a RayNet (female) socket on one end, and a waterproof (female) RJ45 socket on the other end, along with a locking gland for a watertight fit.
3	Adapter cable with a RayNet (male) plug on one end, and an RJ45 SeaTalkhs ® waterproof (male) plug on the other end.
4	Adapter cable with a RayNet (male) plug on one end, and an RJ45 SeaTalkhs ® (male) plug on the other end.
5	Adapter cable with a RayNet (female) socket on one end, and an RJ45 SeaTalkhs ® waterproof (male) plug on the other end.
6	Adapter cable with a RayNet (female) socket on one end, and an RJ45 SeaTalkhs ® (male) socket on the other end.

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