Raymarine®

ELEMENT

Operation Instructions

Document number: 81388 (Rev 18) | English (en-US) | Date: 02-2026 | Applicable software version: v3.20.95

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CHAPTER 1: IMPORTANT INFORMATION

Warning: Ensure safe navigation

This product is intended only as an aid to navigation and must never be used in preference to sound navigational judgment. 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.

Warning: Minimum Safe Depth, Width and Height

Depending on cartography vendor, the *[Minimum safe depth]*, *[Minimum safe width]*, and *[Minimum safe height]* settings that you specify for your vessel will be used during automatic route generation. These settings will ensure that automatic routes are not generated in areas that are unsuitable for your vessel.

Minimum safe settings are user-defined calculations. As these calculations are outside of Raymarine's control, Raymarine will not be held liable for any damage, physical or otherwise, resulting from the use of the automatic route generation feature or the *[Minimum safe depth]*, *[Minimum safe width]* or *[Minimum safe height]* settings.

Warning: Automatic route generation

• Do NOT rely on automatically generated routes to guarantee that the route is safe to navigate. You MUST review the suggested route carefully and where necessary edit the route before following it.

• If a waypoint within any automatically generated route is added or moved the Automatic route generation algorithm will NOT be used, extra care should be taken to ensure that the route leg and any moved waypoints are safe to navigate.

Warning: Traffic separation

Automatic route generation features do not adhere to the Traffic Separation Schemes identified in Rule 10 of the *International Regulations for Preventing Collisions at Sea 1972* as amended.

Raymarine® therefore recommends that you do NOT use Automatic route generation to create any part of a route which will cross traffic lanes or pass near to traffic separation lines. In these situations Automatic route generation MUST be switched Off and the route or route leg MUST be built manually, ensuring compliance to the rules laid out in the above regulations.

Warning: Radar transmission safety

The Radar scanner transmits electromagnetic energy. Ensure all personnel are clear of the scanner when the radar is transmitting.

Warning: Minimum Sonar Depth

Accurate bottom tracking can be unreliable in depths shallower than 0.8 m (2.62 ft). When operating at or below this depth, be cautious of misleading sonar returns or false bottom tracking.

Warning: Sonar operation

• 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.

Electronic chart data

Raymarine does not warrant the accuracy of such information, and is not responsible for damages or injuries caused by errors in chart data or information utilized by the product and supplied by third parties. Use of electronic charts provided by third parties is subject to the supplier's End-User License Agreement (EULA).

Network interfaces and services

Declaration of Network Interfaces and Services used by this product.

Devices connected to the product via Wi-Fi use the following network interface and services. The interface and services are required for proper product operation, and cannot be disabled.

Interfaces

- Wi-Fi

Services

Services	Wi-Fi
Raymarine proprietary services	Yes
DHCP	Yes
HTTP	Yes
LLDP	Yes
NFS	Yes
RPC Bind	Yes
SSH	Yes
Telnet	Yes
Websocket	Yes
Protocol Buffers	Yes

PSTI Compliance

For products sold into the United Kingdom (UK), use the following link to obtain the product's Statement of Compliance with the *Product Security and Telecommunications Infrastructure* (PSTI) Regulations:

Visit the following web address and enter the product's model name or number (SKU) into the provided search field:

- www.bit.ly/rym-sec-com

End-User License Agreements (EULAs)

The EULAs for third-party electronic charts are available via the following links:

- **LightHouse charts:** — LightHouse Navigation Charts EULA 84231-3-EN.pdf
- **Navionics charts:** https://www.navionics.com/usa/la
- **CMAP charts:** https://www.c-map.com/legal/terms-and-conditions-eula

Open source license agreements

This product is subject to certain open source license agreements. Copies of the license agreements can be found on the Raymarine website: www.bit.ly/rym-docs

Warranty policy and registration

Visit the Raymarine website to **read the latest warranty policy**, and **register** your product's warranty online: www.bit.ly/rym-warranty

It is important that you register your product to receive full warranty benefits. Your product package includes a barcode label indicating the serial number of the unit. This serial number is also provided on a label affixed to the product itself. You will need this serial number when registering your product online.

Technical accuracy

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Publication copyright

CHAPTER 2: DOCUMENT INFORMATION

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2.1 Product documentation

The following documentation is applicable to your product:

All documents are available to download in PDF format from the Raymarine website www.raymarine.com.

Description	Part number
LightHouse Sport Basic operation instructions	81384
LightHouse Sport Advanced operation instructions (This document)	81388
Element HV Installation instructions	87360

Printed (hardcopy) product manuals

All applicable user documentation for your product is available on our website to view or download free-of-charge. If you would prefer a **printed** (hardcopy) product manual, a Print Shop service is available, enabling you to purchase a high-quality, professionally-printed manual for your product, delivered directly to your door.

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

Printed manuals are provided by a third-party (**Lulu Press**).

To order a printed manual, use the Lulu Press website link provided below. The manual will then be printed and delivered to the address you specify. Once an order is placed, it typically takes Lulu Press approximately 5 to 10 working days to print and deliver a printed manual.

Supplier	How to purchase
lulu	1. Click the following link. 2. In the displayed search field, enter the required document number, e.g. *81406* www.bit.ly/rym-printshop

Note:

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

• Printed manuals can be shipped worldwide.

2.2 Document conventions

The following conventions are used throughout this document:

- **Highlight** — The term 'highlight' refers to using the *[Directional pad]* to highlight an item.
- **Select** — The term 'select' refers to using the *[Directional pad]* to highlight an item, and then pressing the *[OK]* button to select the item.
- **Scroll** — The term 'scroll' refers to using the *[Directional pad]* to move up or down a menu to an item that is not currently shown on the screen.
- **Adjust** — The term 'adjust' refers to the use of the *[Directional pad]* to change a numeric value or slider bar control.
- **Enable** — The term 'enable' refers to using the *[Directional pad]* to highlight a toggle switch, and then pressing *[OK]* to activate the switch (when activated, the switch background will turn green and the toggle is positioned to the right).
- **Disable** — The term 'disable' refers to using the *[Directional pad]* to highlight a toggle switch, and then pressing *[OK]* to de-activate the switch (when de-activated, the switch background will turn gray and the toggle is positioned to the left).

The term 'select the *[Settings]* menu' refers to selecting the settings icon found at the bottom of app menus.

Procedures for navigating menu hierarchies

Menu hierarchies are used in this document to provide a quick summary on how to access a particular function or menu option.
Examples:

- “The internal sonar module is turned off from the Fishfinder app menu: *[Menu > Set-up > Sounder Set-up > Internal Sounder]*.”
- “The internal GPS can be switched off from the GPS settings menu: *[Homescreen > Status area > Satellites > Settings > Internal GPS]*.”

2.3 Document illustrations and screenshots

Note:

• Whilst care is taken to ensure that the illustrations and screenshots provided in this document portray the latest hardware and software versions available, where differences are purely aesthetic, some illustrations and screenshots may depict an older version of hardware or software.

• The navigation and/or sensor data shown in screenshots may be simulated data and therefore may not reflect real world conditions.

2.4 Glossary

A glossary of common terms and abbreviations used in this document can be found in the appendix.

Refer to: **p.176 — Glossary**

CHAPTER 3: SOFTWARE DETAILS

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3.1 Applicable software version

Product software is updated regularly to add new features and improve existing functionality.

This document has been updated to reflect the following software version:

Applicable software version:
v3.20.95

Check the website for the latest software:

LightHouse Sport software download link
https://bit.ly/rym-element-download

3.2 Applicable products

This document is applicable to the following products:

Part number	Description
E70532 / E70644	Element™ 7 HV — HyperVision™ sonar / GPS combo with Wi-Fi.
E70531	Element™ 7 S — Conical sonar / GPS combo with Wi-Fi.
E70534 / E70645	Element™ 9 HV — HyperVision™ sonar / GPS combo with Wi-Fi.
E70533	Element™ 9 S — Conical sonar / GPS combo with Wi-Fi.
E70536 / E70646	Element™ 12 HV — HyperVision™ sonar GPS combo with Wi-Fi.
E70535	Element™ 12 S — Conical sonar GPS combo with Wi-Fi.

3.3 Quantum software compatibility

When connecting a Quantum or Quantum 2 radar scanner to an MFD / chartplotter via a Wi-Fi connection, both the radar scanner and MFD / chartplotter must be running the minimum software version stated below.

Quantum software version	MFD / chartplotter software version
v2.52 or later.	• Axiom-Series — v4.6.148 or later. • Axiom 2-Series — v4.6.148 or later. • Element-Series — v3.19.17 or later.

Note:
This information does not apply to a Quantum / Quantum 2 radar scanner connected to an MFD / chartplotter via a **wired** connection.

3.4 Software updates

Raymarine® regularly issues software updates for its products which provide new and enhanced features and improved performance and usability.

It is important to ensure that you have the latest software for your products by regularly checking the Raymarine® website for new software releases.

www.raymarine.com/software

Note:

• It is recommended that you always backup your User data before performing a software update.

• The “Check online” feature is only available on display variants that include built-in Wi-Fi that have been configured with an active Internet connection.

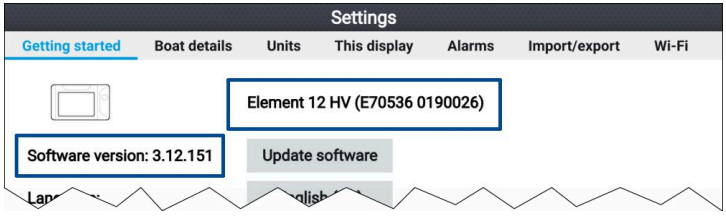
• In order to perform a software update any connected radar scanner must be switched to standby.

In addition to updating your display's software, your display can also be used to update the software of devices connected to the same SeaTalkng ® backbone.

Important:
If you need to downgrade the display's software to an earlier version follow the software downgrade procedure: **p.145 —** Downgrading software

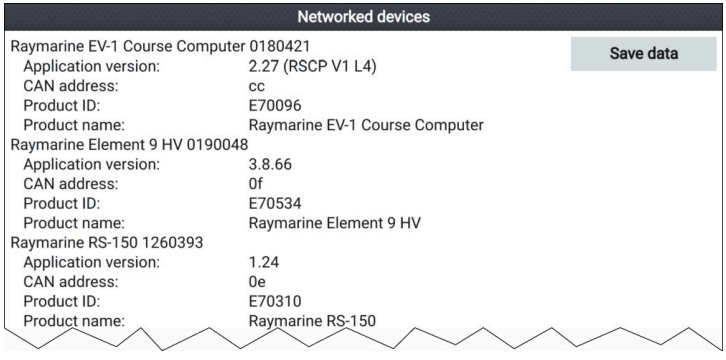
Identify display variant and software version

Refer to the Getting started menu: *[Homescreen > Settings > Getting started]* on your display to identify product variant and current software version.



Identifying connected products

To display a list of products that are connected to the same SeaTalkng ® backbone follow the steps below.



From the Homescreen:

1. Select *[Settings]*.
2. Select the *[This display]* tab.
3. Select *[Networked devices]*.

   Product information for compatible products is displayed. The software version can be located against *[Application version:]*.
4. If required, use the *[Up]* and *[Down]* buttons to scroll through the list of product information.
5. You can also save the list of product information to memory card by selecting *[Save data]*.

   The product information file will be saved in .json file format that can be viewed using most standard notepad applications.

Updating display software using a memory card

Follow the steps below to update the software on your display.

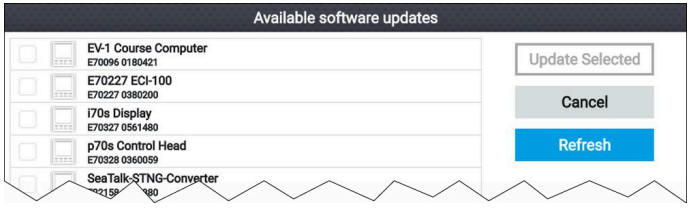
1. Check the product hardware variant and the software version of the products you want to update.
2. Go to the Raymarine website: (*[www.raymarine.com > Support > Software Updates]*).
3. Browse for your product.
4. Check if an updated software version is available for your product.
5. Download the relevant software package(s) (ISO files).
6. Copy the files to MicroSD card.
7. With your display powered on, insert the MicroSD card into the card reader slot.

   The software update files will be recognized automatically.

8. Select *[Yes]* to update the software.

   A list of available products is displayed. The list will include your display and products that are connected to the SeaTalkng ® backbone.

Software update list example



9. Select each device that you want to update.

   If a notification is displayed asking if you want to reinstall the current software version, unless you are experiencing problems with the product select [No], otherwise select [Yes] and the current version of software will be reinstalled.

10. When all relevant products have been chosen, select *[Update selected]* to commence the software update process.
11. Wait for the update process to complete.
12. Select *[Exit]*.

Note:

• Your products may reboot automatically as part of the update process.

• You can also select *[Check SD card]* from the *[Update software]* pop-over options (*[Homescreen > Settings > Getting started > Update software]*.

Updating software using an internet connection

When using an Element™ display that includes built-in Wi-Fi, follow the steps below to update your display's software and software on approved devices connected to the same SeaTalkng ®backbone, using an internet connection.

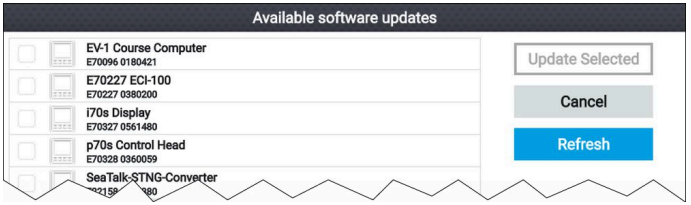
1. Select *[Update software]* from the Getting started menu: (*[Homescreen > Settings > Getting started]*).
2. Select *[Check online]* from the pop-over menu.

   If you do not have an active internet connection then you will be requested to create one.

3. To set up a Wi-Fi connection select *[Wi-Fi settings]* and connect to the required Wi-Fi access point/hotspot.
4. Select *[Start]*.

   A list of available products is displayed. The list will include your display and products that are connected to the SeaTalkng ® backbone.

Software update list example



5. Select each device that you want to update.

   If a notification is displayed asking if you want to reinstall the current software version, unless you are experiencing problems with the product select [No], otherwise select [Yes] and the current version of software will be reinstalled.

6. When all relevant products have been chosen, select *[Update selected]* to commence the software update process.
7. Wait for the update process to complete.
8. Select *[Exit]*.

Note:
Your products may reboot automatically as part of the update process.

CHAPTER 4: SOFTWARE RELEASE SUMMARY

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4.1 New software features and improvements

The following new features and / or general improvements have been added to **v3.20.95** of the LightHouse Sport operating system, for Element-Series displays.

This list includes *new features* only. It may not include software maintenance items, such as bug fixes or performance improvements.
To download the software, and view the complete list of all software updates, including new features, bug fixes, and general improvements, visit:

LightHouse Sport software download link
https://bit.ly/rym-element-download

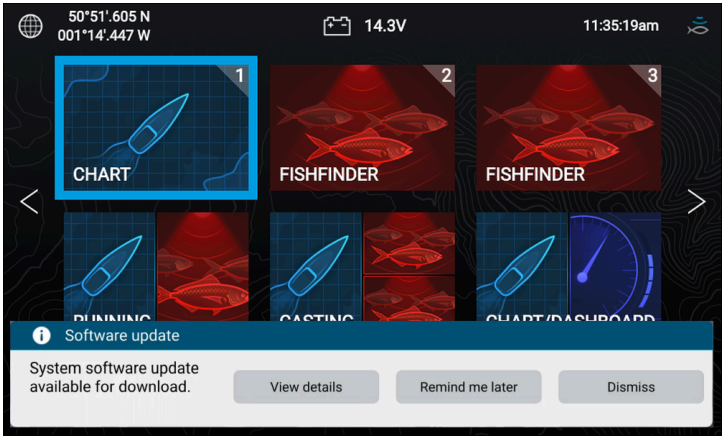
General improvements v3.20.95 (February 2026):

- Further cybersecurity-related updates.

4.2 Automatic software update check

Chartplotters running software v3.20.88 (or later) will automatically check online for software updates for Raymarine products.

With an active Internet connection, the chartplotter checks for software updates at start up. If an update is available, a notification will be displayed.



The notification provides the following options:

- *[View details]* — View details of the available product software updates and commence download and installation.
- *[Remind me later]* — You will be reminded of the available software updates the next time the chartplotter is switched on.
- *[Dismiss]* — Dismiss further notifications for this software update.

CHAPTER 5: GENERAL INFORMATION

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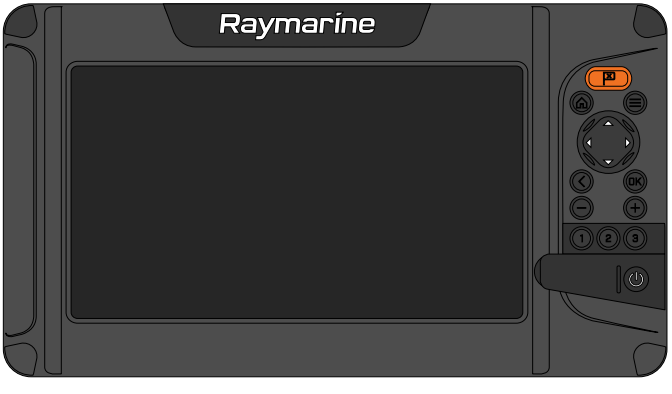
5.1 Product overview

Element™ displays are combination fishfinder / chartplotting displays that can be connected to a NMEA 2000 or SeaTalkng ® network and display vessel data and data from compatible sensors and devices. Element displays are available with either a built-in HyperVision™ sonar module (Element™ HV), or a built-in conical sonar module (Element™ S).

Important:
An Element display can NOT be connected to the same SeaTalkng ® backbone as a Multifunction display. Examples of MFDs include Axiom, or a Series, c Series, e Series, eS Series, or gS Series displays. Further, because the Element display does NOT have a RayNet connection, it is not possible to network it in any way with a Multifunction display (MFD).



Element™ displays include the following features:

- New simple-to-use LightHouse™ Sport operating system optimized for fishing.
- Sunlight-viewable LCD.
- Built in GPS / GNSS receiver.
- Supports wireless Quantum™ radar scanner connection.
- Send navigation data to connected autopilot.
- Supports AIS connection.
- Personal sonar mapping using Raymarine RealBathy™.
- Compatible with LightHouse NC2 charts with Fishing Hot Spots®, Navionics and C-MAP cartography.
- 3 user programmable Quicklaunch buttons.
- Share waypoints between networked Element™ displays.
- Supports display of data from up to 2 standard NMEA 2000–compliant trim tabs.
- Supports display of data from compatible networked (NMEA 2000 / SeaTalkng ®) devices and sensors.
- Supports display of data from compatible engines when connected via an ECI-100.
- Transmit position data to a VHF radio connected to the same NMEA 2000 / SeaTalkng ® backbone.

Element™ displays are available with and without built-in Wi-Fi. Displays that include Wi-Fi can connect to the internet and perform over the air software updates.

Element™ HV

Element™ HV display's HyperVision™ 1.2 MHz CHIRP sonar technology increases sonar image resolution, providing a higher level of precision for bottom structure, vegetation and fish identification.

When connected to a HyperVision™ transducer, the following fishfinder channels are available:

- RealVision™ 3D (Hyper 1.2 MHz)
- RealVision™ 3D (Standard 350 kHz)
- SideVision™ (Hyper 1.2 MHz)
- SideVision™ (Standard 350 kHz)
- DownVision™ (Hyper 1.2 MHz)
- DownVision™ (Standard 350 kHz)
- Sonar Conical high CHIRP (200 kHz)

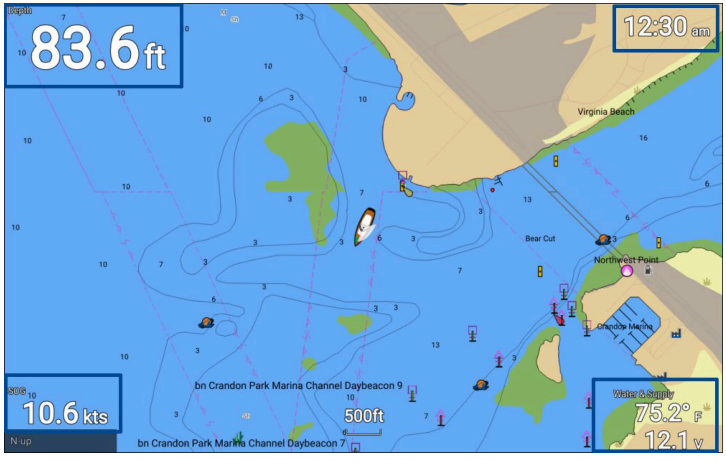
Element™ S

When connected to a CPT-S transducer, only the traditional conical high CHIRP (200 kHz) fishfinder channel is available.

5.2 Databoxes

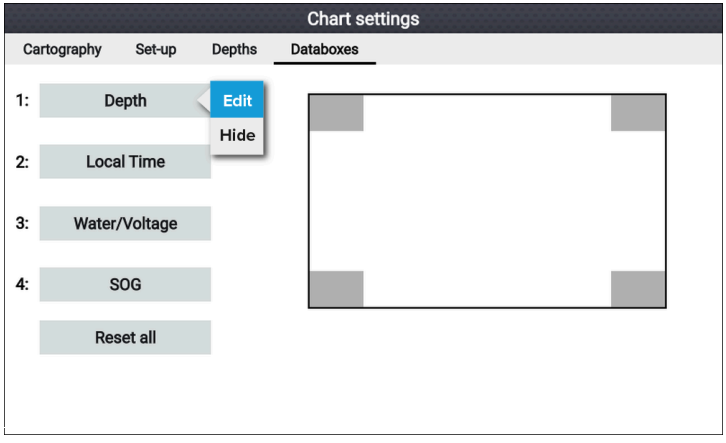
System data is overlaid onto the Chart and Fishfinder apps using databoxes located around the edge of the app screen.

Example (Chart databoxes)



Databoxes can be edited or shown / hidden from the app menu: *[Menu > Settings > Databoxes]*.

Editing databoxes



With the app displayed and in focus:

1. Press the *[Menu]* button.
2. Select the *[Settings]* icon.
3. Select The *[Databoxes]* tab.
4. Select the databox you want to edit.
   The pop-over menu is displayed.
5. Select *[Edit]* to change the data item that is displayed in the databox.
6. Select the Data item category.
7. Select the Data item.
8. Press the *[Menu]* button to return to the app screen.

Note:
To remove or display the databox, select *[Hide]* or *[Show]* from the pop-over menu.

Data items

The following data items can be displayed in Databoxes.

Note:
Where more than 1 data source is available for a data item, based on the specified Boat details (*[Homescreen > Settings > Boat details]*), then data items will be available for each data source.

Category	Data item
[Battery] • *[Battery 1]* • *[Battery 2]* • *[Battery 3]*	• *Time till zero charge* • *State of charge* • *Battery temperature* • *Battery voltage* • *Battery current*
[Boat]	• *Fresh water (%)* • *Live well (%)* • *Gray water (%)* • *Black water (%)*

Category	Data item
[Depth]	• *Depth*
[Display]	• *Supply voltage*
[Distance]	• *Trip (season)* • *Trip (month)* • *Trip (day)* • *Ground Log*
[Engine] • *[Port engine]* • *[Starboard engine]* • *[All engines]*	• *Engine hours* • *Engine RPM* (Revolutions per minute) • *Boost pressure* • *Oil temperature* • *Oil pressure* • *Alternator* • *Coolant pressure* • *Coolant temperature* • *Engine load* • *Engine trip* • *Fuel flow* • *Fuel flow (inst)* • *Fuel flow (avg)* • *Fuel pressure* • *Gear* • *Trans oil pressure* • *Trans oil temperature*

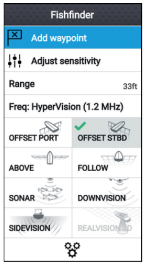
Category	Data item
[Fuel] • *[Tank 1]* • *[Tank 2]* • *[All Tanks]*	*[Tank 1]* and *[Tank 2]*: • *Fuel level (%)* *[All Tanks]*: • *Engine economy total* • *Fuel flow total* • *Time to empty* • *Distance to empty* • *Fuel used (season)* • *Fuel used (trip)* • *Est. fuel remaining* • *Total fuel (%)*
[Environment]	• *Max water temp* • *Min water temp* • *Water temp* • *Set* • *Drift* • *Water & Supply* (Water temp and supply voltage) • *Sunrise/set*
[GPS]	• *Course over ground* • *Average SOG* (Average Speed Over Ground) • *Maximum SOG* • *SOG* • *Vessel position* • *Course over ground SOG*
[Heading]	• *Heading*

Category	Data item
[Navigation]	• *Route ETA* (Route Estimated Time of Arrival) • *Route TTG* (Route Time To Go) • *Active waypoint* • *Waypoint TTG* • *Estimated arrival time* • *Distance to waypoint* • *Cross track error* • *Bearing to waypoint* • *Wpt info* (Waypoint information)
[Speed]	• *VMG to waypoint* (Velocity Made Good to Waypoint) • *VMG to windward* (Velocity Made Good to Wind) • *Avg speed* • *Max speed* • *Speed thru water*

Category	Data item
[Time]	• *Time* • *Date* • *Time and Timer*
[Wind]	• *Cardinal* • *Beaufort* • *Ground wind direction* • *True wind direction* • *Minimum true wind angle* • *Maximum true wind angle* • *True wind angle* • *Maximum true wind speed* • *Minimum true wind speed* • *True wind speed* • *Minimum app wind angle* • *Maximum app wind angle* • *App wind angle* • *Minimum app wind speed* • *Maximum app wind speed* • *App wind speed*

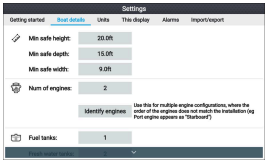
5.3 Menu types

The different types of menu available in LightHouse™ Sport are shown below.



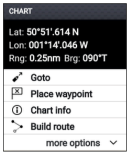
App menus

- Each app includes a menu. Menus provide access to the app's features and settings.
- The menu is displayed on the right side of the screen when the *[Menu]* button is pressed.
- From a single app page, pressing the *[Back]* button or the *[Menu]* button will close the app menu.
- From a multi-app splitscreen page, pressing the *[Back]* button will close the app menu and return to the multi-app page view.
- From a multi-app splitscreen page, pressing the *[Menu]* button will close the app menu, maintaining the app in fullscreen page view.
- Menu options that include a '>' symbol will open a menu page or related menu options for that item.



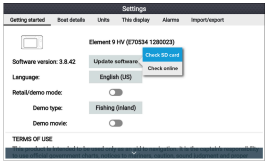
Menu pages and tabs

- Menu pages are accessed from app menu options and icons on the homescreen.
- Menu pages are fullscreen pages containing menu options and settings, menu pages are usually set out in tabs with each tab containing options relevant to the tab's title.
- Selecting tab titles will display the contents for that tab.
- Pressing the *[Back]* button will return you to the previous menu.



Context menus

- Context menus are available in the Chart and Fishfinder apps. Context menus are accessed by highlighting an object or location on the app screen and pressing the OK button.
- Context menus provide context-sensitive information and options.
- Selecting *[more options]* will display further contextual menu options.
- Pressing the *[Back]* button or the *[Menu]* button will close context menus.



Pop-over menus

- Pop-over menus are available on the homescreen, in apps and from menu pages. Pop-over options provide access to further menu options and settings.
- Pressing the *[Back]* button will close pop-over menus.

Controls and settings

Common menu controls and options are detailed below.

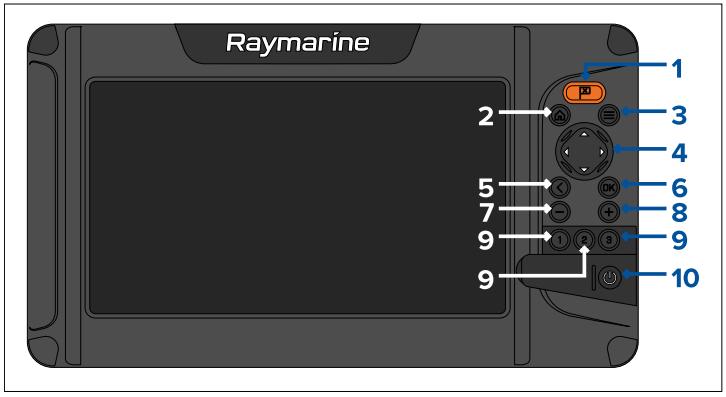
	**Toggle switch** • Toggle switches are used to enable (switch on) or disable (switch off) various features and settings. • When enabled (switched on) the white circle will be moved right and the switch's background will be filled Green.
	
	**Setting field** Setting fields show the selected value for that control. Selecting a setting field will display the available options relevant to the options available. Depending on field selected the options could be in the following formats: • Pop-over options (selection list) • Numeric value control (as shown) • Onscreen keyboard • File browser • Selection list (full page)
	**Setting button** • Setting buttons are available on Menu pages and Notification / Alarm messages to access further settings or confirm setting changes.
	**Page down** • Further options are available off screen. • Scroll *[Down]* to display these options.

CHAPTER 6: SET UP

CHAPTER CONTENTS

6.1 Display controls

The buttons available on Element™ displays and their function are detailed below.



1. *[Waypoint]*
   - Press to place a waypoint at your vessel's position (unless cursor mode is active in the Chart or Fishfinder app).
   - Press to place a waypoint at the cursor's position in the Chart and Fishfinder apps (when in cursor mode).
2. *[Home]*
   - Press to display the Homescreen.
3. *[Menu]*
   - Press to open Homescreen menus and app menus.
   - Press and hold for approximately 2 seconds to switch which app has focus in a multi app page.
   - Press to close Homescreen menus and app menus.
4. *[Directional pad]* (8–axis directional controls)
   - Use to navigate Homescreen and menus.
   - Press any direction to activate cursor mode in the Chart and Fishfinder apps.
   - Use to position the cursor in the Chart and Fishfinder apps.
5. *[Back]*
   - Return to previous menu or dialog.
6. *[OK]* — Confirms menu selections, opens context menus
   - Press to confirm a currently highlighted option.
   - Press to open context sensitive menus in the Chart and Fishfinder apps.
7. *[Minus]* (Zoom / Range out)
   - Press to increase the area displayed onscreen in the Chart app.
   - Press to decrease the zoom level in the Fishfinder app, when in Zoom mode.
   - Press to revert to scrolling mode from lowest zoom level in the Fishfinder app.
8. *[Plus]* (Zoom / Range in)
   - Press to decrease the area displayed onscreen in the Chart app.
   - Press once to initiate Zoom mode in the Fishfinder app, subsequent presses will increase the zoom level.
9. *[Quicklaunch 1]* / *[Quicklaunch 2]* / *[Quicklaunch 3]*
   - Press to open the assigned app page.
   - Press and hold to assign the quick launch button to the app page currently highlighted on the Homescreen.
10. *[Power]*
    - Power on — Press and hold until the display beeps (approximately 2 seconds).
    - Shortcuts menu — Press once to open the shortcuts menu.
    - Power off — Press and hold until the display turns off (approximately 5 seconds).
    - Power off — Press to open the Shortcuts menu and then select *[Power down display]*.

Switching on and off at the breaker

When powered off the display will still consume a small amount of power.

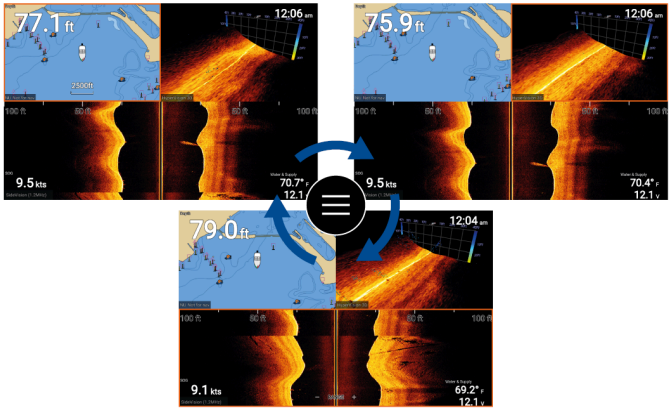
If you wish to ensure that the display is not consuming any power then it must be switched off at the breaker or have the power cable unplugged.

When the breaker is switched back on or the power cable is reconnected the display will remain powered off, until switched back on using the *[Power]* button.

Switching active app

On app pages that contain more than 1 app you can select which app has the current focus (i.e.: which app responds to your control).

Press and hold the *[Menu]* button to move focus to the next app.



In addition to pressing and holding on the *[Menu]* button you can also switch app focus from the app menu. With a multi app page displayed:

1. Press the *[Menu]* button.
2. Highlight the *[Switch to]* option.
3. In app pages with more than 2 apps, use the *[Right]* and *[Left]* buttons to highlight the app you want to make active.
4. Press the *[OK]* button.
5. Press the *[Back]* button to close the menu.

6.2 Getting started

Startup wizard

The first time the display is powered up, or after a *[Factory reset]* the startup wizard is displayed.

The startup wizard guides you through the configuration of important display settings.

The settings included in the startup wizard are listed below:

- **User interface language** — for a list of available user interface languages see: User interface languages
- **Activity** — activity selection determines default settings and homescreen app page icons:
  - Fishing (inland)
  - Fishing (coastal)
  - Fishing (ice)
  - Motor cruising
  - Sailing
  - Paddle
  - Other
- ***Boat details** — boat details include important safety related settings:

Note:
* Boat details are skipped when the *[Fishing (ice)]* activity is selected. If required, boat details can be configured manually from the *[Boat details]* settings tab.

  - Safety clearances
  - Number of engines
  - Number of tanks
  - Number of batteries
  - Sonar transducer selection
  - Radar selection

Important:

- Ensure you select the correct *[Sonar transducer]*.
- Ensure that the *[Radar installed]* option is enabled if you intend to connect a Quantum™ radar scanner to the display.

Changing activity type

Once the Activity type has been specified during the initial startup wizard, you must perform a factory reset for the display and complete the startup wizard once again, in order to change the Activity type.

1. Backup your user data before performing a factory reset:

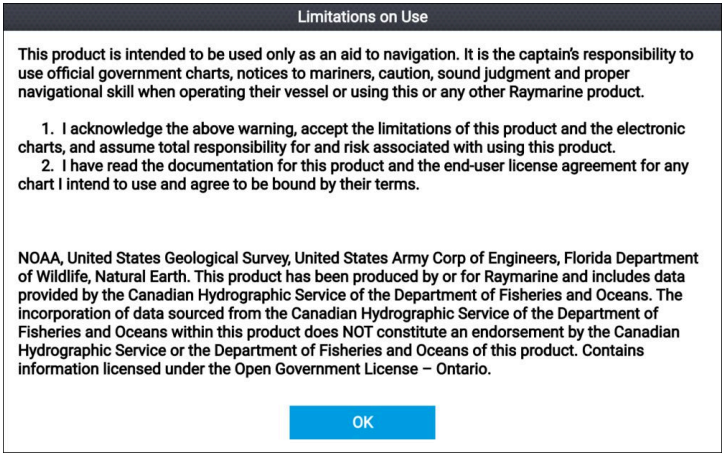
   For details on exporting your user data, refer to:
   p.37 — Saving user data
2. Perform a factory reset:

   For instructions on performing a factory reset, refer to:
   p.34 — Performing a power on reset
3. Follow the startup wizard instructions, including selecting your new Activity type.
4. Import your user data.

   For instructions on importing your user data, refer to:
   p.34 — Importing user data

First power up Limitation on Use acknowledgement

After you have completed the Startup wizard the Limitation on Use (LoU) disclaimer is displayed.



You must read and agree to the terms in order to use your display.

Selecting *[OK]* means you have accepted the terms of use.

Identifying engines

If your multifunction display / chartplotter has mislabelled your engines, this can be corrected by running the engine identification wizard.

When the engine manufacturer is set to *[Other]*, the engine identification wizard will be enabled in the *[Boat details]* menu: *[Homescreen > Settings > Boat details > Identify engines]*.

1. Ensure the correct number of engines is selected in the *[Num of Engines:]* box.
2. Select *[Identify engines]*.
3. Follow the onscreen prompts to complete the engine identification wizard.

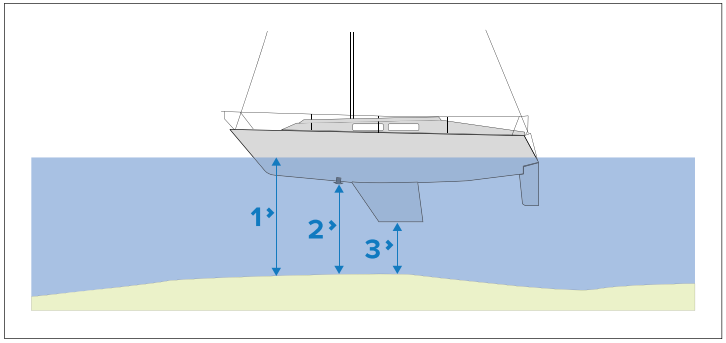
Sonar transducer calibration

Sonar transducers should be calibrated to ensure that accurate readings are displayed on the MFD / chartplotter.

Depth transducer offset

Depth is measured from the transducer face to the bottom (e.g.: seabed). An offset value can be applied to the depth data so that the displayed depth reading represents the depth reading taken from either the keel (negative offset) or the waterline (positive offset).

Before setting a waterline or keel offset, establish the vertical distance between the transducer and waterline or the bottom of your vessel's keel, as appropriate. Then set this distance as the depth offset value.

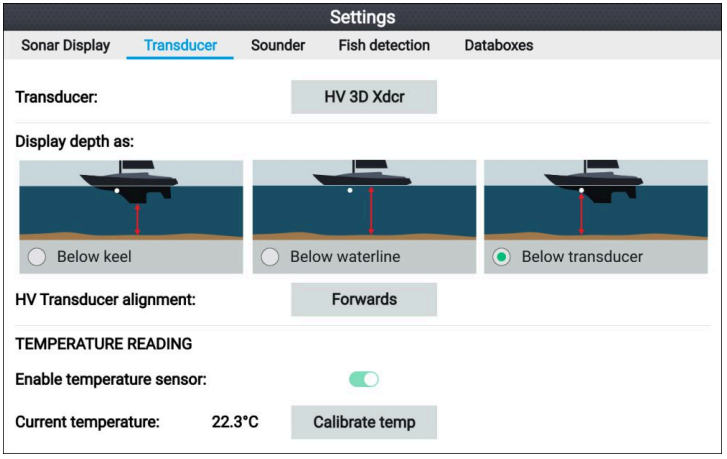


1. **Waterline** — The depth reading will be increased from the transducer's default reading.
2. **Transducer** — This is the default reading from the transducer (zero offset applied).
3. **Keel** — The depth reading will be decreased from the transducer's default reading.

Configuring transducer settings

For systems with a transducer connected, as part of setting up your system for the first time it is important that you correctly configure your transducer.

Transducer configuration settings are available from the **Fishfinder app**.



1. Select *[Transducer]* from the Fishfinder app's *[Settings]* menu: *[Menu > Settings > Transducer]*
2. If your installation required you to install an all-in-one transducer backwards (e.g.: this may occur when connecting the transducer to a trolling motor), then select *[Backwards]* from the *[HV transducer alignment]* option. This ensures that the port and starboard channels appear correctly orientated onscreen, otherwise keep the default setting: *[Forwards]*.
3. Select where you want your depth measurements taken from:
   i. *Below transducer (default)* — No offset required
   ii. *Below keel* — Enter the distance between the transducer face and the bottom of the keel.
   iii. *Below waterline* —Enter the distance between the bottom of your keel and the waterline.
4. You can configure temperature settings as follows:
   i. Enable or disable temperature readings as required.
   ii. If enabled, check the temperature reading against the actual water temperature.
   iii. If the current reading requires adjustment, select *[Calibrate temp]* and enter the difference between your 2 readings.

Performing a power on reset

There may be circumstances in which it is necessary to reset your display to factory (default) settings; for example, as part of a troubleshooting activity.

Important:
Before performing a power on reset ensure you have backed up your settings and user data to a memory card.

With the display powered off:

1. Press and hold the *[Home]* button.
2. Press and hold the *[Power]* button until the display beeps.
3. Release the *[Power]* button.
4. When the Raymarine logo appears, release the *[Home]* button.
5. Use the *[Down]* button to highlight *[Wipe data/factory reset]*.
6. Press the *[OK]* button.
7. Use the *[Down]* button to highlight *[Yes]*.
8. Press the *[OK]* button.

   The display will now be reset to factory default settings, and all user data will be removed. *'Data wipe complete'* is displayed at the bottom of the screen when the reset is finished.
9. The display will then restart automatically.

Importing user data

You can import user data (i.e.: GPX format Waypoints, Routes and Tracks) to your display.

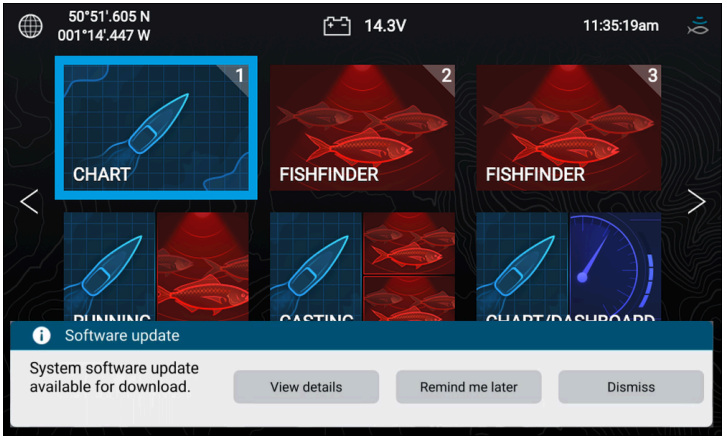
1. Insert the MicroSD card that contains your user data files into the memory card reader on your display.
2. Select *[Import from card]* from the Import/export menu: (*[Homescreen > Settings > Import/export > Import from card]*).
3. Navigate to your User data file (.gpx).
4. Select the relevant GPX file.

   Your user data has now been imported.
5. Select *[OK]*.

Automatic software update check

Chartplotters running software v3.20.88 (or later) will automatically check online for software updates for Raymarine products.

With an active Internet connection, the chartplotter checks for software updates at start up. If an update is available, a notification will be displayed.

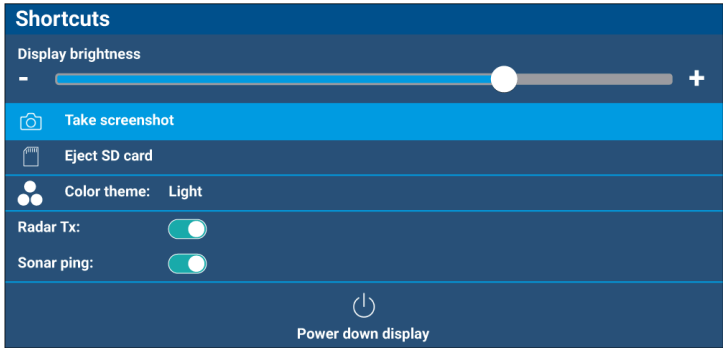


The notification provides the following options:

- *[View details]* — View details of the available product software updates and commence download and installation.
- *[Remind me later]* — You will be reminded of the available software updates the next time the chartplotter is switched on.
- *[Dismiss]* — Dismiss further notifications for this software update.

6.3 Shortcuts

The Shortcuts menu can be accessed by pressing the *[Power]* button.



The following shortcuts are available:

- *[Display brightness]*
- *[Take Screenshot]*
- *[Eject SD card]*
- *[Color theme:]*
- (1)*[Radar Tx:]*
- *[Sonar ping:]*
- *[Power down display]*

Note:

• If no controls are pressed, the *[Shortcuts]* menu will automatically close after approximately 5 seconds.

• (1)Radar transmission controls are only available when the display is paired with a compatible radar scanner.

Taking a screenshot

You can take a screenshot and save the image to external memory.

1. Insert a memory card into the card reader slot.
2. Press the *[Power]* button.
   The Shortcuts menu is displayed.
3. Select *[Take screenshot]*.

The screenshot will be saved in .png format to the inserted memory card.

Note:
Screenshots can also be taken by pressing and holding the *[Back]* button.

Adjusting brightness

Display brightness (backlight illumination level) can be adjusted from the *[Shortcuts]* menu. Lower brightness levels are recommended for viewing the display during low light conditions (e.g.: at night), and higher levels for daylight viewing. Lower brightness levels will also reduce the display's power consumption.

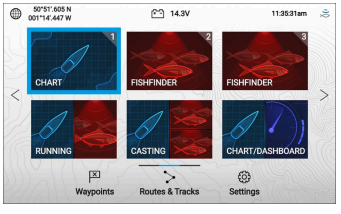
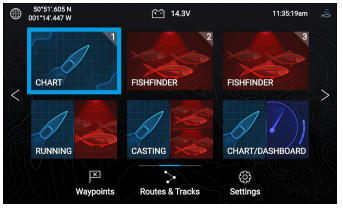
With the Shortcuts menu displayed (accessible via the Power button):

1. Use the *[Plus]* and *[Minus]* buttons or the *[Left]* and *[Right]* buttons to adjust display brightness.

Note:
When the brightness is not set to maximum and the shortcuts menu is displayed, each press of the *[Power]* button will increment the brightness level.

Changing the display's color theme

You can change the color theme of your display's user interface from the *[Shortcuts]* menu.

	
Light theme (Default)	Dark theme

With the Shortcuts menu displayed (accessible via the Power button):

1. Select *[Color theme:]*
   The pop-over menu with available color themes is displayed.
2. Select the desired color theme.

Note:
Changing the *[Color theme]* inverts the Black and White colors used for text and in Homescreen and menu backgrounds. The dark theme is recommended in lower light conditions e.g.: at night.

Disabling and enabling sonar ping

You can disable and enable the sonar module ping from the *[Shortcuts]* menu.

With the Shortcuts menu displayed (accessible via the Power button):

1. Select *[Sonar ping:]* to disable or enable sonar pinging.

Disabling and enabling radar transmission

You can disable and enable radar scanner transmission from the *[Shortcuts]* menu.

With the Shortcuts menu displayed (accessible via the *[Power]* button):

1. Select *[Radar Tx]* to disable or enable radar transmission.

6.4 Memory card compatibility

MicroSD memory cards can be used to backup / archive system data (e.g. Waypoints, Routes, and Tracks), and can also store additional data, such as video recordings (if supported by your display). Once system data is backed up to a memory card, old data can be deleted from the system. The archived system data can be retrieved at any time. It is recommended that your system data is backed up to a memory card on a regular basis.

Compatible cards

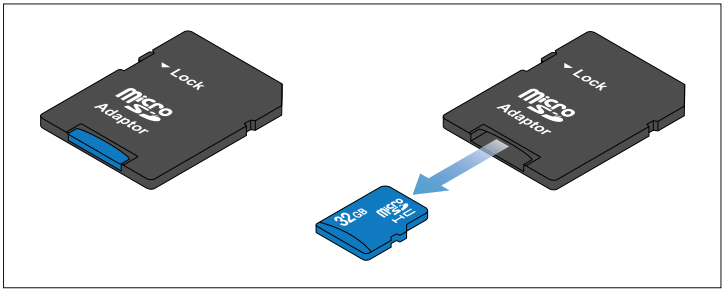
The following types of MicroSD cards are compatible with your display. **If the card's native format does not match one of the display's supported formats, the card will not be recognized by the display. In this situation, it will be necessary to re-format the card using a separate device, such as a laptop or PC for example.**

Type	Size	Native card format	Display supported Format
MicroSDSC (Micro Secure Digital Standard Capacity)	Up to 4GB	FAT12, FAT16 or FAT16B	NTFS, FAT32, exFAT
MicroSDHC (Micro Secure Digital High Capacity)	4GB to 32GB	FAT32	NTFS, FAT32, exFAT
MicroSDXC (Micro Secure Digital eXtended Capacity)	32GB to 2TB	exFAT	NTFS, FAT32, exFAT

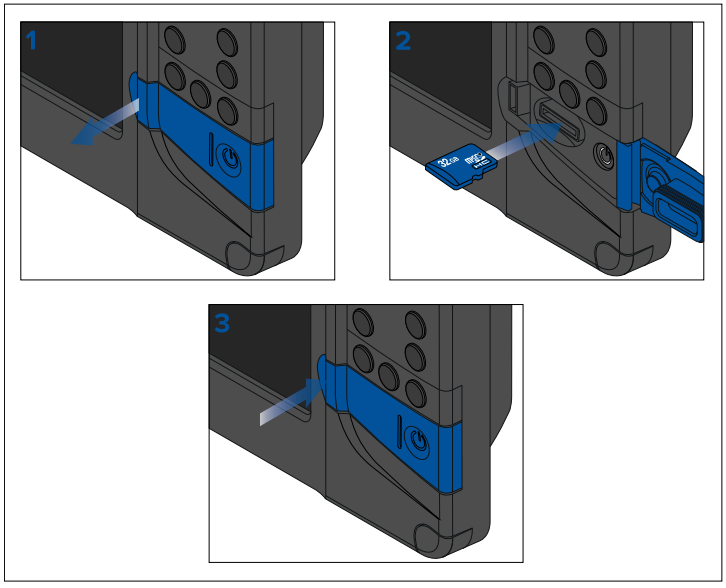
- **Speed class rating** — For best performance it is recommended that you use Class 10 or UHS (Ultra High Speed) class memory cards, or better.
- **Use branded memory cards** — When archiving data it is recommended that you use good quality branded memory cards.

Removing MicroSD card from its adaptor

MicroSD memory and cartography chart cards are usually supplied inserted into an SD card adaptor. The card will need to be removed from the adaptor before inserting into your display.



Inserting a MicroSD card



1. Open the card reader door.
2. Ensuring correct orientation (contacts facing down), insert the MicroSD card into the card reader slot.
3. Close the card reader door, ensuring that the edges of the door are flush.

Removing the MicroSD card

1. Press the *[Power]* button.

   The *[Shortcuts]* menu is displayed.
2. Select *[Eject SD card]*.
3. Wait for the 'You may now safely remove SD cards.' message to be displayed.
4. Open the card reader door.
5. Remove the MicroSD card from the card reader.

   Push in to release the MicroSD card from its slot.
6. Close the card reader door.
7. Select *[I have removed SD cards]* on the displayed message.

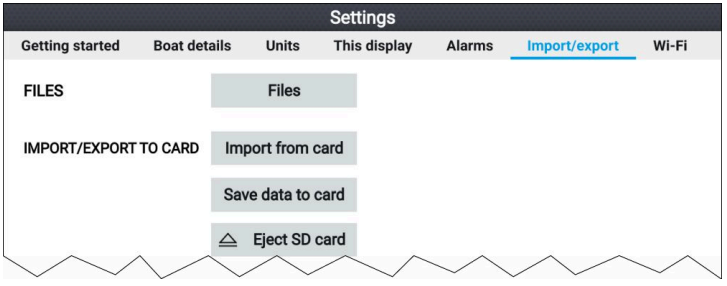
Caution: Ensure card reader cover or door is securely closed

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

6.5 User data import and export

User data (i.e.: Waypoint, Routes and Tracks) can be imported and exported from your display. User data is saved in the common .gpx file format.

The Import/export menu can be accessed from the homescreen settings menu *[Homescreen > Settings > Import/export]*.



Saving user data

You can backup your user data (waypoints, routes and tracks) to a MicroSD card.

1. Insert a memory card into your display's card reader.
2. Select *[Save data to card]* from the Import/export menu: *[Homescreen > My data > Import/export]*.

   A pop-over menu is displayed.
3. Select the desired option:
   - *[Save all data]* to save (export) all waypoints, routes and tracks.
   - *[Save waypoints]* to save (export) all waypoints.
   - *[Save routes]* to save (export) all routes.
   - *[Save tracks]* to save (export) all tracks.

4. Select *[Save]* to save the user data using the default filename. Alternatively:
   i. Use the onscreen keyboard to enter your own filename and then select *[Save]*.
5. Select *[OK]* to return to the Import/export menu, or select *[Eject card]* to safely remove the memory card.

The user data file is saved to the '\Raymarine\My Data\' directory of your memory card in gpx format.

Importing user data

You can import user data (i.e.: GPX format Waypoints, Routes and Tracks) to your display.

1. Insert the MicroSD card that contains your user data files into the memory card reader on your display.
2. Select *[Import from card]* from the Import/export menu: (*[Homescreen > Settings > Import/export > Import from card]*).
3. Navigate to your User data file (.gpx).
4. Select the relevant GPX file.

   Your user data has now been imported.
5. Select *[OK]*.

6.6 EV-1 heading sensor

You can connect an EV-1 heading sensor to your display, this will ensure that accurate heading data is available, regardless of vessel movement.

The EV-1 heading sensor will automatically calibrate (linearize) itself while the following conditions are met:

- vessel speed is between 3 to 15 knots, and
- at least a 270° turn has been made.

Note:
The time it takes for automatic calibration can be reduced by completing a full 360° turn at between 3 to 15 knots.

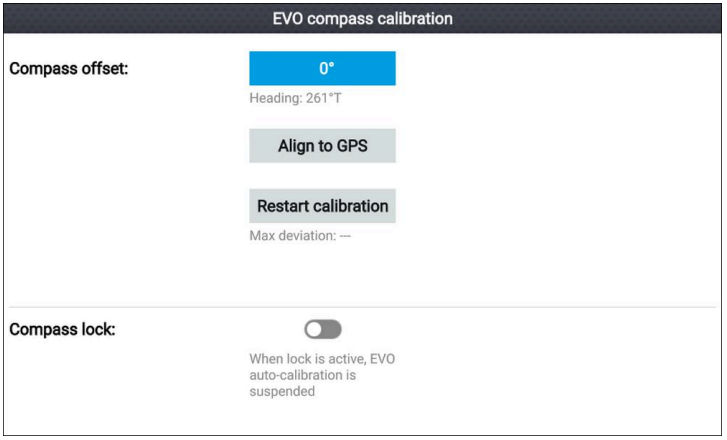
After the initial calibration has been completed a notification will be displayed and a Max deviation value will be reported in the *[EVO COMPASS]* section of the *[This display]* menu. If dashes are displayed then the calibration has not been successful.

If the Maximum deviation is 45° or greater, it is recommended that either the EV-1 is relocated, in a location with less magnetic interference, or that any devices causing magnetic interference are moved farther away from the EV-1.

Manually adjusting an EV-1 heading sensor

If there is a difference between Heading and the reported COG (Course Over Ground), which is not attributable to tide and wind conditions, then you can adjust the EV-1 heading sensor's settings to compensate.

The EV-1 settings can be accessed from the *[This display]* menu: *[Homescreen > Settings > This display > EVO set-up]*.



1. If the difference is within plus or minus 10°, then select the *[Compass offset]* field and adjust until COG and heading values are the same, or
2. If the difference is greater than plus or minus 10° you can align your heading sensor to the COG, reported by you GPS/GNSS, by selecting *[Align to GPS]* and following the onscreen instructions.

Restarting calibration

If you experience problems with your heading data or have had to relocate the EV-1 sensor, you can restart the automatic calibration.

From the *[This display]* menu:

1. Select *[EVO set-up]*.

2. Select *[Restart calibration]*.

   The maximum deviation will be reset and automatic calibration will commence once the vessel speed (3 to 15 knots) and turn circle (at least 270° turn) conditions are met.

Locking compass calibration

The EV-1 sensor is designed to continually adjust its calibration settings in the background to improve its accuracy.

If your vessel is regularly in environments with strong magnetic disturbances (e.g.: offshore wind farms or busy rivers) it may be desirable to use the compass lock feature to prevent the continual adjustment, as over time this may cause an error in reported heading.

To enable compass lock:

1. Select *[EVO set-up]* from the *[This display]* menu.
2. Select the Compass lock toggle switch so that it is enabled.

Note:
You can disable the calibration lock at anytime by disabling the *[Compass lock]* toggle switch.

6.7 Multiple data sources (MDS)

MDS is a Raymarine scheme for managing multiple sources of identical data types on the same network (e.g.: in an MFD network you may have more than one source of GNSS (GPS) position data).

The MFD will automatically select a preferred data source (device) to use for that data type.

MDS can be used for the following data types:

- *Depth*
- *Speed through water*
- *Heading*
- *GPS*
- *GPS Datum*
- *Wind*
- *Time & Date*
- *Water temperature* (chartplotters only)

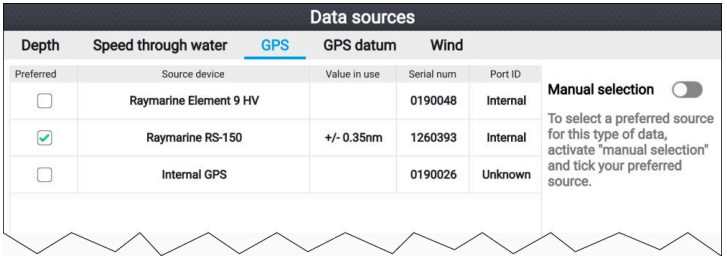
If you do not want to use the automatically selected data source you can manually select your preferred data source.

Note:
For MDS to be available on your system, all products in the system that report data must be MDS-compliant. The system will report any products that are NOT MDS-compliant. It may be possible to upgrade the software for these non-compliant products, to make them compliant. Visit the Raymarine website to obtain the latest software for your products: https://bit.ly/rym-software
If MDS-compliant software is not available for the product and you do NOT want to use the system's preferred data source, you must remove any non-compliant products from the system. You should then be able to select your preferred data source.
Once you have completed setting up your preferred data sources, you may be able to add non-compliant products back into the system.

Data sources menu

When a network / system includes multiple sources of the same data type, such as GPS / GNSS position data, the display will choose the most appropriate source for the data. If you prefer, you can manually select your own source for the data.

The *[Data sources]* menu can be accessed from the *[Settings]* menu: *[Homescreen > Settings > This display > Data sources]*.



Each tab in the data sources menu enables you to view and select your preferred data source for that type of data. The currently active data source will display its current 'value in use'. By default data sources are selected automatically and the source for the data may change depending on conditions.
With the *[Manual selection]* toggle enabled, you can manually assign your preferred source for the data. Manually selected data sources will not change.

Manually assigning a data source

To manually assign a data source follow the steps below.

From the Homescreen:

1. Select *[Settings]*.
2. Select the *[This display]* tab.
3. Select the *[Data sources]* button.
4. Select the tab for the type of data you want to assign a source for.

   Once a tab is selected the display will search the network and list all compatible devices that provide that data type.
5. Use the *[Up]* and *[Down]* buttons to highlight a device.
6. Press the *[OK]* button to select the device as the source for that data type.

The selected device will become the only source used for that data.

Note:
Unless manual selection is required for a specific reason, it is recommended that *[Manual selection]* remains disabled, so that the display can determine the best source for the data.

6.8 Wireless (Wi-Fi) connections

Connecting the display to a Wi-Fi access point

The display can access the internet via a Wi-Fi access point. When connected to a Wi-Fi access point that has internet access, software updates can be downloaded and installed directly on the display.

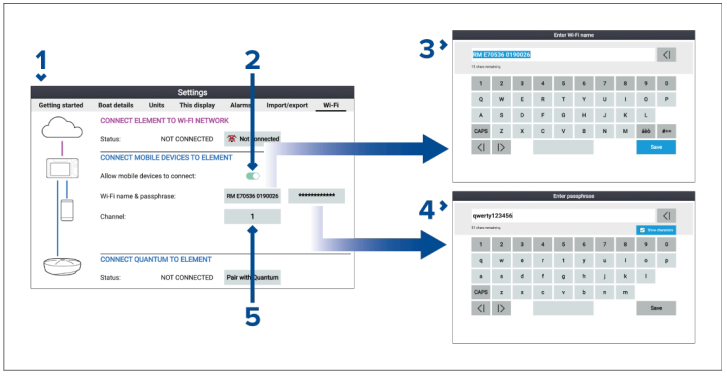
1. Open the Wi-Fi settings tab: (*[Homescreen > Settings > Wi-Fi]*).
2. Select *[Not connected]* in the 'Connect Element to Wi-Fi Network' section of the Wi-Fi tab.

   The display will search for and display a list of all Wi-Fi access points in range.
3. Select the Wi-Fi access point you want to connect to
4. Enter the Wi-Fi access point's password.
5. Select *[Next]*.
6. Select *[CONNECT]*.
7. Press the *[Back]* button to return to the Wi-Fi settings tab.

The display will now connect to the chosen Wi-Fi access point.

Configuring Wi-Fi credentials for mobile device connections

Mobile devices can be connected to the display using a Wi-Fi connection. Connecting your mobile device to the display enables the use of Raymarine apps e.g.: RayConnect. The credentials for your display's Wi-Fi connection can be identified and configured from the Wi-Fi settings tab.



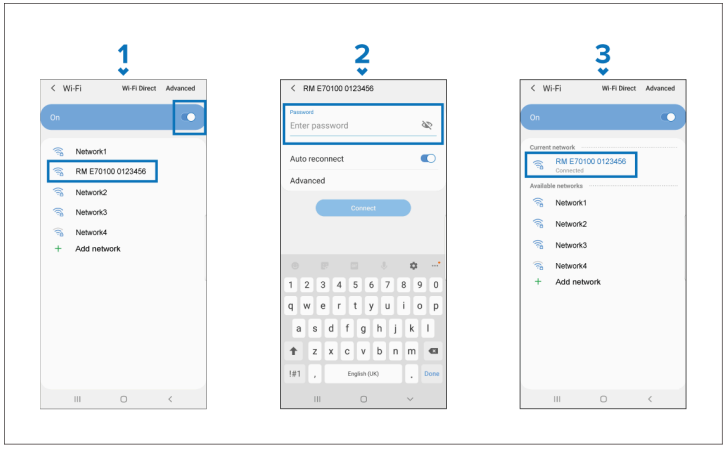
1. The Wi-Fi settings tab is accessed from the Settings menu: (*[Homescreen > Settings > Wi-Fi > CONNECT MOBILE DEVICES TO ELEMENT]*).
2. To enable a mobile device to connect to the display *[Allow mobile devices to connect]* must be enabled
3. The display's Wi-Fi network name can be viewed from the Wi-Fi settings tab and can be changed by selecting the name field.
4. The display's Wi-Fi network passphrase can be viewed by selecting the passphrase field and then selecting *[Show characters]* on the Enter passphrase page. The passphrase can also be changed from the same page.
5. The display's Wi-Fi network channel can be viewed from the Wi-Fi settings tab and can be changed by selecting the channel field.

Connecting an Android device to the display

Android devices can be connected to the display's Wi-Fi connection.

Open your Android device's Wi-Fi settings from the top drop down menu or via the *[Settings]* icon.

Example Android Wi-Fi connection



Note:
Depending on device type, manufacturer and version of the Android operating system in use, screens and options may be different than in the example above.

1. Enable Wi-Fi by setting the toggle to on (blue) and select your MFD from the available networks.
2. Enter your MFD's Wi-Fi passphrase and select *[Connect]*.

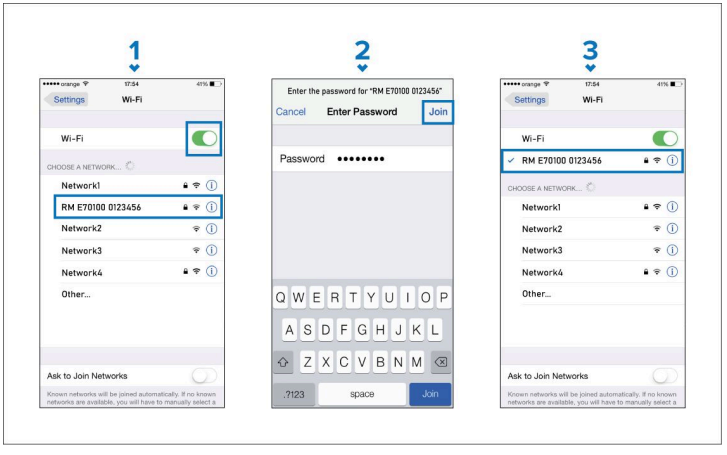
   Make sure the password you enter is case sensitive.
3. Once your Android device is connected to your MFD's Wi-Fi network, it will display "*Connected*" under the MFD's device name.

For troubleshooting advice, refer to the Wi-Fi troubleshooting information in the *Troubleshooting* chapter.

Connecting an iOS device to the display

iOS devices can be connected to the display's Wi-Fi connection.

Open your iOS device's Wi-Fi settings from the top drop down menu or via *[Settings]*.



Note:
Depending on device type, and iOS version in use, screens and options may be different than in the example above.

1. Enable Wi-Fi by setting the toggle to on (green) and select your MFD from the available networks.
2. Enter your MFD's Wi-Fi passphrase and select join.

   Make sure the password you enter is case sensitive.
3. When your iOS device is connected to your MFD's Wi-Fi it will display a tick next to the MFD's name.

For troubleshooting advice refer to the Wi-Fi troubleshooting information on the Troubleshooting chapter **p.144 —** Troubleshooting

Raymarine app

You can use the Raymarine app to purchase and download LightHouse™ Charts from the Chart Store.

Important: Download packages containing Charts for larger regions (such as North America, Northern Europe, and Australia/NZ) and also those including satellite photos, consist of very large files, which can take a long time (possibly several hours) to download via a mobile device and the Raymarine app. When purchasing these larger download packages, it is recommended that you download the Charts from the Chart Store **via a web browser** on a laptop or PC. For more information on this procedure, refer to: **Downloading Charts from the Chart Store**

If you wish to use the Raymarine app to download LightHouse charts, use the following procedure:

1. Log in to the Raymarine app with an existing Raymarine account, or create a new account using the app.
2. Purchase LightHouse™ Charts, via the Chart Store accessible from the app.
3. Define the regions and types of cartographic data you want the chart to contain.
4. Connect your mobile device's Wi-Fi to your Raymarine multifunction display (MFD). For information on connecting your mobile device, refer to:
   - Android — **p.40 —** Connecting an Android device to the display
   - iOS — **p.41 —** Connecting an iOS device to the display
5. Download the charts to a MicroSD card inserted in your Raymarine multifunction display (MFD). Alternatively, if you're using an Axiom® or Axiom® 2 MFD, you can download the charts to the MFD's internal memory storage

LightHouse charts

LightHouse Charts is the brand name for Raymarine's electronic navigation charts.

Pre-programmed LightHouse Charts cards can be purchased from LightHouse Charts approved dealers.

LightHouse Charts come with a free 1 year subscription to LightHouse Charts Premium. The Premium subscription unlocks data-rich points of interest (POI), high-resolution satellite aerial overlays and regular chart updates and improvements. After the free subscription period ends, the Premium features can be renewed for an annual fee.

To find an approved dealer, activate your Premium subscription, or to download chart updates visit the LightHouse Charts Store: https://chartstore.raymarine.com/lighthouse-charts

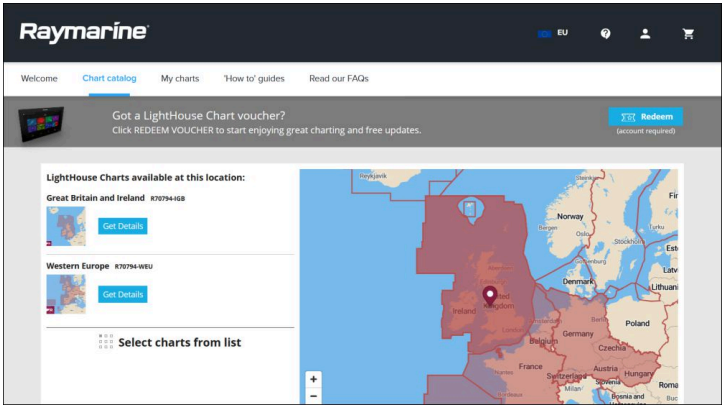
LightHouse Chart store

The LightHouse Charts store can be accessed from a personal computer (PC), or from a mobile device using the Raymarine app.

The Chart Store requires you to create an account and to login before you can activate your premium subscription, or download chart updates.

Important: Download packages containing Charts for larger regions (such as North America, Western Europe, and Australia/NZ) and also those including premium aerial overlays and POI images, create very large files, which can take a long time (possibly several hours) to download via a mobile device and the Raymarine app. When downloading these larger packages, it is recommended that you use the web browser on a laptop, or PC.

The chart store can be accessed using the following link: https://chartstore.raymarine.com/lighthouse-charts



Downloading charts using the Raymarine app

Purchased LightHouse™ charts can be downloaded to the MFD via a mobile device, using the Raymarine app and Wi-Fi to transfer the charts to a MicroSD (µSD) memory card inserted into your MFD, or to the internal storage of an Axiom® or Axiom® 2 MFD.

Important: Download packages containing Charts for larger regions (such as North America, Northern Europe, and Australia/NZ) and also those including satellite photos, consist of very large files, which can take a long time (possibly several hours) to download via a mobile device and the Raymarine app. When purchasing these larger download packages, it is recommended that you download the Charts from the Chart Store **via a web browser** on a laptop or PC. For more information on this procedure, refer to: **Downloading Charts from the Chart Store**

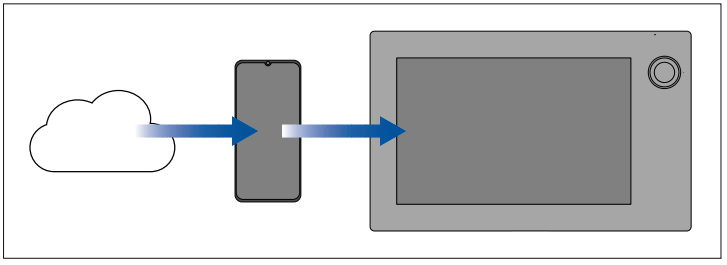
When downloading charts via a mobile device and the Raymarine app, the following pre-requisites should be observed:

- If using mobile data, ensure you have sufficient data allowance remaining to prevent being charged.
- Ensure you have sufficient free space on your mobile device's internal storage for the charts to be downloaded to.
- Ensure that the memory card you want to use is formatted in the exFAT file system format (Chart cards purchased from the Raymarine chart store will arrive in this format).
- Ensure that the memory card has been inserted into the display's card reader prior to commencing the process (this will create the necessary Lighthouse_ID file in the card's root directory.
- A file named 'Lighthouse_charts' must be created in the memory card's root directory (Chart cards purchased from the Raymarine chart store will already include this file).
- It is recommended that there are no other files on the memory card prior to downloading charts to it.
- Ensure *[Allow devices to connect]* is enabled in your display settings:
  - Element™ displays: *[Homescreen > Settings > Wi-Fi]*.
  - Axiom® displays: *[Homescreen > Settings > This display > Wi-Fi SHARING]*.
- Connect your mobile device's Wi-Fi to your MFD. For information on connecting your mobile device, refer to:
  - Android — **p.40 —** Connecting an Android device to the display
  - iOS — **p.41 —** Connecting an iOS device to the display

Note:

• Once a storage location (memory card or internal memory) has been chosen for your charts you cannot change it. Charts cannot subsequently be saved to a different card.

• Charts cannot be downloaded to the internal storage of Element™ displays.



1. Install and open the Raymarine app from the relevant app store, using the relevant QR code provided below.
2. Create an account or Log in to the Raymarine app.
3. If requested select *[ALLOW ONLY WHILE USING THE APP]*.
4. Go to the *[MY CHARTS]* area.
5. Select the chart region you want to download.
6. If you have more than one region on the same continent in MY CHARTS, to minimize download file size, you can group up to 3 regions together.
7. If updates are available click *[Get latest data]*.
8. If you have a valid Premium subscription you can add *[Streets & Points of Interest]* and *[Aerial photos]* by clicking *[Add now]*, next to the items you want to include.

   When adding [Streets & Points of Interest] and [Aerial photos] you can create up to 5 area boxes for each feature per purchased region. Follow the onscreen instructions to define each area of coverage.

9. Select *[Download]* and then follow the onscreen instructions to download your charts to your MFD.

Account settings

You can edit your Raymarine account details using the *[Account]* menu.

You can edit the account's:

- Name
- Email address
- Password
- Region
- News and offers notification settings

Pairing a Quantum-Series Radar scanner

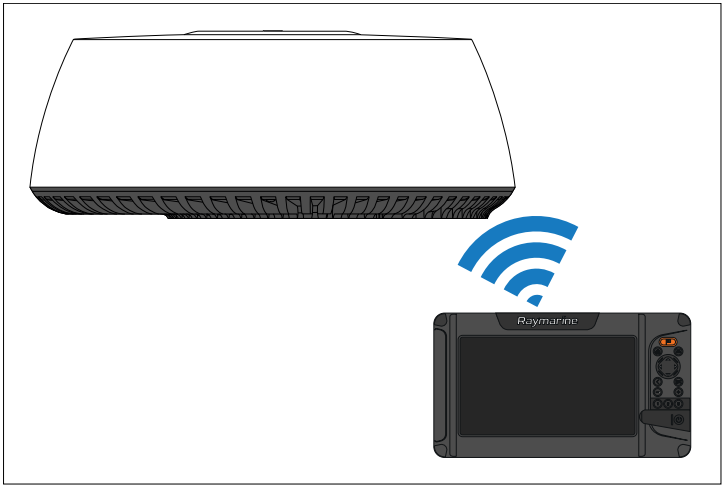
You can connect a Quantum-Series Radar scanner to your display using the Wi-Fi connection.

Pre-requisites:

- Ensure you have installed and connected your Quantum-Series Radar scanner to a power supply in accordance with the instructions supplied with the Radar scanner.
- Ensure you know your Quantum-Series Radar scanner's SSID and passcode.

Important:
Ensure that the software installed on your Quantum-Series Radar scanner is compatible with your MFD / chartplotter.

• Due to a software security update, Quantum-Series Radar scanners running v2.52 software (or later) require your Element-Series MFD / chartplotter to be running LightHouse Sport v3.19.17 (or later).



1. Select *[Pair with Quantum]* from the *[This display]* tab: *[Homescreen > Settings > This display > Quantum Radar: > Pair with Quantum]*.
2. Enter the SSID and passcode for your Quantum-Series Radar scanner.
3. Select *[Connect]*.
4. Follow any onscreen instructions to continue pairing with your Quantum-Series Radar scanner.

   The pairing process may take several minutes to complete.

   For more information on the Quantum-Series Radar scanner pairing process (including troubleshooting information), refer to your Quantum-Series Radar Installation Instructions document.

CHAPTER 7: COMPATIBLE TRANSDUCERS

CHAPTER CONTENTS

7.1 Compatible transducers - Element HV displays

HyperVision™ transducers

The following HyperVision™ transducers can be connected to Element™ HV displays:

Part number	Description
E70643 / A80603	**HV-100** — HyperVision™ Transom mount, Plastic transducer (direct connection).
A80604	**HV-300TH** — HyperVision™ All-in-one, Thru-hull, Plastic transducer (direct connection).
T70448	**HV-300THP** — HyperVision™ Pair, Thru-hull, Plastic transducers (direct connection using supplied cables).
R70725	**HV-300THP-P** Split, Port side, Thru-hull, Plastic transducer (Requires 'Y' cable (A80605) to connect split pair transducers, and extension cable (A80562) to connect to display).
R70726	**HV-300THP-S** Split, Starboard side, Thru-hull, Plastic transducer (Requires 'Y' cable (A80605) to connect split pair transducers, and extension cable (A80562) to connect to display).

Third party transducers

The third party transducers listed below can be connected to Element™ HV using adaptor cables.

Adaptor cable	Transducer
A80560	**MinnKota** Embedded, 83 kHz /200 kHz transducer.
A80606	**MotorGuide** Embedded, 83 kHz / 200 kHz transducer.

Note:
When using third party transducers only the 200 kHz channel will be available.

Compatible legacy transducers

DownVision™ transducers

The following DownVision™ transducers can be connected to Element™ HV displays using the CPT-S / DownVision 9–pin adaptor cable (A80559):

Part number	Description
A80507	**CPT-90 DVS** — DownVision™, Transom mount, Plastic transducer.
A80351	**CPT-100 DVS** — DownVision™, Transom mount, Plastic transducer. Replaced A80270.
A80277	**CPT-110** — DownVision™, Thru-hull, Plastic transducer with fairing block.
A80350	**CPT-120** — DownVision™, Thru-hull, Bronze transducer with fairing block. Replaced A80271.

Dragonfly® transducers

The following Dragonfly® transducers can be connected to Element™ HV displays using the Dragonfly 10–pin adaptor cable (A80558):

Part number	Description
R70374	**CPT-DVS** — DownVision™, Transom mount, Plastic transducer.
A80278	**CPT-70** — DownVision™, Thru-hull, Plastic transducer with fairing block.
A80349	**CPT-80** — DownVision™, Thru-hull, Bronze transducer with fairing block.

High CHIRP sonar transducers

The following conical beam, high CHIRP sonar transducers can be connected to Element™ HV displays using the CPT-S/DownVision 9–pin adaptor cable (A80559):

Part number	Description
E70342	**CPT-S** High CHIRP, Transom mount, Plastic transducer.
E70339	**CPT-S** High CHIRP, 0° angled element, Flush mount, Thru-hull, Plastic transducer.
A80448	**CPT-S** High CHIRP, 12° angled element, Flush mount, Thru-hull, Plastic transducer.
A80447	**CPT-S** High CHIRP, 20° angled element, Flush mount, Thru-hull, Plastic transducer.
A80446	**CPT-S** High CHIRP, 0° angled element, Flush mount, Thru-hull, Bronze transducer.
E70340	**CPT-S** High CHIRP, 12° angled element, Flush mount, Thru-hull, Bronze transducer.
E70341	**CPT-S** High CHIRP, 20° angled element, Flush mount, Thru-hull, Bronze transducer.

Legacy transducer extension cables

When connecting a compatible legacy transducer to an Element display, using an adaptor cable: if the cable run requires extending, you must use an extension cable which is compatible with your transducer.

Important:
The HyperVision™ extension cable cannot be used to extend the cable run of legacy transducers.

Legacy transducer	Compatible extension cable
Dragonfly® transducers	**A80312** — 4 m (13.1 ft) Dragonfly® transducer extension cable. **Note:** Power supply wires should be isolated and protected from shorting or water ingress.
DownVision™ transducers	**E66074** — 3 m (9.84 ft) DownVision™ transducer extension cable.
High CHIRP sonar transducers	**A80273** — 4 m (13.1 ft) CPT-S transducer extension cable.

7.2 Compatible transducers - Element S displays

High CHIRP sonar transducers

The following conical beam, high CHIRP sonar transducers can be connected to Element™ S displays:

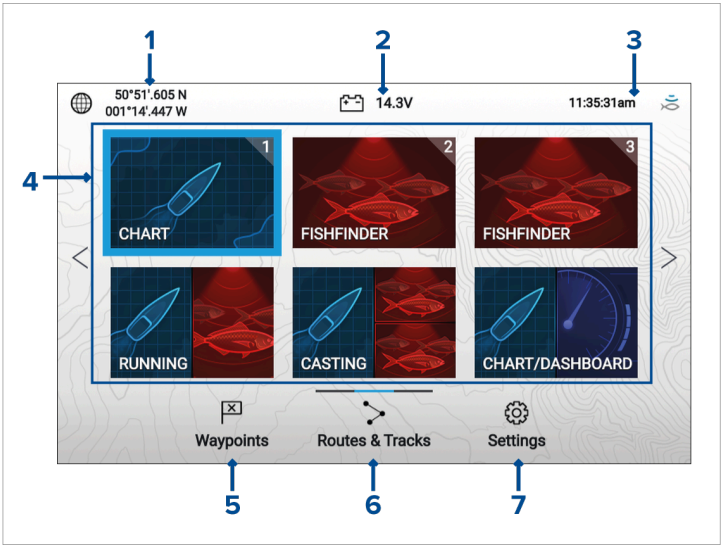
Part number	Description
E70342	**CPT-S** High CHIRP, Transom mount, Plastic transducer.
E70339	**CPT-S** High CHIRP, 0° angled element, Flush mount, Thru-hull, Plastic transducer.
A80448	**CPT-S** High CHIRP, 12° angled element, Flush mount, Thru-hull, Plastic transducer.
A80447	**CPT-S** High CHIRP, 20° angled element, Flush mount, Thru-hull, Plastic transducer.
A80446	**CPT-S** High CHIRP, 0° angled element, Flush mount, Thru-hull, Bronze transducer.
E70340	**CPT-S** High CHIRP, 12° angled element, Flush mount, Thru-hull, Bronze transducer.
E70341	**CPT-S** High CHIRP, 20° angled element, Flush mount, Thru-hull, Bronze transducer.

CHAPTER 8: HOMESCREEN

CHAPTER CONTENTS

8.1 Homescreen overview

All settings and apps can be accessed from the Homescreen.

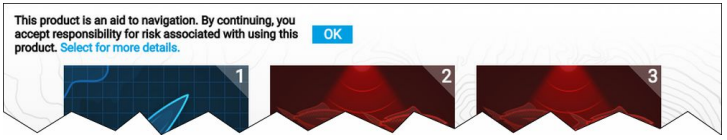


1. **Position/fix details** — Shows your vessel's current position coordinates. Select the area to view fix accuracy and to access position settings.
2. **Supply voltage** — Shows the display's supply voltage. The Voltage reading is colored Red if the current supply voltage is lower than the value specified in the *[Low voltage threshold]* alarm setting: *[Homescreen > Settings > Alarms > Low voltage threshold]*.
3. **Status area** — Displays system time, count down/up timer and sonar ping status. Select the area to set count down / up timer, time zone and to set daylight savings.
4. **App page icons** — The Homescreen is made up of 3 pages that can each contain up to 6 app page icons. Selecting an app page icon opens the relevant app page.To view a different Homescreen page, keep pressing the Directional pad's *[Left]* or *[Right]* buttons until the Homescreen page changes. You can identify which Homescreen page is being shown using the indicator bar, located above the *[Routes & Tracks]* icon.
5. **Waypoints** — Select to view the *[Waypoints]* list.
6. **Routes & Tracks** — Select to view the *[Routes and Tracks]* lists.
7. **Settings** — Select to view the display's *[Settings]* menu.

Note:
The combination of the selected *[Activity]* and *[Transducer selection]* during the Start up wizard determines the default app page icons displayed on the Homescreen.

Accepting the Limitations on Use

After your display has powered up the Homescreen is displayed.



1. Before using the display you must accept the Limitations on Use (LoU) disclaimer. To view the full LoU Disclaimer, use the *[Left]* button to highlight the text and press the *[OK]* button.

   The LoU acknowledgment is displayed each time the display is powered on. The full LoU text can be accessed at any time, it is located at the bottom of the [Getting started] menu: [Homescreen > Settings > Getting started].

Available apps

The available Apps are hosted and displayed in App "pages". Each app "page" can include up to 4 apps, and is represented on the Homescreen by an app page icon. Select an icon to launch the corresponding app page. Pages hosting single apps display the app full screen. Pages hosting multiple apps display the apps in a split-screen layout.

The available apps are:

[Chart] — The Chart app displays electronic cartographic information from your Chart cards, and when used in conjunction with a GNSS (GPS) receiver, plots your vessel's position on the display. The Chart app can be used to: mark specific locations using Waypoints, build and navigate Routes; or keep a record of where you have been by recording a visual Track.
For detailed information about the Chart app, refer to: **p.75 —** Chart app

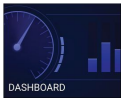
[Fishfinder] — The Fishfinder app uses a connected transducer to help you find fish. The app displays an underwater view of bottom structure and targets in the water column covered by your transducer.

Note:

• The channels available in the Fishfinder app are determined by the display variant and connected transducer.

• The icon used on the homescreen will reflect the fishfinder channel in use.

For detailed information about the Fishfinder app, refer to: **p.101 —** Fishfinder app



[Dashboard] — The Dashboard app provides data readings from connected sensors and devices.

Note:
The Dashboard app is only available in split-screen app pages.

For detailed information about the Dashboard app, refer to: **p.120 —** Dashboard app

[Radar] — The Radar app is a situational awareness aid that displays a graphical representation of your surroundings in relation to your vessel using the echo / target returns from a connected Quantum radar scanner. The Radar app allows you to track targets and measure distances and bearings

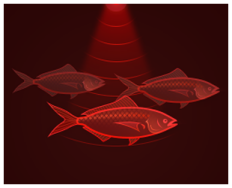
Note:
The Radar app is included in homescreen app page icons when the *[Radar installed]* option is enabled in the initial start up wizard. Alternatively, you can add the Radar app to the homescreen manually. For more information on adding new app pages, refer to:
p.53 — Creating a new app page

For detailed information about the Radar app, refer to: **p.129 —** Radar app

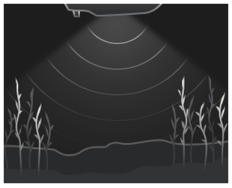
Note:
For more information on adding new app pages, refer to:
p.53 — Creating a new app page

Fishfinder app pages

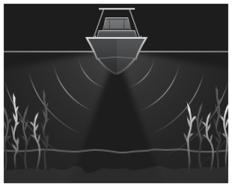
The icons used to represent fishfinder app pages on the homescreen change to reflect the fishfinder channel that has been selected for that instance of the fishfinder app.



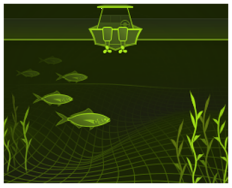
Sonar
The conical beam fishfinder channel is represented using the sonar app icon. The conical beam fishfinder channel provides a traditional scrolling 2D view of the water beneath your vessel.



DownVision™
The DownVision™ fishfinder channel is represented using the DownVision™ app icon.
The DownVision™ fishfinder channel provides a photo like scrolling 2D view of the water beneath and to the sides of your vessel.



SideVision™
The SideVision™ fishfinder channel is represented using the SideVision™ app icon.
The SideVision™ fishfinder channel provides a photo like Scrolling 2D view of the water on each side of your vessel.



RealVision™ 3D
The RealVision™ 3D fishfinder channel is represented using the RealVision™ app icon.
The RealVision™ 3D fishfinder channel provides a scrolling 3D view of the water behind and to the sides of your vessel.

Ice fishing app pages

When the display is configured for ice fishing (via the Startup wizard), the available fishfinder modes will be represented using ice fishing app page icons on the homescreen. These app pages enable you to select different types of sonar view, optimized for ice fishing activities.

Trail & Radial
The trail and radial app page is a splitscreen page that includes a traditional (historical), scrolling, 2D view and an instantaneous (real-time) radial view of the water beneath the transducer. The radial view shows the returns from the sonar signal (using the same color coding as the traditional scrolling view), organized in a circular formation. This view enables you to quickly identify what is currently passing under your transducer (e.g. bottom structure or target etc), in each segment of the depth range.

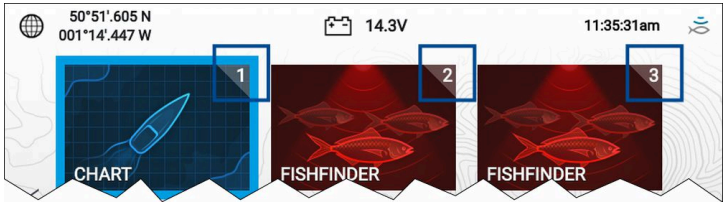
Trail & A-Scope
The trail and A-scope app page is a splitscreen page that includes a traditional (historical), scrolling, 2D view and an instantaneous (real-time) A-scope view of the water beneath the transducer.

Radial
The radial app page is a fullscreen page that provides an instantaneous (real-time), radial view of the water beneath the transducer. The radial view shows the returns from the sonar signal (using the same color coding as the traditional scrolling view), organized in a circular formation. This view enables you to quickly identify what is currently passing under your transducer (e.g. bottom structure or target etc), in each segment of the depth range.

A-Scope
The A-scope app page is a fullscreen page that provides an instantaneous (real-time) view of the water beneath the transducer. This allows you to see what is currently passing under your transducer (e.g. bottom structure or target etc), rather than the historical display provided by the traditional, scrolling, 2D view.

Assigning app pages to Quicklaunch buttons

App pages assigned to the Quicklaunch buttons are identified using the associated Quicklaunch button number in the top right corner of the app page icon.



You can change which app page is assigned to the Quicklaunch buttons by following the steps below:

1. Using the *[Directional pad]*, highlight the app page icon that you want to assign to a Quicklaunch button.
2. Press and hold the relevant *[Quicklaunch]* button until the 'Quicklaunch button configured' message is displayed.

   The app page icon is updated to show the associated *[Quicklaunch]* button number in the top right corner of the icon.
3. Repeat steps 1 and 2 for the remaining *[Quicklaunch]* buttons, if required.

8.2 Customizing app pages

You can customize the homescreen app pages.

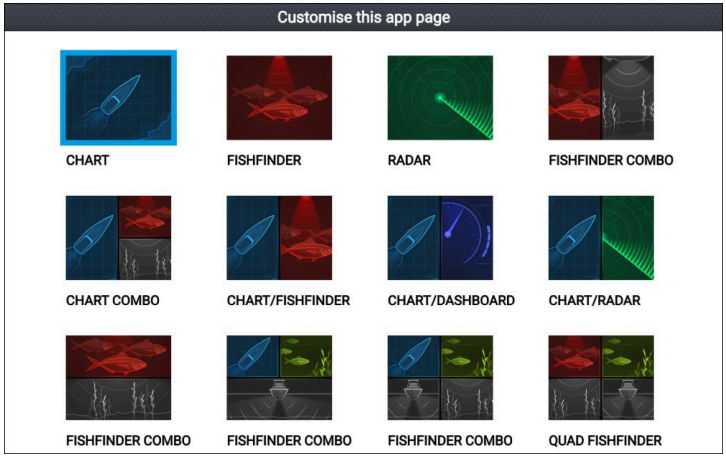
1. Highlight the app page icon you want to change.
2. Press and hold the *[OK]* button.

   The pop-over menu is displayed.
3. Select the relevant option:

   - *[Customize]* — select customize to change the app page to one of the available configurations.
   - *[Delete]* — select delete to delete the app page icon from the homescreen.
   - *[Rename]* — select rename to change the name of the app page icon using the onscreen keyboard.
   - *[Assign as Quicklaunch 1/2/3]* — select to assign the app page to a Quicklaunch button.

8.3 Creating a new app page

The homescreen consists of 3 homescreen pages, the first page is populated with app page icons by default. New pre-configured app pages can be added to the homescreen.



1. If required, use the *[Left]* and *[Right]* buttons to display a homescreen page that has space available.
2. Highlight a blank space on the homescreen.
3. Press and hold the *[OK]* button.
4. Select the desired app page configuration.

   Use the [Down] button to display further available page layouts.

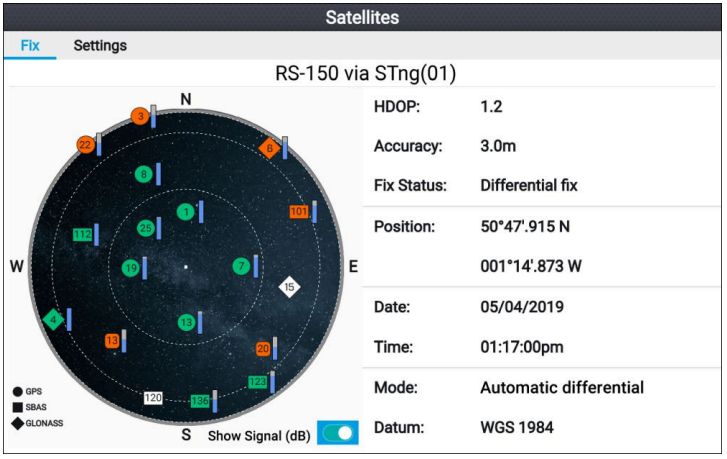
The new app page icon will now be available on the homescreen.

8.4 Global positioning

GPS/GNSS status

Your vessel's GPS/GNSS position coordinates are provided in the top left corner of the homescreen. You can access fix accuracy and settings by selecting this area.

If latitude and longitude is displayed on the homescreen, your vessel has a valid position fix. If the text turns red, it means that your fix accuracy is low.



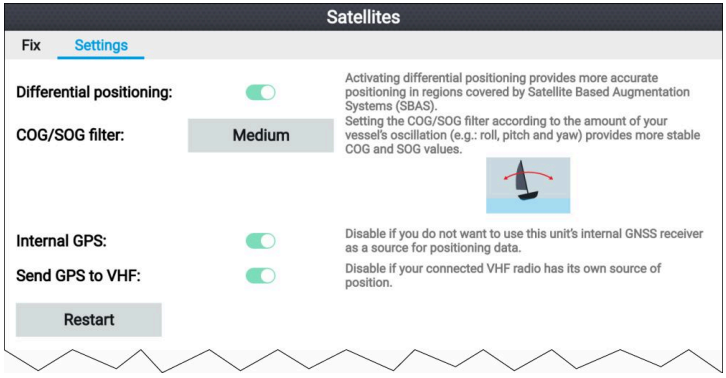
The sky view on the left side of the page shows available satellites and identifies the GNSS constellation to which they belong. The color of the satellite symbol identifies its status:

- White = searching for satellite
- Green = satellite in use
- Orange = tracking satellite

The *[Show Signal (dB)]* toggle switch can be used to show or hide a signal strength bar for each satellite.

GPS / GNSS settings

Settings for your GPS / GNSS receiver can be accessed by selecting the top left corner of the homescreen and then selecting the *[Settings]* tab.

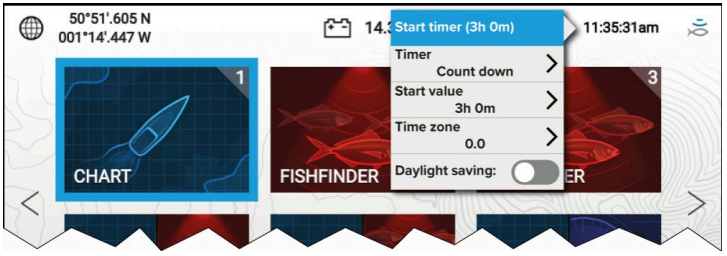


From the GPS / GNSS settings tab you can:

- *[Differential positioning:]* — Enabling differential positioning provides more accurate positioning in regions covered by Satellite Based Augmentation Systems (SBAS).
- *[COG/SOG filter:]* — Setting the COG / SOG filter according to the amount of your vessel's oscillation (e.g.: roll, pitch and yaw) provides more stable COG and SOG readings.
- *[Internal GPS:]* — Enable and disable your display's built-in GPS / GNSS receiver.
- *[Send GPS to VHF:]* — Enable and disable output of GPS / GNSS data from your display to a connected VHF radio.
- *[Restart]* — Restart the GPS / GNSS receiver in use by the display.

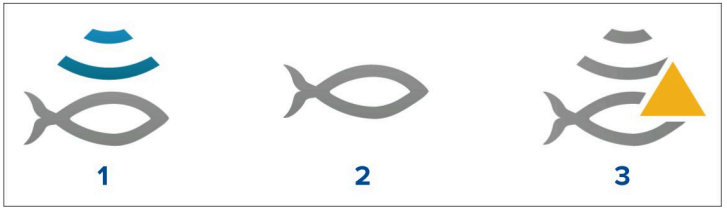
8.5 Status area

The status area is located at the top right of the homescreen. This area displays the current time and identifies the status of the display's sonar ping. The status area pop-over menu provides access to the timer and time and date settings.



Status area icons

The icons displayed in the Status area signify the current status of certain connected devices.



1. Sonar pinging.
2. Sonar ping disabled.
3. Sonar error.

8.6 Timer

A timer is provided in the homescreen status area. The timer can be used as a countdown timer or as a count-up (stopwatch). Whilst the countdown or count-up timer is in use, it is displayed in the status area, below the current time.

Using the count down timer

From the homescreen:

1. Select the status area, located in the top right corner of the homescreen.
2. The status area pop-over menu is displayed.
3. Ensure that *[Count down]* is selected in the *[Timer]* option.
4. Select *[Start value]* and adjust to the desired value.

   The count down timer can be set to a maximum of 9 hours and 59 minutes.
5. Press the *[Back]* button to return to the pop-over menu.
6. Select *[Start timer]*.

The count down timer can be stopped or reset at anytime from the pop-over menu.

Using the count up timer

From the homescreen:

1. Select the status area, located in the top right corner of the homescreen.
2. The status area pop-over menu is displayed.
3. Ensure that *[Count up]* is selected in the *[Timer]* option.
4. Select *[Start timer]*.

   The count up timer can count upwards to a maximum of 23 hours and 59 minutes.

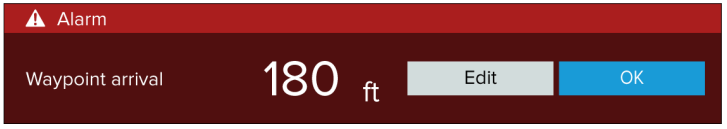
The count up timer can be stopped or reset at anytime from the pop-over menu.

8.7 Alarms

Alarms are used to alert you to a hazard or situation requiring your attention. Alarms are triggered based on their specified thresholds.

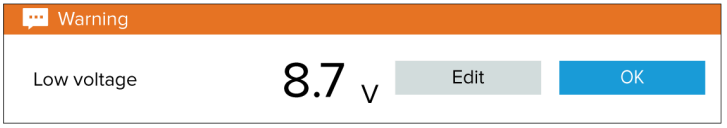
Alarms are color coded to signify their severity:

Dangerous alarm example



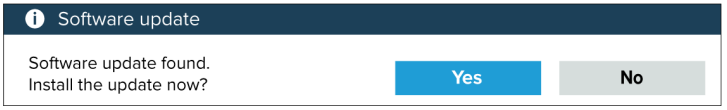
Red — is used to signify a dangerous alarm condition, immediate action is required due to a potential or immediate danger to life or vessel. Dangerous alarms are accompanied by an audible tone. The Dangerous alarm notification and audible tone will continue to be displayed until acknowledged or the conditions that triggered the alarm are no longer present.

Warning alarm example



Orange — is used to signify a warning alarm condition. Warning alarms are used to signify that there has been a change in situation that you need to be aware of. Warnings alarms are accompanied by an audible tone. The warning alarm notification and audible tone will continue to be displayed until acknowledged or the conditions that triggered the alarm are no longer present.

Notification example



Blue — is used to signify information requiring user acknowledgement. Information notifications may self dismiss after 3 seconds, unless they require user interaction. Information notifications are not accompanied by an audible tone.

Acknowledging alarms

Follow the steps below to acknowledge an active alarm.

With an alarms notification displayed onscreen:

1. Select *[OK]*.

   The notification is dismissed and the audible tone is stopped.

An acknowledged alarm remains active until the conditions that triggered the alarm are no longer present.

Note:
If an alarm notification includes an *[Edit]* button, selecting it will display the relevant setting in the Alarms menu so that, if required, you can change the alarm threshold.

Alarm settings

Depending on connected peripheral hardware and configuration the alarms listed below can be enabled and disabled and where applicable alarm thresholds can be set or changed.

Note:
Alarms are only triggered when relevant hardware (e.g.: sensors) is connected and reporting the data required for the alarm.

- *[Dangerous AIS targets]* — If enabled, an alarm is triggered when AIS targets become dangerous. AIS targets are deemed dangerous when they have the potential to cross your path within a specified distance and time. For alarm parameters refer to:
  p.57 — AIS dangerous targets
- *[Depth]* — If enabled, when the depth detected by your depth transducer passes the specified value the depth alarm is triggered.

Note:
The MFD depth alarm is independent of the Shallow depth alarm available on instrument displays and other MFDs. If you have Instrument displays or Axiom MFDs connected to your system it is recommended that the shallow depth alarm is only enabled on one device.

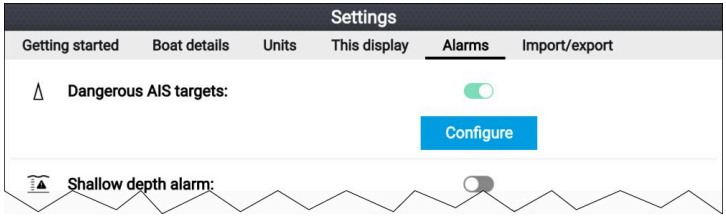
- *[Waypoint arrival]* — If enabled, when you arrive at a waypoint, an alarm is triggered. This setting allows you to specify a radius size for the alarm. When your vessel crosses the specified radius, the Waypoint Arrival alarm is triggered.
- *[Low voltage]* If enabled, the alarm is triggered if the supply voltage to the display drops below the value specified in the *[Low voltage threshold]* field.
- *[Off track]* — If enabled, during active navigation an alarm is triggered when your vessel steers off track by more than the specified *[Cross track error]* value.
- *[Position drift]* — If enabled, an Alarm is triggered when your vessel drifts from its current GNSS (GPS) position by more than the specified *[Drift range]*.
- *[Water temperature alarm]* — If enabled, an alarm is triggered when the water temperature reading reaches the temperature specified in *[Lower temp limit]* or *[Upper temp limit]*.
- *[Fish detection beep]* If, enabled the alarm is triggered when the Fishfinder app detects a sonar targets that the fish detection algorithm considers to be a fish. For further details refer to:
  p.111 — Fish detection
- *[Engine alarms]* — If enabled, alarms will be triggered when engine warning alarms are received from connected, compatible engine management systems or interfaces.
- *[Satellite fix lost]* If enabled, the alarm is triggered if the position fix of the GNSS (GPS) receiver currently in use is lost.
- *[Minimum sonar depth]* — When your sonar transducer detects depths of 0.8 m/2.62 ft the alarm is triggered.

Important:
Accurate bottom tracking can be unreliable in depths shallower than 0.8 m/2.62 ft. When operating at or below this depth be cautious of misleading sonar returns or false bottom tracking.

AIS dangerous targets

If AIS targets enter a dangerous target state they can trigger an alarm on your display. AIS targets are considered to be dangerous if they will pass within a specified safe distance from your vessel within a specified time interval.

The dangerous target alarm can be enabled and disabled from the alarms menu: *[Homescreen > Settings > Alarms > Dangerous AIS targets]*.



The dangerous target alarm can be configured from the Dangerous target page, accessed from the alarms menu:*[Homescreen > Settings > Alarms > Dangerous AIS targets > Configure]*.

To set up the AIS dangerous target alarm, first adjust the *[Safe distance]* to the desired value and then select a *[Time to reach safe distance]*. The alarm will be triggered if a tracked target will reach the specified Safe distance from your vessel within the time period selected.

You can display a Safe distance ring around your vessel in the Chart app and Radar app by enabling *[Show safe distance]*.

8.8 Settings menu

The display's settings can be accessed by selecting the *[Settings]* icon on the Homescreen.

The following settings and details are available for your display.

Tab	Settings
[Getting started]	• Hardware and software information about your display. • Update display software. • Change the user interface language. • Enable/disable Retail/demo mode (Simulator mode). • Choose a *[Demo type]*. • Enable/disable Demo movie. • View the Terms of Use disclaimer.
[Boat details]	• Configure Minimum safe depth, height and width. • Configure engines. • Configure tanks. • Configure batteries. • Select transducer
[Units]	• Configure preferred units of measurement. • Configure date and time settings. • Configure Bearing mode. • Configure system datum. • Configure variation.

Tab	Settings
[This display]	• Switching between *[Light]* and *[Dark]* user interface color themes. • Calibrate an EV-1 heading sensor. • Select data sources. • Diagnostics: View display product information, view product information for connected products, save / erase system logs. • Pair Quantum™ radar scanner. • Perform a Settings or Factory reset.
[Alarms]	• Configure alarm settings.
[Import/export]	• Import and export user data (Waypoints, Routes and Tracks) from MicroSD card. • Eject SD card.
[Wi-Fi]	• Connect display to a Wi-Fi access point. • Connect mobile devices to the display. • Connect Quantum™ Radar to display using Wi-Fi connection.

Selecting display language

You can choose which language you want the display's user interface to use.

1. Select the *[Language]* button from the *[Getting started]* menu: *[Homescreen > Settings > Getting started > Language:]*.
2. Select your desired language.

User interface languages

The following user interface languages are available:

Languages			
Arabic (ar-AE)	Bulgarian (bg-BG)	Chinese (Simplified) (zh-CN)	Chinese (Traditional) (zh-TW)
Croatian (hr-HR)	Czech (cs-CZ)	Danish (da-DK)	Dutch (nl-NL)
English (en-GB)	English (en-US)	Estonian (et-EE)	Finnish (fi-FI)
French (fr-FR)	German (de-DE)	Greek (el-GR)	Hebrew (he-IL)
Hungarian (he-IL)	Icelandic (is-IS)	Indonesian (Bahasa) (id-ID)	Italian (it-IT)
Japanese (ja-JP)	Korean (ko-KR)	Latvian (lv-LV)	Lithuanian (lt-LT)
Malay (Bahasa) (ms-MY ZSM)	Norwegian (nb-NO)	Polish (pl-PL)	Portuguese (Brazilian) (pt-BR)
Russian (ru-RU)	Slovenian (sl-SI)	Spanish (es-ES)	Swedish (sv-SE)
Thai (th-TH)	Turkish (tr-TR)	Vietnamese (vi-VN)	

The selected language also determines the display's default units of measure.

Boat details

To ensure correct operation and display of data you should set the Boat Details settings according to your requirements.

Boat details can be accessed from the *[Settings]* menu: *[Homescreen > Settings > Boat Details]*

Option	Description
[Min safe height:]	Enter your vessel's maximum unladen height from the waterline. To ensure adequate clearance, it is recommended that you add a safety margin to this figure to allow for variation caused by vessel movements.
[Min safe width:]	Enter your vessel's maximum width at its widest point. To ensure adequate clearance on both sides, it is recommended that you add a safety margin for port and starboard to this figure to allow for variation caused by vessel movements.

Option	Description
[Min safe depth:]	Enter your vessel's maximum depth when fully laden. This is the depth from the waterline to the lowest point on the vessel's keel. To ensure adequate clearance, it is recommended that you add a safety margin to this figure to allow for variation caused by vessel movements.
[Num of engines:]	You can configure your system to display data for up to 2 engines, when connected to a compatible engine management system.
[Identify engines:]	Once you have selected the number of engines, select *[Identify engines]* and follow the onscreen instructions to configure your engines. May require an extra hardware interface to enable engine data to be displayed.
[Fuel tanks:]	You can configure your system to display data for up to 2 fuel tanks.
[Fresh water tanks:]	You can configure your system to display data for up to 2 fresh water tanks.
[Live well tanks:]	You can configure your system to display data for up to 2 Live well tanks.
[Gray water tanks:]	You can configure your system to display data for a Gray water tank.
[Black water tanks:]	You can configure your system to display data for a Black water tank.
[Batteries:]	You can configure your system to display data for up to 3 batteries.
[Transducer:]	You can select the transducer type that is connected to your display. **Important:** Ensure the display is powered off before physically changing your transducer.

Units of measure

You can select your preferred units for data readings from the *[Units]* menu: *[Homescreen > Settings > Units]*.

Default units of measure are determined by the selected user interface language.

Measurement	Units
[Distance units]	• *[NM & ft]* — Nautical miles & Feet • *[NM & m]* — Nautical miles & Meters • *[mi & ft]* — Miles & Feet • *[km & m]* — Kilometers and Meters • *[NM & yd]* — Nautical miles & Yards
[Speed units]	• *[Kts]* — Knots • *[MPH]* — Mile per hour • *[KPH]* — Kilometers per hour
[Depth units]	• *[Meters]* — m • *[Feet]* — ft • *[Fathoms]* — Fm
[Temperature units]	• *[Celsius]* — C • *[Fahrenheit]* — F
[Wind speed units]	• *[Knots]* — kts • *[Meters per Second]* — m/s
[Volume units]	• *[US Gallons]* — Gsl • *[Imperial Gallons]* — Gal • *[Liters]* — Ltr

Measurement	Units
[Economy units]	• Distance per Volume • Volume per Distance • Liters per 100 km
[Pressure units]	• *[Bar]* • *[PSI]* • *[Kilopascals]* — KPa
[Date format]	• MM : DD : YYYY • DD : MM : YYYY • MM : DD : YY • DD : MM : YY
[Time format]	• 12hr • 24hr
[Time zone:]	• UTC offsets • Daylight saving

Measurement	Units
[Bearing mode:] Determines how bearing and heading data are displayed.	• True • Magnetic
[System datum:] Determines the chart datum used by your display. This should be set to the same datum used by your paper charts.	List of available datums.

Measurement	Units
[Variation:] When set to *[Auto]*, the display will automatically compensate for the naturally-occurring offset of the Earth's magnetic field.	• Auto • Manual
[Manual variation:] When *[Variation]* is set to *[Manual]*, you can specify a fixed offset value, to compensate for the naturally-occurring offset of the Earth's magnetic field.	• 30°W to 30°E

CHAPTER 9: WAYPOINTS, ROUTES AND TRACKS

CHAPTER CONTENTS

9.1 Waypoints

Waypoints are used to mark specific locations or points of interest.

Waypoints can be used in the Chart and Fishfinder apps. Your display can store up to 5,000 waypoints, which can be sorted in up to 200 waypoint groups.

In the Chart app you can navigate to a waypoint by selecting *[Goto]* from the Waypoint context menu.

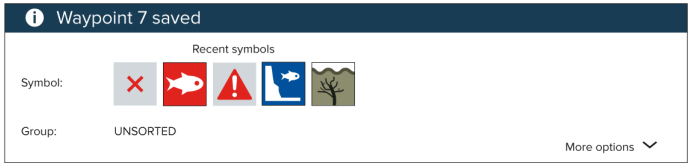
Waypoints can be imported and exported from the display. For more information, refer to: **p.73 — User data import and export**

Placing a waypoint (Quick method)

To place a waypoint at a specific location in the Chart or Fishfinder apps, follow the steps below.

1. Use the *[Directional pad]* to place the cursor over the desired location and press the *[Waypoint]* button.

   The app will be in cursor mode and the waypoint saved notification is displayed.



Note:
If there is no interaction with the notification within 5 seconds the notification will automatically close, saving the waypoint with the default values.

2. If required, select a recent waypoint symbol that you want to assign to the waypoint.
3. Press the *[OK]* button.

The waypoint will be saved with the chosen symbol, in the waypoint group shown against *[Group:]*.

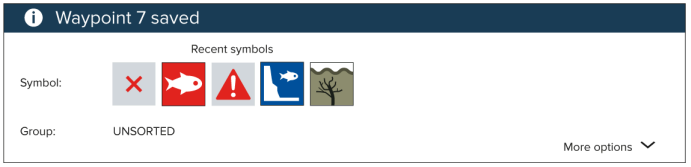
Placing a waypoint at your vessel's location

To place a waypoint at your vessel's locations follow the steps below.

Note:
For a waypoint to be placed at your vessel's location your display must have a GPS/GNSS position fix.

1. If, required press the *[Back]* button to enter Motion mode in the Chart app, or Scrolling mode in the Fishfinder app.
2. Press the *[Waypoint]* button.

   The app will be in cursor mode and the waypoint saved notification is displayed.



Note:
If there is no interaction with the notification within 5 seconds the notification will automatically close, saving the waypoint with the default values.

3. If required, select the a recent waypoint symbol that you want to assign to the waypoint.
4. Press the *[OK]* button.

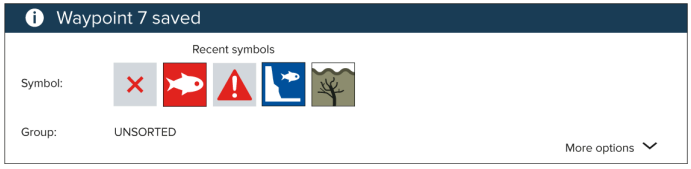
The waypoint will be saved with the chosen symbol, in the waypoint group shown against *[Group:]*.

Placing a waypoint (Detailed method)

You can place a waypoint at a specified location or at the vessel's location and modify the defaults settings (e.g.: waypoint name, symbol or group etc.) by following the steps below.

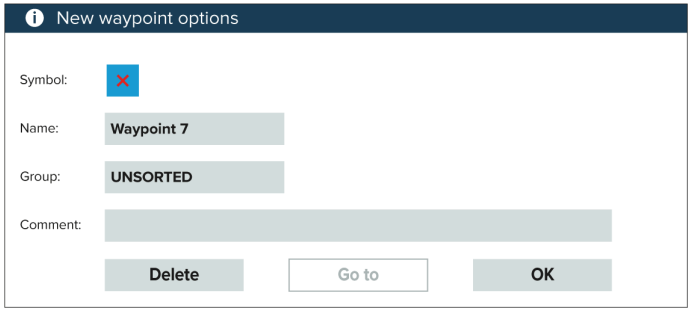
1. Use the *[Directional pad]* to place the cursor over the desired location and press the *[Waypoint]* button.

   The app will be in cursor mode and the 'waypoint saved' notification is displayed.



Note:
If there is no interaction with the notification within 5 seconds the notification will automatically close, saving the waypoint with the default values.

2. Press the *[Down]* button.
   The 'new waypoint options' menu is displayed.



3. You can select the waypoint symbol to view a list of available symbols and then select the symbol you want to use.
4. You can select the *[Name:]* field to open the onscreen keyboard and customize the name of your waypoint.
5. You can select the *[Group:]* field to open the list of waypoint groups and either choose an existing or create a *[New group]*.
6. You can also add notes about the waypoint by selecting the *[Comment:]* field and using the onscreen keyboard.
7. When you have finished customizing the waypoint details, press the *[OK]* button to save the details.
8. You can select *[Goto]* to begin navigation to the new waypoint.

Note:
Selecting *[Delete]* will delete the waypoint.

Moving a waypoint

You can move an existing waypoint to a new location by following the steps below.

1. Select the waypoint that you want to move.
2. Select *[more options]* from the context menu.
3. Select *[Move]*.
4. Use the Directional pad to move the waypoint to the new location.
5. Press the *[OK]* button.

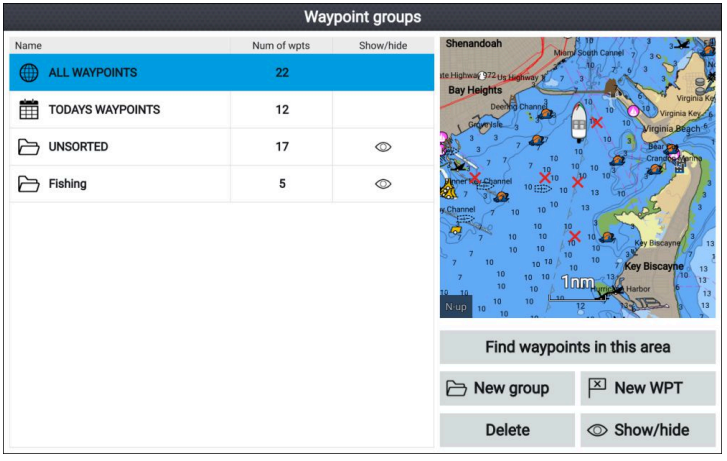
The waypoint has now been moved to its new location.

Note:
When moving a waypoint from a route that was generated using autorouting, the new position and route leg are not recalculated using the autorouting feature and the waypoint symbol will not change.

Waypoint management

Waypoints are sorted and displayed in waypoint groups menu.

Waypoint groups menu



Waypoints can be viewed from the waypoint menu which can be accessed from the Homescreen (*[Homescreen > Waypoints]*) and from the Chart app (*[Chart app > Menu > Waypoints]*).

Waypoints will be saved to the same group as the last waypoint you created. All waypoints can also be viewed by selecting *[ALL WAYPOINTS]* and waypoints created the same day can be viewed by selecting *[TODAYS WAYPOINTS]*.

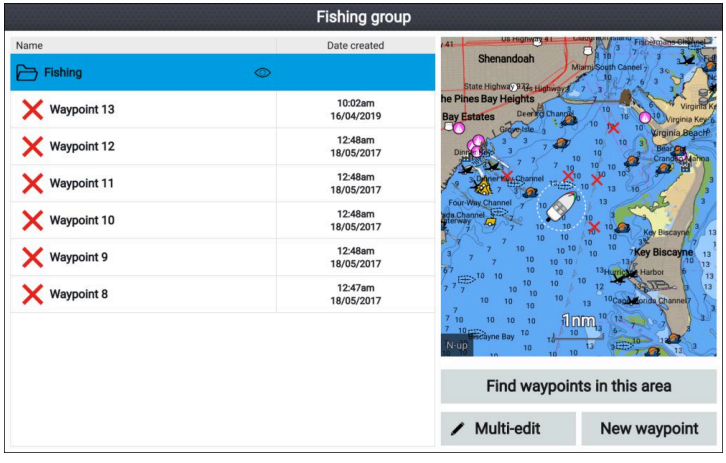
You can use the waypoint groups menu options to:

- Find nearby waypoints.
- Create a new waypoint group.

Note:
Waypoint group names can be any combination of letters, numbers, symbols and special characters and can include up to 16 characters. Waypoint group names must be unique.

- Create a new waypoint.
- Delete a waypoint or waypoint group.

Waypoint groups

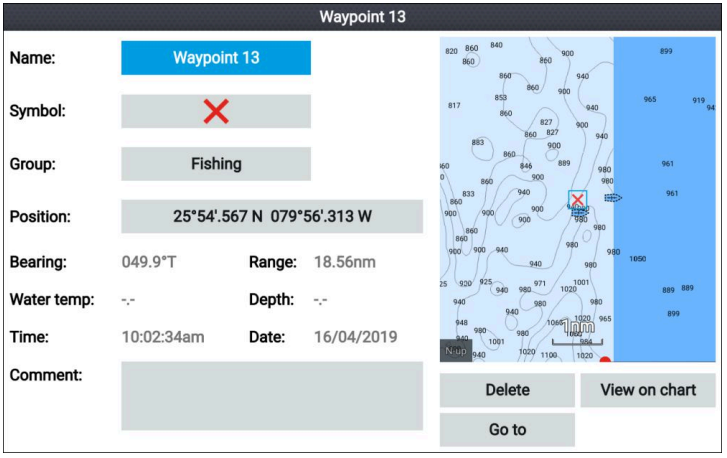


Selecting *[ALL WAYPOINTS]*, *[TODAYS WAYPOINTS]*, *[UNSORTED]* or a user created waypoint group will display a list of all the waypoints in that group / category.

With a list of waypoint displayed you can:

- Find waypoints located in the area covered by the LiveView pane.
- Edit multiple waypoints (i.e.: you can change the symbol used for multiple waypoints, move multiple waypoints to a different group or delete multiple waypoints).
- Create a new waypoint in the current waypoint group.
- View and customize waypoint details.

Waypoint details



Selecting a waypoint from the list displays customizable details for that waypoint. The waypoint's location is also displayed in the LiveView pane on the right side of the screen

With the waypoint details displayed you can:

- Edit the waypoint's Name.

Note:
Waypoint names can be any combination of letters, numbers, symbols and special characters and can include up to 16 characters. Waypoint names must be unique.

- Change the waypoint's symbol.
- Assign or change the waypoint group.
- Enter new position coordinates for the waypoint.

- Add or edit the waypoint comment.

Note:
Waypoint comments can be any combination of letters, numbers, symbols and special characters and can include up to 32 characters.

- Delete the waypoint.
- Perform a Go to.
- View the waypoint in the Chart app.

Creating a waypoint group

To create a new waypoint group follow the steps below.

From the homescreen:

1. Select *[Waypoints]*.
2. Select *[New group]*.
3. Enter a name for the group using the onscreen keyboard.
4. Select *[Save]*.

The new waypoint group will become the new default group for all new waypoints.

Deleting a waypoint group

To delete a waypoint group follow the steps below.

From the homescreen:

1. Select *[Waypoints]*.
2. Select *[Delete]*.
3. Select the Group that you want to delete.
4. Select *[Delete selected]*.
5. Select *[Yes]*.

The waypoint group and waypoints that are assigned to that group will be deleted.

Creating a waypoint based on coordinates

You can manually create a waypoint based on the coordinates of the location where you want the waypoint placed.

From the homescreen:

1. Select *[Waypoints]*.
2. Select *[New WPT]*.
3. Enter the relevant details in the available fields.
4. Choose a waypoint symbol.
5. Enter the position coordinates where you want the waypoint placed by selecting on the *[Position:]* field and using the onscreen keypad to enter the latitude and longitude for the location where you want the waypoint placed..

   By default your vessel's coordinates will be displayed.
6. Select *[Save]* to return to the waypoint details.
7. Press the *[Back]* button to return to the Waypoint groups menu.

Finding nearby waypoints

You can find waypoints that are within the LiveView pane by following the steps below.

The waypoint find feature will find and create a list of all waypoints located within the area covered by the LiveView pane.
From the homescreen:

1. Select *[Waypoints]*.
2. To find waypoints that are located within the area covered by the LiveView pane, select *[Find waypoints in this area]*, otherwise:
3. Highlight a waypoint in the waypoint list and select *[Find waypoints in this area]*.

A list of all the found waypoints will be shown in the waypoint list.

Panning the LiveView area

You can change the chart area displayed in the LiveView.

1. Open the *[Waypoints]* menu.

   The waypoints menu can be accessed from the Homescreen ([Homescreen > Waypoints]) and from the Chart app ([Chart app > Menu > Waypoints]).
2. Press the *[Right]* button.

   [Find waypoints in this area] will be highlighted.
3. Press the *[Up]* button.

   Focus will move to the LiveView pane.
4. Press the *[OK]* button.

   The LiveView pane will enter panning mode.
5. Use the *[Directional pad]* to pan the chart area to the desired location.
6. Press the *[Back]* button.
7. Select *[Find waypoints in this area]*.

Showing and hiding waypoint groups

When the waypoint menu is accessed from the Chart app you can hide and show waypoints.

From the Chart app:

1. Press the *[Menu]* button.
2. Select *[Waypoints]*.
3. Select *[Show/hide]*.
   The list of waypoint groups is displayed, all waypoint groups are selected (ticked) by default.
4. Deselect any groups that you do not want to change.
   You can also use the *[Show all]* and *[Hide all]* options if you want to show or hide all of your waypoints.
5. Press the *[Back]* button to return to the waypoints menu.

Note:
The *[Show/hide]* option is not available when accessing the waypoint menu from the homescreen.

Waypoint sharing

An Element™ display will share waypoints with a second Element™ display connected to the same SeaTalkng ® / NMEA 2000 network.

Note:

• More than 2 Element™ displays cannot be connected to the same network.

• Routes and tracks are not shared. If a route is created on display 1 only the route's waypoints will be shared with display 2.

The following waypoint functions will be synchronized between displays:

- Creating individual waypoints
- Deleting waypoints
- Editing waypoint details
- Moving waypoint location
- Creating an empty waypoint group
- Adding individual waypoints to a group

The following waypoint functions will NOT be synchronized between displays:

- Moving a waypoint to a different group
- Multi-move of waypoints
- Multi-edit of waypoint details
- Multi-delete of waypoints
- Deleting a waypoint group

Note:
Performing a waypoint function that does not support synchronization will break the link between the waypoints on each Element™ display. Those waypoints must then be managed individually on each display.

9.2 Routes

Routes are used to plan your journey in advance. You can plan your journey directly on your display, or at home using software capable of exporting waypoints and routes in standard .gpx format.

Routes consist of a number of waypoints. Your display can store up to 50 routes, each route consisting of up to 250 waypoints. When creating routes the route capacity is subject to the display's 5,000 waypoint limit (e.g.: your display could store 20 routes each containing 250 waypoints).

To navigate a saved route, place the cursor over the route and press the *[OK]* button, then select *[Follow route]* from the context menu.

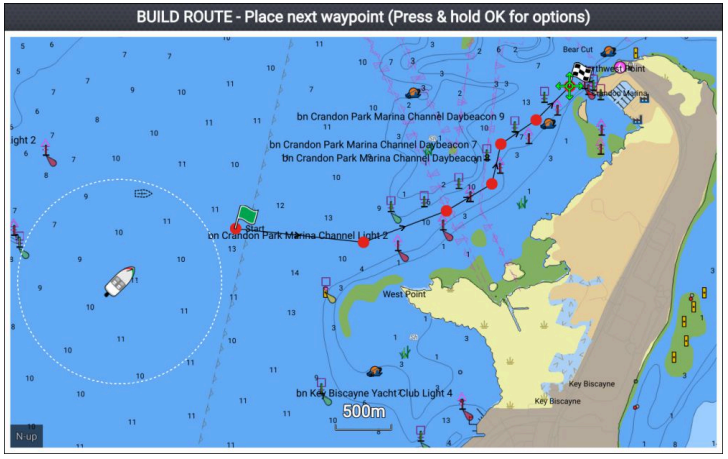
Routes can be imported and exported from the display. For more information, refer to: **p.73 —** User data import and export

Creating a Route

Follow the steps below to build a new route

Routes can be created in the Chart app.

Important:
Before following a route, you must ensure that each waypoint and leg of your route is safe for your vessel to navigate.



1. Select the location for the first waypoint.
2. Select *[Build route]* from the context menu.
3. Select the location for the second waypoint.

   The 2 waypoints will be joined by a line, creating the first leg of your route.
4. Select the location for the subsequent waypoints, required to complete your route.
5. When your route is complete press and hold the *[OK]* button and then select *[Finish build]* from the context menu.

   The finish route build notification is displayed.
6. From the notification you can either:

   - Select *[Follow]* to immediately start following the route, or
   - Select *[Follow in reverse]* to follow the route in reverse waypoint order, or
   - Select *[Route plan]* to view the route plan menu, or
   - Select *[Exit]* to return to the Chart app.

Note:
You can press the *[Back]* button at anytime during route building to remove the last waypoint you placed.

Use Autorouting during route creation

Whilst building a route you can use Autorouting to automatically add a route leg to a route you have already started to create. The Autorouting features require compatible cartography.

1. Press and hold anywhere on screen and select either *[Autoroute to wpt]* or *[Autoroute to here]*.

   Selecting [Autoroute to wpt] will allow you to select a waypoint from your Waypoints list to include in your route, selecting [Autoroute to here] will create a route leg to the cursor's current position.

Once an Autoroute leg has been added you can select *[Finish route build]* or add further manual or autoroute route legs.

Autorouting

Autorouting is available when using compatible cartography. Autorouting allows you to build a route automatically between a point on the chart and your vessel.

Selecting *[Autoroute to here]* from the chart context menu, or selecting *[Autoroute to]* from an existing waypoint's context menu will create a route automatically between your vessel and the chosen point.

The created route is generated by comparing data available on your cartography against the minimum safe distances specified in the *[Boat details]* menu: (*[Homescreen > Settings > Boat details]*).

Waypoints will not be placed in areas that conflict with your specified minimum safe distances. Caution symbols are used for waypoints that are near objects or restricted areas.

Never follow a route before checking each route leg is safe for your vessel.

Caution: Easy Routing — Dredged areas

The C-MAP® Easy Routing feature will ignore some hazards in dredged areas. Easy Routing is intended for passage planning between harbors, rather than within a harbor.

Warning: Traffic separation

Automatic route generation features do not adhere to the Traffic Separation Schemes identified in Rule 10 of the *International Regulations for Preventing Collisions at Sea 1972* as amended.

Raymarine® therefore recommends that you do NOT use Automatic route generation to create any part of a route which will cross traffic lanes or pass near to traffic separation lines. In these situations Automatic route generation MUST be switched Off and the route or route leg MUST be built manually, ensuring compliance to the rules laid out in the above regulations.

Warning: Minimum Safe Depth, Width and Height

Depending on cartography vendor, the *[Minimum safe depth]*, *[Minimum safe width]*, and *[Minimum safe height]* settings that you specify for your vessel will be used during automatic route generation. These settings will ensure that automatic routes are not generated in areas that are unsuitable for your vessel.

Minimum safe settings are user-defined calculations. As these calculations are outside of Raymarine's control, Raymarine will not be held liable for any damage, physical or otherwise, resulting from the use of the automatic route generation feature or the *[Minimum safe depth]*, *[Minimum safe width]* or *[Minimum safe height]* settings.

Autoroute - compatible cartography vendors

The Autoroute feature is compatible with the following cartography vendor features.

- Navionics® Autorouting.
- Navionics® Dock-to-dock
- C-MAP® Easy Routing

Differences between automatic route generation functions

There are important differences between the way different vendors handle automatic route generation.

Depth clearances (Tidal height)

- Navionics® Autorouting and Dock-to-dock avoids shallow areas based on the user defined *[Minimum safe depth]* setting plus an additional Navionics® safety margin. it assumes the lowest tide level, normally Lowest Astronomical Tide (LAT). The tide can be lower than LAT due to atmospheric effects such as high air pressure, wind direction, etc.
- C-MAP® Easy Routing assumes that there will be some tide. The user must apply their own safety margin as appropriate to current conditions. Route legs that cross areas shallower than the user defined *[Minimum safe depth]* setting are marked with hazard

waypoint symbols, it is critical that these legs are checked to ensure that there is sufficient tide to avoid the hazard.

Width & Height clearances

- Navionics® Autorouting and Dock-to-dock does not use the user defined *[Minimum safe width]* or *[Minimum safe height]* settings when generating routes. Objects with width / height constraints are marked with hazard waypoint symbols, it is critical that these legs are checked to ensure that there is sufficient clearance to avoid the hazard.
- C-MAP® Easy Routing uses the user defined *[Minimum safe width]* and *[Minimum safe height]* settings to determine if sufficient clearance is available. The user must apply their own safety margin as appropriate to current conditions. The Height datum must be checked, as it could be Mean High Water Springs (MHWS) or Highest Astronomical Tide (HAT). In both cases the tide can be higher than the datum due to atmospheric effects such as high air pressure, wind direction, etc.

Reviewing an automatically generated route

Before following any route you must ensure that it is safe to do so.

Selecting *[Check route]* from the *[Auto-route created]* notification will open the *[Auto-route review]* menu.

From the *[Auto-route review]* menu:

1. Range in on each route leg and waypoint.
2. Check either side of the route leg and around the waypoint for any possible obstructions.

   Obstructions can be charted objects or restricted areas. Routes generated automatically should show a caution symbol in areas where there are possible obstructions.
3. Where obstructions exist, make adjustments to the route so that the waypoints and route legs are no longer obstructed.

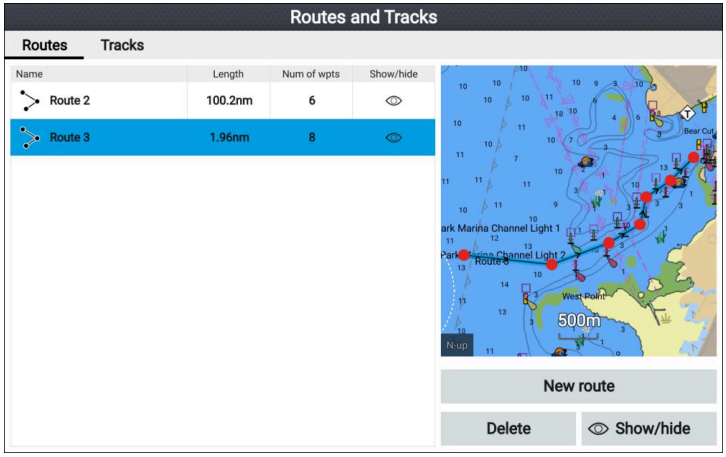
Route management

Routes are managed using the routes and tracks menu.

The *[Routes & Tracks]* menu can be accessed from the Homescreen and from the Chart app: *[Homescreen > Routes & Tracks]*, or *[Chart app > Menu > Routes & Tracks]*.

When the routes and tracks menu is opened the routes menu is displayed by default.

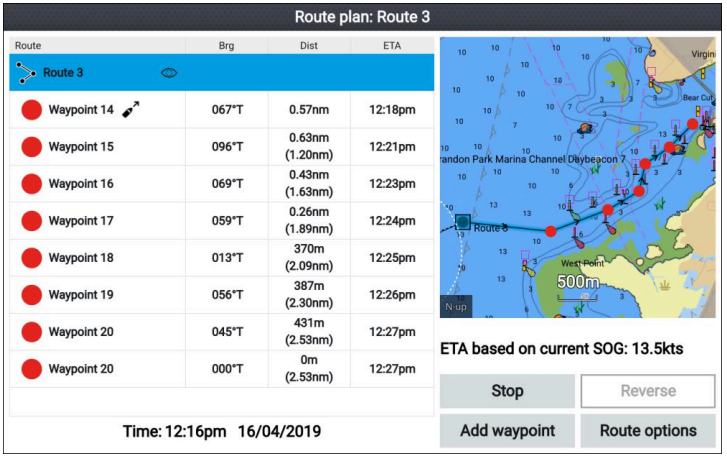
Routes menu



From the route menu you can *[Delete]* routes, create a *[New route]* using existing waypoints or *[Show/hide]* routes.
To view the route plan, select a route and choose *[View route plan]* from the pop-over menu.

Route plan

The route plan displays a list of all waypoints in the route and includes a LiveView pane showing the route's location.



From the route plan you can:

- navigate the route by selecting *[Follow]*
- change the route direction by selecting *[Reverse]*
- add an existing waypoint to the route by selecting *[Add waypoint]*
- change route options, such as route name, route color, route hide or delete the route by selecting the relevant option from the *[Route options]* pop-over menu.

Note:
Route names can be any combination of letters, numbers, symbols and special characters and can include up to 16 characters. Route names must be unique.

By selecting a waypoint from the route plan you can use the pop-over menu to:

- change the position of the waypoint in the route by selecting *[Move up]* or *[Move down]*.
- remove the waypoint from the route by selecting *[Remove from route]*.
- delete the waypoint by selecting *[Delete waypoint]*.
- edit the waypoint details by selecting *[Edit waypoint]*.
- start to follow the route from the selected waypoints by selecting *[Follow from here]*.

9.3 Tracks

Tracks are used to record where you have been. Tracks are made up of track points that are created at regular time or distance intervals.

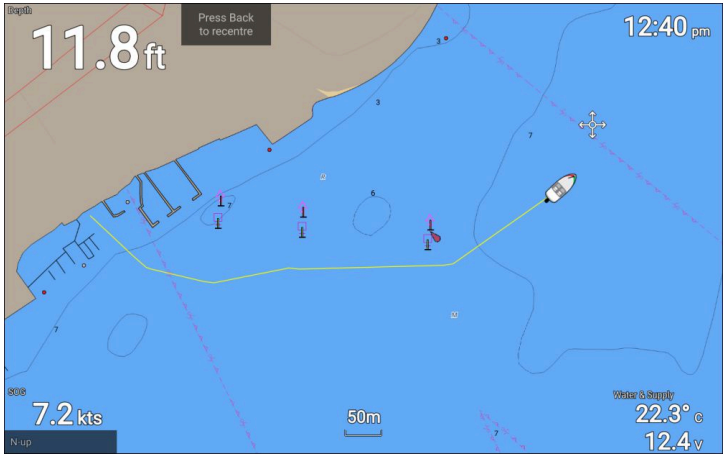
You can store up to 15 tracks on your display, each track can contain up to 10,000 points.

Tracks can be converted into routes so that they can be followed.

Tracks can be imported and exported from the display. For more information, refer to: **p.73 —** User data import and export

Creating a track

You can record your vessel's voyage using Tracks. Once a Track is saved it can be converted to a route so that the same passage may be followed again at a later date.



With the Chart app displayed:

1. If required, press the *[Back]* button to enter motion mode.
2. Press the *[OK]* button.
   The boat details pop-over menu is displayed.
3. Select *[Start track]*.
   Your vessel's voyage will now be recorded.
4. When your voyage is complete, select *[Stop track]* from the boat details pop-over menu.

You can also start a new track recording at anytime from the Routes & Tracks menu: accessible from the homescreen: *[Homescreen > Route & Tracks]* and from the Chart app menu:*[Menu > Routes & Tracks]*.

Converting a track to a route

From the *[Routes & Tracks]* menu, accessible from the homescreen*[Homescreen > Routes & Tracks]* and the Chart app: *[Menu > Routes & Tracks]*.

1. Select the *[Tracks]* tab..
2. Select the track that you want to convert.
3. Select *[Create route from track]* from the pop-over menu.
4. Select *[OK]* to return to the tracks menu, or.
5. Select *[Edit]* to view the route plan.

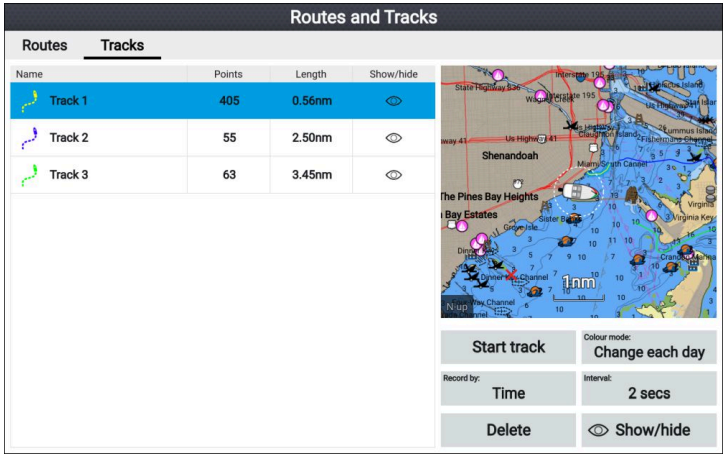
Track management

Tracks are managed using the tracks menu.

The *[Routes & Tracks]* menu can be accessed from the Homescreen and from the Chart app: *[Homescreen > Routes & Tracks]*, or *[Chart app > Menu > Routes & Tracks]*.

When the routes and tracks menu is opened the routes menu is displayed by default. Select the *[Tracks]* tab to display the tracks menu.

Track menu



From the tracks menu you can:

- Start or Stop tracks recording.
- Change track recording settings.
- Delete tracks.
- Show or hide tracks.

By selecting a track from the list you can use the pop-over menu to:

- edit the track name.
- change the line color the track uses.
- Convert the track into a route.
- Delete the track.

Note:
Track names can be any combination of letters, numbers, symbols and special characters and can include up to 16 characters. Track names must be unique.

Track settings

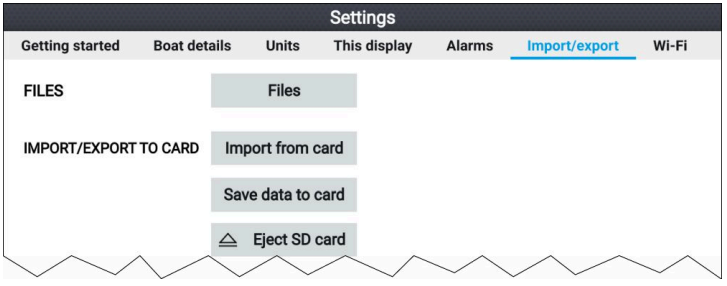
The following track settings are available which change the way tracks are recorded.

Menu item and description	Options	
[Color mode:] Track line color can be set to a specific color, or you be changed automatically every day or after every track.	• *Red* • *Yellow* • *Green* • *Blue* • *Purple* • *Orange* • *Black* • *Change each day (default)* • *Change each track*	
[Record by:] You can change the way that the track points, which make up the track are dropped In Auto the track interval is set automatically to minimize the track points used whilst maintaining the actual path taken	• *Auto* • *Time (default)* • *Distance*	
[Interval:] You can change the interval at which track points are dropped.	Time intervals: • *2 secs (default)* • *5 secs* • *10 secs* • *30 secs* • *1 min* • *3 mins* • *5 mins*	Distance intervals • *120 ft (default)* • *300 ft* • *600 ft* • *0.20 nm* • *0.50 nm* • *1.00 nm*
	• *10 mins* • *30 mins*	

9.4 User data import and export

User data (i.e.: Waypoint, Routes and Tracks) can be imported and exported from your display. User data is saved in the common .gpx file format.

The Import/export menu can be accessed from the homescreen settings menu *[Homescreen > Settings > Import/export]*.



Saving user data

You can backup your user data (waypoints, routes and tracks) to a MicroSD card.

1. Insert a memory card into your display's card reader.
2. Select *[Save data to card]* from the Import/export menu: *[Homescreen > My data > Import/export]*.

   A pop-over menu is displayed.
3. Select the desired option:
   - *[Save all data]* to save (export) all waypoints, routes and tracks.
   - *[Save waypoints]* to save (export) all waypoints.
   - *[Save routes]* to save (export) all routes.
   - *[Save tracks]* to save (export) all tracks.
4. Select *[Save]* to save the user data using the default filename. Alternatively:

i. Use the onscreen keyboard to enter your own filename and then select *[Save]*.

5. Select *[OK]* to return to the Import/export menu, or select *[Eject card]* to safely remove the memory card.

The user data file is saved to the '\Raymarine\My Data\' directory of your memory card in gpx format.

Importing user data

You can import user data (i.e.: GPX format Waypoints, Routes and Tracks) to your display.

1. Insert the MicroSD card that contains your user data files into the memory card reader on your display.
2. Select *[Import from card]* from the Import/export menu: (*[Homescreen > Settings > Import/export > Import from card]*).
3. Navigate to your User data file (.gpx).
4. Select the relevant GPX file.

   Your user data has now been imported.
5. Select *[OK]*.

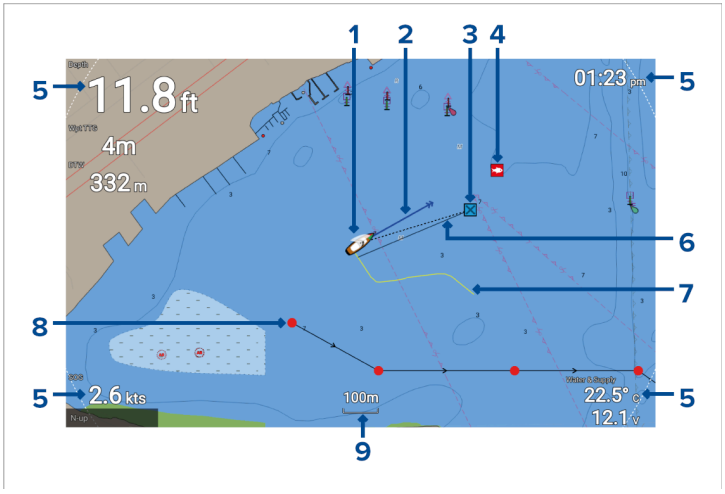
CHAPTER 10: CHART APP

CHAPTER CONTENTS

10.1 Chart app overview

The Chart app displays a representation of your vessel in relation to land masses and other charted objects, which enables you to plan and navigate to your desired destination. The Chart app requires a GNSS (GPS) position fix in order to display your vessel at the correct location on a world map.

For each instance of the Chart app you can select which electronic cartography you want to use. The selection will persist over a power cycle.



1	**Vessel icon** This icon represents your vessel, only displayed when a GNSS (GPS) position fix is available. The icon is replaced with a Black dot if no heading or COG data is available).
2	**COG line** If Course Over Ground (COG) data is available, you can display a COG vector for your vessel.
3	**Destination waypoint** During a go to, this is the current destination waypoint.
4	**Waypoint** Use waypoints to mark specific locations or points of interest.
5	**Databoxes** Databoxes display key information that is available on your system. You can configure which data is shown in each databox or the databoxes can be hidden.
6	**Destination line** During a go to, a dashed line connects your vessel to the destination point.
7	**Track** You can record the passage your vessel takes using Tracks.
8	**Route** You can plan your route in advance by creating a Route using waypoints to mark each route leg.
9	**Chart range** Identifies the scale for the displayed chart range.

Chart app controls

The Chart app has 2 control modes, motion mode and cursor mode. The behavior of some controls are dependent upon control mode.

Motion mode

Motion mode is the default mode when the Chart app is opened. In motion mode the vessel icon remains centered onscreen and the chart area automatically pans as progress is made.
Controls behavior:

- Pressing the *[OK]* button opens the vessel context menu.
- Pressing any button on the *[Directional pad]* will switch to Cursor mode.
- Pressing the *[Waypoint]* button will place a waypoint at your vessel's current location.
- Pressing the *[Plus]* or *[Minus]* buttons will range in and range out respectively, centered around your vessel .

Cursor mode

In cursor mode the chart area remains static and the vessel icon moves in the direction of travel.
Controls behavior:

- Pressing the *[OK]* button opens the context menu for the area or charted object directly under the cursor's position.
- Pressing any button on the *[Directional pad]* moves the cursor in the respective direction, when the cursor reaches the edge of the app window the chart area will pan in that direction.
- Pressing the *[Waypoint]* button will place a waypoint at the cursor's location.
- Pressing the *[Plus]* or *[Minus]* buttons will range in and range out respectively, centered around the cursor position.
- Pressing the *[Back]* button will re-center the vessel icon and switch back to Motion mode.

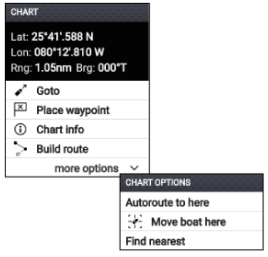
Chart ranging and panning

You can change the range (zoom level) in the Chart app using the *[Plus]* and *[Minus]* buttons.

You can pan the chart area using the *[Directional pad]*.

Chart app context menu

Context menus provide context sensitive information and menu options.



- The Chart app context menu is accessed by selecting a location or a cartographic object in the Chart app.
- The context menu provides Latitude, longitude, range and bearing details for the selected location or object.
- The context menu provides quick access to relevant menu options.
- Select *[more options]* to display further options.

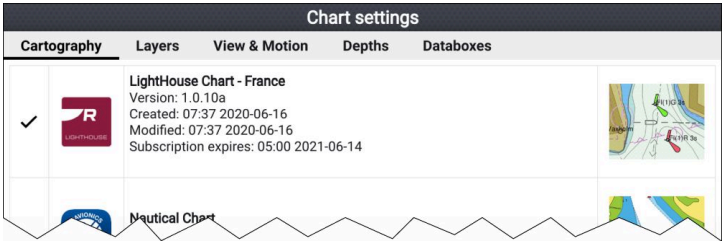
Note:
The *[Move boat here]* option is only available in Demo/simulator mode.

The following options are available from the chart context menu:

- *Goto*
- *Place waypoint*
- *Chart info*
- *Build route*
- *Autoroute to here*
- *Move boat here*
- *Find nearest*

Selecting a chart card

You can use LightHouse™ charts and compatible Navionics and C-MAP electronic charts. The electronic chart cards must be inserted into your display's MicroSD card reader.



From the Chart app:

1. Press the *[Menu]* button.
2. Select the *[Settings]* icon.

   Pressing the Directional pad's [Up] button once the menu opens will move the selection to the bottom of the menu and highlight the settings icon.
3. Select the cartography that you want to use from the Cartography tab.

The menu will close and the Chart app will display your chosen cartography.

Chart modes

The Chart app provides preset modes that can be used to quickly set up the Chart app for your intended use.

To change chart mode select the required mode from the app menu.

[SIMPLE]
Simple mode suppresses chart detail to provide a clearer, simpler view for general orientation. In simple mode only navigation-related menu options are available. Changes made to settings are not saved in simple mode.

[DETAILED]
Detailed mode is the default mode. Full chart details and menu options are available. Changes made to settings are saved.

[FISHING]
Fishing mode optimizes the Chart app for fishing. If supported by your cartography, fishing mode also displays more detailed contour lines. Full menu options are available. Changes made to settings are saved.

RUNNING
Running mode optimizes the Chart app for fast running. In running mode, chart detail is suppressed and full vessel offset is applied. This provides a clearer view ahead, which is ideal for faster running conditions. Full menu options are available. The Chart app can be configured to enter running mode automatically when vessel speed exceeds 10 knots. Changes made to settings are saved.

TIDES
In Tides mode, tide and current station icons are replaced with graphics representing tide and current conditions. Animation controls are displayed that enable playback of Tide and Current predictions over a 24 hour period. Tides mode also suppresses chart detail, to enhance the tide and current graphics. In this mode, set and drift vector graphics are displayed on the Chart around your vessel position.

View and motion

Controls are available which determine how the chart is displayed in relation to your vessel icon.

Chart motion

Chart motion controls how the chart and boat are drawn in relation to each other.
The following options are available:

- *[Relative motion]* — In relative motion the vessel icon remains fixed onscreen and the chart area moves relative to your position. In this mode you can adjust the fixed position of the vessel icon using the *[Boat position]* setting..
- *[True motion]* — In true motion the chart is fixed and your vessel icon moves around the chart. As the vessel icon reaches the edge of the screen, the chart is redrawn to reveal the area in front of your vessel.
- *[Auto range]* — In auto range the largest possible scale is maintained that will display both your vessel and the destination / target waypoint simultaneously.

Chart orientation

The orientation of the chart affects the alignment of the chart relative to either your vessel heading, your course or North.
The following options are available:

- *[North-up]* — In north-up the top of the screen always points towards north. As your vessel's heading changes, the vessel icon rotates accordingly.
- *[Head-up]* — In head-up the top of the screen always points towards your vessel's current heading, and as your heading changes the chart rotates accordingly.
- *[Course-up]* — In course-up the top of the screen always points towards your destination, and as your destination changes the chart rotates accordingly.

Boat position

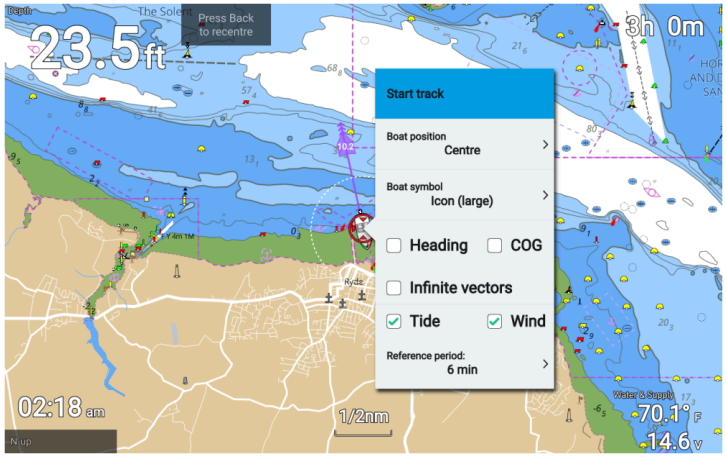
The boat position determines the position of the vessel icon onscreen. Your boat position can only be changed when the *[Chart motion]* setting is set to *[Relative motion]*. You can change the position of the vessel icon to provide a greater distance in front of your vessel.

The following options are available:

- *[Center]* — Center is the default boat position and places the vessel icon in the center of the screen.
- *[Partial offset]* — Partial offset positions the vessel icon half way between the center and the bottom of the screen.
- *[Full offset]* — Full offset positions the vessel icon toward the bottom of the screen providing the greatest view ahead.

Vessel details

The Vessel details pop-over provides access to vessel-related settings.



From the Vessel details pop-over you can:

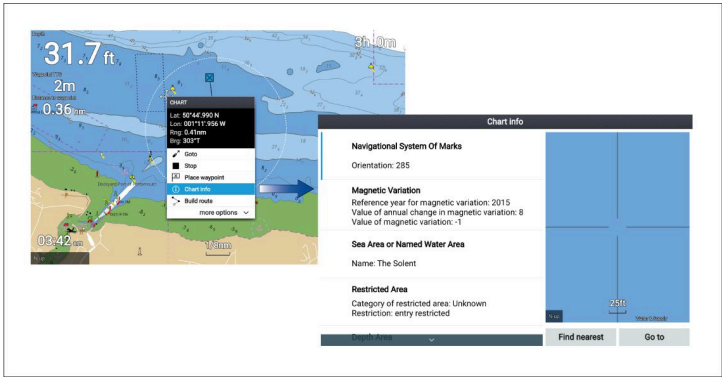
- start/stop a track.
- offset the position of the boat symbol.
- change the symbol used to represent your vessel.
- show / hide Heading vector.
- show / hide COG vector.
- change vectors to display infinite length vectors or reference period length vectors.
- show / hide Tide graphics
- show / hide Wind graphics
- set the length of reference periods for vectors.

Note:
When the Chart mode is set to simple the available options are reduced.

Viewing object information

Charted objects that are available with your cartography can be selected, and object information viewed.

When you select an object, the cursor will change to the Object cursor.



1. Press the *[OK]* button to display the object context menu.
2. Select *[Chart info]*.
   A list of nearby objects is displayed.
3. Scroll through the list to display detailed information for the required object.

10.2 Cartography overview

The Chart app includes a basic world base map. To use the Chart app for navigation purposes, compatible, detailed Electronic Navigational Charts (ENC) or Raster Navigational Charts (RNC) are required.

- **Raster Navigational Chart (RNC)** — A Raster chart is a digital image of a paper chart, and therefore the available information is limited to the information available on the paper equivalent.
- **Electronic Navigational Chart (ENC)** — ENCs are Vector-based charts and include information that is not available on paper or Raster charts. Objects and features on Vector charts can be selected to obtain data-based information that otherwise would not be readily available. Object and features can also be enabled and disabled or customized.

Note:

• The level of detail and features available on charts is dependent on vendor, chart type, subscription level and geographic region. Prior to purchasing charts check the vendor's website to establish what level of detail is available on the charts you want to purchase.

• The information relating to available chart detail and settings in this manual should be treated as guidance only as it is subject to change that is not under Raymarine's control.

The Chart app range scale will also affect the level of detail shown onscreen. Generally, more detail is available at lower ranges. The chart scale in use is indicated by the scale indicator, and the value displayed is the distance that the line represents across the screen.

You can remove and insert chart cards at any time. The chart screen is automatically redrawn when the system detects that a compatible chart card has been inserted or removed.

Different cartography types can be viewed simultaneously using an app page that includes multiple instances of the Chart app.

Supported electronic navigational charts

MFDs running the LightHouse Sport operating system can utilize the electronic navigational charts (ENC) listed below.

- Next generation LightHouse™ charts
- Retired LightHouse™ vector, raster and NC2 charts.
- Navionics charts
- C-Map

Refer to the Raymarine website for the latest list of supported chart cards: www.raymarine.com

To check the current availability of Navionics chart cards and types, please visit www.navionics.com

To check the current availability of C-MAP® chart cards and types, please visit: lightmarine.c-map.com.

Third-party raster charts

Raster navigational charts from the third-party vendors listed below are supported.

Note:
Raster charts are created by scanning paper charts; each segment of the paper chart is turned into a digital image. The detail available on a raster chart is limited to the detail on the paper chart it was created from. Raster charts do not offer the dynamic content that is typically available on vector-based electronic charts.

- **Standard mapping** — USA only. For details, visit: https://www.standardmap.com
- **CMOR Mapping** — USA only. For details, visit: https://www.cmormapping.com
- **Strike Lines Charts** — USA only. For details, visit: https://strikelines.com
- **Imray** — For details, visit: https://www.imray.com

Note:
For assistance with using these charts, please refer to the chart vendor.

Caution: Care of chart and memory cards

To avoid irreparable damage to, and / or loss of data from chart and memory cards:

- 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.
- Ensure that the correct memory card ejection procedure is carried out before removing the chart or memory card from the card reader.

LightHouse charts

LightHouse Charts is the brand name for Raymarine's electronic navigation charts.

Pre-programmed LightHouse Charts cards can be purchased from LightHouse Charts approved dealers.

LightHouse Charts come with a free 1 year subscription to LightHouse Charts Premium. The Premium subscription unlocks data-rich points of interest (POI), high-resolution satellite aerial overlays and regular chart updates and improvements. After the free subscription period ends, the Premium features can be renewed for an annual fee.

To find an approved dealer, activate your Premium subscription, or to download chart updates visit the LightHouse Charts Store: https://chartstore.raymarine.com/lighthouse-charts

LightHouse Charts Gen 2 and improved Chart app performance

Raymarine has introduced improvements to LightHouse Charts and the Chart app's cartography engine.

Smaller charts

LightHouse Charts Gen 2 or later will have reduced file sizes, which will improve download times.

Note:
LightHouse Charts Gen 2 or later require LightHouse 4 v4.8.164 or later, on Axiom-Series and Axiom 2-Series displays. Element-Series displays require LightHouse Sport v3.20.65 or later.

Improved performance

LightHouse 4 v4.8.164 on Axiom-Series / Axiom 2-Series displays and LightHouse Sport v3.20.65 on Element-Series displays includes a new cartography engine, which provides improved performance in the Chart app, reducing the time it takes to render chart details when ranging in and out.

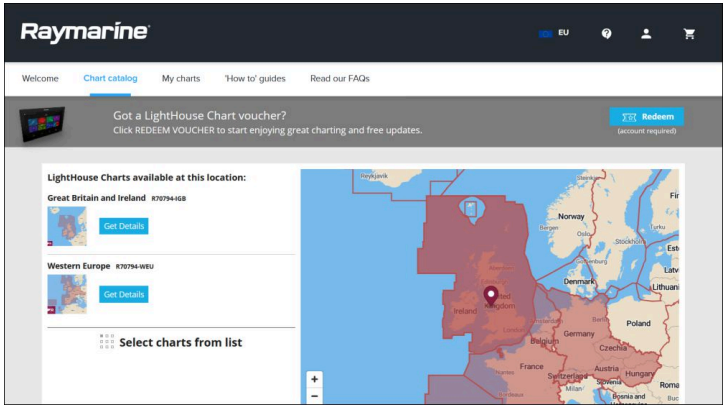
LightHouse Chart store

The LightHouse Charts store can be accessed from a personal computer (PC), or from a mobile device using the Raymarine app.

The Chart Store requires you to create an account and to login before you can activate your premium subscription, or download chart updates.

Important: Download packages containing Charts for larger regions (such as North America, Western Europe, and Australia/NZ) and also those including premium aerial overlays and POI images, create very large files, which can take a long time (possibly several hours) to download via a mobile device and the Raymarine app. When downloading these larger packages, it is recommended that you use the web browser on a laptop, or PC.

The chart store can be accessed using the following link: https://chartstore.raymarine.com/lighthouse-charts



Pre-programmed LightHouse Chart Cards

LightHouse Charts are pre-programmed on MicroSD cards. Insert the card into your chartplotter's card reader to start using.

Note:
New regions are added all the time, check with your local Raymarine dealer for the latest available regions.

Region	Part number
Australia and New Zealand	R70794–AUS
Caribbean & Brazil	R70794–CAR
Denmark	R70794–DEN
Finland	R70794–FIN
France	R70794–FRA
Germany	R70794–GER
Greece	R70794–GRE
Great Britain & Ireland	R70794–IGB
Iceland & Faroe Islands	R70794–ICE
Italy	R70794–ITA
Mediterranean	R70794–MED
Netherlands	R70794–NED
North America	R70794
Northern Europe	R70794–NEU
Norway	R70794–NOR
Portugal	R70794–POR
Red Sea & The Gulf	R70794–RSG
South Africa	R70794–SAF
Spain	R70794–SPA
Sweden	R70794–SWE
Western Europe	R70794–WEU

Hybrid LightHouse charts

LightHouse 4 v4.1.75 (for Axiom-Series and Axiom 2-Series displays) and LightHouse Sport v3.17.37 (for Element-Series displays) includes the new hybrid cartography engine which provides improved performance for supported LightHouse Charts. From September 2022 new and updated LightHouse Charts regions will be available that will include support for the new hybrid chart engine.

Redeeming a voucher code

Pre-programmed LightHouse Charts chart cards are supplied with a voucher code that enables you to activate your premium data subscription.

1. Go to the LightHouse Charts store: https://chartstore.raymarine.com/lighthouse-charts
2. Click *[Redeem]*, or *[Redeem your voucher]*.
3. Create a new account, or login to your existing account.
4. Enter your voucher code and click *[Submit]*.
5. Click *[View charts]* from the voucher accepted page.
6. Select your region.
7. Click *[Done]*.

   Your selected region(s) will now be available in *[MY CHARTS]*.

Downloading charts from My Charts

Once redeemed charts can be downloaded from the MY Charts area of the LightHouse™ charts store.

1. Log in to your account.
2. Go to the *[MY CHARTS]* area.
3. Expand the Download options for the region(s) you want to download.
4. If updates are available click *[Get latest data]*.
5. If you have a valid Premium subscription you can select *[Add now]* for *[Streets & Points of interest]* and *[Aerial photos]* to include these with your download.

   When adding [Streets & Points of Interest] and [Aerial photos] you can create up to 5 area boxes for each feature per purchased region. Follow the onscreen instructions to define each area of coverage.
6. Click *[Download]*.
7. If you have more than 1 region you can group them together by selecting the relevant grouping option.

   Grouping allows you to minimize download file size, by grouping up to 3 regions, from the same continent together.
8. Check the SD card requirements.

Note:
A blank chart card purchased from a Raymarine dealer will already be in the correct format.

9. Click *[CONTINUE]*.
10. Check unique ID file.

Note:
A blank chart card purchased from a Raymarine dealer will already include the unique ID file.

11. Click *[CONTINUE]*.
12. Check 'LightHouse_charts' folder

Note:
A blank chart card purchased from a Raymarine dealer will already include the 'LightHouse_charts' folder.

13. Click *[CONTINUE]*.
14. Click *[Browse to file]* and locate the Lighthouse_id.txt file in the root directory of the chart card.
15. Click *[CONTINUE]*.

    The download package will now be prepared and downloaded to your computer.

Note:

• Depending on files size and connection speed the package preparation and download may take some time, click *[receive email notification]* to get an email when the package is ready to be downloaded.

• If the download does not start automatically once the package has been prepared click *[Download]*.

16. Locate the downloaded file and copy to the Lighthouse_charts folder on your SD card.

Note:
Ensure that the folder contains only 1 cartography file.

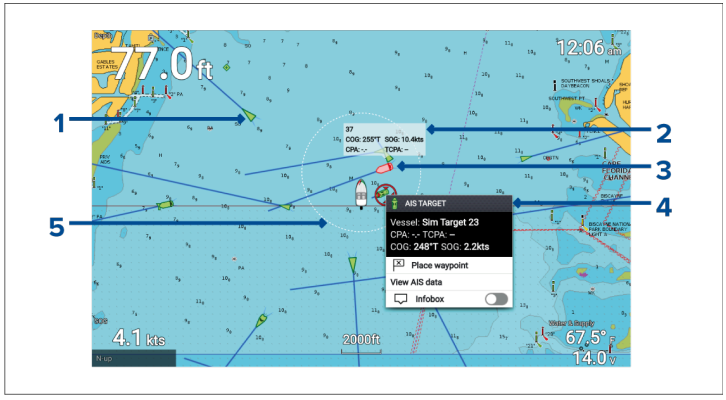
17. The memory card can now be inserted into your MFD.

10.3 Automatic Identification System (AIS) support

With compatible AIS hardware connected to your display, AIS targets can be tracked.

AIS equipped vessels that are transmitting their position, and are within range of your vessel, can be represented in the Chart app using AIS target icons.

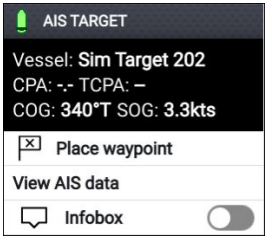
Note:
A maximum of 100 AIS targets can be tracked simultaneously. If there are more than 100 AIS targets within range of your vessel the closest 100 targets will be displayed.



1. **AIS target icon** — Example of an AIS target icon.
2. **AIS Infobox** — Information can be displayed for each target individually.
3. **Dangerous AIS target icon** — Example of an AIS target icon that is dangerous.
4. **AIS context menu** — The AIS context menu is displayed when an AIS target is selected.
5. **Safe distance ring** — A ring can be displayed which represents the dangerous target *[Safe distance]*.

AIS target context menu

The AIS target context menu provides context sensitive data and menu options related to AIS targets.

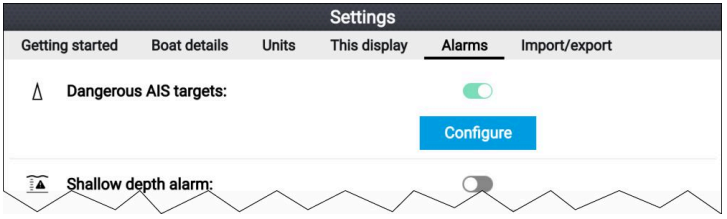


- The AIS target context menu is accessed by highlighting an AIS target onscreen and pressing the *[OK]* button.
- The context menu provides vessel name or MMSI CPA and TCPA, if available, COG and SOG data.
- The following menu options are available:
  - *[Place waypoint]* (places a waypoint at the cursor's location)
  - *[View AIS data]* (displays more detailed AIS data on a fullscreen page)
  - *[Infobox]* (displays the AIS data that is shown in the context AIS target context menu onscreen, next to the AIS target)

AIS dangerous targets

If AIS targets enter a dangerous target state they can trigger an alarm on your display. AIS targets are considered to be dangerous if they will pass within a specified safe distance from your vessel within a specified time interval.

The dangerous target alarm can be enabled and disabled from the alarms menu: *[Homescreen > Settings > Alarms > Dangerous AIS targets]*.



The dangerous target alarm can be configured from the Dangerous target page, accessed from the alarms menu:*[Homescreen > Settings > Alarms > Dangerous AIS targets > Configure]*.

To set up the AIS dangerous target alarm, first adjust the *[Safe distance]* to the desired value and then select a *[Time to reach safe distance]*. The alarm will be triggered if a tracked target will reach the specified Safe distance from your vessel within the time period selected.

You can display a Safe distance ring around your vessel in the Chart app and Radar app by enabling *[Show safe distance]*.

AIS vectors

Vectors can be displayed for AIS targets.

AIS target vectors settings can be accessed from the *[Target Settings]* tab: *[Menu > AIS Targets > Target Settings]*.

The length of the vector indicates the predicted position of the target after the time interval specified in *[Vectors period]* has passed. Adjusting the *[Vectors period]* option will adjust the length of the vector.

AIS vectors can be enabled and disabled using the *[AIS vectors]* toggle switch.

Target vectors can be enabled and disabled for individual targets: Press and hold on an AIS target to display the context menu, and then select *[Vector]*.

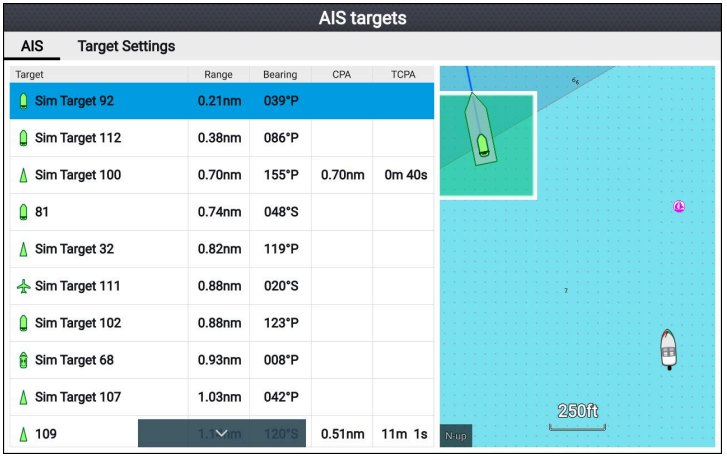
The vectors can be set to *[True]* or *[Relative]*.

	**True vectors** In true mode the vectors are shown ground referenced (i.e.: their actual path over ground).
	**Relative vectors** In relative mode the vectors are shown relative to your vessel's position.

AIS targets list

Tracked AIS targets are listed in the AIS targets list.

The AIS targets list can be accessed from the Chart app menu: *[Menu > AIS Targets]*.



When an AIS target is highlighted the LiveView pane will pan and zoom to show the AIS target.

When an AIS target is selected the AIS target details page is displayed.

AIS Settings

Settings related to AIS can be accessed from the Target Settings menu: *[Menu > AIS Targets > Target Settings]*.

[AIS:]	Enables and disables display of AIS targets in the Chart app. **Note:** When disabled AIS targets and details are still available in the AIS targets list.
[Silent mode (don't transmit my position:]	Your AIS hardware will not transmit any data when in silent mode. In Silent mode AIS data can still be received from other vessels.
[Hide static targets:]	Targets travelling under 2 knots will be hidden, unless the target is dangerous or becomes dangerous.
[AIS vectors:]	Enables and disables display of vectors on AIS targets.
[Vectors period:]	Determines the predicted position of the target (and therefore the length of the vector). **Note:** The Vectors period settings also applies to your vessel's COG vector.
[Reference mode:]	Determines whether vectors are shown in true or relative mode.

AIS target symbols

Different symbols are used to identify type of AIS target and their status.

AIS symbols

	Sailing Vessel		Commercial
	High speed vessel / Wing In Ground vessel		Cargo vessel
	Passenger vessel		Other
	Land based station		ATON
	SAR (Search and Rescue)		Virtual ATON
	SART (Search and Rescue Transponder)		

AIS target symbol status

	Lost (No border, crossed through)		Uncertain (Dashed outline)
	Dangerous and Uncertain (Dashed outline and Flashes Red)		
	Dangerous (Flashes Red)		ATON off position (Red border)

10.4 Navigation

Autopilot command

Element™ displays can send navigation data to a connected Evolution™ autopilot system.

Note:

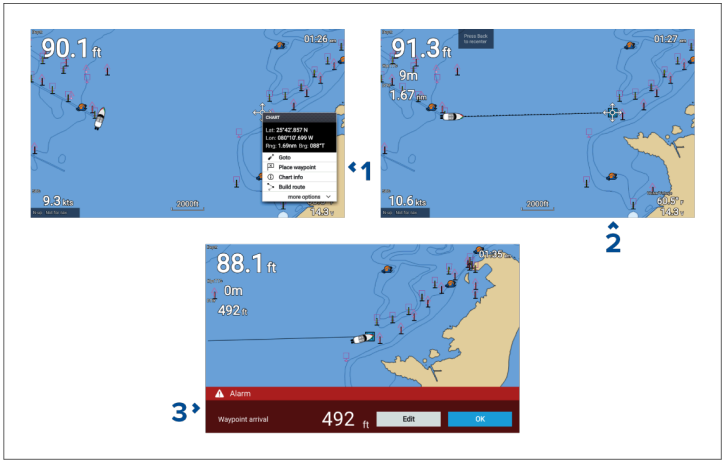
• Your autopilot system must have a compatible dedicated autopilot controller connected. For a list of compatible autopilot controllers, refer to: **p.159 — Compatible autopilot controllers**

• For information on Evolution™ autopilot systems and required system components, refer to the relevant *Evolution Installation instructions* document. This is available to download from the Raymarine website: www.raymarine.com

[Goto], *[Follow]* and *[Stop]* commands initiated on the Element™ display are sent to the autopilot controller for acknowledgement.

Navigating to a waypoint or point of interest

You can perform a “Goto” to a Waypoint or to a specific location.



1. Select the waypoint or point of interest and select *[Goto]* from the context menu.

   You can stop the [Goto] at any time by selecting Stop from the context menu, or by selecting another [Goto].

   The Chart app will begin active navigation.
2. Navigate your vessel to the destination point, using the Chart app as a guide.
3. Select *[OK]* to accept the waypoint arrival alarm, which is triggered when you reach a specified distance from the waypoint.

You can also perform a Goto from the *[Go]* menu: *[Menu > Go]*.

Note:
In a network that contains 2 Element™ displays, with one display performing active navigation (i.e.: performing a *[Goto]* or a *[Follow]*) navigation options will not be available on the networked display.

Adjusting the waypoint arrival alarm

The waypoint arrival alarm is enabled by default. The waypoint arrival alarm creates a virtual circle, of the specified radius, around the destination point. When your vessel reaches the virtual circle the alarm is triggered.

From the homescreen:

1. Select *[Settings]*.
2. Select the *[Alarms]* tab.
3. Select the *[Arrival radius:]* setting field.
4. Adjust the distance to the desired value.
5. Press the *[Back]* button to return to the alarms menu.

Note:
The waypoint arrival alarm can be disabled or enabled using the *[Waypoint arrival:]* toggle switch.

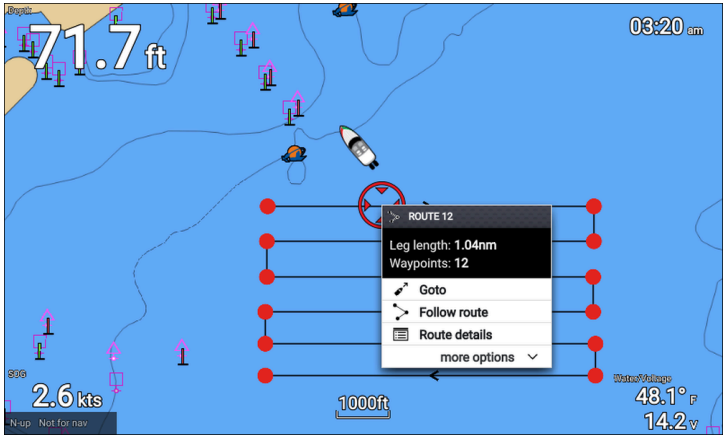
Restarting cross track error (XTE)

A cross track error (XTE) occurs when your actual route diverges from your original planned route. Restarting XTE plots a new course directly from your current position to your destination, rather than continuing to follow the original planned route.

1. Select *[Restart XTE]* from the *[Navigation]* menu: *[Menu > Navigation > Restart XTE]*.

Following a Route

Follow the steps below to navigate a saved route.



From the Chart app, with the route displayed onscreen:

1. Select a route leg.
   The route context menu is displayed.
2. Select *[Follow route]* to follow the route from start to finish.

Alternatively you can select Follow route from the route pop-over menu, accessed from the Routes menu. *[Menu > Routes & Tracks > Routes > <Route name> > Follow]*.
For more information on routes and route management refer to: 9.2 Routes

Following a route from a specified waypoint

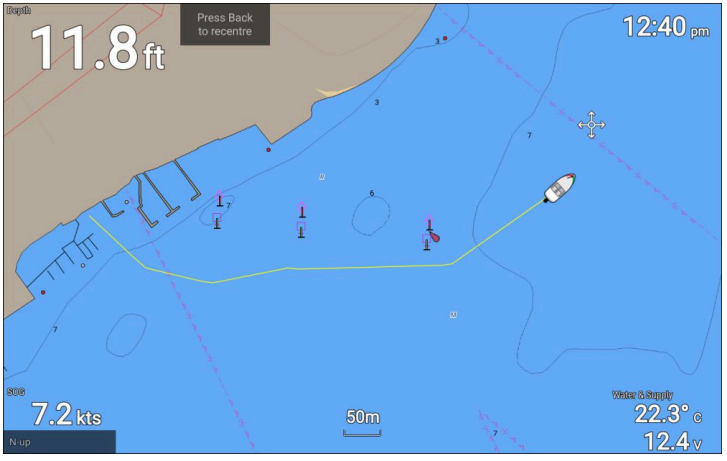
You can start following a route from any waypoint in that route.

From the Chart app, with the route displayed onscreen:

1. Select the waypoint that you want to start following your route from.
   The route context menu is displayed.
2. Select *[more options]*
3. Select *[Follow from here]*.

Creating a track

You can record your vessel's voyage using Tracks. Once a Track is saved it can be converted to a route so that the same passage may be followed again at a later date.



With the Chart app displayed:

1. If required, press the *[Back]* button to enter motion mode.
2. Press the *[OK]* button.
   The boat details pop-over menu is displayed.

3. Select *[Start track]*.

   Your vessel's voyage will now be recorded.
4. When your voyage is complete, select *[Stop track]* from the boat details pop-over menu.

You can also start a new track recording at anytime from the Routes & Tracks menu: accessible from the homescreen: *[Homescreen > Route & Tracks]* and from the Chart app menu:*[Menu > Routes & Tracks]*.

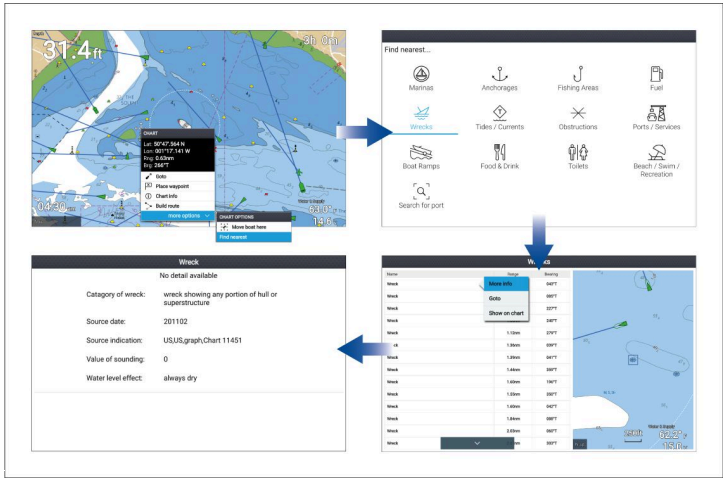
10.5 Find nearest

The Find nearest feature allows you to select a location and search for nearby objects or points of interest.

Note:

• The level of detail available on charts is dependent on vendor, chart type, subscription level and geographic region. Prior to purchasing charts check the vendor's website to establish what level of detail is available on the charts you want to purchase.

• The information relating to available chart detail and settings in this manual should be treated as guidance only as it is subject to change that is not under Raymarine's control.



Selecting a location and pressing the *[OK]* button will open the Chart context menu, selecting *[more options]* and then *[Find nearest]* will display the Find nearest options page where you can select the type of place or object you want to search for.

Selecting an option will display a list of all nearby objects for that type. The list is sorted by an object's proximity to the selected location. However, the Range and Bearing displayed is relative to your vessel's position.

Find nearest options

Note:
Legacy LightHouse Charts refers to retired LightHouse vector, raster and NC2 Charts.

The options available on the find nearest page depend on the cartography type you are using:

- *[Marinas]* (LightHouse Charts, Navionics and C-Map)
- *[Anchorages]* (LightHouse Charts)
- *[Fishing Areas]* (LightHouse Charts)
- *[Fuel]* (LightHouse Charts)
- *[Wrecks]* (LightHouse Charts, Legacy LightHouse Charts, Navionics and C-Map)
- *[Tides]* (LightHouse Charts, Legacy LightHouse Charts, Navionics and C-Map)
- *[Currents]* (LightHouse Charts, Legacy LightHouse Charts, Navionics and C-Map)
- *[Lakes]* (Navionics and C-Map)
- *[Obstructions]* (LightHouse Charts, Legacy LightHouse Charts, Navionics and C-Map)
- *[Ports/Services]* (LightHouse Charts, Navionics and C-Map)
- *[Boat Ramps]* (LightHouse Charts)
- *[Food & Drink]* (LightHouse Charts)
- *[Toilets]* (LightHouse Charts)
- *[Beach/Swim/Recreation]* (LightHouse Charts)
- *[Search for port]* (LightHouse Charts, Legacy LightHouse Charts, Navionics, C-Map)
- *[Small Craft Facility]* (Legacy LightHouse Charts)

- *[Harbor Facility]* (Legacy LightHouse Charts)
- *[Businesses]* (Navionics)
- *[Point of interest]* (C-Map)
- *[Outdoor Recreational Areas (ORA)]* (C-Map)
- *[ORA Services]* (C-Map)

List options

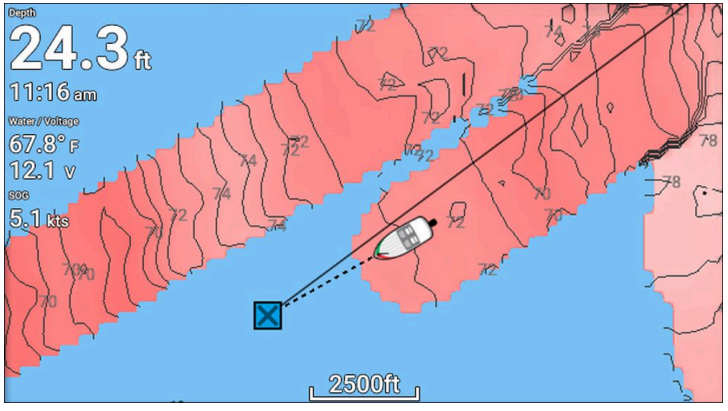
From the list of found objects or places the following pop-over options are available for each item in the list:

- View more information about the object by selecting *[More info]*.
- Navigate to the selected object by selecting *[Goto]*.
- Display the selected object in the Chart app by selecting *[Show on chart]*.

When an item from the list is selected the *[LiveView]* on the right of the screen will highlight and zoom to the selected object.

10.6 RealBathy™

You can create precise personal bathymetric charts in real time using Raymarine's RealBathy™ feature.



Note:
RealBathy™ requires compatible LightHouse™ NC2 charts and a MicroSD card with sufficient free space to record depth and bathymetry data.

When using RealBathy™, new contour lines are drawn in real time on the screen based on your transducer's depth readings. Color shading is used to reflect depth, with darkest shade signifying the shallowest area. The sonar data is recorded to the inserted memory card.

Setting up and creating RealBathy contours

To enable creation of RealBathy™bathymetric contours in real time follow the steps below:

Important:

- You will need to know the distance above the bottom face of your transducer to the waterline.
- For tidal environments LightHouse™ NC2 cartography is required that includes tide station information for your location.

From the Chart app.

1. Insert your LightHouse™ NC2 chart card into the display's card reader.
2. Select your LightHouse™ chart card as your cartography for the Chart app.

   For details on choosing your cartography refer to: Selecting a chart card
3. Enter the distance above the bottom face of your transducer to the waterline in the *[Waterline to tdcr:]* setting field.
4. Enable the *[RealBathy;]* toggle switch, located in the *[Depths]* menu: *[Menu > Depths]*
5. Select the relevant *[Height correction]* option:
   - *[None]* — No corrections are made.
   - *[Tidal]* — Uses nearby tide station data to correct height. When *[Tidal]* is selected a tidal station search is performed and a list of available stations is displayed. Select the closest tide station to your location.

- *[Lake level]* — User specified value using the water level marker for your location.

Note:
To ensure accurate contour depths it is recommended that:

• in tidal environments (e.g.: seas and oceans) you use LightHouse™ NC2 cartography that includes tide station information and select the tide station closest to your location, or

• in fresh water environments (e.g.: lakes) select *[Lake level]* in the *[Height correction:]* field and then enter the current reading from the water level marker for your location into the field located under the height correction option.

6. Adjust the *[Visibility:]* setting to the desired transparency.

   100% provides full visibility of the RealBathy contours, as the percentage decreases the chart detail behind the RealBathy contours becomes more visible.

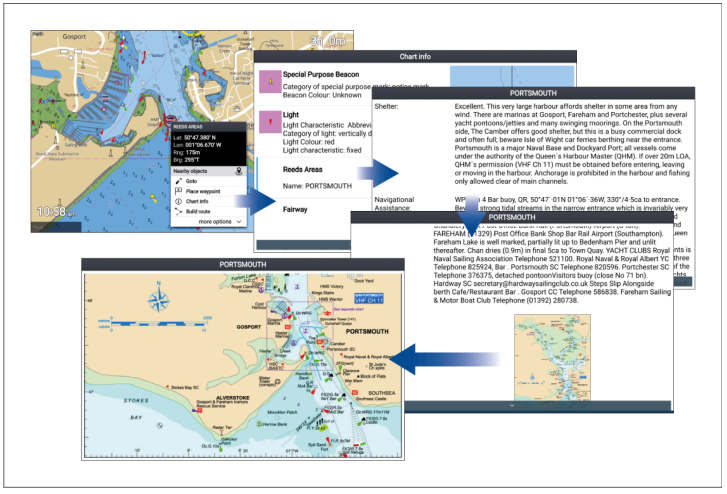
7. Select the required *[Density:]* setting.

   Steep drop-offs can result in overlapping contour lines, lowering the density in these situations provides a clearer view.

10.7 Reeds almanac

The Reeds almanac is available for supported regions of Raymarine LightHouse charts.

The Reeds symbol signifies the availability of Reeds almanac data for a specific area, and this symbol is displayed in the Chart app when the *[Streets & POI]* layer is enabled: *[Chart app > Menu > Settings > Layers > Street & POI]*.



Selecting a Reeds symbol will display the context menu. Selecting *[Chart info]* and then selecting the *[Reeds Areas]* displays the full details and any related images. Selecting images will open the image fullscreen.

10.8 Tides mode

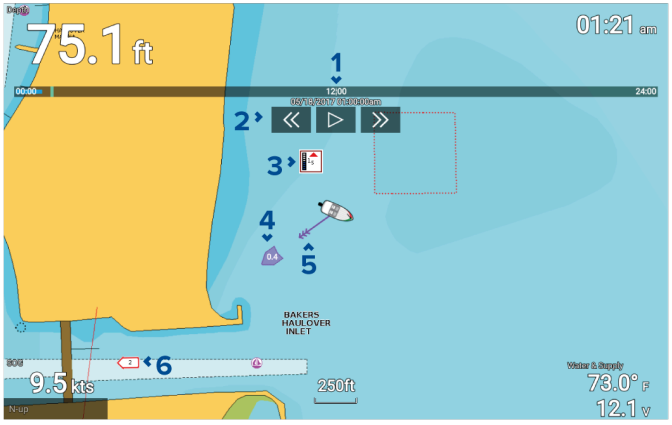
Tides mode suppresses chart detail to enhance tide and / or current information and provides set and drift vectors for your vessel. Tide mode also displays an animation progress bar. Depending on the cartography in use, tide and / or current station symbols may be replaced with dynamic graphics. Dynamic graphics can be animated using the *[Animate tides]* option which enables playback of tide and / or current predictions for a 24 hour period.

Note:

• Set and drift vectors require a paddle wheel transducer.

• Animations are only available on supported cartography. Refer to your cartography provider for more information.

• Tides mode requires accurate date information, taken from your GNSS / GPS position data. Alternatively, you can input a specific date manually.



1. Animation progress bar — The bar fills with Blue as the animation progresses for the current 24 hour period, or Green when playing animations from a different period.
2. Playback controls — Provides controls to play and stop animation playback or skip forwards or backwards through the animation.
3. Dynamic tide graphic — Available when using Navionics cartography.
4. Drift value — Provides drift value in specified speed units.
5. Set vector — Vector arrow identifies tide direction
6. Dynamic current graphic — Available when using Navionics cartography.

Note:
The data provided in the tide and current graphs and graphics is for information purposes only and must NOT be relied upon as a substitute for prudent navigation. Only official government charts and notices to mariners contain all the information needed for safe navigation.

Using animation controls

The animation controls can be selected using the *[Directional pad]* and *[OK]* button.

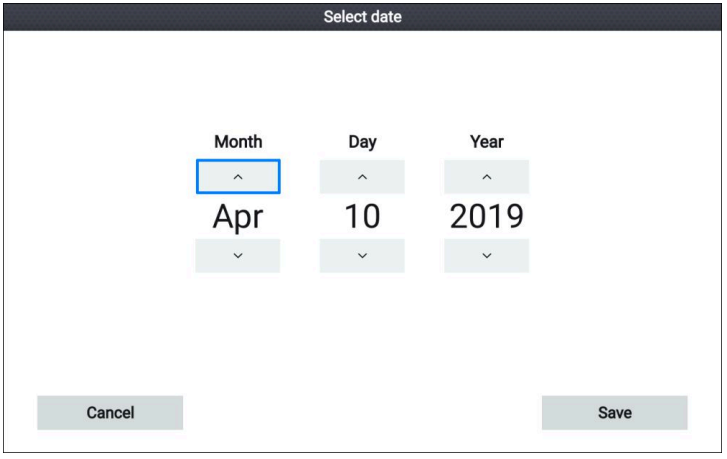
With cartography containing tide data selected in the Chart app:

1. Select the *[TIDES]* mode icon from the menu.
2. Select *[Animate tides]* from the menu.
3. Use the *[OK]* button to start and stop playback.
4. Use the *[Left]* button to skip backwards through the animation.
5. Use the *[Right]* button to skip forwards through the animation.

Note:
Pressing and releasing the *[Left]* or *[Right]* buttons will skip the animation in 15 minute intervals. Pressing and holding the *[Left]* or *[Right]* buttons will skip the animation continuously, until the button is released.

Selecting a date for tide animations

You can select a specific date for tide and current animations.



1. Select *[Select date]* from the menu.
2. Use the *[Left]* and *[Right]* buttons to select the month, day or year.
3. Use the *[Up]* and *[Down]* buttons to highlight the *[Up]* or *[Down]* arrows
4. Use the *[OK]* button to change the highlighted value.
5. Select *[Save]*.

Tide station information

Depending on your cartography, Tide station information may be available.

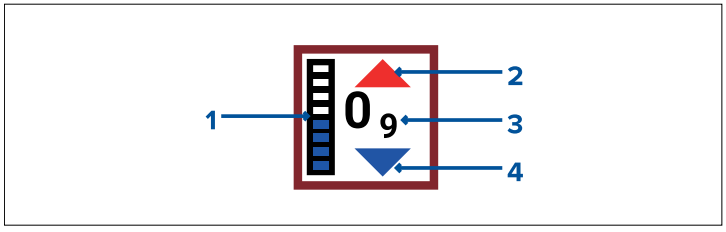
Tide station symbol

The location of Tide stations is marked on the chart using a diamond-shaped symbol with a ‘T’ in the middle.

- The symbol is colored Red when using Navionics cartography.
- The symbol is colored Black when using LightHouse Charts or C-Map cartography.

Dynamic tide graphic

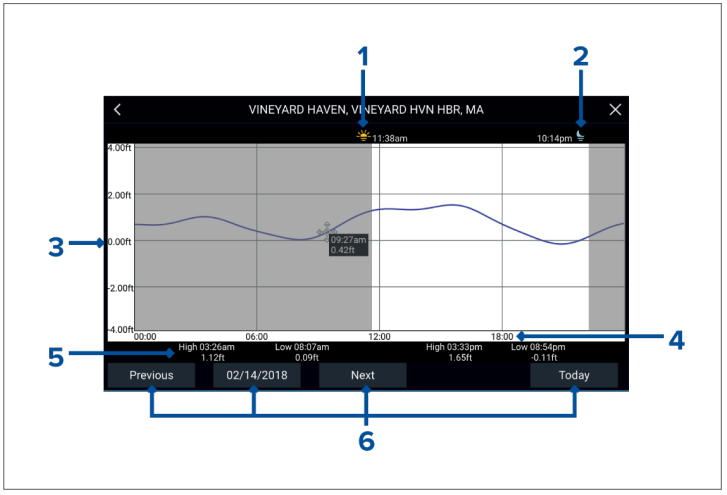
Using Navionics cartography, when the Tides is enabled (*[Menu > Settings > Set-up > Tides]*) the tide symbol is replaced with a dynamic tide height graphic:



1. Tide bar — The tide bar plots the current tide height against the maximum predicted tide height for that day.
2. Red arrow indicates tide height is increasing.
3. Tide height — Tide height is displayed in user-selected depth units, with decimals displayed in subscript. Decimals are not shown for values of 10 or greater.
4. Blue arrow indicates tide height is decreasing.

Tide graph

Tide graphs are available with compatible cartography by selecting *[more options]* and then *[Tide station]* from the tide station’s context menu.



1. **Sunrise** — Indicates time of sunrise.
2. **Sunset** — Indicates time of sunset.
3. **Height** — Provides tide height in selected units.
4. **Time** — Indicates time of day.
5. **Low / High tide** — Indicates the time of low and high tides.
6. **Time and date options** — Use the buttons to view previous, next or today’s tide predictions, or enter a date by selecting the date field.

Current station information

Depending on your cartography, Current station information may be available.

Current station symbol

Current station locations are marked on the chart using a diamond-shaped symbol with a ‘C’ in the middle.

- The symbol is colored Blue when using applicable Navionics cartography.
- The symbol is colored Black when using applicable C-Map cartography.

Dynamic current graphic

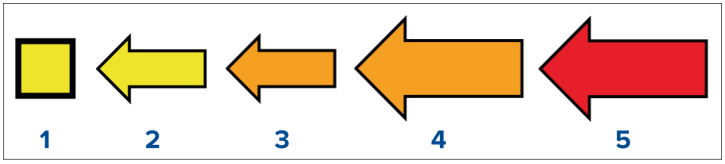
Using Navionics cartography, when the Tides option is enabled (*[Menu > Settings > Set-up > Tides]*), the current station symbol is replaced with a dynamic current graphic:

The dynamic current graphic is an arrow pointing in the direction of current flow. Arrow length indicates the speed of the current; the longer the arrow, the faster the speed.
The arrow's border indicates current status:

- Red = increasing current speed.
- Blue = decreasing current speed.

Current speed is shown inside the arrow. Current speed is displayed in user-selected speed units, with decimals displayed in subscript. Decimals are not shown for values of 10 or greater.
If tidal conditions are "slack", the word "SLACK" appears in a box with a Blue border.

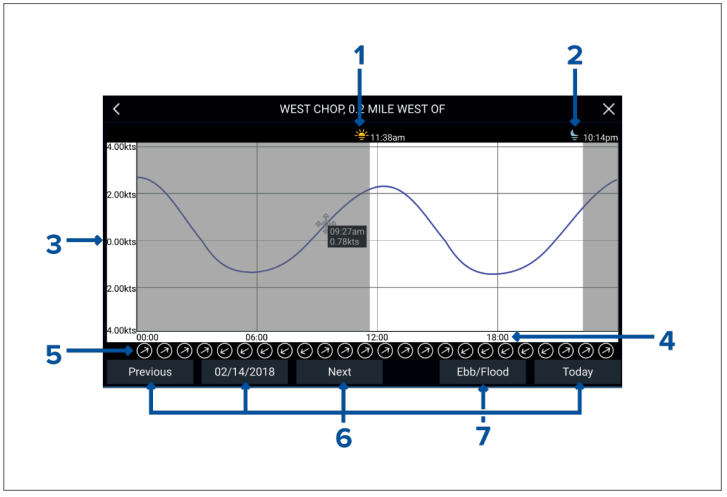
When using C-Map cartography, arrows are used to indicate the direction of current flow. The size and color of the arrow indicates the strength of the current:



	Color	Speed
1	Yellow	0 to 0.1 Knots
2	Yellow	0.2 to 1.0 Knots
3	Orange	1.1 to 2.0 Knots
4	Orange	2.1 to 3.0 Knots
5	Red	>3.0 Knots

Current graph

Current graphs are available by selecting *[more options]* and then *[Current station]* from the current station's context menu.



1. **Sunrise** — Indicates time of sunrise.
2. **Sunset** — Indicates time of sunset.
3. **Speed** — Provides current speed in selected units.
4. **Time** — Indicates time of day.
5. **Direction** — Indicates the direction of the current (relative to North).
6. **Time and date options** — Use the buttons to view previous, next or today's tide predictions, or enter a date by selecting the date field.
7. **Ebb / Flood** — Displays a list showing ebb, slack and flood tides.

Displaying tide or current graphs

1. Select a tide or current station symbol or dynamic graphic.
2. Select *[more options]* from the context menu.
3. Select *[Tide station]* or *[Current station]*

Note:
You can also access tide and current graphs by selecting *[More info]* from the pop-over options when performing a *[Find nearest]* search for tides.

10.9 Chart settings

The table below lists settings applicable to the Chart app and their location within the app's *[Settings]* menu. Available settings are dependent on the cartography in use. If a setting is not displayed then the feature is not compatible with your cartography. If a feature is grayed out then it requires a subscription to activate the feature.

Cartography tab

Description	Options
Allows you to select the cartography that you want to use in the current Chart app.	• *LightHouse Charts* • *Navionics* • *C-MAP*

Layers tab

Menu item and description	Options
[Chart detail:] Allows you to select the level of detail displayed onscreen for vector based cartography. This setting is available when using LightHouse™, Legacy LightHouse™, C-MAP® and Navionics® charts.	• *Low* • *Medium* • *High*
[Navigation mark symbols] Determines whether International or US navigation mark symbols are used This setting is available when using Navionics® charts.	• *US* • *International*
[Chart Object Size] Adjust the display size of chart objects. This setting is available when using LightHouse™ charts.	Slider bar control.
[Day color palette] When enabled *[Bright sun]* switches to a darker color palette in the Chart app which is more easily readable in bright sunlight. This setting is available when using LightHouse™ charts.	Bright sun: • *On* • *Off*
[Chart style] Switch between chart presentation styles. This setting is available when using LightHouse™ charts.	• *Leisure* • *Government*
[Auto enter RUNNING mode:] When enabled the Chart app will automatically switch to running mode when vessel speed exceeds 10 knots, the Chart app will automatically switch to the previously used mode when vessel speed drops below 10 knots. This setting is always available and not dependent on the cartography in use.	• *On* • *Off*
[AIS] Enables and disables the display of AIS targets in the Chart app. **Note:** AIS hardware is required. This setting is always available and not dependent on the cartography in use.	• *On* • *Off*
[Radar] Enables and disables the display of a Radar overlay in the Chart app. **Note:** Radar hardware is required. This setting is always available and not dependent on the cartography in use.	• *On* • *Off*
[Use Radar without heading data] Enables use of the Radar overlay in the Chart app when heading data is not available. This setting is always available and not dependent on the cartography in use.	• *On* • *Off*

Menu item and description	Options
[Aerial overlay] Enables and disables display of a photographic aerial overlay. This setting is available when using C-MAP® or Navionics® charts.	• *On* • *Off*
[Coverage:] Determines where the aerial overlay will be used. This setting is available when using Navionics® charts.	• *Land only* • *Land and sea* • *Land and shallow*
[Aerial overlay opacity] Allows opacity percentage of the aerial overlay to be set. This setting is always available and not dependent on the cartography in use.	*0%* to *100%*
[Range rings] Enables and disables the display of Radar style range rings in the Chart app. This setting is always available and not dependent on the cartography in use.	• *On* • *Off*
[Roads] Enables and disables the display of enhanced street details in the Chart app. This setting is available when using LightHouse™ charts. with a valid premium subscription.	• *On* • *Off*
[POI] Enables and disables the display point of interest in the Chart app. This setting is available when using LightHouse™ charts. with a valid premium subscription.	• *On* • *Off*
[Tides] Enables and disables display of Tide and Current graphics at tide and current stations. This setting is available when using Navionics® charts.	• *On* • *Off*

Menu item and description	Options
[Waypoint names] Enables and disables the display of waypoint name next to waypoint symbols. This setting is always available and not dependent on the cartography in use.	• *On* • *Off*
[Fishing AOI] Enables and disable the display of Fishing areas of interest. This setting is available when using LightHouse™ orC-MAP® charts.	• *On* • *Off*
[Community edits] Enables and disables display of crowd sourced data. This setting is available when using Navionics® charts.	• *On* • *Off*
[Chart boundaries] Enables and disables the display of chart boundary lines. This setting is always available and not dependent on the cartography in use.	• *On* • *Off*
[High res bathy] Enables and disables display of High Resolution Bathymetry charts which provides improved bottom detail, contours and structure. This setting is available when using C-MAP® charts.	• On • Off
[Sports fishing] Allows you to display easy-to-use information pages about fishing locations including fish type, size, depth and reef and bottom composition. This setting is available when using C-MAP® charts.	• On • Off

View & Motion tab

Menu item and description	Options
[Chart motion:] Chart motion controls how the chart and boat are drawn in relation to each other. This setting is always available and not dependent on the cartography in use.	• *Relative motion* • *True motion* • *Auto range*
[Chart orientation:] The orientation of the chart affects the alignment of the chart relative to either your vessel heading, your course or North. This setting is always available and not dependent on the cartography in use.	• *North-up* • *Head-up* • *Course-up*
[Boat position] Adjust the boat position to allow more or less 'look ahead' space in front of your boat. This setting is always available and not dependent on the cartography in use.	• *Center* • *Partial offset* • *Full offset*
[Boat type:] The icon used to represent your vessel can be customized to better reflect your vessel. This setting is always available and not dependent on the cartography in use.	• *Inboard Speed Boat* • *Outboard Speed Boat* • *Power Cruiser* • *Pro Fishing Boat* • *RIB* • Sail Cruiser • Race Sail • Catamaran • *Kayak* • *Pontoon*
[Icon type:] The type of icon used to represent your vessel can be customized.	• *Icon (large)* • *Icon (small)*
This setting is always available and not dependent on the cartography in use.	• *Outline* • *Teardrop*

Depths tab

Menu item and description	Options
[Show soundings] Enables and disables the display of depth soundings on the chart. When set to *[Manual]*, depth soundings will be shown from *[Zero to]* the maximum depth you specify. This setting is always available and not dependent on the cartography in use.	• *None* • *Manual* • *All*
[Show contours] Enables and disables the display of depth contours on the chart. When set to *[Manual]*, contours will be shown from *[Zero to]* the maximum depth you specify. This setting is available when using LightHouse™, C-MAP® and Navionics® charts.	• *None* • *Manual* • *All*
[Shallow area] Enables and disables identification of areas deemed to be shallow. When enabled, a red hatched area is displayed in areas shallower than the depth specified in the *[Zero to]* field. This setting is available when using Navionics® charts.	• *On* • *Off*
[Shallow contour] Determines the depth at which the Shallow contour is displayed. The Shallow contour cannot be set to a value greater than the Safe contour or Deep contour value. This setting is available when using LightHouse™ and legacy LightHouse™ charts.	Numeric depth value
[Safe contour] Determines the depth at which the Safe contour is displayed.	Numeric depth value

Menu item and description	Options
The Safe contour cannot be set to a value that is less than the Shallow contour or greater than the Deep contour. This setting is available when using LightHouse™ and legacy LightHouse™ charts.	
[Deep contour:] Determines the depth at which the deep contour. This setting is always available and not dependent on the cartography in use.	Numeric depth value
[Deep water color] Allows you to specify the color used to identify deep water This setting is available when using C-MAP® and Navionics®charts.	• *Blue* • *White*
[Depth gradient] Allows you to specify the gradient shade between shallow water and deep water. This setting is available when using LightHouse™and legacy LightHouse™ charts.	• *Dark to light* • *Light to dark*
[Record depth data] Enables depth and position data to be recorded to memory card This setting is available when using LightHouse™ and legacy LightHouse™ vector charts.	• *On* • *Off*
[SD card:] When a suitable MicroSD card has been inserted the free space available for recording depth data and RealBathy is displayed. This setting is available when using LightHouse™ and legacy LightHouse™ vector charts.	N/A
[Waterline to tdcr:] Enter the distance between the waterline and your depth transducer. This setting is available when using LightHouse™ and legacy LightHouse™ vector charts.	0 ft to 9.9 ft

Menu item and description	Options
[RealBathy:] Displays previously recorded RealBathy™ data saved on memory card on the chart. This setting is available when using LightHouse™ and legacy LightHouse™ vector charts.	• *On* • *Off*
[Visibility] Determines the transparency of the RealBathy data displayed onscreen. This setting is available when using LightHouse™ and legacy LightHouse™ vector charts.	• *0% to 100%*
[Height correction:] Determines the level of height correction applied to RealBathy and depth data. This setting is available when using LightHouse™ and legacy LightHouse™ vector charts.	• *None* • *Tidal* • *Lake level*
[Density] Selects the density of available depth contours. This setting is available when using LightHouse™ and legacy LightHouse™ vector charts.	• *Low* • *Medium* • *High* • *Very high*
[Fishing Zone:] You can set up a Fishing zone by enabling *[Fishing zone]* and specifying a minimum depth and maximum depth. Areas on the chart that are between these depths will be colored White, areas outside of these depths will be colored Blue. This setting is available when using Navionics® cartography.	• On • Off
[Sonar logging] Allows logging of depth and position data to your Navionics chart card. This setting is available when using Navionics® charts.	• *On* • *Off*

Menu item and description	Options
[SonarChart Live] Enables and disables Navionics SonarChart Live feature which enables real time creation and display of high resolution bathymetry charts. This setting is available when using Navionics® charts.	• *On* • *Off*
[Tide correction] Enables Sonar logging depth measurements to be offset by tide height data from nearby tide stations. This setting is available when using Navionics® cartography.	• *On* • *Off*
[Density] Selects the density of available depth contours. This setting is available when using Navionics® charts.	• *Low* • *Medium* • *High* • *Very high*
[2D shading] Enables and disables 2D shading. This setting is available when using Navionics® charts.	• *On* • *Off*
[Density] Determines the density of available depth contours. This setting is available when using Navionics®charts.	• *Very high* • *High* • *Medium* • *Low*

Databoxes tab

- *[1:]* — Determines the data item displayed in databox 1.
- *[2:]* — Determines the data item displayed in databox 2.
- *[3:]* — Determines the data item displayed in databox 3.
- *[4:]* — Determines the data item displayed in databox 4.
- *[Reset all]* — Selecting will reset all databoxes to factory defaults.

10.10 SonarChart™ Live

You can create personal bathymetry charts using your depth transducer and the SonarChart™ Live feature, available with compatible Navionics® electronic cartography cards.

Note: Before using SonarChart™ Live ensure you have correctly configured your transducer depth settings.

When using SonarChart™ Live, new contour lines are drawn in real time on the screen based on your transducer's depth readings. Color shading is used to reflect depth, with dark red signifying the shallowest area. The sonar data is recorded to your cartography card and is shared with Navionics when you update your chart card online.

Tide correction

SonarChart™ Live records the actual readings from your depth transducer under current tide / water level conditions. You can enable automatic adjustment of depth readings based on normalized low tide / low water level depth data taken from a nearby Tide station.

Enabling SonarChart Live

SonarChart™ Live enables creation of real time bathymetry contours.

With your transducer depth settings correctly configured and compatible cartography selected:

1. Select the *[Depths]* tab from the chart app settings menu: *[Chart app > Menu > Settings > Depth]*.
2. Enable the *[Sonar logging]* toggle switch.
3. Select the *[SonarChart Live]* field and select *[On]* from the pop-over options.

   The SonarChart™ Live options are:

   - *[Off]* — SonarChart™ Live contours are not displayed onscreen and are not being created.
   - *[On]* — SonarChart™ Live contours are being recorded and displayed in realtime.
   - *[History]* — SonarChart™ Live contours are not being recorded but historical recordings are displayed onscreen.
4. Select the *[Visibility]* setting field, and adjust to your preferred value.

5. Enable *[Tide correction]*.

   When enabled tide correction will automatically adjust depth readings based on normalized low tide / low water level data taken from a nearby Tide station.

6. Select a *[Density]* level.

CHAPTER 11: FISHFINDER APP

CHAPTER CONTENTS

11.1 Fishfinder channel overview

The Fishfinder app available on Element™ displays is segregated into “Channels”, each of which utilizes a different type of sonar technology. The range of Fishfinder channels available is dependent on the type of connected transducer.

For more information on the Fishfinder channel types available for each Element™ variant, and the type of transducer required for each, please refer to:

- Element™ **S** displays — **p.110 —** Fishfinder channels — **Element™** S displays
- Element™ **HV** displays — **p.108 —** Fishfinder channels — **Element™** HV displays

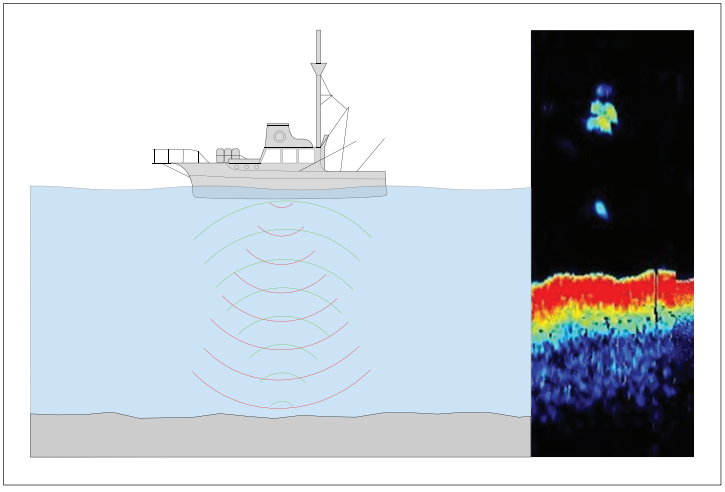
Note:
The HyperVision™ transducers available for **HV** variant displays each utilize a number of different sonar technologies; all are combined into a single HyperVision™ transducer:

- RealVision™ 3D
- SideVision™
- DownVision™
- CHIRP

11.2 Sonar technologies

Traditional sonar technology

Traditional sonar uses a single carrier frequency or carrier wave for the sonar ping. The sonar works by measuring the time it takes the ping echo to return to the transducer to determine target depth.

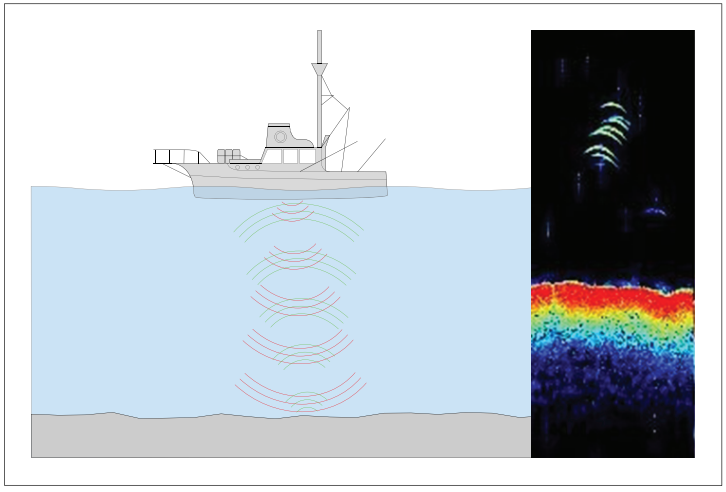


CHIRP technology

CHIRP (Compressed High Intensity Radar Pulse) sonar uses a swept frequency signal covering a wide range of frequencies which produces more accurate images with higher detail than traditional sonar.

The benefits of CHIRP sonar include: improvements to target resolution, bottom detection (through bait balls and thermoclines), and detection sensitivity.

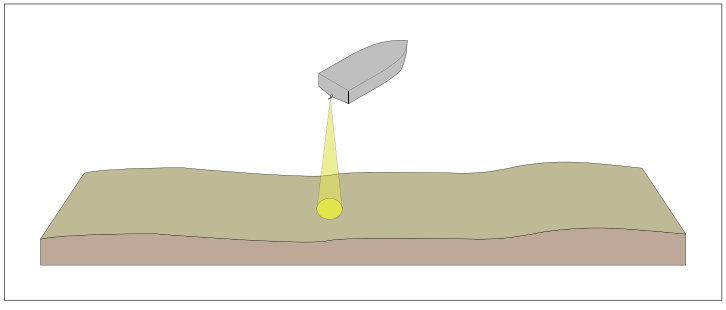
CHIRP technology is utilized by RealVision® 3D / RealVision® Max 3D, SideVision®, and DownVision® transducers.



CHIRP Sonar overview

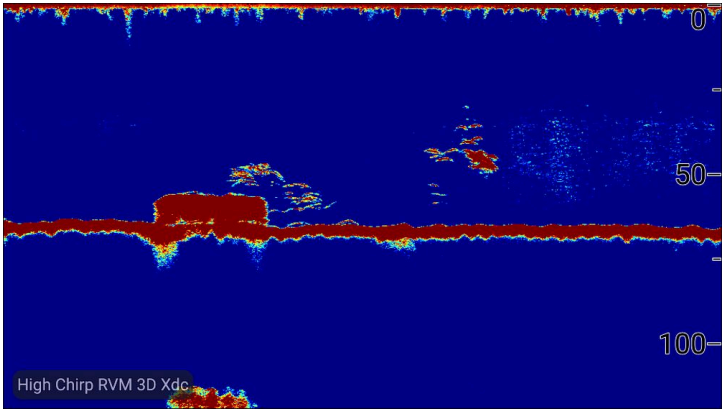
CHIRP sonar produces a conical-shaped beam. The coverage of the conical beam is the water column directly beneath the vessel.

Conical beam



Sonar is effective at a range of speeds. In deeper waters, the CHIRP bandwidth is automatically optimized to improve bottom lock and the detection of moving objects (e.g. fish) in the wider water column.

CHIRP sonar screen example



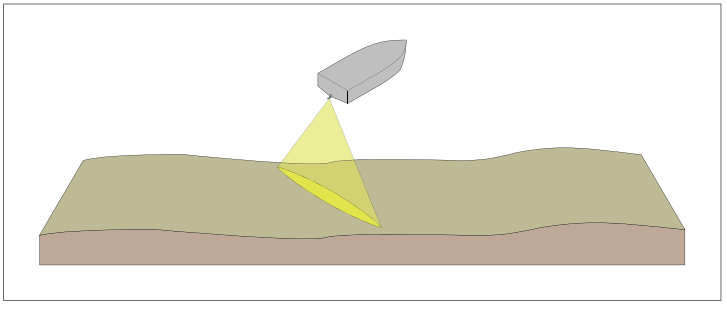
DownVision® overview

Explanation of the DownVision® sonar technology and its key benefits.

DownVision® technology produces a wide-angle side-to-side beam and a thin fore-to-aft beam. The coverage of the DownVision® beam is a water column directly beneath and to the sides of the vessel.

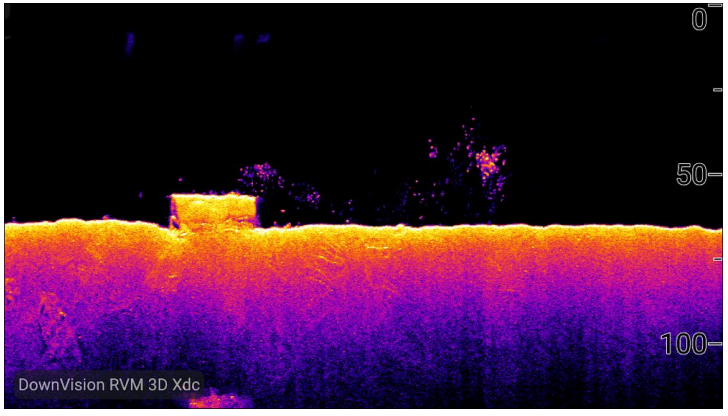
DownVision® beam

DownVision® is effective at lower vessel speeds. In deeper waters, the CHIRP bandwidth is automatically optimized to improve bottom lock and the detection of moving objects (e.g. fish) in the wider water column.



The wide, thin beam produces clear target returns. The use of CHIRP processing and a higher operating frequency provide a more detailed image, making it easier to identify bottom structures around which fish may reside.

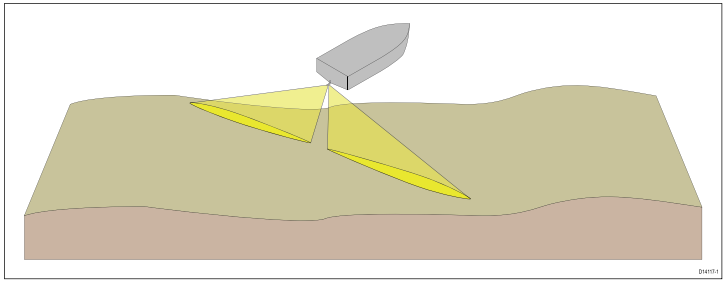
DownVision® screen example



SideVision™ overview

SideVision™ transducers are side looking transducers that produce 2 wide-angle side-to-side beams, each with a thin fore-to-aft beam to build up a detailed underwater view as your vessel moves forward.. The coverage of the SideVision™ beams is an area to both side of your vessel.

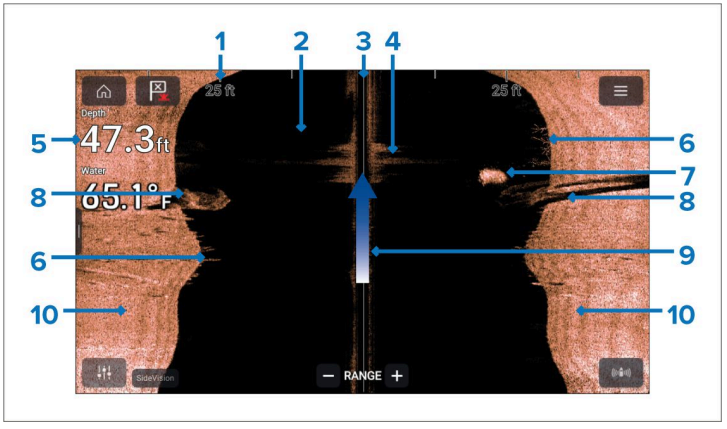
SideVision™ beams



The transducers send pulses of sound waves into the water on each side of your vessel, and records the sound waves that are reflected off objects suspended in the water column and the bottom,, known as sonar returns. The sonar image is constructed line-by-line, similar to the way a television picture is composed of many horizontal lines. Each successive ping from the transducer adds a new line of image data to the top of your display. Each new line shows sonar returns from both the port and starboard sides of your vessel. As new lines are added with each successive ping, older data gradually scrolls down the display, building up a detailed image of the water column and bottom to the sides of your vessel. If your vessel maintains the same bearing and speed for a period of time, you can interpret the image as a plan of the bottom along your vessel's course. SideVision™ is effective at lower vessel speeds.

Note:
SideVision™ does not provide direct depth readings. The scale shown across the top of the image indicates the distance of features from your vessel.

SideVision™ screen interpretation



1. **Range scale** — The range scale indicates distance (range) to port and starboard from your vessel.
2. **Water** — Using the default color palette black indicates no sonar returns i.e.: clear water.
3. **Centerline** — The solid line represents the centerline of your vessel. left of the centerline represents the water, objects and bottom to the port side of your vessel, right of the centerline represents the starboard side.

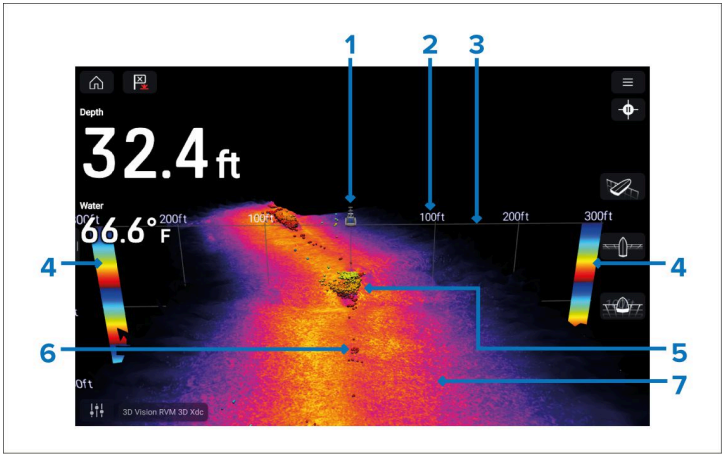
4. **Turbulent water** — turbulence in the water caused by such things as vessel wake can produce a sonar return due to the aeration in the water.
5. **Water depth** — When using a separate depth transducer current depth can be displayed in a data overlay.
6. **Vegetation** — Examples of vegetation growth (e.g: trees) on the bottom.
7. **Bait ball** — Example of a bait ball at an approximate distance of 18.5 ft from your vessel.
8. **Structure** — Example of bottom structure. Underwater structures such as pipelines, piers and other large solid structures may cause an area of shadow directed away from your vessel's direction.
9. **Vessel direction** — Vessel direction of travel. The sonar image will scroll from top to bottom as your vessel moves.
10. **Bottom** — Solid mass indicating the bottom, using the default color palette the bottom is colored copper. It may be possible to identify the transition of bottom material (e.g.: where an area of mud meets an area of gravel).

RealVision™ 3D overview

RealVision™ 3D and RealVision™ Max 3D transducers produce life-like 3D sonar imagery. When using a RealVision™ 3D or RealVision™ Max 3D transducer, the *[3D Vision]* channel will be available in the Fishfinder app. RealVision™ 3D and RealVision™ Max 3D transducers are also capable of producing DownVision™, SideVision™, and CHIRP conical sonar channels.

3D Vision provides a true, easy-to-understand view of bottom topography, debris, and fish.

3D Vision screen interpretation



1. **Vessel location** — The vessel icon indicates the location and direction of your vessel.
2. **Range scale** — The range scale indicates distance (range) to port and starboard from your vessel.
3. **Water line** — This line represents the top of the water column.
4. **Depth indicator** — Provides an indication of object depths.
5. **Structure** — Example of bottom structure, including underwater structures such as pipelines, piers, and other large solid structures.
6. **Sonar returns** — Sonar return / detected object.
7. **Bottom** — Solid mass indicating the bottom. It may be possible to identify the transition of bottom material (e.g.: where an area of mud meets an area of gravel).

11.3 Sonar channel range

Range capabilities of the available sonar channels are shown below.

Note:
Stated range are for optimum conditions and are dependent upon connected transducer.

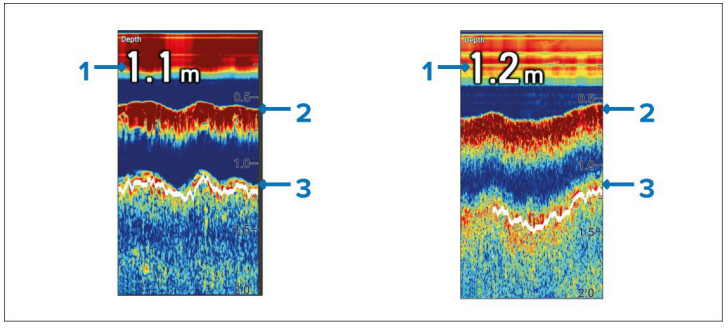
Sonar module / sonar channel	Minimum depth	Maximum depth
RealVision™ 3D	0.6 m (2 ft)	91 m (300 ft)
SideVision™	0.6 m (2 ft) each side	91 m (300 ft) each side
DownVision™	0.6 m (2 ft)	183 m (600 ft)
HyperVision™ (RealVision™ 3D, SideVision™ or DownVision™)	0.6 m (2 ft)	38 m (125 ft)
CHIRP sonar channel (when using RealVision™ 3D, SideVision™ or DownVision™ transducers	0.6 m (2 ft)	274 m (900 ft)

Sonar minimum depths

Accurate bottom tracking can be unreliable in depths shallower than 0.8 m/2.62 ft. When operating at or below this depth be cautious of misleading sonar returns, false bottom tracking and incorrect depth readings

The Minimum sonar depth alarm is triggered when your vessel reaches or is in water shallower than this depth.

Below are examples of the Sonar app when it is tracking a false bottom in shallow waters.

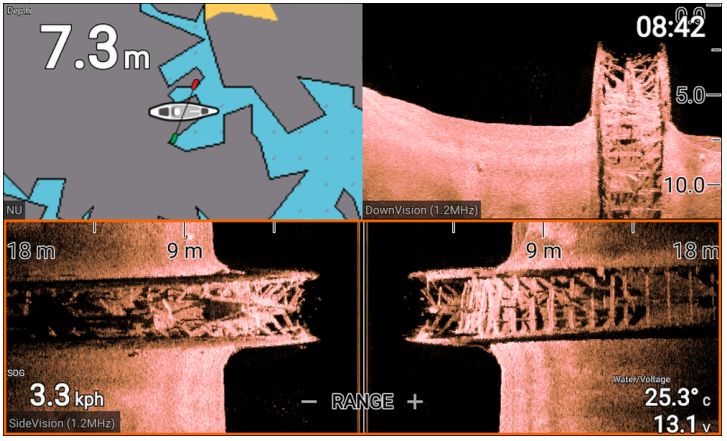


1. Examples of incorrect depth readings due to false bottom tracking.
2. Actual bottom tracking and water depth.
3. False bottom tracking providing false depth readings.

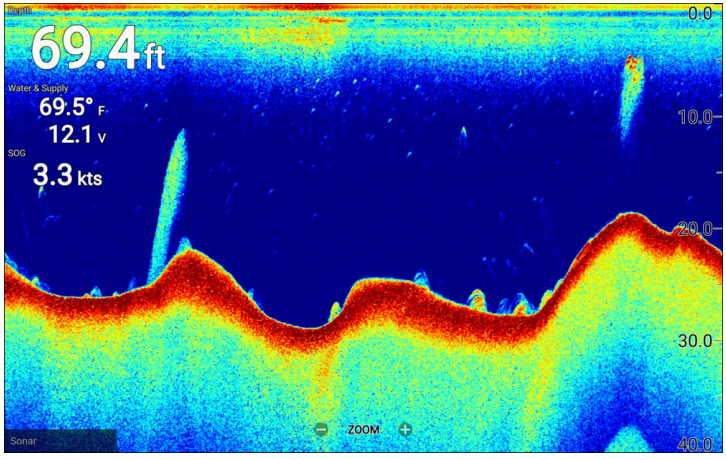
11.4 Fishfinder app overview

The Fishfinder app displays a visualization of the echoes received from the transducer connected to your display and builds an underwater scrolling view of bottom structure and targets that pass under your transducer. Fishfinder channels are available that represent the different sonar technologies that are available depending on your display variant and connected transducer.

Example — Element HV display



Example — Element S display



For each instance of the Fishfinder app that is available on the homescreen you can select which fishfinder channel that you want to use. The channel selection will persist over a power cycle.

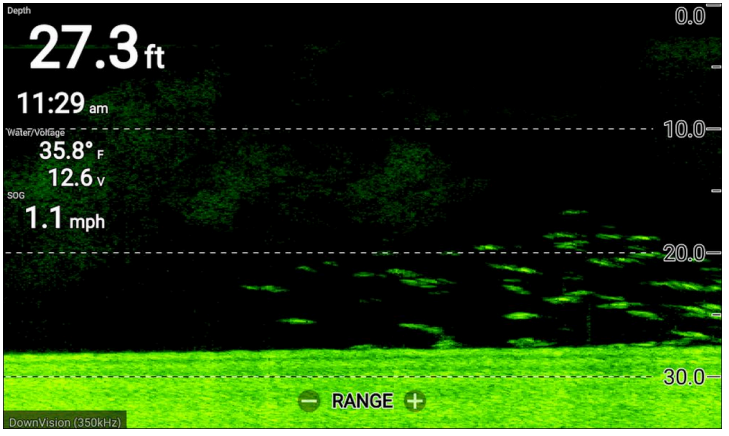
Opening the Fishfinder app

Select an app page icon from the homescreen that includes the Fishfinder app.

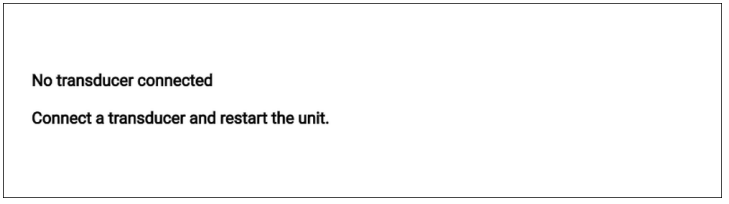
Pre-requisites:

1. Ensure your transducer is compatible (check the latest details available on the Raymarine website). If in doubt please contact an authorized Raymarine dealer for advice.
2. Ensure you have installed and connected your transducer in accordance with its supplied documentation.

When opened the Fishfinder app will scroll across the screen, displaying target returns of objects and bottom structure that has passed under your transducer.



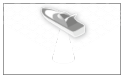
If the '**No transducer connected**' warning is displayed then your transducer has not been detected.



Check your transducer connection(s) are correct and free from damage, then power cycle your display. If the transducer is still not found then refer to your transducer's installation documentation for further troubleshooting information.

Fishfinder channels — Element™ HV displays

The following fishfinder channels are available on Element™ HV displays, depending on the type of transducer connected.

Channel icon	Channel type	Required transducer
	**RealVision™ 3D channel** (350 kHz / 1.2 MHz) Provides a scrolling 3D view of the water behind and to the sides of your vessel.	HyperVision™ transducer. For a list of compatible transducers, refer to: **p.46 — HyperVision™ transducers**
	**SideVision™ channel** (350 kHz / 1.2 MHz) Provides a photo-like scrolling 2D view of the water on each side of your vessel.	HyperVision™ transducer. For a list of compatible transducers, refer to: **p.46 — HyperVision™ transducers**
	**DownVision™ channel** (350 kHz / 1.2 MHz) Provides a photo-like scrolling 2D view of the water beneath and to the sides of your vessel.	HyperVision™ or DownVision™ transducer. For a list of compatible transducers, refer to: **p.46 — Compatible transducers - Element HV displays**
	**Sonar channel** (Conical high CHIRP (200 kHz)) Provides a traditional scrolling 2D view of the water beneath your vessel.	Compatible CHIRP transducer. For a list of compatible transducers, refer to: **p.47 — High CHIRP sonar transducers**

Note:
The HyperVision™ transducers available for **HV** variant displays each utilize a number of different sonar technologies; all are combined into a single HyperVision™ transducer:

- RealVision™ 3D
- SideVision™
- DownVision™
- CHIRP

Switching fishfinder channel frequency

On Element™ HV variant displays DownVision™, SideVision™ and RealVision™ 3D channels are available in both 350 kHz (Standard) and 1.2 MHz (Hyper) frequencies.

With either DownVision™, SideVision™ or RealVision™ 3D channel displayed:

1. Press the *[Menu]* button.
2. Select the *[Freq:]* option.
3. Select either *[Standard (350 kHz)]* or *[HyperVision (1.2 MHz)]* as required.

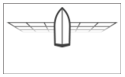
   HyperVision™ channels provide higher resolution than standard channels with reduced range.

RealVision™ modes

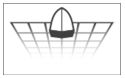
When the RealVision™ fishfinder channel is selected the RealVision™ fishfinder modes will be available from the main menu.

[OFFSET PORT]
Offset port provides a scrolling, 3D view looking at your vessel from the port side.

[OFFSET STBD]
Offset stbd provides a scrolling, 3D view looking at your vessel from the starboard side.



[ABOVE]
Above provides a scrolling, 3D view looking down at your vessel from above.

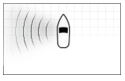


[FOLLOW]
Follow provides a scrolling, 3D view looking at your vessel from off the stern.

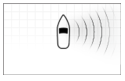
SideVision™ modes

When the SideVision™ fishfinder channel is selected the SideVision™ fishfinder modes will be available from the main menu.

[LEFT / RIGHT]
Left / right mode is a photo like, scrolling, 2D view of the water on both sides of your vessel.



[LEFT]
Left mode is a photo like, scrolling, 2D view of the water on the port side of your vessel.



[RIGHT]
Right mode is a photo like, scrolling, 2D view of the water on the starboard side of your vessel.

Ice fishing modes

When the display is configured for ice fishing (via the Startup wizard), the available fishfinder modes are accessible from the main menu. These modes enable you to select different types of sonar view, optimized for ice fishing activities.

[TRAIL / RADIAL]
The trail and radial mode is a splitscreen view that includes a traditional (historical), scrolling, 2D view and an instantaneous (real-time) radial view of the water beneath the transducer. The radial view shows the returns from the sonar signal (using the same color coding as the traditional scrolling view), organized in a circular formation. This view enables you to quickly identify what is currently passing under your transducer (e.g. bottom structure or target etc), in each segment of the depth range.

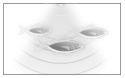
[TRAIL / ASCOPE]
The trail and A-scope mode is a splitscreen view that includes a traditional (historical), scrolling, 2D view and an instantaneous (real-time) A-scope view of the water beneath the transducer.

[RADIAL]
The radial mode is a fullscreen view that provides an instantaneous (real-time), radial view of the water beneath the transducer. The radial view shows the returns from the sonar signal (using the same color coding as the traditional scrolling view), organized in a circular formation. This view enables you to quickly identify what is currently passing under your transducer (e.g. bottom structure or target etc), in each segment of the depth range.

[A-SCOPE]
The A-scope mode is a fullscreen view that provides an instantaneous (real-time) view of the water beneath the transducer. This allows you to see what is currently passing under your transducer (e.g. bottom structure or target etc), rather than the historical display provided by the traditional, scrolling, 2D view.

Fishfinder channels — Element™ S displays

The following fishfinder channels are available on Element™ S variant displays.

Channel icon	Channel type	Required transducer
	**Sonar channel** (Conical high CHIRP (200 kHz)) Provides a traditional scrolling 2D view of the water beneath your vessel.	Compatible CHIRP transducer. For a list of compatible transducers, refer to: **p.47** — High CHIRP sonar transducers

11.5 Fishfinder app controls

The Fishfinder app has 2 control modes, scrolling mode and pause / playback mode. The behavior of some controls are dependent upon control mode and also the fishfinder channel in use. The following controls apply to DownVision™, SideVision™ and sonar channels. The controls below do not apply to RealVision™ 3D channels.

Scrolling mode

Scrolling mode is the default mode when the Fishfinder app is opened. In scrolling mode an image is displayed which scrolls from right to left across the screen.
Control behavior:

- Pressing the *[Plus]* button will switch to zoom mode.
- When in zoom mode pressing the *[Plus]* or *[Minus]* buttons will increase and decrease the zoom level.
- Pressing the *[OK]* button displays the onscreen gain controls on the left side of the screen.
- Pressing the *[Waypoint]* button will place a waypoint at your vessels's current location.
- Pressing the *[Menu]* button will open the app menu.
- Pressing any button on the *[Directional pad]* will switch to pause / playback mode.

Pause / Playback mode

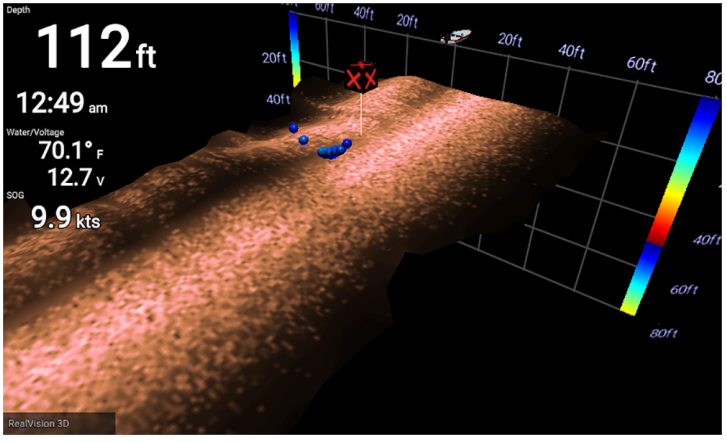
In pause / playback mode the image is temporarily paused and the cursor can be moved around the screen.

Control behavior:

- Pressing the *[Plus]* button will switch to zoom mode and the scrolling image remains paused.
- When in Zoom mode pressing the *[Plus]* or *[Minus]* buttons will increase and decrease the zoom level.
- Pressing the *[OK]* button displays the fishfinder context menu.
- Pressing the *[Waypoint]* button will place a waypoint at the cursor's location.
- Pressing any button on the *[Directional pad]* will move the cursor in that direction.
- With the cursor at the far left of the screen, continuing to press the *[Left]* button will display the scrolling image history, which enables you to view structure and targets you have already passed.
- Pressing the *[Menu]* or *[Back]* button will return the Fishfinder app to scrolling mode.

RealVision™ 3D app controls

When viewing RealVision™ 3D channels the controls behave differently to other fishfinder channels.



Scrolling mode

Scrolling mode is the default mode when the Fishfinder app is opened. In scrolling mode an image is displayed which scrolls across the screen.
Control behavior:

- Pressing the *[Plus]* or *[Minus]* buttons will increase and decrease the zoom level.
- Pressing any button on the *[Directional pad]* will rotate the image in the respective direction.
- Pressing the *[Waypoint]* button will place a waypoint at your vessel's current location.
- Pressing the *[Menu]* button will open the app menu.
- Pressing the *[OK]* button pauses scrolling and switches to pause / playback mode.

Pause / Playback mode

In pause / playback mode the image is paused and the cursor can be moved around the screen.
Control behavior:

- Pressing the *[Plus]* or *[Minus]* buttons will increase and decrease the zoom level.
- Pressing the *[OK]* button displays the fishfinder context menu.
- Pressing the *[Waypoint]* button will place a waypoint at the cursor's location.
- Pressing any button on the *[Directional pad]* will move the cursor in that direction.
- With the cursor positioned at the opposite edge of the screen to the vessel icon, continuing to move the cursor in the same direction will display the scrolling image history, which enables you to view structure and targets you have already passed.
- Pressing the *[Menu]* button will return the Fishfinder app to scrolling mode and open the app menu.
- Pressing the *[Back]* button will return the Fishfinder app to scrolling mode.

Placing a Waypoint in the Fishfinder app

When you observe something of interest in the Fishfinder app you can place a waypoint at its location so that you can find the area again.

1. Use the *[Directional pad]* to highlight a point of interest onscreen.

   Scrolling is paused, temporarily.
2. Press the *[Waypoint]* button and, if required enter relevant waypoint details.

   Scrolling will resume automatically if no buttons are pressed for approximately 15 seconds.

11.6 Fish detection

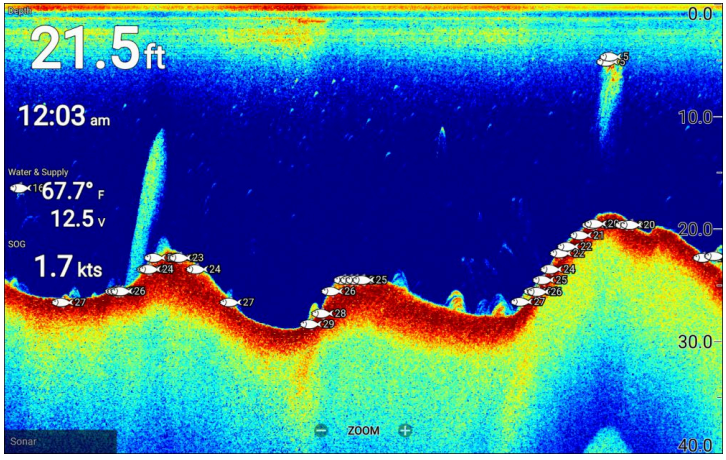
Fish detection options are available when using Raymarine® transducers.

The Fish detection feature is only available when using the *[SONAR]* channel.

The Fish detection feature can be accessed from the Fishfinder app menu: *[Fishfinder > Menu > Settings > Fish detection]*

Fish detection options include:

- *[Fish detection beep]* — An audible 2 tone beep is sounded when a sonar target is detected that the fish detection algorithm considers to be a fish.
- *[Fish icons]* — A fish icon is placed onscreen over sonar targets that the fish detection algorithm considers to be fish.
- *[Fish depth labels]* — The depth of sonar targets are displayed next to the target that the fish detection algorithm considers to be fish.



The fish detection feature can be adjusted manually as follows:

- *[Detection sensitivity]* — The detection sensitivity setting determines the size at which sonar targets are considered to be fish. The higher the value, the more sonar targets will be considered to be fish.
- *[Ignore fish shallower than:]* — Specifies the depth at which the fish detection algorithm will be used.
- *[Ignore fish deeper than:]* — Specified the depth at which the fish detection algorithm will stop being used.

Using these options allows you to specify a depth band of water where you will be fishing and the size of the fish you want to catch.

11.7 Sonar scroll back

You can "scroll back" in the Fishfinder app to playback sonar history when the Fishfinder app is in Pause / Playback mode.

To activate pause / playback mode:

- **Sonar / DownVision / SideVision** — Press any *[Directional pad]* button.
- **RealVision 3D** — Press the *[OK]* button.

In pause / playback mode the *[Scroll back bar]* is displayed.

The scrolling image can be played back from any point since the Fishfinder app was opened.

Playing back sonar history

The Fishfinder app's sonar history can be played back.

With the Fishfinder app in scrolling mode:

1. Press any button on the *[Directional pad]* or press the *[OK]* button when viewing a RealVision channel.

   The Fishfinder app will enter Pause / playback mode.
2. Using the *[Directional pad]*, move the cursor in the same direction that the image is scrolling, until you reach the edge of the screen.

   e.g.: when viewing a DownVision channel use the [Left] button on the [Directional pad] to position the cursor on the left edge of the screen, continue to press the [Left] button to start scrolling back through the available sonar history.

11.8 Fishfinder sensitivity controls

Optimum performance is usually achieved using the default settings. You can adjust the image using the Sensitivity controls to improve the displayed image. Sensitivity setting adjustment is also applied to the sonar history that is displayed when using sonar scroll back.

The sensitivity controls can be accessed from the Fishfinder app menu: *[Menu > Adjust sensitivity]*.
The following sensitivity controls are available to help you optimize the sonar image.

Control	Description
G Auto	*[Gain]* The gain control determines the signal strength at which target returns are shown onscreen. The gain control can be set to *[Auto]* or *[Manual]*. In Auto you can apply an offset of up to ± 50%. A higher value produces more target returns and noise onscreen.
I Auto	*[Intensity]* The intensity control sets the lower limit for the color used for the strongest target returns. All target returns above this value are displayed in the strongest color. Those with a weaker value are divided equally between the remaining colors. The intensity control can be set to *[Auto]* or *[Manual]*. In Auto you can apply an offset of up to ± 50%.
SF Auto	*[Surface Filter]* The surface filter control determines the amount of noise displayed onscreen by varying the gain throughout the water column. A lower value decreases the depth at which the control is applied. The control can be set to *[Auto]* or *[Manual]*.
All to AUTO	*[All to Auto]* Sets all Sensitivity controls to *[Auto]* with 0% offset, where applicable.

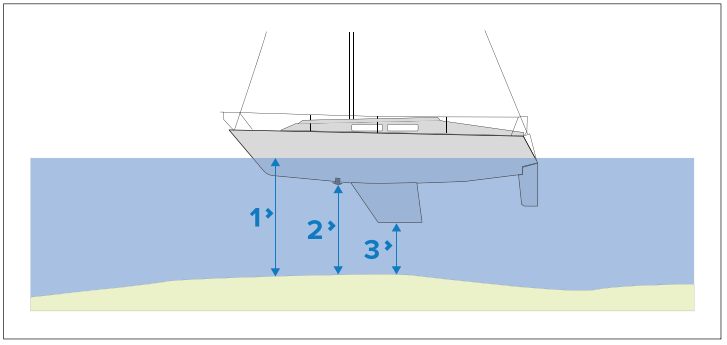
11.9 Sonar transducer calibration

Sonar transducers should be calibrated to ensure that accurate readings are displayed on the MFD / chartplotter.

Depth transducer offset

Depth is measured from the transducer face to the bottom (e.g.: seabed). An offset value can be applied to the depth data so that the displayed depth reading represents the depth reading taken from either the keel (negative offset) or the waterline (positive offset).

Before setting a waterline or keel offset, establish the vertical distance between the transducer and waterline or the bottom of your vessel's keel, as appropriate. Then set this distance as the depth offset value.

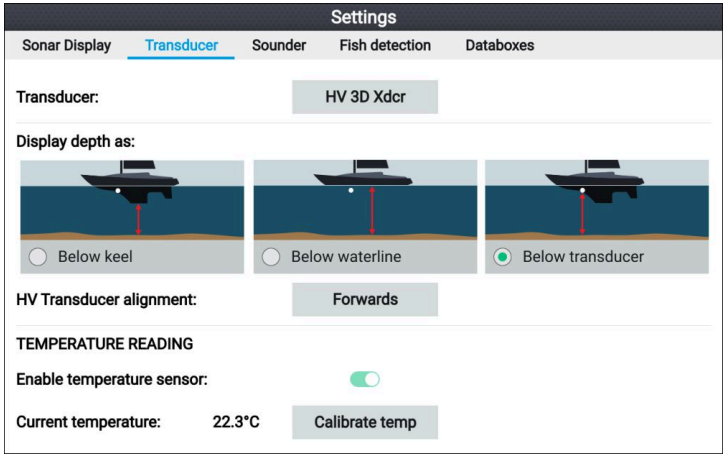


1. **Waterline** — The depth reading will be increased from the transducer's default reading.
2. **Transducer** — This is the default reading from the transducer (zero offset applied).
3. **Keel** — The depth reading will be decreased from the transducer's default reading.

Configuring transducer settings

For systems with a transducer connected, as part of setting up your system for the first time it is important that you correctly configure your transducer.

Transducer configuration settings are available from the **Fishfinder app**.



1. Select *[Transducer]* from the Fishfinder app's *[Settings]* menu: *[Menu > Settings > Transducer]*
2. If your installation required you to install an all-in-one transducer backwards (e.g.: this may occur when connecting the transducer to a trolling motor), then select *[Backwards]* from the *[HV transducer alignment]* option. This ensures that the port and starboard channels appear correctly orientated onscreen, otherwise keep the default setting: *[Forwards]*.
3. Select where you want your depth measurements taken from:
   i. *Below transducer (default)* — No offset required
   ii. *Below keel* — Enter the distance between the transducer face and the bottom of the keel.
   iii. *Below waterline* —Enter the distance between the bottom of your keel and the waterline.
4. You can configure temperature settings as follows:
   i. Enable or disable temperature readings as required.
   ii. If enabled, check the temperature reading against the actual water temperature.
   iii. If the current reading requires adjustment, select *[Calibrate temp]* and enter the difference between your 2 readings.

11.10 Fishfinder settings menu

The table below details the settings available in the Fishfinder app.

Note:
The availability of some fishfinder settings are dependent on the fishfinder channel being viewed.

Sonar display tab (RealVision™ 3D channel)

Menu item and description	Options
[Boat icon] Choose which boat icon to use.	List of available boat icons.
[Target colors] Changes the color palette used for target returns.	• *Rainbow (default)* • *Burnt Yellow* • *Cool Blue* • *Lime Green* • *Ruby Red*
[Color targets by] Changes the way targets are colored. *[Depth]* colors targets according to their depth, a gradient scale can be shown on the 3D grid to aid depth identification. *[Intensity]* colors targets according to their size, the bigger the target the darker the color used.	• *Depth (default)* • *Intensity*

Menu item and description	Options
[Bottom colors] Changes the color used for bottom structure.	• *Copper* • *Inv Copper* • *Slate Gray* • *Lime Green* • *Inv Lime Green* • *Burnt Yellow (default)* • *Inv Burnt Yellow* • *Cool Blue* • *Inv Cool Blue* • *Ruby Red*
[Background] Changes the color used for the app background.	• *Black (default)* • *Blue* • *White* • *Gray*
[Target size] Determines the size that target returns will appear onscreen. The higher the number the larger the target returns appear.	Value between 0 to 25 (*5 (default)*)

Sonar display tab (SideVision™ channel)

Menu item and description	Options
[Color palette] Various color palettes are available to suit different conditions or your personal preference.	• *Copper* • *Inv Copper* • *Slate Gray* • *Lime Green* • *Inv Lime Green* • *Burnt Yellow (default)* • *Inv Burnt Yellow* • *Cool Blue* • *Inv Cool Blue* • *Ruby Red*
[Range lines] Displays vertical range lines onscreen.	• *On* • *Off (default)*
[Color threshold] Color threshold determines the signal strength below which target returns are not shown. A low value results in only the strongest colors or lightest shades being displayed.	Value between 0% to 100%.(*100% (default)*)
[Scroll speed] Determines the scrolling speed for the Sonar image.	Value between 0% to 500% (*100% (default)*).

Sonar display tab (DownVision™ channel)

Menu item and description	Options
[Color palette:] Various color palettes are available to suit different conditions or your personal preference.	• *Copper* • *Inv Copper* • *Slate Gray* • *Lime Green* • *Inv Lime Green* • *Burnt Yellow (default)* • *Inv Burnt Yellow* • *Cool Blue* • *Inv Cool Blue* • *Ruby Red*
[Depth lines:] Displays horizontal depth lines.	• *On* • *Off (default)*
[Temperature graph:] When enabled overlays a temperature line on the scrolling sonar image. The temperature line will help to determine change in water surface temperature. In Pause / playback mode temperature labels are displayed on the temperature line.	• *On* • *Off (default)*
[Manual temp range:] When enabled you can specify a fixed manual minimum and maximum limit for water surface temperature. The Maximum and Minimum limits are displayed in the temperature graph. The temperature graph overlay must be enabled before manual temperature range can be enabled.	• *On* • *Off (default)*
[Maximum temp:] Specifies the fixed maximum water temperature limit for the temperature graph.	Temperature value.
[Current temp:] Displays the temperature currently being recorded by your transducer's temperature sensor.	Temperature value.
[Minimum temp:] Specifies the fixed minimum water temperature limit for the temperature graph.	Temperature value.
[Beep:] When manual temperature range has been selected the display can trigger an audible beep when the current temperature reading passes the minimum and maximum temperature thresholds.	• *On* • *Off (default)*
[Color threshold] Color threshold determines the signal strength below which target returns are not shown. A low value results in only the strongest colors or lightest shades being displayed.	Value between 0% to 100%.(*100% (default)*)
[Scroll speed] Determines the scrolling speed for the Sonar image.	Value between 0% to 500% (*100% (default)*).

Sonar display tab (Sonar high CHIRP channel)

Menu item and description	Options
[Color palette] Various color palettes are available to suit different conditions or your personal preference.	• *Classic Blue (default)* • *Classic Black* • *Classic White* • *Sunburst* • *Grayscale* • *Inv. Grayscale* • *Copper* • *Night Vision*
[A-scope] A-Scope mode provides a splitscreen view that includes the normal scrolling sonar image and a smaller pane which shows a 'live' image of what is directly below your transducer.	• *Off (default)* • *Center* • *Right* • *Cone*
[Depth lines] Displays horizontal depth lines.	• *On* • *Off (default)*
[White line] Displays a solid white line along the detected bottom contour.	• *On* • *Off (default)*
[Bottom fill] Fills the area below the detected bottom contour with a solid color.	• *On* • *Off (default)*
[Temperature graph:] When enabled overlays a temperature line on the scrolling sonar image. The temperature line will help to determine change in water surface temperature. In Pause / playback mode temperature labels are displayed on the temperature line.	• *On* • *Off (default)*
[Manual temp range:] When enabled you can specify a manual minimum and maximum limit for water surface temperature. The temperature graph overlay must be enabled before manual temperature range can be enabled.	• *On* • *Off (default)*
[Maximum temp:] Specifies the fixed maximum water temperature limit for the temperature graph.	Temperature value.
[Current temp:] Displays the temperature currently being recorded by your transducer's temperature sensor.	Temperature value.
[Minimum temp:] Specifies the fixed minimum water temperature limit for the temperature graph.	Temperature value.
[Beep:] When manual temperature range has been selected the display can trigger an audible beep when the current temperature reading passes the minimum and maximum temperature thresholds.	• *On* • *Off (default)*
[Color threshold] Color threshold determines the signal strength below which target returns are not shown. A low value results in only the strongest colors or lightest shades being displayed.	Value between 0% to 100%.(*100% (default)*)
[Scroll speed] Determines the scrolling speed for the Sonar image.	Value between 0% to 500% (*100% (default)*).

Transducer tab

Menu item and description	Options
[Transducer:] Displays the type of connected transducer.	N/A
[Display depth as:] Determines the position from where depth readings are taken.	• *Below keel* • *Below waterline* • *Below transducer (default)*
[HV transducer alignment:] You can select which orientation your HyperVision™ transducer has been installed in. E.g.: if you have installed the transducer on a trolling motor, the transducer may have been installed with the bow arrow pointing towards the stern of the trolling motor instead of the bow. *[Forwards]* should be selected if the transducer's bow arrow is pointing towards the bow. *[Backwards]* should be selected if the transducer's bow arrow is pointing towards the stern.	• *Forwards (default)* • *Backwards*
[Enable temperature sensor:] Enables and disables the selected transducer's temperature sensor.	• On • Off
[Current temperature:] Displays the transducer's current temperature reading.	N/A
[Calibrate temp] Allows you to enter an offset between the actual measured water temperature and the current temperature displayed by your transducer.	Offset temperature value.

Sounder tab

Menu item and description	Options
[Ping enable:] Enables and disables transducer ping.	• *On (default)* • *Off*
[Ping rate limit:] Allows you to restrict the transducer's maximum ping rate to suit current conditions.	Value between 1 and 100 (*80 (default)*).
[Interference rejection] Removes interference caused by other transducers on your vessel or from vessels equipped with transducers close by.	• *Auto (default)* • *Low* • *Medium* • *High* • *Off*
[2nd echo rejection] The control helps to remove false target returns or false bottom that can be caused by signal reflection.	• *Off* • *Low (default)* • *High*
[Reset sounder] Resets the sonar module to factory default settings.	• *Yes* • *No*

Note:
The fish detection tab is only available when viewing a high CHIRP sonar channel.

Fish detection tab

Menu item and description	Options
[Fish detection beep:] Enables and disables audible beep when a target is detected that is considered to be a fish.	• *On* • *Off (default)*
[Fish icons:] Enables and disables display of a fish icon over targets considered to be fish.	• *On* • *Off (default)*

Menu item and description	Options
[Fish depth labels:] Enables and disables display of depth labels next to targets considered to be fish.	• *On* • *Off (default)*
[Detection sensitivity:] Determines how sensitive the fish detection algorithm is. The higher the value, the more target returns will be considered to be fish.	Values from 0 to 10 (*8 (default)*).
[Ignore fish shallower than:] Targets returns found in water shallower than the specified depth will not be considered to be fish. **Note:** The shallow limit cannot be greater than the deep limit.	0 ft to 1000 ft (*3.3 ft (default)*) or equivalent units.
[Ignore fish deeper than:] Targets returns found in water deeper than the specified depth will not be considered to be fish. **Note:** The deep limit cannot be less than the shallow limit.	0 ft to 1000 ft (*984 ft (default)*) or equivalent units.

Databoxes tab

Description	Option
Determines the data item displayed in databox 1.	*[1:]*
Determines the data item displayed in databox 2.	*[2:]*
Determines the data item displayed in databox 3.	*[3:]*
Determines the data item displayed in databox 4.	*[4:]*
Selecting will reset all databoxes to factory defaults.	*[Reset all]*

CHAPTER 12: DASHBOARD APP

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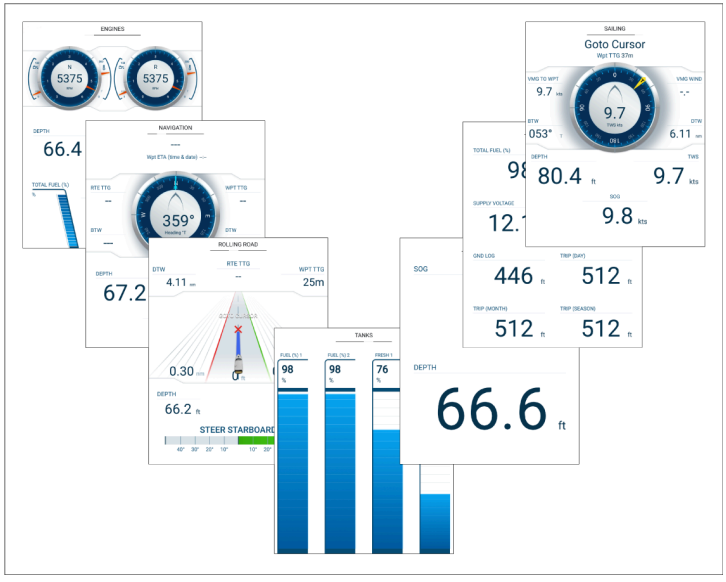
12.1 Dashboard app overview

The Dashboard app enables you to view system data. System data may be generated by your display or by devices connected to your display via SeaTalkng ® / NMEA 2000.

Note:
For data to be available in the Dashboard app it must be transmitted to your display from compatible hardware using supported protocols and messages.



You can configure which data pages you want visible in the Dashboard app, the Data page selection will persist over a power cycle.

The Dashboard app is pre-configured, based on start up wizard selections, with a number of customizable data pages.

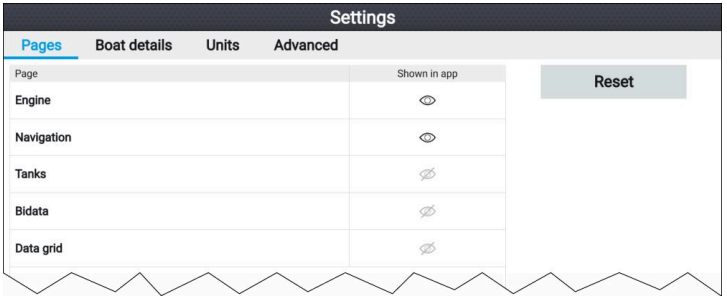
Switching data page

When the Dashboard app is the active app you can cycle through the available data pages.

1. Use the *[Left]* and *[Right]* buttons to cycle through the available data pages.

Alternatively, you can select a page you want to display using the page icons found in the app menu.

Hiding and showing data pages



With the Dashboard app displayed and active:

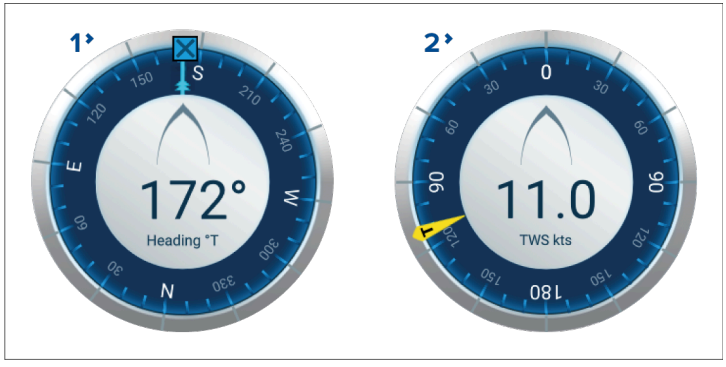
1. Press the *[Menu]* button.
2. Select the *[Settings]* icon.

   The menu is opened on the *[Pages]* tab.
3. Using the *[Up]* button and *[Down]* button, highlight the page you want to hide or show.
4. Press the *[OK]* button.
5. Select either *[Hide page]* or *[Show page]*.
6. Press the *[Menu]* button to close the menu.

12.2 Navigation and sailing dials

Dials are available for the Navigation and Sailing pages, which provide a compass dial displaying various data indicators.

Note:
The navigation and sailing dials are **only** available when the display's *Activity type* is set to *[Sailing]*, when completing the startup wizard.
The Activity type is specified during the initial startup wizard. If you want to change the Activity type after that initial selection, you must first perform a factory reset for the display and complete the startup wizard once again. For more information, refer to:
Changing activity type



1. **Navigation dial** — The navigation dial provides a full compass with Heading read out, COG indicator and destination waypoint indicator.
2. **Sailing dial** — The sailing dial provides a full compass with wind speed read out and wind angle indicator. The sailing dial can be switched between displaying True wind and Apparent wind.

Dial indicators:

	**COG indicator** Visual identification of your course over the ground. The COG indicator is available on the navigation dial when COG data is available.
	**Destination waypoint indicator** Visual identification of the course to your current destination. The Destination waypoint indicator is available during active navigation (i.e.: Navigating to a waypoint, performing a goto or following a route).
	**True wind angle indicator** Visual identification of the true wind angle. The indicator is available on the sailing dial when wind data is available and the dial is set to TWS.
	**Apparent wind angle indicator** Visual identification of the apparent wind angle. The indicator is available on the sailing dial when wind data is available and the dial is set to AWS.

Switching between TWS and AWS sailing dials

The sailing dial can be configured to display either True wind data or Apparent wind data.

From the Dashboard app with the sailing page displayed:

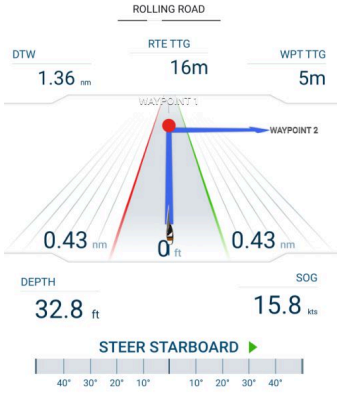
1. Press the *[Menu]* button.
2. Select *[Customize page]*.

   The Dashboard app page will enter edit mode with the sailing dial highlighted.
3. Press the *[OK]* button.
4. Select *[Edit]* from the pop-over menu.
5. Select *[Wind]*.
6. Select *[TWS]* to display the True wind dial, or select *[AWS]* to display the Apparent wind dial.
7. Press the *[Back]* button to exit edit mode.

12.3 Rolling road

The rolling road dashboard page provides a graphical representation of your vessel's course and indicates if your vessel has deviated from its course.

With your display receiving accurate heading and position data, you can use the rolling road page to monitor your course and accurately steer to a target destination.

Goto cursor / Goto waypoint	Follow route
	

The rolling road graphic represents a width of water, equal to the limit specified in the cross track error (XTE) alarm, on each side of your vessel. The Cross track error alarm can be configured from the alarms menu: *[Homescreen > Settings > Alarms > Cross-track error:]*.

During active navigation (performing a *[Goto]* or *[Follow]*) , navigational data and steering advise are provided on the page.

Follow the steering advise to correct any course deviation that occurs and maintain your course to the target destination.

12.4 Customizing existing data pages

The data items displayed on each page can be changed.

1. Select *[Customize page]* from the Dashboard app menu: *[Menu > Customize page]*.
2. Select the data item that you want to change.
3. Select *[Edit]* from the data item pop-over menu.
4. Select the new data item that you want to display.

12.5 Data items

The following data items can be displayed in Databoxes.

Note:
Where more than 1 data source is available for a data item, based on the specified Boat details (*[Homescreen > Settings > Boat details]*), then data items will be available for each data source.

Category	Data item
[Battery] • *[Battery 1]* • *[Battery 2]* • *[Battery 3]*	• *Time till zero charge* • *State of charge* • *Battery temperature* • *Battery voltage* • *Battery current*
[Boat]	• *Fresh water (%)* • *Live well (%)* • *Gray water (%)* • *Black water (%)*
[Depth]	• *Depth*
[Display]	• *Supply voltage*
[Distance]	• *Trip (season)* • *Trip (month)* • *Trip (day)* • *Ground Log*
[Engine] • *[Port engine]* • *[Starboard engine]* • *[All engines]*	• *Engine hours* • *Engine RPM* (Revolutions per minute) • *Boost pressure* • *Oil temperature* • *Oil pressure* • *Alternator* • *Coolant pressure* • *Coolant temperature* • *Engine load* • *Engine trip* • *Fuel flow* • *Fuel flow (inst)*
	• *Fuel flow (avg)* • *Fuel pressure* • *Gear* • *Trans oil pressure* • *Trans oil temperature*
[Fuel] • *[Tank 1]* • *[Tank 2]* • *[All Tanks]*	*[Tank 1]* and *[Tank 2]*: • *Fuel level (%)* *[All Tanks]*: • *Engine economy total* • *Fuel flow total* • *Time to empty* • *Distance to empty* • *Fuel used (season)* • *Fuel used (trip)* • *Est. fuel remaining* • *Total fuel (%)*
[Environment]	• *Max water temp* • *Min water temp* • *Water temp* • *Set* • *Drift* • *Water & Supply* (Water temp and supply voltage) • *Sunrise/set*
[GPS]	• *Course over ground* • *Average SOG* (Average Speed Over Ground)

Category	Data item
	• *Maximum SOG* • *SOG* • *Vessel position* • *Course over ground SOG*
[Heading]	• *Heading*
[Navigation]	• *Route ETA* (Route Estimated Time of Arrival) • *Route TTG* (Route Time To Go) • *Active waypoint* • *Waypoint TTG* • *Estimated arrival time* • *Distance to waypoint* • *Cross track error* • *Bearing to waypoint* • *Wpt info* (Waypoint information)
[Speed]	• *VMG to waypoint* (Velocity Made Good to Waypoint) • *VMG to windward* (Velocity Made Good to Wind) • *Avg speed* • *Max speed* • *Speed thru water*

Category	Data item
[Time]	• *Time* • *Date* • *Time and Timer*
[Wind]	• *Cardinal* • *Beaufort* • *Ground wind direction* • *True wind direction* • *Minimum true wind angle* • *Maximum true wind angle* • *True wind angle* • *Maximum true wind speed* • *Minimum true wind speed* • *True wind speed* • *Minimum app wind angle* • *Maximum app wind angle* • *App wind angle* • *Minimum app wind speed* • *Maximum app wind speed* • *App wind speed*

12.6 Dashboard app settings menu

Pages tab	Available options
• *[Navigation]* • *[Tanks]* • *[Bidata]* • *[Data grid]* • *[Engines]*	The pop-over menu provides the following options: • *[Hide page / Show page]* — When hidden, the page will not be displayed in the Dashboard app. • *[Move up]* — Moves the page up in the page order. • *[Move down]* — Moves the page down in the page order. • *[Rename]* — Renames the page. The data pages can be reset to factory default settings using the *[Reset]* button.

Boat details

To ensure correct operation and display of data you should set the Boat Details settings according to your requirements.

Boat details can be accessed from the *[Settings]* menu: *[Homescreen > Settings > Boat Details]*

Option	Description
[Min safe height:]	Enter your vessel's maximum unladen height from the waterline. To ensure adequate clearance, it is recommended that you add a safety margin to this figure to allow for variation caused by vessel movements.
[Min safe width:]	Enter your vessel's maximum width at its widest point. To ensure adequate clearance on both sides, it is recommended that you add a safety margin for port and starboard to this figure to allow for variation caused by vessel movements.
[Min safe depth:]	Enter your vessel's maximum depth when fully laden. This is the depth from the waterline to the lowest point on the vessel's keel. To ensure adequate clearance, it is recommended that you add a safety margin to this figure to allow for variation caused by vessel movements.
[Num of engines:]	You can configure your system to display data for up to 2 engines, when connected to a compatible engine management system.
[Identify engines:]	Once you have selected the number of engines, select *[Identify engines]* and follow the onscreen instructions to configure your engines. May require an extra hardware interface to enable engine data to be displayed.
[Fuel tanks:]	You can configure your system to display data for up to 2 fuel tanks.
[Fresh water tanks:]	You can configure your system to display data for up to 2 fresh water tanks.
[Live well tanks:]	You can configure your system to display data for up to 2 Live well tanks.

Option	Description
[Gray water tanks:]	You can configure your system to display data for a Gray water tank.
[Black water tanks:]	You can configure your system to display data for a Black water tank.
[Batteries:]	You can configure your system to display data for up to 3 batteries.
[Transducer:]	You can select the transducer type that is connected to your display. **Important:** Ensure the display is powered off before physically changing your transducer.

Units of measure

You can select your preferred units for data readings from the *[Units]* menu: *[Homescreen > Settings > Units]*.

Default units of measure are determined by the selected user interface language.

Measurement	Units
[Distance units]	• *[NM & ft]* — Nautical miles & Feet • *[NM & m]* — Nautical miles & Meters • *[mi & ft]* — Miles & Feet • *[km & m]* — Kilometers and Meters • *[NM & yd]* — Nautical miles & Yards
[Speed units]	• *[Kts]* — Knots • *[MPH]* — Mile per hour • *[KPH]* — Kilometers per hour
[Depth units]	• *[Meters]* — m • *[Feet]* — ft • *[Fathoms]* — Fm
[Temperature units]	• *[Celsius]* — C • *[Fahrenheit]* — F
[Wind speed units]	• *[Knots]* — kts • *[Meters per Second]* — m/s
[Volume units]	• *[US Gallons]* — Gsl • *[Imperial Gallons]* — Gal • *[Liters]* — Ltr
[Economy units]	• Distance per Volume • Volume per Distance • Liters per 100 km
[Pressure units]	• *[Bar]* • *[PSI]* • *[Kilopascals]* — KPa
[Date format]	• MM : DD : YYYY • DD : MM : YYYY • MM : DD : YY • DD : MM : YY
[Time format]	• 12hr • 24hr
[Time zone:]	• UTC offsets • Daylight saving

Measurement	Units
[Bearing mode:] Determines how bearing and heading data are displayed.	• True • Magnetic
[System datum:] Determines the chart datum used by your display. This should be set to the same datum used by your paper charts.	List of available datums.
[Variation:] When set to *[Auto]*, the display will automatically compensate for the naturally-occurring offset of the Earth's magnetic field.	• Auto • Manual
[Manual variation:] When *[Variation]* is set to *[Manual]*, you can specify a fixed offset value, to compensate for the naturally-occurring offset of the Earth's magnetic field.	• 30°W to 30°E

Advanced settings menu

Menu item and description	Options
[Maximum RPM:] The maximum RPM (Revolutions Per Minute) field determines the maximum RPM value displayed on the engine dial. when set to auto the system decides the maximum RPM value.	• *Auto (default)* • *3000RPM* • *4000RPM* • *5000RPM* • *6000RPM* • *7000RPM* • *8000RPM* • *9000RPM* • *10000RPM*
[Custom RPM red zone:] When enabled the engine RPM dial will show a Red zone between the *[Custom RPM red zone]* and the value specified in the RPM red zone start value field.	• *On* • *Off (default)*
RPM red zone start value	0 RPM to 10,000 RPM

CHAPTER 13: RADAR APP

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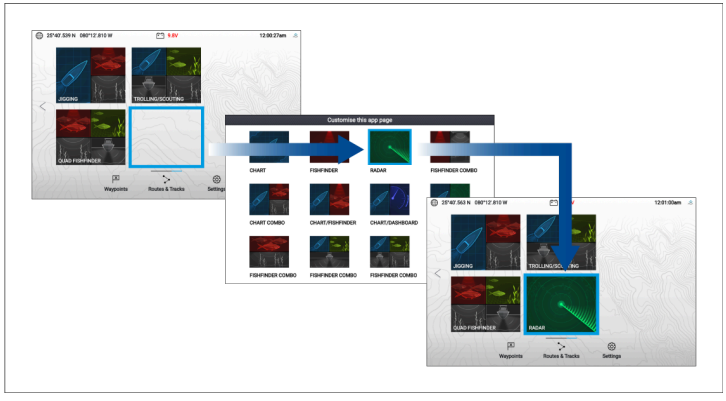
13.1 Adding the Radar app icon to the homescreen

If the Radar app icon is not displayed on the homescreen it can be added manually following the steps below.



From the homescreen:

1. Using the *[Directional pad]*, highlight a blank space on the homescreen.
2. Press and hold the *[OK]* button.
3. Highlight the Radar app icon and press the *[OK]* button.

The Radar app icon is now displayed on the homescreen.

Pairing a Quantum-Series Radar scanner

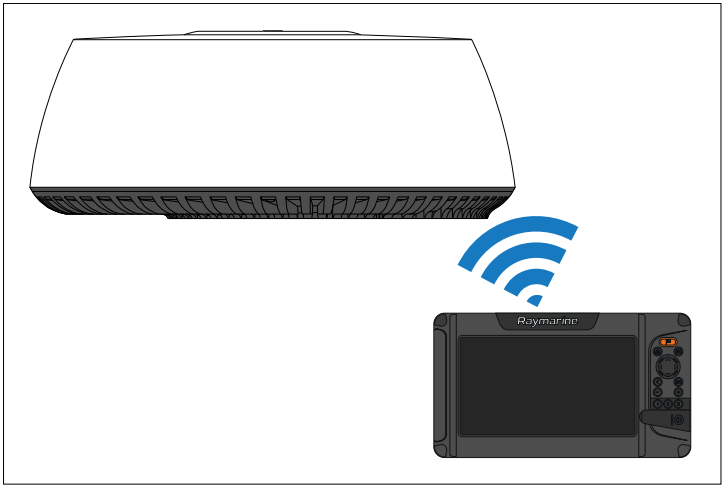
You can connect a Quantum-Series Radar scanner to your display using the Wi-Fi connection.

Pre-requisites:

- Ensure you have installed and connected your Quantum-Series Radar scanner to a power supply in accordance with the instructions supplied with the Radar scanner.
- Ensure you know your Quantum-Series Radar scanner's SSID and passcode.

Important:
Ensure that the software installed on your Quantum-Series Radar scanner is compatible with your MFD / chartplotter.

- Due to a software security update, Quantum-Series Radar scanners running v2.52 software (or later) require your Element-Series MFD / chartplotter to be running LightHouse Sport v3.19.17 (or later).



1. Select *[Pair with Quantum]* from the *[This display]* tab: *[Homescreen > Settings > This display > Quantum Radar: > Pair with Quantum]*.
2. Enter the SSID and passcode for your Quantum-Series Radar scanner.
3. Select *[Connect]*.
4. Follow any onscreen instructions to continue pairing with your Quantum-Series Radar scanner.

   The pairing process may take several minutes to complete.

   For more information on the Quantum-Series Radar scanner pairing process (including troubleshooting information), refer to your Quantum-Series Radar Installation Instructions document.

13.2 Opening the Radar app

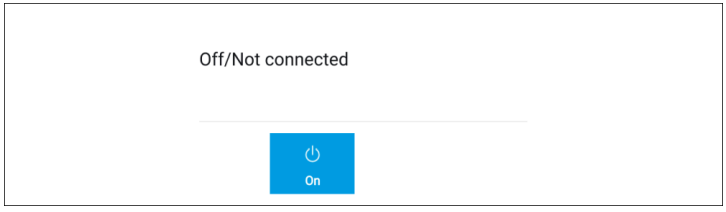
The Radar app is opened by selecting a page icon from the homescreen that includes the Radar app.

Pre-requisites:

1. Ensure your radar scanner is compatible, check the latest details available on the Raymarine website, if in doubt please contact an authorized Raymarine dealer for advice.
2. Ensure you have installed your radar scanner in accordance with the documentation that was supplied with your Radar.

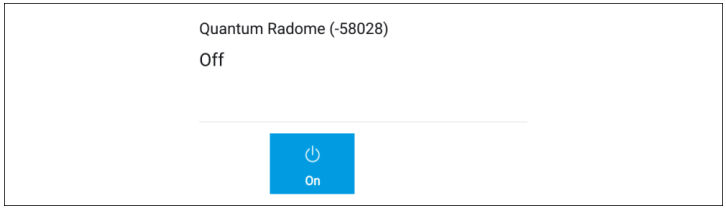
The Radar app will open in one of the following states:

Off/Not Connected



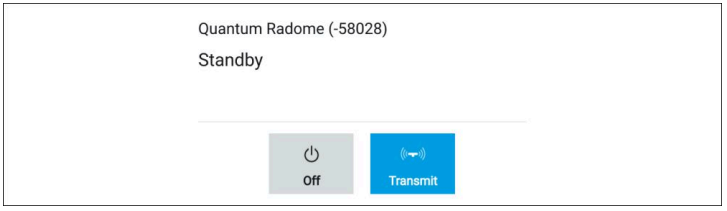
If the '**Off/Not Connected**' message is displayed then the display cannot establish a connection with your radar scanner:
Ensure that your display and radar scanner are paired correctly and then select *[On]* to power up your radar.
If the '**Radar not found**' message is displayed then power cycle your system and perform the pairing procedure again. If the radar scanner still cannot be found refer to your Radar's installation documentation for further troubleshooting information.

Off



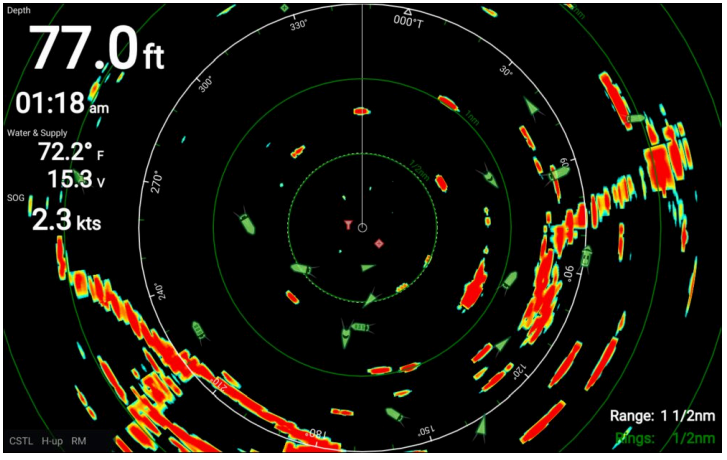
If the '**Off**' message is displayed then your radar scanner is powered off, select *[On]* to power up your Radar

Standby (Not transmitting)



If the '**Standby**' message is displayed then select *[Transmit]* to begin transmitting.

Transmitting



If your radar scanner is connected, powered up and transmitting then the radar image is displayed and echoes returns are displayed onscreen.

Putting the radar into standby

With your selected radar displayed onscreen:

1. Select *[Transmit]* from the main menu.
   The radar scanner will stop transmitting and is put into standby mode.

Powering down your radar scanner

With your radar scanner in standby mode:

1. Select the *[Off]* icon.
2. Select *[Yes]* to confirm power down.

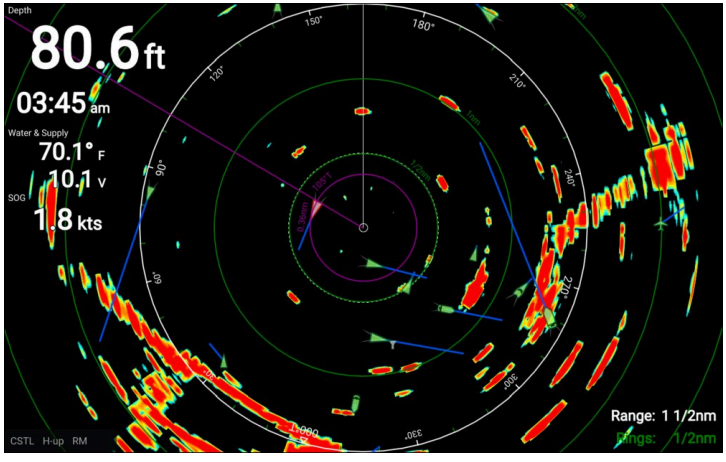
   The radar scanner will still consume a small amount of power whilst it is powered off, this is to ensure the radar can be powered back up quickly.

13.3 Radar app overview

Radio Detection and Ranging (RADAR) is used on the water to detect the presence of objects at a distance, and if they are moving, detect their speed. Radar works by transmitting radio pulses, then detecting reflections of these pulses (echoes) from objects in the area. The Radar app is a navigation aid, used to enhance situational awareness by displaying a visualization of the echoes received by a connected radar scanner.

The Radar app can be displayed in Fullscreen and splitscreen app pages.

For details on how to interpret the radar display refer to:
p.168 — Interpreting the Radar display



Note:

• Some features of the Radar app require your display to have both a GNSS (GPS) position fix and compass heading data available, e.g.: to enable accurate display of AIS targets in relation to your vessel and to report geographical positions (Latitude and Longitude) of the cursor position.

• Radar target tracking and Doppler features are not available in LightHouse™ Sport.

The Radar app allows you to configure a *[Guard Zone]* alarm which is triggered when an object is located within the specified guard zone area.

The Range rings, the bearing ring and a VRM/EBL can be used to identify a target's range and bearing in relation to your vessel.

AIS targets can also be displayed and tracked in the Radar app.

Compatible radar scanners

Element™ displays that include Wi-Fi can be connected wirelessly to the following radar scanners:

- Quantum™ Q24W (E70344)
- Quantum™ Q24C (E70210)
- Quantum™ 2 Doppler Q24D (E70498)

Note:
Element displays do not support tracking of radar targets or doppler features

Radar app controls

The Radar app has 2 control modes, motion mode and cursor mode. The behavior of some controls are dependent upon control mode.

Motion mode

Motion mode is the default mode when the Radar app is opened. In motion mode the cursor is not displayed onscreen.
Controls behavior:

- Pressing the *[OK]* button opens the sensitivity controls.
- Pressing any button on the *[Directional pad]* will switch to Cursor mode.

- Pressing the *[Waypoint]* button will place a waypoint at your vessel's current location.
- Pressing the *[Plus]* or *[Minus]* buttons will range in and range out respectively, centered around your vessel .

Cursor mode

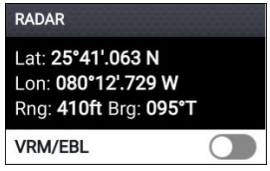
In cursor mode the cursor can be used to select objects onscreen. Controls behavior:

- Pressing the *[OK]* button opens the context menu for the area or object directly under the cursor's position.
- Pressing any button on the *[Directional pad]* moves the cursor in the respective direction.
- Pressing the *[Waypoint]* button will place a waypoint at your vessel's current location.
- Pressing the *[Plus]* or *[Minus]* buttons will range in and range out respectively.
- Pressing the *[Back]* button will switch back to Motion mode.

Note:
Waypoints are not shown in the Radar app.

Radar app context menu

The Radar context menu provides context sensitive data and menu options.



- The Radar context menu is accessed by highlighting a location or object onscreen and pressing the *[OK]* button.
- The context menu provides Latitude, longitude, range and bearing details for the selected location or object in relation to your vessel's position.
- The context menu provides access to the VRM/EBL marker control

13.4 Radar modes

The Radar app provides preset modes that can be used to quickly achieve the best picture depending on your current situation. Only Radar modes supported by your Radar scanner are shown.

To change radar mode select the required mode from the Radar app menu.

[HARBOR]
Harbor mode takes into account land clutter that is typically encountered in a Harbor, so that smaller targets are still visible. This mode is useful when navigating in a Harbor.

[COASTAL]
Coastal mode takes into account slightly higher levels of Sea clutter that are encountered out of Harbor areas. This mode is useful when in open water but keeping to coastal areas.

[OFFSHORE]
Offshore mode takes into account high levels of Sea clutter so that targets are still visible, useful when navigating in open water away from the coast.

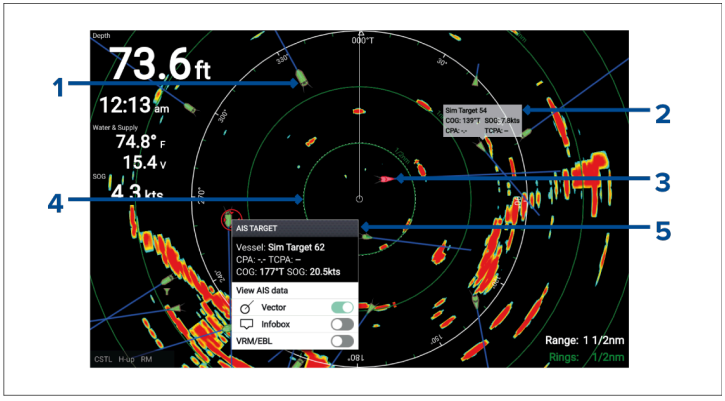
[WEATHER]
Weather mode optimizes the display to help identify precipitation, useful for helping determine weather fronts.

13.5 Automatic Identification System (AIS) support

With compatible AIS hardware connected to your display, AIS targets can be tracked.

AIS equipped vessels that are transmitting their position, and are within range of your vessel, can be represented in the Radar app using AIS target icons.

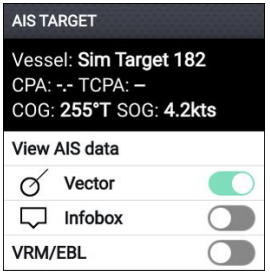
Note:
A maximum of 100 AIS targets can be tracked simultaneously. If there are more than 100 AIS targets within range of your vessel the closest 100 targets will be displayed.



1. **AIS target icon** — Example of an AIS target icon.
2. **AIS Infobox** — Information can be displayed for each AIS target.
3. **Dangerous AIS target icon** — Example of an AIS target icon that is dangerous.
4. **Safe distance ring** — A ring can be displayed which represents the dangerous AIS target alarm's *[Safe distance]*.
5. **AIS context menu** — The AIS context menu is displayed when an AIS target is selected.

AIS target context menu

The AIS target context menu provides context sensitive data and menu options related to AIS targets.

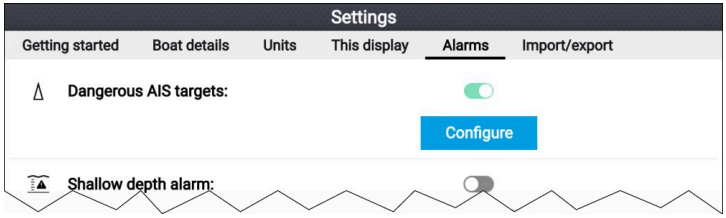


- The AIS target context menu is accessed by highlighting an AIS target onscreen and pressing the *[OK]* button.
- The context menu provides vessel name or MMSI, CPA and TCPA, if available, COG and SOG data.
- The following menu options are available:
  - *[View AIS data]* (displays more detailed AIS data on a fullscreen page)
  - *[Vector]* (enables and disables display of the AIS target vector)Vector is a global setting and applies to both the Radar app and Chart app.
  - *[Infobox]* (displays the AIS data that is shown in the context AIS target context menu onscreen, next to the AIS target)
  - *[VRM/EBL]* (allows creation of a Variable Range Marker / Electronic Bearing Line)

AIS dangerous targets

If AIS targets enter a dangerous target state they can trigger an alarm on your display. AIS targets are considered to be dangerous if they will pass within a specified safe distance from your vessel within a specified time interval.

The dangerous target alarm can be enabled and disabled from the alarms menu: *[Homescreen > Settings > Alarms > Dangerous AIS targets]*.



The dangerous target alarm can be configured from the Dangerous target page, accessed from the alarms menu:*[Homescreen > Settings > Alarms > Dangerous AIS targets > Configure]*.

To set up the AIS dangerous target alarm, first adjust the *[Safe distance]* to the desired value and then select a *[Time to reach safe distance]*. The alarm will be triggered if a tracked target will reach the specified Safe distance from your vessel within the time period selected.

You can display a Safe distance ring around your vessel in the Chart app and Radar app by enabling *[Show safe distance]*.

AIS vectors

Vectors can be displayed for AIS targets.

AIS target vectors settings can be accessed from the *[Target Settings]* tab: *[Menu > AIS Targets > Target Settings]*.

The length of the vector indicates the predicted position of the target after the time interval specified in *[Vectors period]* has passed. Adjusting the *[Vectors period]* option will adjust the length of the vector.

AIS vectors can be enabled and disabled using the *[AIS vectors]* toggle switch.

Target vectors can be enabled and disabled for individual targets: Press and hold on an AIS target to display the context menu, and then select *[Vector]*.

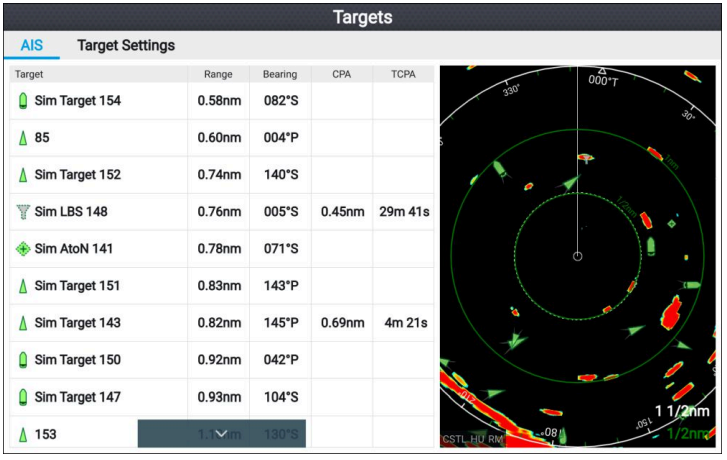
The vectors can be set to *[True]* or *[Relative]*.

	**True vectors** In true mode the vectors are shown ground referenced (i.e.: their actual path over ground).
	**Relative vectors** In relative mode the vectors are shown relative to your vessel's position.

AIS targets list

Tracked AIS targets are listed in the AIS targets list.

The AIS targets list can be accessed from the Radar app menu: *[Menu > AIS Targets]*.



When an AIS target is highlighted in the list the selected AIS target will also be highlight in the LiveView pane.

When an AIS target is selected the AIS target details page is displayed.

AIS Settings

Settings related to AIS can be accessed from the Target Settings menu: *[Menu > AIS Targets > Target Settings]*.

[AIS:]	Enables and disables display of AIS targets in the Chart app. **Note:** When disabled AIS targets and details are still available in the AIS targets list.
[Silent mode (don't transmit my position:]	Your AIS hardware will not transmit any data when in silent mode. In Silent mode AIS data can still be received from other vessels.
[Hide static targets:]	Targets travelling under 2 knots will be hidden, unless the target is dangerous or becomes dangerous.
[AIS vectors:]	Enables and disables display of vectors on AIS targets.
[Vectors period:]	Determines the predicted position of the target (and therefore the length of the vector). **Note:** The Vectors period settings also applies to your vessel's COG vector.
[Reference mode:]	Determines whether vectors are shown in true or relative mode.

AIS target symbols

Different symbols are used to identify type of AIS target and their status.

AIS symbols

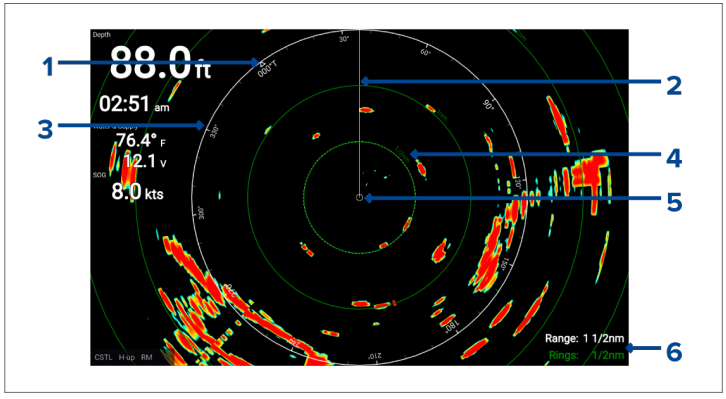
	Sailing Vessel		Commercial
	High speed vessel / Wing In Ground vessel		Cargo vessel
	Passenger vessel		Other
	Land based station		ATON
	SAR (Search and Rescue)		Virtual ATON
	SART (Search and Rescue Transponder)		

AIS target symbol status

	Lost (No border, crossed through)		Uncertain (Dashed outline)
	Dangerous and Uncertain (Dashed outline and Flashes Red)		
	Dangerous (Flashes Red)		ATON off position (Red border)

13.6 Range and bearing

The Radar app helps you identify a target's range (distance) and bearing from your vessel.



1. North indicator (Always points north).
2. SHM (Ships Heading Marker).
3. Bearing indicator ring (White).
4. Range rings with range indicator (Green).
5. Vessel position.
6. Current displayed bearing and range ring separation distance (Range: identifies the distance from your vessel to the bearing indicator ring. Rings: identifies the distance between each range ring).

The displayed range can be adjusted at anytime using the *[Plus]* and *[Minus]* buttons.

Range rings can be switched off from the Presentation tab: *[Menu > Settings > Presentation > Range rings:]*

You can also choose whether to display a numerical range indicator against each ring using the *[Range ring labels:]* option.

VRM (Variable Range Marker) / EBL (Electronic Bearing Line)

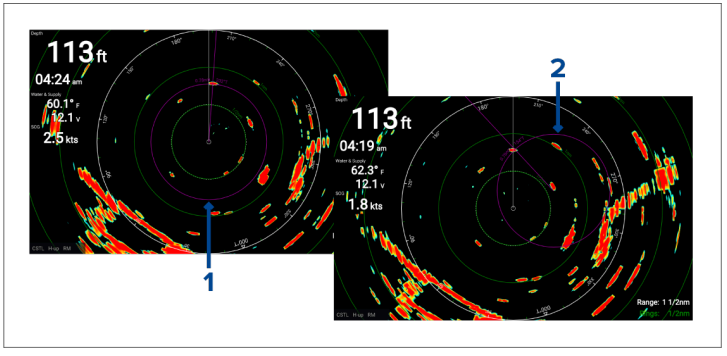
The VRM/EBL is used to determine range and bearing of radar objects.

Variable range marker (VRM)

The VRM is a circle centered on one object and then adjusted so that the circle meets a second object. The range between the 2 objects is displayed along the circle.

Electronic Bearing Line (EBL)

The EBL is a straight line from the center of the VRM to the edge of the screen and signifies the bearing from the object in the center of the VRM to the second object which the EBL should pass through.



1. **Centered VRM/EBL**By default when the VRM/EBL is enabled it will be centered around your vessel. You can use the 'centered' VRM/EBL to determine the range and bearing of an object in relation to your vessel.
2. **Floating VRM/EBL**You can adjust the VRM/EBL so that it is centered on another object, know as a 'floating' VRM/EBL. You can use the floating VRM/EBL to determine the range and bearing between the 2 objects.

The reference point used for the VRM/EBL can be configured to either measure bearing from true north / magnetic north or be a bearing relative to your vessel.

When set to *[True/Mag]* bearing is measured from the display's selected bearing reference (i.e.: True or Magnetic north). The display's bearing reference can be specified from the *[Units]* menu: *[Homescreen > Units > Bearing]*.

When set to *[Relative]* bearings are taken from the Ships Heading Marker (SHM).

Creating a centered VRM/EBL

To create a VRM/EBL centered on your vessel follow the steps below.

From the Radar app:

1. Press a button on the *[Directional pad]* to enter cursor mode.
2. Press the *[OK]* button.

   The radar context menu is displayed.
3. Enable the *[VRM/EBL]* toggle switch.
4. Use the *[Directional pad]* to change the size of the VRM and location of the EBL.
5. Press the *[Back]* button to place the VRM/EBL.

Creating a floating VRM/EBL

To create a floating VRM/EBL follow the steps below

From the Radar app:

1. Press a button on the *[Directional pad]* to enter cursor mode.
2. Press the *[OK]* button.

   The radar context menu is displayed.
3. Enable the *[VRM/EBL]* toggle switch.
4. Press and hold the *[OK]* button for approximately 3 seconds, until the VRM/EBL lines turn White.
5. Use the *[Directional pad]* to change the center location of the VRM.
6. Press and hold the *[OK]* button for approximately 3 seconds, until the VRM/EBL lines turn Blue.
7. Use the *[Directional pad]* to change the location where the VRM and EBL intersect.
8. Press the *[Back]* button to place the VRM/EBL.

Editing a VRM/EBL

Once the VRM/EBL has been placed you can adjust its size and position.

With a VRM/EBL displayed:

1. Press a button on the *[Directional pad]* to enter cursor mode.
2. Press the *[OK]* button.

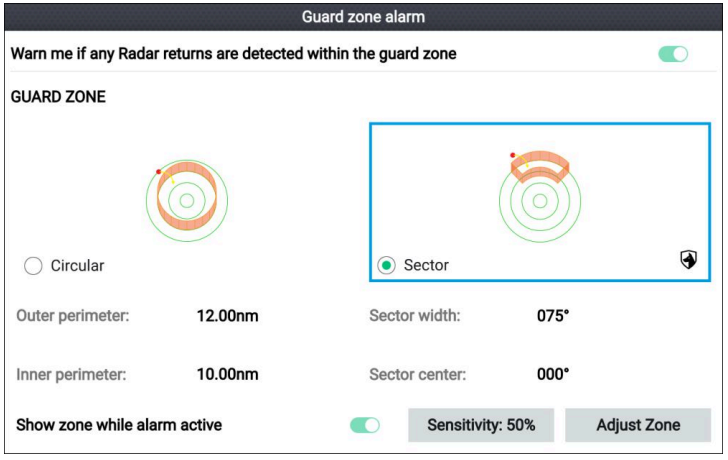
   The radar context menu is displayed.
3. Select *[Edit VRM/EBL]*.
4. Use the *[Directional pad]* to change the size of the VRM and location of the EBL.
5. Press and hold the *[OK]* button for approximately 2 seconds, until the VRM/EBL lines turn White to move the center of the VRM.
6. Press the *[Back]* button to place the VRM/EBL.

13.7 Guard zone alarm

The guard zone alerts you if radar returns (objects) are detected within the specified guard zone area.

The guard zone can be configured from the Guard zone menu:

The guard zone can be configured from the *[Guard zone alarm]* menu: *[Menu > Guard zone alarm]*.

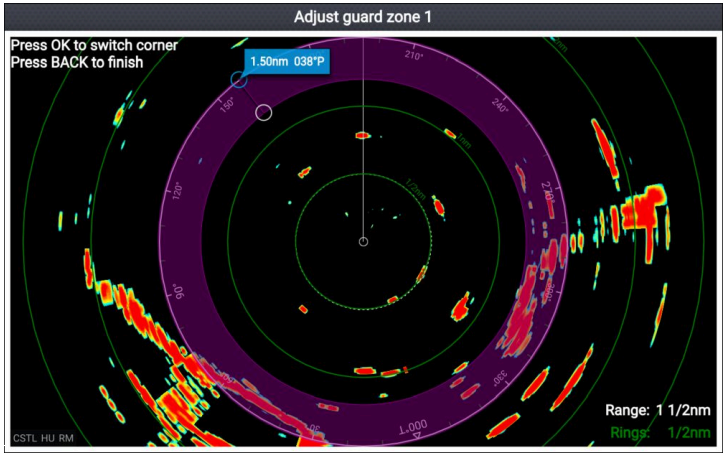


The guard zone can be configured as a sector or as a circle around your vessel.

If required, the sensitivity of the guard zone can be adjusted using the *[Sensitivity:]* field. Sensitivity determines the size at which objects will trigger the alarm. A Higher sensitivity setting will detected smaller objects than a lower sensitivity setting.

Adjusting the guard zone alarm

The size and position of the guard zone can be adjusted.



1. Select *[Adjust zone]* from the guard zone alarm menu.
2. Use the *[Directional pad]* to adjust the size and position of the outer perimeter to the desired location.
3. Press the *[OK]* button to switch to the inner perimeter.
4. Use the *[Directional pad]* to adjust the size and position of the inner perimeter to the desired location.
5. Press the *[Back]* button to set the guard zone.

13.8 Sensitivity controls

Optimum performance is usually achieved using the default settings. You may be able to enhance the radar image using the sensitivity controls.

Sensitivity settings can be accessed by pressing the *[OK]* button while in motion mode, or the *[Adjust sensitivity]* menu: *[Menu > Adjust sensitivity]*.

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Control	Description
	*['G' Gain]* The control determines the signal strength at which target returns are shown onscreen. A higher value produces more target returns and noise onscreen.
	*['R' Rain]* Precipitation appears on the radar screen as lots of small echoes which continuously change size, intensity and position. The rain control suppresses these echoes making it easier to identify real objects. The higher the rain control is set the more echoes will be suppressed.
	*['S' Sea clutter]* Radar echoes from waves can clutter the radar screen. The sea control suppresses these echoes (for up to 5 nm depending on conditions) making it easier to identify real objects. The higher the sea control is set the more echoes will be suppressed.

Control	Description
	*['CG' Color Gain]* The control sets the lower limit for the color used for the strongest target returns. All target returns above this value are displayed in the strongest color. Those with a weaker value are divided equally between the remaining colors.
	*[All to Auto]* Sets all Sensitivity settings to *[Auto]*.

13.9 Radar settings menu

The settings menu provides access to the Radar app's settings and options.

Transmission tab

Description	Options
[Scanner] Displays the name of the connected radar scanner.	N/A

View & Motion tab

Description	Options
[Orientation:] The orientation setting determines how the radar image is displayed onscreen in relation to your vessel.	• *Head-up* — The top of the screen always points towards your vessel's current heading and as your heading changes the radar image rotates accordingly. In head-up the motion mode is fixed to relative motion. • *North-up* — The top of the screen always points towards north and as your vessel's heading changes the SHM rotates accordingly. • *Course-up* — In course-up the top of the screen always points towards your destination and as your heading changes the SHM rotates accordingly.
[Motion mode] Motion mode determines whether your vessel remains in a fixed position onscreen or moves relative to other moving objects.	• *Relative motion* — The position of your vessel remains fixed onscreen and the radar image moves relative to your position. In relative motion mode you

Description	Options
Note: In True motion mode the boat position is fixed to *[Full offset]*.	can adjust your vessel's onscreen position using the boat position setting. • *True motion* — Stationary radar targets remain fixed and moving targets, including your vessel, move in true perspective to each other and to landmass. As your vessel's position reaches the edge of the screen, the image is redrawn to reveal the area ahead.
[Boat position] Boat position determines the position of your vessel onscreen. You can adjust the boat position to provide a greater distance ahead of your vessel. **Note:** Boat position can only be changed in *[Relative motion]* mode.	• *Center* — Vessel position is in the center of the screen • *Partial offset* — Vessel position is partially offset from the center to provide greater distance in front of your vessel. • *Full offset* — Vessel position is fully offset to provide the maximum distance in front of your vessel.

Presentation tab

Description	Options
[Range rings:] Enables and disables display of range rings.	• *On* • *Off*
[Range ring labels:] Enables and disables display of distance labels on each range ring.	• *On* • *Off*
[Show AIS targets in radar:] Enables and disables the display of AIS targets.	• *On* • *Off*
[Silent mode (don't transmit my position):] Enables and disables your vessel's transmission of AIS data.	• *On* • *Off*
[Hide static targets:] Enables and disables the display of static AIS targets.	• *On* • *Off*
[Color palette:] Allows selection of the color palette.	List of color palettes.

Advanced tab

Note:
Under normal circumstances it should not be necessary to adjust Advanced settings.

Description	Option
[VRM/EBL reference:] Determines the reference point used for VRM/EBLs.	• *True/Mag*When set to *[True/Mag]* bearing is measured from the display's selected bearing reference (i.e.: True or Magnetic north). The display's bearing reference can be specified from the *[Units]* menu: *[Homescreen > Units > Bearing]*. • *Relative*When set to *[Relative]* bearings are taken from the Ships Heading Marker (SHM).
[Interference rejection:] Suppresses interference from other close by radar scanners.	• *On* • *Off*

Description	Option
[IR level:] Determines the level of suppression used. The higher the suppression the less interference will be displayed. **Note:** Only available when *[Interference rejection]* is enabled.	• *Level 1* (lowest suppression) • *Level 2* • *Level 3* • *Level 4* • *Level 5* (highest suppression)
[Main Bang Suppression (MBS):] MBS eliminates saturation which appears immediately around your vessel.	• *On* • *Off*
[Target expansion:] When enabled, increases the radar pulse length to provide larger target returns.	• *On* • *Off*
[Bearing alignment:] Enables you to align the radar image correctly in relation to your vessel's bow.	• 179.5° Port to 180° Starboard
[Sea clutter curve (manual mode):] When the sea sensitivity control is set to manual the sea clutter curve setting is available. Radar echoes produced by waves can make it difficult to distinguish between waves and real objects. these echoes are known as 'sea clutter'. The sea clutter curve setting adjusts your radar scanner's sensitivity to sea clutter. The higher setting will display less sea clutter.	• *1* • *2*

Description	Option
[Transmit frequency] Changing the transmit frequency can reduce interference on the radar image by shifting the frequency band used by your radar scanner. **Note:** The transmit frequency settings is only not available when the radar range is set to less than 1/2 nm.	• *Low* • *Normal* • *High*
[Reset advanced settings] Resets the advanced settings to factory defaults.	N/A

Databoxes tab

Settings	Description
[1:]	Determines the data item displayed in databox 1.
[2:]	Determines the data item displayed in databox 2.
[3:]	Determines the data item displayed in databox 3.
[4:]	Determines the data item displayed in databox 4.
[Reset all]	Selecting will reset all databoxes to factory defaults.

Bearing alignment

The radar's bearing alignment ensures that radar echoes (objects) appear at the correct bearing relative to your vessel's bow. You should check the bearing alignment for any new installation.

Checking alignment

Align the bow with a stationary object between 0.25 nm and 2 nm away.
Reduce the gain sensitivity control to make the target as small as possible on the screen.
Note the position of the object on the screen. If the object is not under the ship's heading marker (SHM), then bearing alignment is required.

Adjusting alignment

Adjust the *[Bearing alignment]* setting until the target object appears under the SHM.
[Bearing alignment] setting can be accessed from the *[Advanced]* tab: *[Menu > Advanced > Bearing alignment]*.

CHAPTER 14: TROUBLESHOOTING

CHAPTER CONTENTS

14.1 Troubleshooting

The troubleshooting section provides possible causes and the corrective action required for common problems that are associated with the installation and operation of your product.

Before packing and shipping, all products are subjected to comprehensive testing and quality assurance programs. If you do experience problems with your product, this section will help you to diagnose and correct problems to restore normal operation.

If after referring to this section you are still having problems with your product, please refer to the *Technical support and servicing* section of this manual for useful links and contact details.

14.2 Software update download troubleshooting

When downloading software updates a large file is temporarily downloaded to the display's internal storage which is automatically removed once the update process is complete.

During the software update process the display may run out of internal storage space and display a 'Not enough storage space available' message.
If this message is displayed then repeat the process with a MicroSD card inserted into the display's card reader. The display will then automatically download the file to the memory card instead of the internal storage. The download file will be removed once the update process is complete.

Note:

• It is recommended that a MicroSD card with at least 2 GB of free space is used.

14.3 Downgrading software

In the unlikely event that you need to downgrade your display's software, follow the instructions below.

1. Insert a Micro SD card containing only the downgraded software version into the display's card reader slot.
2. Select *[Update software]* from the Getting started, settings tab (*[Homescreen > Settings > Getting started]*).
3. Select *[Check SD card]*.
4. Use the *[Left]* directional button to highlight the software version and press *[OK]*.

   Details of the current and new software version are displayed.
5. Select *[Yes]*.
6. Use the *[Directional]* buttons to highlight *[Update]*, and then press the *[OK]* button.

   The software will now be downgraded, and the display will restart.

Important:
If you are downgrading from version v3.13.76 (or later) to version v3.10.10 (or earlier), **you must immediately perform a factory reset**, following the 'Factory reset' instructions:
p.146 — Performing a power on reset

14.4 Power up troubleshooting

Troubleshooting assistance with typical causes of power-related issues, and their solutions.

Product does not power up, or keeps switching 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 *Power Connections* 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 product's *Power* 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 product switched on, try carefully flexing the power cable near to the product's *Power* 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 vessel's power supply may be wired incorrectly. Ensure that the product's *Installation Instructions* have been followed completely.

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 power up, or keeps switching off*'.
Software corruption:	1. In the unlikely event that the product's software has become corrupted, try downloading and installing the latest software from: www.bit.ly/rym-software 2. If your product includes a display: as a last resort, attempt to perform a 'Power on Reset'. Be aware that this will delete all settings / presets and user data, and revert the unit back to factory default settings.

Performing a power on reset

There may be circumstances in which it is necessary to reset your display to factory (default) settings; for example, as part of a troubleshooting activity.

Important:
Before performing a power on reset ensure you have backed up your settings and user data to a memory card.

With the display powered off:

1. Press and hold the *[Home]* button.
2. Press and hold the *[Power]* button until the display beeps.
3. Release the *[Power]* button.
4. When the Raymarine logo appears, release the *[Home]* button.
5. Use the *[Down]* button to highlight *[Wipe data/factory reset]*.
6. Press the *[OK]* button.
7. Use the *[Down]* button to highlight *[Yes]*.
8. Press the *[OK]* button.
   The display will now be reset to factory default settings, and all user data will be removed. *'Data wipe complete'* is displayed at the bottom of the screen when the reset is finished.
9. The display will then restart automatically.

14.5 GNSS (GPS) troubleshooting

Potential problems with the GNSS (GPS) receiver and possible causes and solutions are described here.

"No Fix" status icon is displayed, or, display keeps losing position fix

Possible causes	Possible solutions
Geographic location or prevailing conditions preventing satellite fix.	Check periodically to see if a fix is obtained in better conditions or another geographic location.
Display in poor location. For example: • Below decks. • Close proximity to transmitting equipment such as VHF radio.	Ensure the display has an unobstructed view of the sky.

Note:
A GPS / GNSS status screen is accessible from the display's Homescreen. This provides satellite signal strength and other relevant information.

14.6 Sonar troubleshooting

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

"No transducer connected" message displayed

Possible causes	Possible solutions
Incorrect display software version:	Display software may be incompatible with your connected transducer. Ensure that the display is running the latest available software.
Transducer not connected:	Connect compatible transducer. Ensure that the transducer cable connector is fully inserted and locked in position, and then restart the display.
Wrong transducer selected:	Transducer selection is performed as part of the initial start up wizard. If an incorrect transducer was selected, the "No transducer connected" message is displayed each time a new instance of the Fishfinder app is opened. To view the Fishfinder image, press the Menu button and select the fishfinder channel you want to view. To prevent further "No transducer connected" warnings, perform a factory reset and ensure that the correct transducer is selected from the bottom of the *Boat details* page of the startup wizard.
Damaged display connector:	Check that the transducer connector pins on the back of the display are not bent or broken / missing. If damage is detected, replace the display or send it to an authorized service agent for repair.
Damaged transducer or cable:	1. Check that the transducer cable connector is free from damage, is correctly orientated and fully inserted into the display, and that the connector is locked in position. If damage is detected, replace the transducer. 2. Check the condition of the transducer and cabling for signs of damage. If damage is detected, replace the transducer.
Wrong transducer fitted:	Check product and transducer documentation, and ensure that the transducer is compatible with your system. Replace with a compatible transducer, if necessary.

Scrolling image is not being displayed, or is intermittent

Possible causes	Possible solutions
Sonar ping disabled:	Enable sonar ping from the shortcuts page by pressing the *[Power]* button and enabling *[Sonar ping]*.
Transducer location:	Check that the transducer has been installed in accordance with the instructions provided with the transducer. The transducer must be installed where it is , always submerged, is parallel to the waterline and in an area free from turbulence and aeration.
Damaged display connector:	Check that the transducer connector pins on the back of the display are not bent or broken / missing. If damage is detected replace the display or send it to an authorized service agent for repair.
Damaged transducer or cable:	1. Check that the transducer cable connector is free from damage, is correctly orientated and fully inserted into the display and that the connector is locked in position. If damage is detected, replace the transducer. 2. Check the condition of the transducer and cabling for signs of damage. If damage is detected, replace the transducer.
Fouled transducer:	Check transducer condition, ensuring it is free from debris/fouling. If necessary, clean or replace your transducer. After cleaning or replacement coat the transducer using a water-based anti-fouling paint.
Wrong transducer fitted:	Check product and transducer documentation and ensure that the transducer is compatible with your system.
Proximity of high power cables:	If the transducer cable runs too close to engine and other high power cables the transducer signal may be interrupted causing loss of transducer connection and or electrical noise to appear onscreen. These issues may be more prevalent at higher engine revs. Move transducer cable as far away from high power cables as possible.

No depth reading / lost bottom lock

Possible causes	Possible solutions
Transducer location:	Check that the transducer has been installed in accordance with the instructions provided with the transducer.
Transducer angle:	If the transducer angle is too great, the beam can miss the bottom. Adjust transducer angle and re-check.
Transducer kicked-up:	If the transducer has a kick-up mechanism, check that it has not kicked up due to hitting an object.
Power source insufficient:	With the product under load, using a multi-meter, check the power supply voltage as close to the unit as possible, to establish actual voltage when the current is flowing. (Check your product's *Technical specification* for power supply requirements.)
Damaged or fouled transducer:	Check transducer condition, ensuring it is not damaged and is free from debris / fouling. If necessary, clean or replace your transducer. After cleaning or replacement, coat the transducer using a water-based anti-fouling paint.

Possible causes	Possible solutions
Damaged cables:	1. Check the unit's connector for broken or bent pins. 2. Check that the cable connector is fully inserted into the unit, and that the locking collar is in the locked position. 3. Check the cable and connectors for signs of damage or corrosion. Replace if necessary. 4. With the unit switched on, try flexing the power cable near to the display connector, to see if this causes the unit to re-start or lose power. Replace if necessary. 5. Check the vessel's battery voltage, the condition of the battery terminals and power supply cables, ensuring connections are secure, clean and free from corrosion, replace if necessary. 6. With the product under load, using a multi-meter, check for high voltage drop across all connectors/fuses etc (this can cause the Fishfinder applications to stop scrolling or the unit to reset/turn off), replace if necessary.
Vessel speed too high:	Slow vessel speed and re-check.
Bottom too shallow or too deep:	The bottom depth may be outside of the transducer's depth range. Move vessel to shallower or deeper waters as relevant, and re-check.

Poor / problematic image

Possible causes	Possible solutions
Targets will appear differently if your vessel is stationary (e.g.: fish will appear on the display as straight lines):	Increase vessel speed.
Scrolling paused or speed set too low:	Un-pause or increase sonar scrolling speed.
Sensitivity settings may be inappropriate for present conditions:	Check and adjust sensitivity settings, or perform a Sonar reset.

Possible causes	Possible solutions
Damaged cables:	1. Check the unit's connector for broken or bent pins. 2. Check that the cable connector is fully inserted into the unit, and that the locking collar is in the locked position. 3. Check the cable and connectors for signs of damage or corrosion, replace if necessary. 4. With the product switched on, try flexing the cable near to the display connector to see if this causes the product to re-start or lose power. Replace if necessary. 5. Check the vessel's battery voltage, the condition of the battery terminals and power supply cables, ensuring that connections are secure, clean and free from corrosion. Replace if necessary. 6. With the product under load, using a multi-meter, check for high voltage drop across all connectors / fuses etc (this can cause the Fishfinder applications to stop scrolling, or the unit to reset / switch off). Replace if necessary.
Transducer location:	• Check that the transducer has been installed in accordance with the instructions provided with the transducer. • If a transom mount transducer is mounted too high on the transom, it may be lifting out of the water. Check that the transducer face is fully submerged when planing and turning.
Transducer kicked-up:	If the transducer has a kick-up mechanism, check that it has not kicked up due to hitting an object.

Possible causes	Possible solutions
Damaged or fouled transducer:	• Check transducer condition, ensuring it is not damaged and is free from debris / fouling. If necessary, clean or replace the transducer. • After cleaning or replacement, coat the transducer using a water-based anti-fouling paint.
Damaged transducer cable:	Check that the transducer cable and connection is free from damage, and that the connections are secure and free from corrosion.
Turbulence around the transducer at higher speeds may affect transducer performance:	Slow vessel speed and re-check.
Interference from another transducer:	1. Switch off the transducer causing the interference. 2. Re-position the transducers so that they are farther apart.
Unit power supply fault:	Check the voltage from the power supply, if this is too low it can affect the transmitting power of the unit.

14.7 Radar troubleshooting

No connection can be made to the scanner

Possible causes	Possible solutions
Radar powered down	• Power up the Radar scanner by opening the Radar app and selecting the *[Power]* icon. • Quantum-Series Radar scanners will shut down after 30 minutes has elapsed since a Wi-Fi connection was made to an MFD / chartplotter.
Radar not transmitting	• Select *[Transmit]* for the relevant Radar scanner from the Radar app.
Missing or incorrect Wi-Fi credentials	• Check that you have entered the correct SSID and passcode for your Radar scanner. Both the SSID and passcode are provided on the Radar scanner's packaging, and are also shown on the serial number label on the underside of the product.
Damaged or disconnected Power cable	1. Check that the cable connectors are fully inserted and locked in position. 2. Check the power supply cable and connectors for signs of damage or corrosion, replace if necessary. 3. With the product switched on, try flexing the cable near to the display's connector, to see if this causes the product to re-start or lose power; replace if necessary. 4. Check the vessel's battery voltage, the condition of the battery terminals and power supply cables, ensuring that 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 (this can cause the product to reset / power down); replace if necessary. 6. Check condition of relevant breakers and fuses, and replace if necessary. If the breaker keeps tripping or fuses keep blowing, contact a Raymarine authorized dealer for assistance.
Software mismatch between equipment may prevent communication	• Ensure that the Radar scanner's software version is compatible with the software running on your MFD / chartplotter. **Important:** • Due to a required software security update, Quantum-Series Radar scanners running v2.52 software (or later) require your Element-Series MFD / chartplotter to be running LightHouse Sport v3.19.17 (or later).

Poor image quality

Possible causes	Possible solutions
High network bandwidth usage may interfere with the Wi-Fi	• Disconnect other devices connected wirelessly. • Try power-cycling the system.

Displayed bearing is different to the true bearing

Possible causes	Possible solutions
Bearing alignment adjustment required	• Carry out the Bearing Alignment procedure. For more information, refer to: **p.152 — Bearing alignment**

14.8 Bearing alignment

The radar's bearing alignment ensures that radar echoes (objects) appear at the correct bearing relative to your vessel's bow. You should check the bearing alignment for any new installation.

Checking alignment

Align the bow with a stationary object between 0.25 nm and 2 nm away.
Reduce the gain sensitivity control to make the target as small as possible on the screen.
Note the position of the object on the screen. If the object is not under the ship's heading marker (SHM), then bearing alignment is required.

Adjusting alignment

Adjust the *[Bearing alignment]* setting until the target object appears under the SHM.
[Bearing alignment] setting can be accessed from the *[Advanced]* tab: *[Menu > Advanced > Bearing alignment]*.

14.9 Wi-Fi troubleshooting

Before troubleshooting problems with your Wi-Fi connection, ensure that you have followed the Wi-Fi location requirements guidance provided in the relevant *Installation Instructions*, and have also performed a power cycle / restart of the devices that you are experiencing problems with.

Cannot find network

Possible causes	Possible solutions
Wi-Fi not currently enabled on devices.	Ensure that Wi-Fi is enabled on both Wi-Fi devices, and then re-scan available networks.
Some devices may automatically turn off Wi-Fi when not in use to save power.	Power cycle / restart devices, and then re-scan available networks.
Device not broadcasting.	1. Enable broadcasting of the device's network using the Wi-Fi settings on the device you are trying to connect to. 2. You may still be able to connect to the device even when it is not broadcasting, by manually entering the device's Wi-Fi Name / SSID and passphrase in the connection settings of the device you are trying to connect to.
Devices out of range or signal being blocked.	Move devices physically closer together or, if possible, remove the obstructions and then re-scan available networks.

Cannot connect to network

Possible causes	Possible solutions
Some devices may automatically turn off Wi-Fi when not in use to save power.	Power cycle / restart devices, and then retry the connection.
Trying to connect to the wrong Wi-Fi network	Ensure that you are trying to connect to the correct Wi-Fi network. The Wi-Fi network's name can be found in the Wi-Fi settings on the broadcasting device (the device that you are trying to connect to).
Incorrect network credentials	Ensure that you are using the correct passphrase. The Wi-Fi network's passphrase can be found in the Wi-Fi settings on the broadcasting device (the device that you are trying to connect to).
Bulkheads, decks and other heavy structure can degrade and even block the Wi-Fi signal. Depending on the thickness and material used it may not always be possible to pass a Wi-Fi signal through certain structures	1. Try repositioning the devices so that structure is removed from the direct line of sight between the devices, or: 2. If possible, use a wired connection instead.
Interference being caused by other Wi-Fi enabled or older Bluetooth enabled devices (Bluetooth and Wi-Fi both operate in the 2.4 GHz frequency range, some older bluetooth devices may interfere with Wi-Fi signals.)	1. Change the Wi-Fi Channel of the device you are trying to connect to, and then retry the connection. You can use a free Wi-Fi analyzer app on your mobile or tablet device to help you choose a better channel (i.e. a channel with the least amount of traffic). 2. Temporarily disable each wireless device in turn until you have identified the device causing the interference.
Interference caused by other devices that use the 2.4GHz frequency band. The following common devices use the 2.4GHz frequency band: • Microwave ovens • Fluorescent lighting • Cordless phones / baby monitors • Motion sensors	Temporarily switch off each device in turn until you have identified the device causing the interference, then remove or re-position the offending device(s).
Interference caused by electrical and electronic devices and associated cabling could generate an electromagnetic field which may interfere with the Wi-Fi signal.	Temporarily switch off each item in turn until you have identified the device causing the interference, then remove or re-position the offending device(s).

Connection extremely slow and / or keeps dropping out

Possible causes	Possible solutions
Wi-Fi performance degrades over distance, resulting in products farther away receiving less network bandwidth. Products installed close to their maximum Wi-Fi range will experience slow connection speeds, signal drop-outs, or not being able to connect at all.	• Move devices physically closer together. • For fixed installations such as a Quantum Radar, enable the Wi-Fi connection on a display installed closer to the device.
Interference being caused by other Wi-Fi enabled or older Bluetooth enabled devices (Bluetooth and Wi-Fi both operate in the 2.4 GHz frequency band; some older Bluetooth devices may interfere with Wi-Fi signals.)	1. Change the Wi-Fi Channel of the device you are trying to connect to, and then retry the connection. You can use a free Wi-Fi analyzer app on your mobile or tablet device to help you choose a better channel (i.e. a channel with the least amount of traffic). 2. Temporarily switch off each device in turn until you have identified the device causing the interference, then remove or re-position the offending device(s).
Interference from devices on other vessels. When in close proximity to other vessels, such as when moored up in a marina, many other Wi-Fi signals may be present.	1. Change the Wi-Fi Channel of the device you are trying to connect to, and then retry the connection. You can use a free Wi-Fi analyzer app on your mobile or tablet device to help you choose a better channel (i.e. a channel with the least amount of traffic). 2. If possible, move your vessel to a location with less Wi-Fi traffic.

Network connection established, but no data

Possible causes	Possible solutions
Connected to the wrong network	Ensure that your device is connected to the correct network.
Device software incompatibility	Ensure both devices are running the latest available software.
The device may be defective	1. Try updating software to a later version, or: 2. Re-install the software. 3. Obtain new replacement device.

CHAPTER 15: TECHNICAL SUPPORT

CHAPTER CONTENTS

15.1 Raymarine technical 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.

Servicing and warranty

Raymarine offers dedicated service departments for warranty, service, and repairs.
Visit the Raymarine website to **read the latest warranty policy**, and **register** your product's warranty online:

- www.bit.ly/rym-warranty

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

- Web: www.bit.ly/rym-service
- Tel: +44 (0)1329 246 932

United States (US):

- Web: www.bit.ly/rym-service
- Tel: +1 (603) 324 7900

Web support

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

- **Manuals and Documents** — www.bit.ly/rym-docs
- **Technical support forum** — www.bit.ly/rym-support
- **Software updates** — www.bit.ly/rym-software

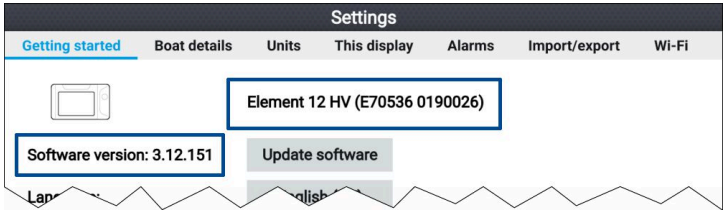
Telephone and online support

Region	Contact details
All regions	**Online support:** www.bit.ly/rym-support
United Kingdom (UK) and EMEA	**Telephone:** +44 (0)1329 246 777 **Address:** Marine House, Cartwright Drive, Fareham, PO15 5RJ, UK.
United States (US)	**Telephone:** Tel: +1 (603) 324 7900 (Toll-free: +800 539 5539) **Address:** 110 Lowell Road, Hudson, NH 03051, USA.
Australia and New Zealand (Raymarine subsidiary)	**Telephone:** +61 2 8977 0300 **Address:** Suite 1.01, 26 Rodborough Road, Frenchs Forest, NSW, 2086, Australia.
France (Raymarine subsidiary)	**Telephone:** +33 (0)1 46 49 72 30 **Address:** 35 avenue Michel Crépeau, 17000 La Rochelle - France.
Germany (Raymarine subsidiary)	**Telephone:** +49 40 237 808 0 **Address:** Atlantic-Haus, Zirkusweg 1, 20359 Hamburg.
Italy (Raymarine subsidiary)	**Telephone:** +39 02 9945 1001 **Address:** Via L. Manara 2, 20812 Limbiate (MB), Italy.
Spain (Authorized Raymarine distributor)	**Telephone:** +34 96 2965 102 **Email:** sat@azimut.es
Netherlands / Benelux (Authorized Raymarine distributor)	**Telephone:** +31 (0)26 3614 905 **Address:** Florijnweg 21G, 6883 JN VELP, Nederland.

Region	Contact details
Sweden (Raymarine subsidiary)	**Telephone:** +46 (0)317 633 670 **Address:** Bolshedens Industriväg 18, 427 50 Billdal, Sweden.
Finland (Raymarine subsidiary)	**Telephone:** +358 (0)207 619 937 **Address:** Suomalaistentie 1-3, 02270 Espoo, Finland.
Norway (Raymarine subsidiary)	**Telephone:** +47 692 64 600 **Address:** Årvollskogen 30, 1529 Moss, Norway.
Denmark (Raymarine subsidiary)	**Telephone:** +45 437 164 64 **Address:** Centervej 7, 4600 Køge, Denmark.
Russia (Distributor)	**Telephone:** Tel: +7 495 788 0508 **Email:** info@mikstmarine.ru

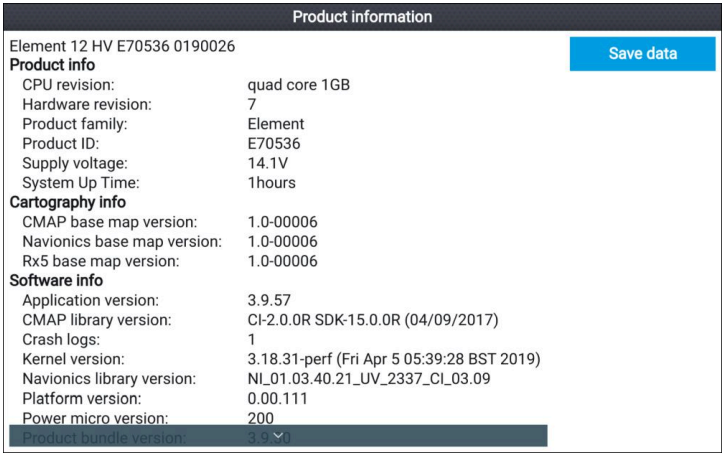
Identify display variant and software version

Refer to the Getting started menu: *[Homescreen > Settings > Getting started]* on your display to identify product variant and current software version.



Viewing product information

You can view detailed product information about your display.



1. Select the *[Settings]* icon from the *[Homescreen]*.
2. Select the *[This display]* tab.
3. Select *[About this product]* from the *[DIAGNOSTICS]* section.
4. If the *[Save data]* button is highlighted press the *[Left]* button.
5. Use the *[Up]* button and *[Down]* button to scroll through the available information.

Saving product information

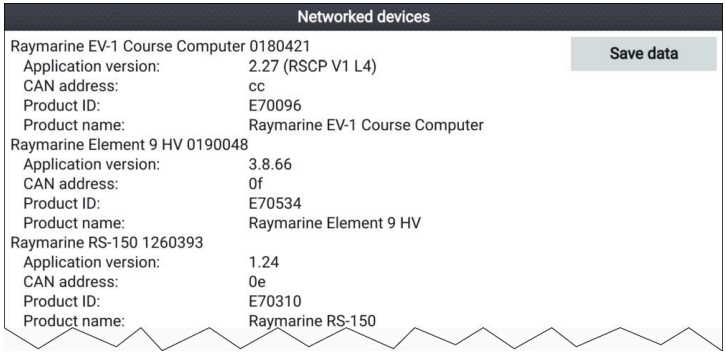
The information displayed on the Product information page can be saved to memory card.

With the Product info page displayed:

1. Use the *[Right]* button to select *[Save data]*.
2. Enter a filename for the data using the onscreen keyboard, or keep the default filename.
3. Select *[Save]*.
4. Select *[Eject card]* to safely remove the memory card, or select *[OK]* to return to the *[Product information]* page.

Viewing information about networked products

Product information for networked products can be viewed from the Networked devices list.



From the Homescreen:

1. Select *[Settings]*.
2. Select *[This display]*.
3. Select *[Networked devices]*.

   Product information for compatible connected products is displayed.
4. If required, use the *[Up]* and *[Down]* buttons to scroll through the list of product information.
5. Press the Right button to highlight the *[Save data]* button, to save product information to a memory card.

Saving system logs

You can save system logs to memory card for diagnostic purposes.

From the Homescreen settings menu: *[Homescreen > Settings]*.

1. Select *[This display]*.
2. Select *[Logs]*.

   The Logs pop-over menu is displayed. The pop-over menu will identify whether there are any logs that can be saved.
3. Select *[Save system logs]*.

15.2 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

- http://www.youtube.com/user/RaymarineInc

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:

- www.bit.ly/rym-training

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:

- www.bit.ly/rym-support

Appendix A Compatible autopilot controllers

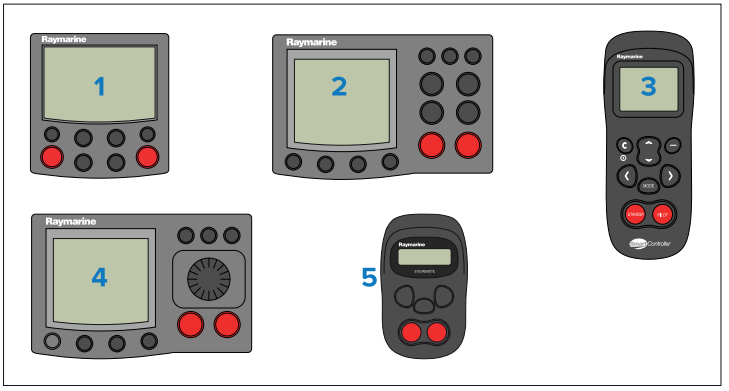
A SeaTalk NG autopilot controller is required to operate your autopilot system. A SeaTalk autopilot controller can be used when connected via a SeaTalk to SeaTalk NG converter, but may have limited functionality.

It is also possible to use more than one autopilot controller to control your autopilot system.

SeaTalk NG autopilot controllers

	Description
1	p70s (E70328)
2	p70Rs (E70329)
3	p70 (E22166)
4	p70R (E22167)
5	ST70 (E22105)
6	ST70+ (E22115)

SeaTalk® autopilot controllers



	Description
1	ST6002 (E12098–P / E12100–P)
2	ST7002 (E12099–P / E12182)
3	ST8002 (E12119–P / E12183)
4	S100 (repeat controller only) (E15024)
5	SmartController (repeat controller only) (E15023)

Appendix B NMEA 2000 PGNs

Administration PGNs

- **59392** — ISO Acknowledge (Receive / Transmit)
- **59904** — ISO Request (Receive / Transmit)
- **60160** — ISO Transport Protocol, Data Transfer (Receive)
- **60416** — ISO Transport Protocol, Connection Management — BAM Group Function (Receive)
- **60928** — ISO Address Claim (Receive / Transmit)
- **65240** — ISO Commanded address (Receive)
- **126208** — NMEA — Request, Commanded, Acknowledged Group Function (Receive / Transmit)
- **126464** — PGN Transmit and Receive List (Receive / Transmit)
- **126996** — Product Information (Receive / Transmit)
- **126998** — Configuration Information (Receive / Transmit)

Data PGNs

- (1)**126992** — System Time (Receive / Transmit)
- **126993** — Heartbeat (Receive / Transmit)
- **127237** — Heading/Track Control (Receive)
- **127245** — Rudder (Receive)
- **127250** — Vessel Heading (Receive)
- **127251** — Rate of Turn (Receive)
- **127258** — Magnetic Variation (Transmit)
- **127488** — Engine Parameters, Rapid Update (Receive)
- **127489** — Engine Parameters, Dynamic (Receive)
- **127493** — Transmission Parameters, Dynamic (Receive)
- **127496** — Trip Parameters, Vessel (Receive)
- **127497** — Trip Parameters, Engine (Receive)
- **127498** — Engine Parameters, Static (Receive)
- **127503** — AC input status (Receive)
- **127504** — AC output status (Receive)
- **127505** — Fluid Level (Receive)
- **127506** — DC detailed status (Receive)
- **127507** — Charger status (Receive)
- **127508** — Battery status (Receive)
- **127509** — Inverter status (Receive)
- **128259** — Speed, (Receive / Transmit)
- **128267** — Water Depth (Receive / Transmit)
- **129025** — Position rapid update (Transmit)
- (1)**129026** — COG & SOG, Rapid Update (Receive / Transmit)
- (1)**129029** — GNSS Position Data (Receive / Transmit)
- (1)**129033** — Time & Date (Transmit)
- **129038** — AIS Class A Position Report (Receive)
- **129039** — AIS Class B Position Report (Receive)
- **129040** — AIS Class B Extended Position Report (Receive)
- **129041** — AIS Aids to Navigation (AtoN) Report (Receive)
- (1)**129044** — Datum (Transmit)
- **129283** — Cross Track Error (Receive / Transmit)
- **129284** — Navigation Data (Transmit)
- **129285** — Navigation — Route / WP Information (Transmit)
- **129291** — Set & Drift, Rapid Update (Receive / Transmit)
- (1)**129539** — GNSS DOPs (Receive / Transmit)
- (1)**129540** — GNSS Sats in View (Receive / Transmit)
- (1)**129542** — GNSS Pseudorange Noise Statistics (Receive / Transmit)
- (1)**129547** — GNSS Pseudorange Error Statistics (Receive / Transmit)
- **129793** — AIS UTC and Date Report (Receive)
- **129794** — AIS Class A Static and Voyage Related Data (Receive)
- **129798** — AIS SAR Aircraft Position Report (Receive)
- **129801** — AIS Addressed Safety Related Message (Receive)
- **129802** — AIS Safety Related Broadcast Message (Receive)
- **129809** — AIS Class B "CS" Static Report, Part A (Receive)

- **129810** — AIS Class B "CS" Static Report, Part B (Receive)
- **130064** — Route and WP Service — Database List (Receive / Transmit)
- **130070** — Route and WP Service — WP Comment (Receive / Transmit)
- **130072** — Route and WP Service — Database Comment (Receive / Transmit)
- **130074** — Route and WP Service — WP List — WP Name & Position (Receive / Transmit)
- **130306** — Wind Data (Receive)
- **130310** — Environmental Parameters (Receive)
- **130311** — Environmental Parameters (Receive)
- **130312** — Temperature (Receive)
- **130576** — Small Craft Status (Receive)
- **130577** — Direction Data (Receive)

Note:
(1) Only transmitted when *[Send GPS to VHF:]* setting is enabled, from the GPS / GNSS Settings menu.

Appendix C LightHouse Sport software release history

The list below is a cumulative list of the new features introduced in subsequent releases of the LightHouse Sport software, since the initial release (v3.8.55; February 2019).

This list includes *new features* only. It does NOT include software maintenance items, such as bug fixes or performance improvements.
To download the software, and view the complete list of all software updates, including new features, bug fixes, and performance improvements, visit:

LightHouse Sport software download link
www.bit.ly/rym-element-download

LightHouse Sport v3.20.88 New features

(Software release date: *September 2025*)
New features:

New feature	More information
Automatic software updates: With an active Internet connection, the chartplotter checks for software updates at start up. If an update is available, a notification will be displayed.	**p.34 — Automatic software update check**
Cybersecurity Updates & Patches	

LightHouse Sport v3.20.65 New features

(Software release date: *December 2024*)
New features:

New feature	More information
Added support for LightHouse Charts version 2 charts and improved performance of Chart app	LightHouse Charts Gen 2 and improved Chart app performance**LightHouse Charts Gen 2 and improved Chart app performance**
The chart layer for *[Streets & POI]*has been split into separate controls for *[Roads]* and *[POIs]*.	**p.95 — Chart settings**

LightHouse Sport v3.19.17 New features

(Software release date: *May 2024*)
New features:

New feature	More information
Software update to maintain compatibility with Quantum-Series radar scanners running software v2.52 or later.	**p.17 — Quantum software compatibility**

LightHouse Sport v3.19.10 New features

(Software release date: *June 2023*)
New features:

New feature	More information
Various improvements to the LightHouse Charts (objects and detail).	N/A
Various improvements to the Navionics chart layers (Land features can be toggled on/off).	N/A

LightHouse Sport v3.19.1 New features

(Software release date: *February 2023*)
New features:

New feature	More information
This release ensures that Element displays fall below allowable Radio Frequency (RF) emissions.	N/A

LightHouse Sport v3.18.11 New features

(Software release date: *December 2022*)
New features:

New feature	More information
Support for updated Australia and New Zealand region LightHouse Charts, including Tide and Current data for those regions.	N/A
Improved performance for LightHouse Charts	N/A

LightHouse Sport v3.17.37 New features

(Software release date: *October 2022*)
New features:

New feature	More information
New hybrid engine for improved performance for LightHouse Charts.	N/A
Support for 2022 Ireland/Great Britain tides.	N/A
Sonar bottom tracking algorithm improvements.	N/A

LightHouse Sport v3.16.38 New features

(Software release date: *October 2021*)
New features:

New feature	More information
Nautical miles & Yards (NM & yd) added as a unit of measure for distance.	p.127 — Units of measure

LightHouse Sport v3.15.50 New features

(Software release date: *August 2021*)
New features:

New feature	More information
Added support for Reeds almanac on LightHouse Charts.	p.91 — Reeds almanac
New minimum sonar depth alarm.	p.56 — Alarm settings
Anchor drift alarm renamed Position drift.	p.56 — Alarm settings
Depth and Water Temp now stored against Waypoints and Track Points.	N/A
Currents and Tides now available for France, with updated LightHouse Charts.	N/A

LightHouse Sport v3.14.92 New features

(Software release date: *June 2021*)
New features:

New feature	More information
Added support for North America LightHouse Charts.	N/A
High resolution contours in Fishing Mode only for North America charts	N/A
Tides and Currents are now available at greater zoom levels.	N/A
Improved Tides and Currents, and Current stations now available for LightHouse Charts Great Britain/Ireland and North America.	N/A

LightHouse Sport v3.14.24 New features

(Software release date: *March 2021*)
New features:

New feature	More information
Added Arabic keyboard for waypoint editing.	N/A
Added further support and improvements for LightHouse Charts.	N/A

LightHouse Sport v3.13.76 New features

(Software release date: *January 2021*)
New features:

New feature	More information
Added compatibility with new LightHouse Charts.	p.81 — LightHouse charts
Added compatibility with new Raymarine mobile app.	p.42 — Raymarine app
Added new Wi-Fi settings tab.	p.40 — Wireless (Wi-Fi) connections
Added 256 color palette Radar overlay in Chart app.	N/A

LightHouse Sport v3.10.10 New features

(Software release date: *November 2019*)
New features:

New feature	More information
Ice fishing activity and fishfinder modes added.	Ice fishing modes

LightHouse Sport v3.9.98 New features

(Software release date: *June 2019*)
New features:

New feature	More information
Added Radar app.	p.129 — Radar app
Added Quantum-Series Wi-Fi pairing controls.	p.130 — Pairing a Quantum-Series Radar scanner
Enabled waypoint sharing between Element-Series displays	p.66 — Waypoint sharing
Enabled output of navigation data to an autopilot.	p.87 — Autopilot command

LightHouse Sport v3.9.40 New features

(Software release date: *April 2019*)
New features:

New feature	More information
Added Automatic Identification System (AIS) support and settings in chart app.	p.83 — Automatic Identification System (AIS) support
Added Tides mode and settings in chart app.	p.91 — Tides mode
Added support for multiple data sources.	p.39 — Multiple data sources (MDS)
Added support for external GPS source.	N/A
Added support for speed and wind data items in databoxes and dashboard app.	p.123 — Data items
Added unit of measure options for wind speed.	p.127 — Units of measure
Added Estonian user interface language.	N/A
Updated NMEA 2000 PGN support.	p.160 — NMEA 2000 PGNs
Updated vessel activity and icons to include sailing.	p.31 — Startup wizard
Added new sailing page to dashboard app.	p.122 — Navigation and sailing dials
Updated troubleshooting options (new ‘networked devices’ list, ‘about this product’ and ‘logs’ options) and renamed section diagnostics.	p.57 — Settings menu

LightHouse Sport v3.8.66 New features

(Software release date: *March 2019*)
New features:

New feature	More information
Initial release for 12 inch displays.	N/A

LightHouse Sport v3.8.55 New features

(Software release date: *February 2019*)
New features:

New feature	More information
Initial release for 7 and 9 inch displays.	N/A

Appendix D Interpreting the Sonar display

Factors influencing the sonar display

The quality and accuracy of the sonar display can be influenced by a number of factors including vessel speed, target depth, target size, background noise, interference, and transducer frequency. Understanding these factors can assist you in interpreting what the sonar is displaying.

Vessel speed

- **Target shape** — The target shape changes, depending on vessel speed. Slower speeds return flatter, more horizontal marks. Higher speeds cause the target to thicken and arch slightly, until at fast speeds the mark resembles a double vertical line.
- **Cavitation** — At higher vessel speeds, propellers cause air bubbles to be formed, which appear as noise on the sonar screen, making it difficult to detect targets.

Target depth

Deeper targets will appear smaller and lighter onscreen, compared to targets of the same size that are closer to the surface.

Target size

Generally, target size is relative; the larger the target, the larger the target will appear onscreen.

Background noise

The sonar image can be negatively impacted by returns received from: floating or submerged debris, propeller wash, rain, sea state, or vessel movement. This noise reduces target detection performance. The *[Sensitivity settings]* can be used to help reduce impact of noise. Some settings can also be automatically controlled according to depth and water conditions.

Interference

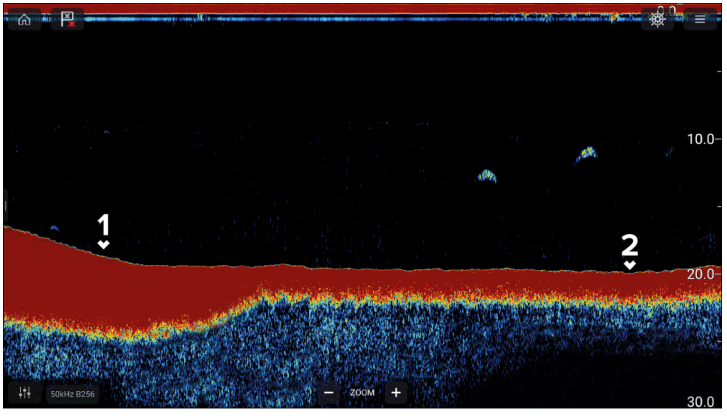
Interference from other nearby sonar operating in close frequency proximity can negatively impact the sonar image. This interference, known as “cross-talk interference” causes vertical “rain drops” throughout the water column.

Transducer frequency

- **Low frequency (e.g.: 50 kHz)** — Lower frequencies can penetrate deeper into the water column than higher frequencies, but at reduced resolution. Lower frequencies are not as effective at detecting smaller targets.
- **High frequency (e.g.: 200 kHz)** — Higher frequencies provide better resolution at shallower depths. Higher frequencies are more effective at detecting smaller targets.
- **CHIRP sonar** — CHIRP sonar combines both low and high frequency ranges, providing the benefits of both.

Interpreting the bottom

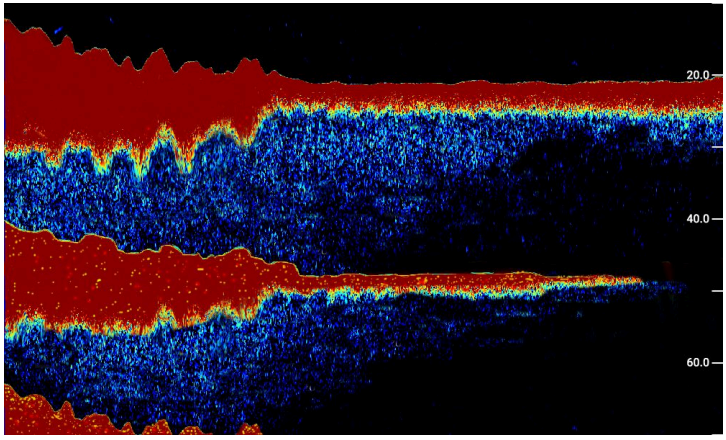
The bottom is represented by a solid line at the bottom of the screen and usually produces a strong echo. As a general rule: the thicker the bottom line, the harder the bottom.



1. Hard bottom.
2. Soft bottom.

Multiple bottoms

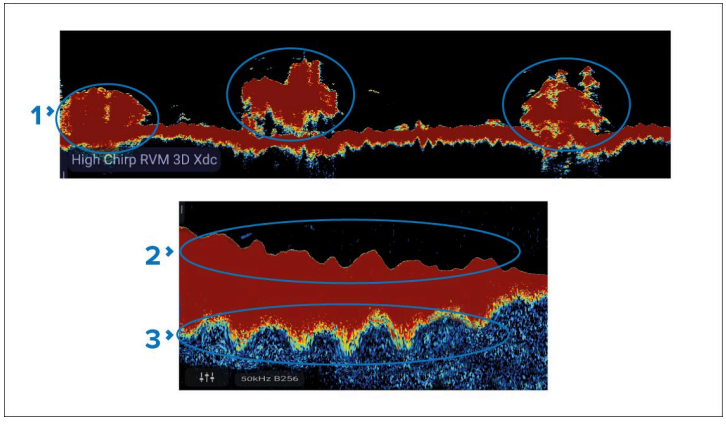
It is possible that the sonar signal can make 2 or more complete trips: hitting the bottom, bouncing off the vessel, and then reflecting off the bottom again. This is most common in shallow waters, or if the bottom is very hard.



Hard bottoms

A hard bottom produces a stronger sonar signal which is displayed as a thicker, solid bottom line, primarily consisting of the color used to represent the strongest returns (e.g.: the darkest color). Hard bottoms may produce a more prominent second bottom line onscreen.

Examples



Hard structure like rocks (2) and wrecks (1) will be displayed as solid returns connected to the bottom , producing an irregular line with peaks and troughs. Tails (3) protruding below the bottom line are another sign of a hard bottom.
When trying to identify a hard bottom, you can set the sonar depth to 3 or 4 times the actual depth and a second or multiple bottoms should appear under hard bottom areas.

Soft bottoms

A soft bottom produces a weaker sonar signal, which is displayed as a thinner overall line. Soft bottoms can also produce voids under the bottom line, instead of weaker returns.

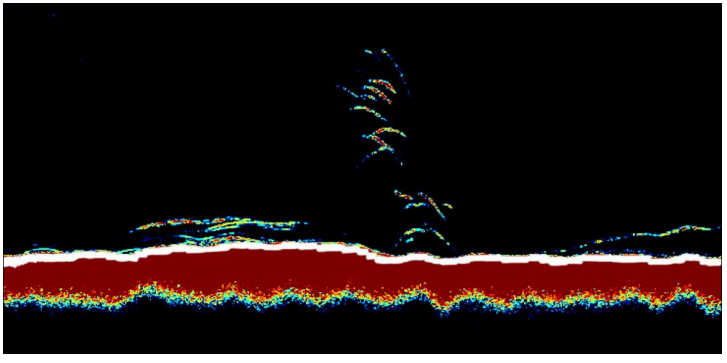
Mixed bottom

A mixed hard and soft bottom may result in a mixture of strong and weak returns.

Note:
Sonar settings can usually be changed to use different, or inverted color palettes. Ensure that you know which colors are being used to represent strong and weak signals.

Bottom line

The bottom line feature displays a white line along the bottom, which helps distinguish between the bottom and targets close to the bottom.



Interpreting objects on the sonar display

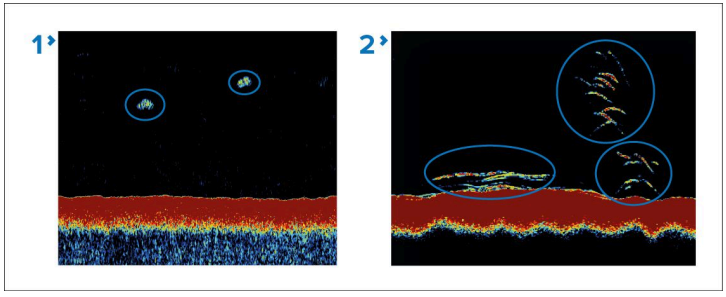
The size at which a target appears on the sonar display is dependent on many factors, and may not be proportional to its actual physical size.

Moving targets (fish)

Moving targets (such as fish) appear as objects in the water column. The shape and size of a displayed target do not necessarily reflect actual target shape and size. Target shape and size are influenced by the sonar technology in use and the velocity of the target.

1. When using traditional **non-CHIRP sonar**: Fish targets appear as blob-like shapes on the screen.
2. When using traditional **CHIRP sonar**: Fish targets appear as arches on the screen.

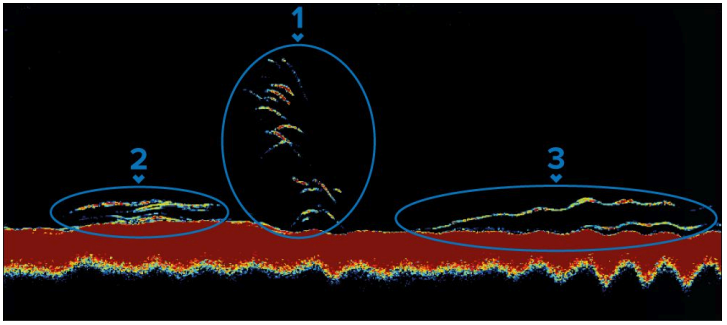
Traditional non-CHIRP vs CHIRP



Target's length

The length of targets is determined by the duration of time in which the detected target is in the transducer's beam. If the target passes through the transducer beam quickly, the target will be narrow. The longer the target is within the transducer beam, the longer the target will appear on the screen.

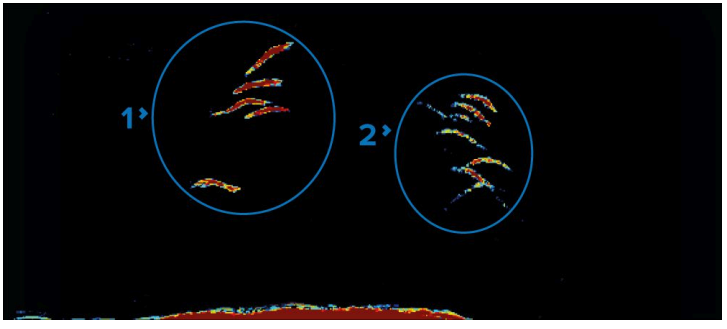
Fish arches



With CHIRP sonar, targets travelling through the transducer beam will appear as arches (1). This is because the transducer's beam is weaker at the edges than in the middle. Either side of the arch represents the weaker signal, and the center of the arch represents the target passing through the strongest part of the transducer beam. Targets that look like half an arch, have passed through the beam too quickly for the complete arch to be formed. The slower a target moves through the beam, the flatter and longer it becomes (2). If the target remains under the transducer beam for a long time, the target will appear as a flat line stretching across the screen (3).

Target's vertical width

The vertical width of a target can be used to help differentiate a target's size. The bigger the vertical width, the bigger the target. For fish, the size of the displayed target is dependent on the size of the fish's swim bladder, rather than its overall size. Fish swim bladder size varies between different species of fish. **The fish bladder is represented by the vertical width of the target, at or near its center.**

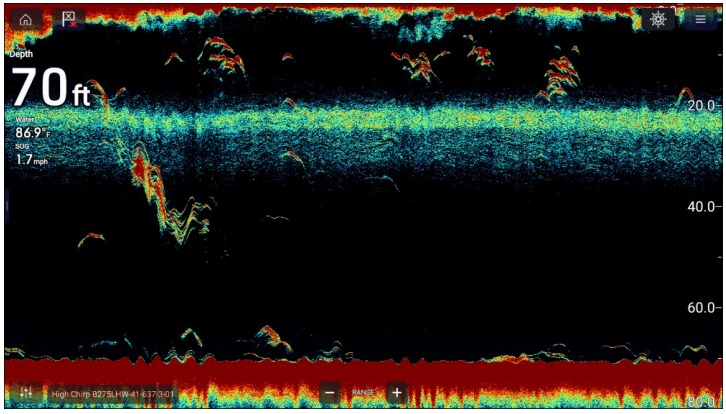


1. Larger vertical width = larger fish.
2. Smaller vertical width = smaller fish.

Thermoclines

A thermocline is a distinct transition layer in the water which separates warmer surface water from colder, denser, deeper water.

Thermoclines are represented on the screen as a horizontal layer in the water column.



Generally, lower transducer frequencies are better for showing thermoclines.

Appendix E Interpreting the radar display

Interpreting objects

The size of a target appearing on screen is dependent on many factors, and may not be proportional to its actual physical size. Nearby objects may appear to be the same size as distant larger objects. Given adequate radar operator experience, the approximate size of different objects can be determined by the relative size and color / brightness of the echoes.

The size of onscreen targets are impacted by:

- The physical size of the reflecting object.
- The material that the object is made from (metallic surfaces reflect signals better than non-metallic surfaces).
- The verticality of the object (objects such as cliffs reflect signals better than sloping objects such as sandbanks).
- The height of costal regions. (High coastlines and mountainous coastal regions can be observed at longer radar ranges; therefore, the first sight of land may be a mountain several miles inland from the coastline. Although the coastline may be much nearer, it may not appear on the radar display until the vessel is closer to shore.)
- The target's reflective visibility. (Some targets, such as buoys and small vessels, are difficult to discern because they do not present a consistent reflecting surface as they pitch and roll in the waves. Consequently, these echoes tend to fade and brighten, and at times disappear momentarily.)
- Similarly-sized targets. (Buoys and small vessels resemble each other; however, vessels can often be distinguished by their motion.)

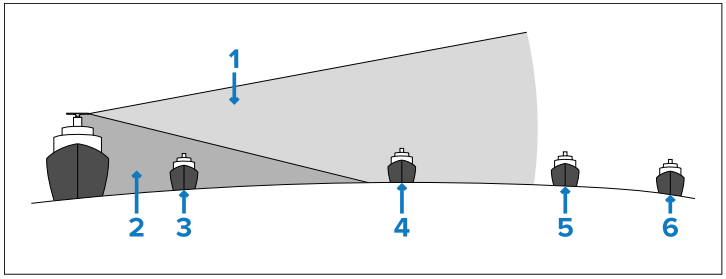
Radar range

Minimum range

Radar performance on larger ships may suffer from shadowing where the minimum radar detection range is degraded by a combination of antenna height, ship structures and cargo. The minimum range is defined by the shortest distance at which, using a scale of 1.5 NM or 0.7 NM, a target having an echoing area of 10 m^2 is still shown separate from the point representing the antenna position. It is mainly dependent on the pulse length, antenna height and location, ownship structure and an efficient transmission line.

Maximum range

The maximum range varies considerably depending on several factors such as the height of the antenna above the waterline, the height of the target above the waterline, the size, shape and material of the target, and atmospheric conditions. Under normal atmospheric conditions, the maximum range is equal to the radar horizon and can be slightly longer. The radar horizon is longer than the optical horizon by approximately 6% because of the diffraction property of the radar beam.



1. Radar horizon (beam).
2. Blind area.
3. Ship will not be visible on the display as it is too close and therefore outside of the radar beam.
4. Ship will be visible on the display as it is within the radar beam.
5. Ship may be visible on the display as it is only just outside of the radar beam.
6. Ship will not be visible on the display as it is too far and therefore outside of the radar beam.

Radar image quality

A number of factors may impact the quality of a radar image.

Not all radar echoes are produced by valid targets. Spurious or missing echoes may be caused by:

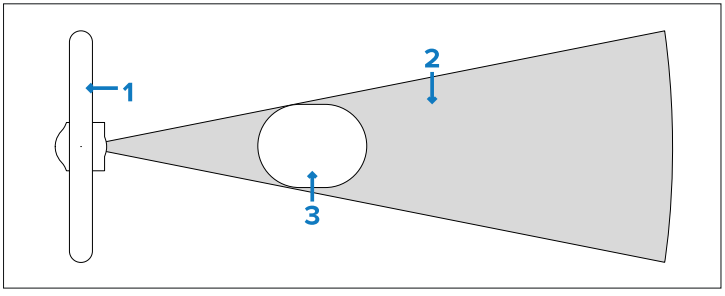
- Blind sectors.
- False echoes.
- Target smearing.
- Multi-path interference.
- Sea state and wave height.
- Precipitation and snow.
- Interference from other radar scanners.

Through observation, practice, and experience, you can generally detect these conditions very quickly and use the radar controls to minimize their impact.

Blind sectors

Obstructions such as funnels and masts near the radar antenna may obstruct the radar beam and cause radar shadows or ‘blind sectors’.

If the obstruction is relatively narrow, there will be a reduction of the radar beam intensity, although it may not block the entire beam. However, for wider obstructions, there may be a total block of the radar beam in the shadow area. There may also be multiple echoes which extend behind the obstruction. Blind sector effects can normally be minimized by careful selection of the radar antenna’s location prior to installation. Targets will not be detected if they are within the blind sector.



1. Antenna.
2. Blind sector.
3. Obstruction (superstructure, funnels, masts, etc.).

False echoes

Any large obstruction may reflect the radar beam, causing false echoes. The surface of the obstruction reflects a significant proportion of the transmitted energy at an angle, creating a false echo. Reflected signals from these objects reach the antenna and are presented on the bearing at which the antenna is pointing.

The range of the false echo is the same distance (via the reflecting surface) of the object causing the false echo. It is also possible to have multiple false echoes at equal distances.

False targets (echoes) usually occur as a result of reflections originating from large structures such as other ships, a harbour building, storage tanks or wind farms etc.

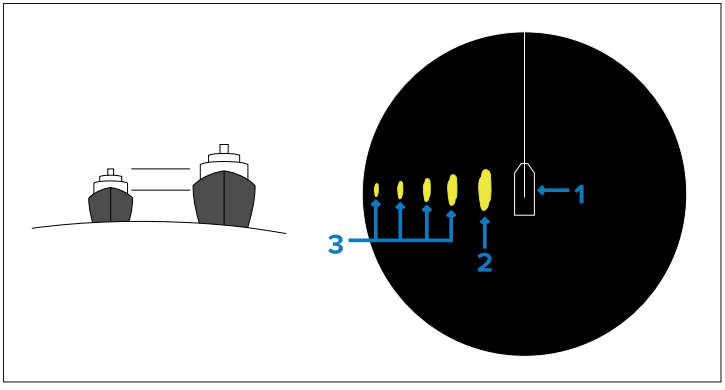
Ownship structures can also generate similar reflections. These reflections are normally seen as a large arc on the radar screen. Adjusting the radar's signal processing control functions may reduce or suppress a reflection, but at the expense of lower target detection performance. Radar systems provide techniques to prevent false targets resulting from previous transmissions (second-time-around echoes). Raymarine Pathfinder Radar has superior processing techniques to reduce these reflections.

Radar operators must make themselves aware of the bearings of obstructions which may produce false echoes.

Multiple echoes

Multiple echoes can occur when another ship or vessel is passing on a parallel course at short range. The radar signal will be reflected back and forth between the actual target and ownship, resulting in multiple echoes being displayed beyond the range of the actual target. Multiple echoes always occur on the same bearing as the actual target and at exact multiples of the actual target's range.

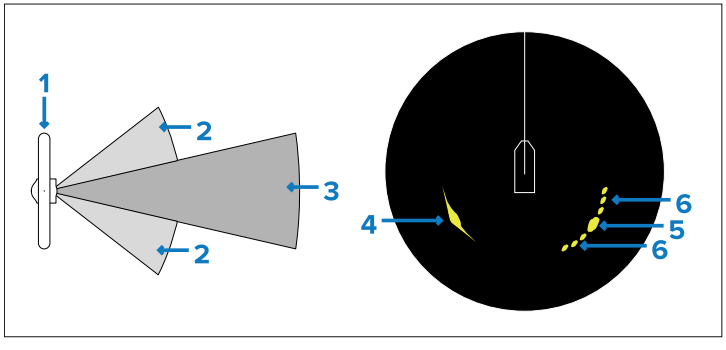
The false echoes become weaker as the amount of energy reflected diminishes with each return. Multiple echoes can be reduced and often removed by decreasing the *[Gain]* (sensitivity) or adjusting the *[Sea]* anti clutter control.



1. Ownship.
2. Actual target.
3. Multiple echoes.

Side lobe echoes

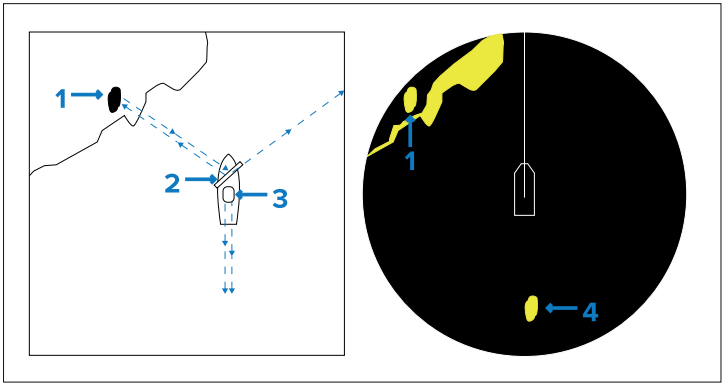
Side lobe patterns are produced by small amounts of energy from the radar beam which are radiated outside of the narrow main beam. The effects of side lobes are most noticeable with larger targets at short ranges (normally below 3 NM). Side lobe echoes form either arcs on the radar screen, or a series of echoes on either side of the actual target, forming a broken arc. The appearance of side lobe echoes can be reduced using the *[Gain]* and / or *[Sea]* anti-clutter controls.



1. Radar antenna.
2. Side lobes.
3. Main lobe.
4. Arc.
5. Actual target.
6. Side echoes.

Inconsistent echoes

In built up areas and in narrow congested waters the radar beam may be reflected along a number of paths, producing confusing spurious echoes on the radar screen. Inconsistent echoes may not always appear in the same location and may not correlate. Adjusting the *[Gain]* control can minimize inconsistent echoes.

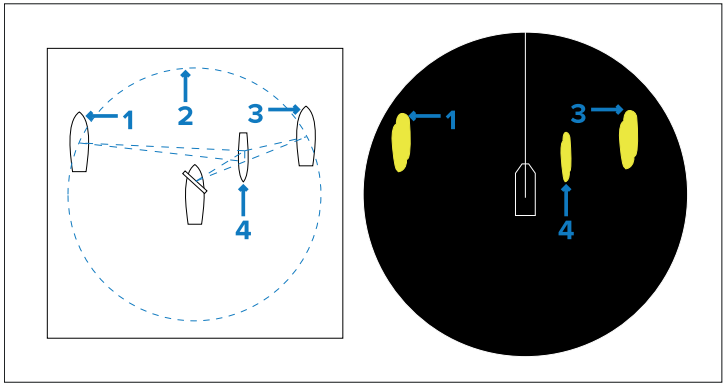


1. Actual object.
2. Radar antenna.
3. Funnel.
4. Inconsistent echo.

Ghost echoes

Ghost echoes can occur when the radar beam is reflected off of an obstruction, like a ship passing between the antenna and the actual target. This can cause a ghost echo of the actual target to appear on the bearing to which the antenna is pointing. The ghost echo will behave in the same manner as the actual target. However, because the antenna is not directed at the actual target, the returns from the ghost target will be weaker than those of the actual target. The range of the ghost echo will be the same as the range of the actual target. The ghost echo will appear on the radar screen at the same radius as the actual target. The VRM facility can be used to confirm this. However, there is no way of determining if the target is a ghost echo or the actual target.

Other types of ghost echoes include echoes of groups of targets (which appear to be real). When in the vicinity of land masses, these may be from large inland objects and may be caused by a combination of atmospheric conditions, unusual propagation conditions, and reflection.



1. Actual target.
2. Common radius.
3. Ghost target.
4. Passing ship or other obstruction.

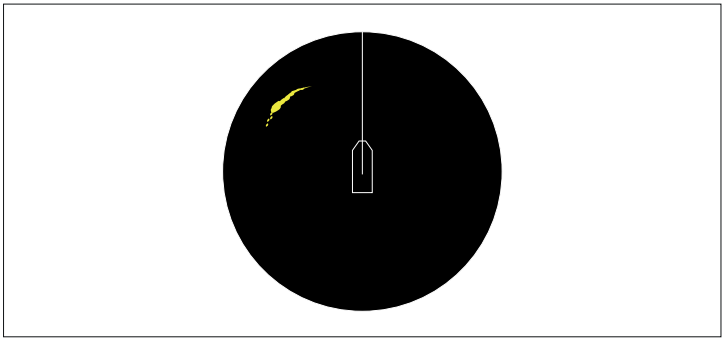
Virtual image

A large target close to ownship may be represented at two positions on the screen. One of them is the actual echo directly reflected by the target, and the other is a false echo which is caused by the mirror effect of a large object on or close to ownship. For example, if ownship comes close to a large metal bridge, a false echo may temporarily be seen on the radar screen.

Target smearing

Where obstructions occur in close proximity to the antenna, the radar beam may be dispersed causing target smearing to occur.

Target smearing is indicated by a number of weaker echoes appearing around a stronger target echo on the radar screen. When the antenna points directly at the target, the returns are at their strongest, and these form the thickest part of the arc-shaped pattern on the screen.

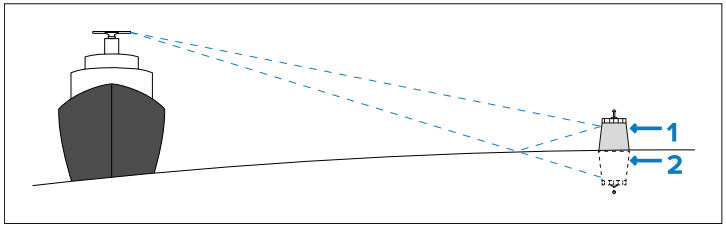


Multi-path interference

The radar beam can reflect back directly from the target or from a sea surface reflection of the target. When this multi-path interference occurs, the two signals will either reinforce one other or cancel each other out, creating a null.

Multi-path interference usually occurs on simple targets (comprising a single reflector) such as buoys, in calm sea states where the water is acting like a mirror. Multi-path interference may produce a large number of signal nulls at short range that become less frequent as range increases.

In higher sea states, when the sea is rough and the water is less likely to reflect, or when the target is complex (comprising a number of reflectors), the effect of multi-path interference is less pronounced, so the nulls are less deep. As the height of the radar antenna (or target) increases, the frequency of the nulls also increases. The frequency of the nulls also increments with increasing radar frequency.



1. Actual target.
2. Reflection.

Radar interference

Interference from other radar scanners operating in the area is shown on the screen as irregular, curved, spoke-like patterns extending from the center to the edge of the radar image.

If interference is present, use the *[Interference Rejection]* control in the *[Radar Sensor]* menu to suppress the interference.

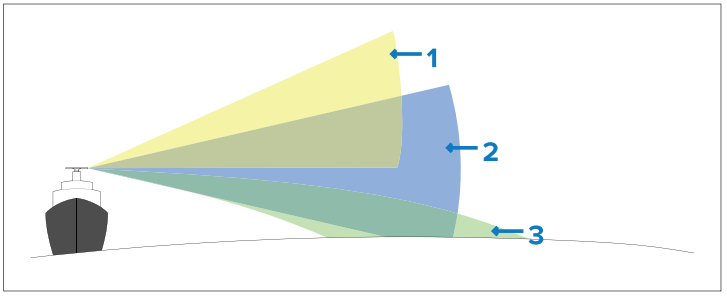
The higher the *[Interference Rejection]* level, the more interference suppression is used.

Atmospheric conditions

Radar signals can be adversely impacted by poor atmospheric conditions.

The radar beam normally travels in a straight line; however, certain atmospheric conditions may cause the beam to bend upwards or downwards. The effect of this condition is known as *anomalous propagation*.

Anomalous propagation



1. **Sub-refraction** — Sub-refraction occurs under unstable atmospheric conditions and causes the radar beam to bend upwards. Sub-refraction causes the radar beam to overshoot distant targets that would have been detected in standard atmospheric conditions. Sub-refraction results in a reduced operational range of the radar.
2. **Standard refraction** — Standard radar beam refraction occurs under normal atmospheric conditions.
3. **Super-refraction** — Super-refraction occurs under stable atmospheric conditions and causes the radar beam to bend downwards. Super-refraction causes the radar beam to follow the earth's surface and improves the operational range of the radar, enabling detection of targets over the horizon.

Ducting

Ducting is a special type of super-refraction occurring when the radar beam, which is bent downwards, reflects off the earth's surface back into the atmosphere. In this scenario, the beam is trapped by a layer of dense air which causes the beam to be reflected back to the earth's surface. This action may occur a number of times, allowing targets to be detected over far greater distances than the radar's usual operation range. However, these echoes may return

several signals later and are shown at false ranges. Transmission 'jitter' techniques are applied to minimize these false echoes or second-time-round returns.

Examples of atmospheric conditions:

- **Fog and mist** — Fog and mist may cause some signal attenuation, resulting in a small reduction in radar range.
- **Dust storms** — In some locations, dust storms can produce difficult conditions, appearing similar to clutter on screen.
- **Hail, Snow and Ice** — Hail and snow produce effects similar to that of rain clutter. Dense snow has a greater effect than lighter flurries which, owing to the small reflecting surface, have minimal effect.The echoes from ice depend on the form and shape of the ice. In general, the effects produced by various forms of ice are as follows:
  - *Smooth flat ice*: Most of the radar beam is reflected at the angle of incidence, providing little or no return signal. Sometimes an advantage is gained by setting up the controls to obtain sea clutter right up to the edge of the ice. Patches of water in a smooth ice field are often revealed by clutter returns when sufficient wind disturbs the surface of the water.
  - *Pack ice*: Strong multiple echoes are obtained from pack ice, producing a pattern on screen similar to excessive sea clutter. The ice left in the wake of a vessel passing through an ice field may be distinguished clearly on the screen.
  - *Ice walls*: Strong echo returns are obtained depending on the angle at which the walls are with respect to the sea surface, to scatter the reflected beam.
  - *Icebergs*: As the angle of iceberg faces is rarely normal to the surface of the sea, much of the reflected signal from the radar beam does not reach the antenna, providing a weak signal return. Also, the surrounding dense air produces a higher than usual atmospheric attenuation.
  - *Growlers*: The detection of growlers by radar is uncertain due to the small surface area above water and the mass that is submerged.

Reflectors and beacons

Reflectors

Reflectors are designed to give maximum returns from radar transmissions and may be fitted to buoys to aid navigation, or to sundry features such as dangerous outcrops of rocks, or any hazard that would impair the navigation of a vessel. Small boats may also have reflectors fitted to increase the range at which they can be detected.

Note:
Some small buoys have a reduced cross-sectional area when heeling over in high sea states.

Beacons

Radar beacons (also known as RACONS) produce a specific, coded signal response when the radar transmission interrogates the beacon. The reflected signal then renders echoes precisely on the radar display. This effect can be reduced when using a high Correlation level (RACONS are not normally affected by Interference Rejection).

Target Detection in clutter conditions

Gain

The raw radar return signal consists of targets, precipitation sea clutter, and a level of noise generated by the radar system. The *[Gain]* control reduces unwanted radar returns to optimize the radar image.

The manual *[Gain]* control sets the detection threshold for the strength of targets. The gain should be set to a level that eliminates or produces minimal noise, when viewed beyond any sea clutter. The *[Gain]* control may require further adjustment when the range scale changes.

Sea state

Low (calm) sea state

Multi-path signals can either enhance or reduce signal strength, depending on the target range and characteristics. The detection range for targets at optimum Gain, assuming that the targets are not obscured by the horizon, will depend on a target's characteristics and the propagation (ducting) conditions. In some circumstances, ducting will permit visibility of targets at much longer ranges than could normally be expected. A radar antenna physically located in a higher position will normally increase the range of detection, but may deteriorate performance in adverse clutter conditions.

Raymarine's Pathfinder radar transmits multiple pulse lengths, which provides enhanced detection.

High (rough) sea state

Rough sea: As sea roughness increases, target detection is less affected by multi-path effects, but more adversely affected by sea clutter. The nature of the signal reflected from a wave is different than the signal reflected from a target. Processing techniques assist in making the target more visible. Clutter signals increase when viewed upwind. Although sea clutter signals can look like actual targets, as most clutter is in the form of sea spikes, they will fail to correlate.

The rapid movement of high speed ships (especially on shorter range scales) may fail to correlate, impacting target detection. Very large waves may also obscure targets, and in these conditions, targets may not be visible to the radar system.

High winds will cause small targets (e.g. buoys and yachts) to heel over, reducing the reflected radar signal and therefore negatively impacting target detection.

Sea clutter

Radar echoes from breaking waves, sea spray and backscatter appear on the radar screen as clutter. The clutter appears centered around ownship, which reduces performance of short range target detection. These echoes are not repetitive or consistent in position or size. With high winds and extreme conditions, echoes from sea clutter may cause dense background clutter in the shape of an almost solid disc. The *[Sea]* anti-clutter control is used to reduce the clutter, improving the quality of the radar image.

The clutter range is dependent on the radar antenna height and the sea state, although other factors can also influence the extent of the clutter.

The *[Sea]* anti-clutter control helps to improve target detection by reducing the visibility of clutter on the radar screen.

The *[Sea]* anti-clutter control applies maximum attenuation at zero range (ownship), and reduces the attenuation as the range increases.

The *[Sea]* anti-clutter control can be manually adjusted or set to automatic.

Rain clutter

Precipitation appears on the radar screen as lots of small echoes which continuously change size, intensity and position — this is known as clutter. The clutter can sometimes appear as large hazy areas, depending on the intensity of the rainfall. The clutter reduces the radar's target detection performance.

The level of reduction in target detection performance is dependent on radar antenna characteristics, transmission frequency and pulse length.

A shorter transmission pulse provides better detection.

The *[Rain]* anti-clutter control helps to improve target detection by reducing the impact of precipitation on the radar screen. However, solid targets such as land masses will appear thinner.

When the *[Rain]* anti clutter control is set to *[Auto]*, target detection is optimized and a short pulse for conventional magnetron transmitters is selected to provide best performance.

The Raymarine Pathfinder radar features a high discrimination on all range scales, maintaining a higher detection performance in all rain clutter conditions.

Appendix F Glossary

Navigation glossary

Common terms and abbreviations used in navigation.

Term	Meaning
Active navigation	Active navigation is the term used when the display is performing navigation to a destination point. The destination point can be a 'Goto' (to an onscreen cursor position or a single waypoint), or part of a 'Follow' (to a waypoint within a route).
AIS (Automatic Identification System)	A tracking system enabling you to receive positional information broadcast by other vessels, and to transmit positional information for your own vessel. AIS is used to identify, locate and track marine vessels in the chart and radar applications. An AIS receiver or transceiver is required to view AIS information.
Auto range	A mode that ranges the chart application automatically, to ensure both the vessel and target waypoint are always visible.
Course Over Ground (COG)	COG is the actual direction of travel, relative to fixed land. Vessel heading may differ from COG due to the effects of currents, tide and wind. COG is transmitted by GNSS (GPS) receivers. Supported data: • NMEA 2000: PGN 129026 • NMEA 0183: RMC
Course up (CU / C-up)	The chart or radar is orientated so as to show your current course directly ahead of your vessel icon. The chart will rotate so that your Course Over Ground (COG) is always upward on the screen.
Cross Track Error (XTE)	The amount of deviation from your intended course, expressed as a distance. In the event that you steer off-track, you can create a new course to the target by selecting "Restart XTE" on your pilot controller or multifunction display.
Direction of Relative Motion (DRM)	The direction a target is travelling in relation to your own vessel's direction and speed.
Follow	The action whereby the display is placed in active navigation following a route.
GNSS (Global Navigation Satellite System)	A constellation of Earth orbiting satellites that can be used to plot latitude, longitude, altitude, Course Over Ground (COG), and Speed Over Ground (SOG). Current available GNSS are: • *GPS* (USA) • *BeiDou* (China) • *Galileo* (EU) • *GLONASS* (Russia)
Goto	The action whereby the display is placed in active navigation travelling to a cursor location or a single waypoint.
Head up (HU / H-up)	The chart or radar is orientated so as to show your current heading directly ahead of your vessel icon at all times. As your vessel changes direction, the chart or radar image rotates accordingly to reflect the new bearing. In Head-up, the motion mode is fixed to Relative motion.

Term	Meaning
Heading (HDG)	Compass direction of travel. Heading can be relative to True north or Magnetic north. Heading can be transmitted from a ship's compass or heading sensor. Supported data: • NMEA 2000: PGN 127237 / 127250 • NMEA 0183: HDG / HDM / HDT
Latitude (Lat)	A geographic coordinate which indicates the position of a point on the Earth that is either north or south of the equator. When provided as a coordinate, the number of degrees is determined in relation to how far (0° to 90°) north or south the coordinate is from the Earth's equator — where 90° refers to either the North Pole or South Pole and 0° refers to the equator. One degree of latitude is approximately equivalent to 60 nautical miles.
Longitude (Lon)	A geographic coordinate which indicates the position of a point on the Earth that is either east or west of the prime meridian. When provided as a coordinate, the number of degrees is determined in relation to how far (0° to 180°) east or west the coordinate is from the prime meridian.
North up (NU / N-up)	The chart or radar image is orientated so that true north is always upward on the screen. As your vessel changes direction, vessel icon (chart) or ship heading line (radar) rotate accordingly to show your relative position to true north.
Rate of Turn (RoT)	RoT is the speed at which your vessel turns in a given direction, typically when under autopilot control.

Term	Meaning
Relative Motion (RM)	In the Chart and Radar applications, relative motion mode fixes your vessel's position and the chart or radar image moves relative to your vessel. In Relative Motion mode you can use the *[Boat position]* setting to determine whether the vessel position is fixed in the *Center* of the chart display or has a *Partial offset*, or *Full offset*. Selecting the partial or full offset has the effect of increasing the view ahead.
Route (RTE)	A series of waypoints typically used to assist with journey planning and navigation. A route is displayed on screen as a series of waypoints linked by a line.
Speed of Relative Motion (SRM)	The velocity of a target relative to your own vessel's velocity (E.g.: If you are travelling in the same direction as a target, the relative speed will be the difference between your vessel's speed and the target's speed. If you are travelling towards / away from each other then relative speed is the combination of both vessel's speeds).
Speed Over Ground (SOG)	The actual speed of travel, relative to fixed land. Vessel speed may differ from STW due to the effects of currents, tide and wind. SOG is transmitted by GNSS (GPS) receivers. Supported data: • NMEA 2000: PGN 129026 • NMEA 0183: RMC
Speed Through Water (STW)	The speed of your vessel through the water, also known as boat speed. Due to tide and current this will be different than Speed Over Ground (SOG). STW is measured by a speed transducer. Supported data: • NMEA 2000: PGN 128259 • NMEA 0183: VHW

Term	Meaning
Time To Go (TTG)	The time remaining until you reach the destination point.
Track	A visible trail displayed in the Chart app on a multifunction display, showing the passage you have taken. The trail consists of a series of track points which are created automatically. You can save the track to create a permanent record of where you have been. You can also create a new route from a track.
True Motion (TM)	True Motion mode fixes the chart position and the vessel icon moves across the screen. As the vessel's position approaches the edge of the screen, the chart image is automatically redrawn to reveal the area ahead of the vessel. As the vessel's position approaches the edge of the display, the image is automatically redrawn to reveal the area ahead of the vessel. **Note:** True Motion mode is not available when the orientation is set to "Head-up".
Waypoint (WPT)	A position marked on the screen to indicate a location to navigate to. Waypoint positions are defined by Longitude / Latitude coordinates, and can be saved for future use. As well as acting as position markers, waypoints are also the building blocks used to create routes. Waypoints can be created and displayed in the Chart, Radar, and Fishfinder apps on a multifunction display.

Sailing glossary

Common terms and abbreviations used in sailing.

Term	Meaning
Apparent Wind	The wind flow observed when the vessel is in motion, relative to the vessel's heading. Apparent wind is different from True wind in that it takes into account your vessel's movement, i.e.: speed and direction of travel. Apparent wind is the raw data that is reported by wind transducers, which can then be used in conjunction with other data sources to calculate True wind. Supported data: • NMEA 2000: PGN 130306 • NMEA 0183: MWV
Apparent Wind Angle (AWA)	The wind angle observed when the vessel is in motion, relative to the vessel's heading. AWA is a combination of the true angle of the wind and the angle that is experienced due to the direction and speed of travel.
Apparent Wind Speed (AWS)	The wind speed observed when the vessel is in motion. AWS is a combination of the true speed of the wind and the speed at which you are travelling.

Term	Meaning
Close-hauled / Beating	Generally, when sailing upwind, the tighter the angle at which the vessel sails with respect to the wind, the faster the vessel will travel. When a vessel's sails are pulled in tightly to the vessel's centerline in order to maximize the vessel's speed when travelling upwind, it is known as sailing "Close-hauled" or "beating". There's a "no-go" zone directly into the wind where a vessel cannot sail in a forward motion. Also, sailing too close to the wind ("pinching") can reduce both speed and efficiency in terms of the vessel's forward motion. Therefore, maximizing forward motion when sailing upwind requires the optimization of both the vessel's sail rigging and the vessel's angle with respect to the wind direction, which is typically 30 to 45 degrees.
Distance to Tack	The travel distance remaining until you need to tack.
Distance to Line	Distance remaining to the closest point along the race start line.
Downwind	Moving in the direction that the wind is blowing.
Ground Wind Direction (GWD)	The direction of the wind relative to north, as observed on land. This is the actual direction the wind is blowing. In addition to Apparent Wind Angle (AWA), Course Over Ground (COG) from a GNSS receiver is also required in order to calculate GWD.
Ground Wind Speed (GWS)	The wind speed observed when stationary, as observed on land. GWS is the actual speed at which the wind is blowing over land. In addition to Apparent Wind Speed (AWS), Speed Over Ground (SOG) data from a GNSS receiver is also required in order to calculate GWS.

Term	Meaning
Header	A wind shift which causes your vessel to turn more downwind.
Laylines	Vector lines showing the course the boat will take when sailing at the optimum angle to the wind, on either tack.
Leeway	The difference in angle between desired heading and actual course, caused by sideways movement of a sailing boat due to the wind.
Lift	A wind shift which allows your boat to turn upwind and closer to your destination.
Line bias	The distance advantage conferred by crossing the start line at the favored end (the end which is more upwind) of the race start line.
Polar table	A performance profile for a vessel, showing the vessel speed achievable at varying angles to the wind, with varying wind speed. In sailing, the Velocity Made Good (VMG) principle demonstrates that travelling in a straight line is not always the quickest route, and polars enable you to optimize your vessel's performance to its best advantage, by improving the accuracy of laylines to display how far you need to sail on a current tack to reach a target waypoint after tacking, and taking wind conditions into consideration.
RSW-Wired (Raymarine Smart Wind)	The Raymarine Smart Wind transducer series. The RSW-Wired series of transducers include a built-in attitude sensor, which is used to provide more accurate readings than standard wind transducers.
Sail plan	Sail configuration recommendations based on wind conditions.
Sailing upwind	Sailing close to the wind direction.

Term	Meaning
Tack	A course change made by a sailing vessel, by turning its heading into and through the wind.
Tacking	The zig-zag maneuver a sailing vessel makes when travelling upwind.
Time To Burn (TTB)	The time remaining during race start countdown before the vessel needs to start moving towards the start line at full speed.
Time to Tack	The amount of time remaining until you need to tack, if the current course and speed are maintained based on the calculated laylines.
True Wind	The actual wind flow; the wind flow that you experience on the water, when stationary. True wind is calculated from Apparent wind data from a wind transducer and STW (Speed Through Water) data from a speed transducer.
True Wind Angle (TWA)	The angle of the wind over water, relative to the vessel's bow, observed when stationary.
True Wind Direction (TWD)	The direction of the wind relative to North. This is the actual direction in which the wind is blowing. In addition to Speed Through Water (STW), Heading data is also required in order to calculate TWD.
True Wind Speed (TWS)	The wind speed observed when stationary, on the water. TWS is the actual speed at which the wind is blowing over water.
Velocity Made Good (VMG)	Sailing term related to the component of a sail vessel's velocity vector that is in the direction of true wind.
Wind shift	The amount of variation in True Wind Direction (TWD) over time.

Appendix G Document change history

Documentation for current products is regularly updated to ensure accuracy and reflect changing product features and / or specifications. Changes made to this document since its last revision are listed below.

Document number:	Document name:
81388	Element LightHouse Sport Operation Instructions

Changes:

Revision	Date	Applicable software version(s)
18	February 2026	v3.20.95

- Updated to reflect software version v3.20.95.

Changes:

Revision	Date	Applicable software version(s)
17	September 2025	v3.20.88

- Updated to reflect software version v3.20.88.
- PSTI Compliance information added.
- Network interfaces and services information added.
- List of compatible transducers added.
- *Interpreting the Sonar* information added to Appendix.
- Minor editorial improvements.

Changes:

Revision	Date	Applicable software version(s)
16	December 2024	v3.20.65

- Added new chapters for New features and Software details.
- Updated software references to LightHouse Sport v3.20.65.
- Updated New features to include v3.20.65.
- Split *[Streets & POIs]* into 2 separate controls in the Chart app Layers settings menu.

- Added details of Chart app and LightHouse Charts Gen 2.
- Added Software release history.
- Added *Interpreting the radar* section to the appendix.
- Added Glossary.

Changes:

Revision	Date	Applicable software version(s)
15	May 2024	v3.19.17

- Updated software references to LightHouse Sport v3.19.17.
- Updated New features to reflect v3.19.17.
- Added Quantum-Series Radar software compatibility details.
- Added important note to Radar pairing procedure.
- Added Radar troubleshooting details.
- Added Software update troubleshooting details.

Changes:

Revision	Date	Applicable software version(s)
14	November 2023	v3.19.10

- Minor editorial improvements.

Changes:

Revision	Date	Applicable software version(s)
13	September 2023	v3.19.10

- Updated third-party raster chart support list, to include Imray Digital Charts.

Changes:

Revision	Date	Applicable software version(s)
12	August 2023	v3.19.10

- Various improvements to the LightHouse Charts (objects and detail).
- Various improvements to the Navionics chart layers (Land features can be toggled on/off).

Changes:

Revision	Date	Applicable software version(s)
11	March 2023	v3.19.1

- This release ensures that Element-Series displays fall below allowable Radio Frequency (RF) emissions.

Changes:

Revision	Date	Applicable software version(s)
10	December 2022	v3.18.11

- Updated software version to v3.18.11.
- Updated new features list, including support for updated Australia and New Zealand region LightHouse Charts and Tides and Current data for those regions.

Changes:

Revision	Date	Applicable software version(s)
9	September 2022	v3.17.37

- Updated new features list.
- Updated LightHouse Charts details to include new regions.

Changes:

Revision	Date	Applicable software version(s)
8	October 2021	v3.16.38

- Nautical miles & Yards (NM & yd) added as a unit of measure for distance.
- Explanation added for all Distance and Speed units of measure abbreviations.
- Added details for calibrating sonar transducers to Fishfinder app chapter.
- Added abbreviations for all units of measure.

- Changed Fathoms units from ‘Fa’ to ‘Fm’.

Changes:

Revision	Date	Applicable software version(s)
7	July 2021	v3.15.50

- Updated new features list to reflect v3.15.50.
- Changed name of Anchor drift alarm to Position drift.
- Added expanded details for each alarm.
- Added details of LightHouse Charts Reeds almanac.
- Included extra autorouting warnings and detail.
- Added details of new minimum sonar depth alarm.
- Added sonar technology overviews and depth range details.

Changes:

Revision	Date	Applicable software version(s)
6	July 2021	v3.14.92

- Updated LightHouse Charts details.
- Expanded Fish detection details.
- Updated NMEA 2000 PGN list.

Changes:

Revision	Date	Applicable software version(s)
5	January 2021	v3.13.76

- Updated Chart app chapter to include new LightHouse Charts features and settings.
- Updated Set up chapter to include new Wi-Fi connections section.
- Updated new features to reflect LightHouse Sport v3.13.76
- Updated Document change history to reflect 81388–5.
- Added software downgrade procedure to Troubleshooting.

Changes:

Revision	Date	Applicable software version(s)
4	January 2020	v3.10.10

- Updated new features to reflect LightHouse Sport v3.10.10.
- Updated startup wizard details to include list of activities and information regarding ice fishing. Removed requirement for a factory reset if wrong transducer is selected.
- Added transducer selection to boat details settings.
- Added app page icons for different fishfinder channels and views to homescreen chapter.
- Added descriptions of different fishfinder channel modes to fishfinder chapter.
- Moved list of compatible autopilot controllers to the appendix.

Changes:

Revision	Date	Applicable software version(s)
3	May 2019	v3.9.98

- Updated new features to reflect LightHouse Sport v3.9.98.
- Updated compatible displays to include S variants and non-Wi-Fi SKUs.
- Updated shortcuts menu details to include Radar transmission controls.
- Removed limited list of SeaTalk NG products that can be updated.
- Added Quantum pairing procedure to Set up chapter.
- Added Radar app chapter.
- Added Radar selection to start up wizard.
- Updated data item names.
- Added Waypoint sharing details.
- Added autopilot commands information.
- Added new rolling road page details to Dashboard app.

- Updated supported PGN list.

Changes:

Revision	Date	Applicable software version(s)
2	April 2019	v3.9.98

- Updated to include support for AIS.
- Updated Document conventions to include “enable” and “disable”.
- Added document change history to appendix.
- Updated LoU and software and hardware info screenshots.
- Updated software version to v3.9.40.
- Updated viewing product information task.
- Updated to include details of MDS support.
- Added details for support of Wind data.
- Added Estonian User Interface language.
- Added wind and speed data to list of data items..
- Added details for wind and navigation dials in Dashboard app.
- Updated list of supported PGNs.
- Updated Chart chapter to include Tides mode.
- Updated Fishfinder chapter to differentiate between HV and S variants.

Changes:

Revision	Date	Applicable software version(s)
1	March 2019	v3.8.66

- Initial release

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