Chapter 10: Using alarms and MOB functions

Chapter contents

10.1 Using Man Overboard (MOB) functions

Man overboard

If you lose a person or object overboard, you can use the Man Overboard (MOB) function to mark the position that the vessel was at when the MOB function was activated.

The MOB function is available at all times, regardless of which application is running. MOB can be set to Dead Reckoning or Position mode. Dead Reckoning mode will take into consideration the effects of wind and tides. This usually provides a more accurate course. Position mode does not take these factors into account.

To obtain a MOB position, your multifunction display must have a GPS position fix. If you're using dead reckoning, heading and speed data must also be available.

When MOB is **activated**:

- An audible MOB alarm is sounded.
- An MOB alarm dialog box is displayed.
- The system sends MOB alarms to other Raymarine equipment.
- The active chart application is changed to a low-detail 2D view, with an initial range of 15 m (50 ft). Motion mode is set to Auto Range.
- The active radar application range is changed to 230 m (760 ft).
- All Goto and Follow functions are disabled in all applications. Navigation to any active waypoint is stopped and any existing navigation function is cancelled.
- If position or heading and speed information is available a MOB waypoint is placed at the current vessel position in any application that is capable of showing waypoints and vessel position.
- MOB data is displayed in the databar, replacing the existing data.
- MOB data is displayed on the homescreen, replacing the status icons.
- As the vessel moves away from the MOB position a dotted line is displayed, joining the MOB position with the vessel's position.

When the MOB alarm is **cancelled**:

- MOB data is removed from the relevant applications.
- The chart application motion mode is reset.
- The chart is centered on the vessel and pitch / rotation set to default.
- GOTO and route functions are restored.
- The databar mode is reset.
- A MOB normal mode signal is sent to any instrument on SeaTalk.

Activating the man overboard (MOB) alarm — New c Series / New e Series

On a New c Series or New e Series display you can use the WPT (MOB) button to activate the MOB alarm

1. Press and hold the **WPT / MOB** button for 3 seconds.

Activating the man overboard (MOB) alarm — New a Series

On a New a Series display you can use the on-screen WPT (MOB) icon to activate the MOB alarm

1. Press and hold the on-screen **WPT / MOB** icon for 3 seconds.

Silencing the MOB alarm.

The MOB alarm can be silenced by following the steps below.

With a MOB alarm active:

1. Select **Ok** on the MOB alarm dialog.
   The alarm will be silenced but remains active.

Cancelling the man overboard (MOB) alarm — New a Series

To cancel a MOB alarm and resume normal operation follow the steps below:

1. Press and hold the on-screen **WPT / MOB** icon for 4 seconds.
   The MOB alarm is cancelled and normal operation is resumed.

Cancelling the man overboard (MOB) alarm — New c Series and New e Series

To cancel a MOB alarm and resume normal operation follow the steps below:

1. Press and hold the **WPT / MOB** button for 4 seconds.
   The MOB alarm is cancelled and normal operation is resumed.

10.2 Alarms

Alarms alert you to a situation or hazard requiring your attention.

You can set up alarms to alert you to certain conditions, such as collision warnings and temperature limits.

Alarms are raised by system functions, and also external equipment connected to your multifunction display.

When an alarm sounds a message dialog is displayed on your multifunction display and any networked displays. The dialog states the reason for the alarm.

You can configure the behavior of certain alarms by selecting the Edit option on the message dialog or by using the **Alarms** menu, accessible from the homescreen via the **Set-Up** icon.

Silencing/Cancelling alarms

To silence/cancel an active alarm:

1. Select **Ok** on the alarm message dialog.

Note: Once silenced some alarms may remain active.

Alarms menu

Menu item	Description	Options
MOB Data Type	Determines whether Position or Dead Reckoning (DR) data is displayed. Assuming that your vessel and the MOB are subject to the same tide and wind effects, the Dead Reckoning setting normally gives a more accurate course.	• Dead Reckoning • Position (default)
Alarm Clock	When set to On, an alarm is triggered at the time you specify for the Alarm Clock Time setting.	**Alarm Clock** • Off (default) • On **Alarm Clock Time** • 00:00 (default) • 00.01 to 24:00 hrs
Anchor Drift	When set to On, the Anchor Drift alarm is triggered when your vessel drifts from your anchor position by more than the distance you specify for the Anchor Drift Range setting.	**Anchor Drift** • Off (default) • On **Anchor Drift Range** • 0.01 — 9.99 nm (or equivalent units)
Countdown Timer	When set to On, counts down the time period you specify for the Timer Period setting, and triggers an alarm when zero is reached.	**Countdown Timer** • Off (default) • On **Timer Period** • 00h00m (default) • 00h01m to 99h59m
AIS Targets	When set to On, the alarm for Dangerous Targets is enabled. This option is only available when an AIS unit is detected. Refer to the AIS section for details.	**Dangerous Targets** • On (default) • Off
Engine Alarms	When set to On then warning alarms from connected engine management systems will be displayed on the multifunction display.	**Engine Alarms** • On (default) • Off
Fishfinder Deep	If this option is set to On, an alarm is triggered when the depth exceeds the value that you specify. This option is only available when a sonar module is detected. **Note:** The Fishfinder Deep alarm limit cannot be set to a value less than the Shallow Limit.	**Fishfinder Deep** • Off (default) • On **Deep Limit** • 2 ft (or equivalent units) to the maximum of the transducer range
Fishfinder Shallow	If this option is set to On, an alarm is triggered when the depth drops below the value that you specify. This option is only available when a sonar module is detected. **Note:** The Fishfinder Shallow alarm limit cannot be set to a value greater than the Deep Limit.	**Fishfinder Shallow** • Off (default) • On **Shallow Limit** • 2 ft (or equivalent units) to the maximum of the transducer range
Fish	If the Fish alarm and fish depth limits alarm are set to On, a warning sounds is triggered if any target meets the sensitivity level and is within the Shallow Fish Limit and Deep Fish Limit that you specify. The following items are available in the sub-menu: • **Fish** — Switches fish alarm On and Off. • **Fish Sensitivity** — If the Fish alarm is set to On, an alarm is triggered when the fish return strength reaches the sensitivity that you specify. • **Fish Depth Limits** — Switches depth limits On and Off. • **Shallow Fish Limit** — Specifies the lower value for the Fish Alarm Depth Limit.	**Fish** • Off (default) • On **Fish Sensitivity** • 1 to 10 **Fish Depth Limits** • On • Off (default)

Menu item	Description	Options
	• **Deep Fish Limit** — Specifies the upper value for the Fish Alarm Depth Limit.	**Shallow Fish Limit** • 2 ft (or equivalent units) to the maximum of the transducer range **Deep Fish Limit** • 2 ft (or equivalent units) to the maximum of the transducer range
Fuel Manager	In the fuel manager alarm options you can switch the low fuel warning alarm on or off and specify the fuel level at which the alarm is triggered.	**Low Fuel** • On • Off (default) **Fuel Level** • 0 to 99999
Guard Zone	The Guard Zone feature in the radar application triggers an alarm when a target is within a specified zone. You can adjust the sensitivity of the alarm. Ensure that the sensitivity is not set too low, or targets may be missed and the alarm will not be triggered.	**Guard Zone Sensitivity** • 1% to 100%
Off Track	When set to On, during active navigation an alarm is triggered when your vessel steers off-track more than the value you specify for the Off Track XTE setting.	**Off Track Alarm** • Off (default) • On **Off Track XTE** • 0.01 to 9.99 nm (or equivalent units)
Sea Temperature	When set to On, triggers an alarm when the sea temperature is equal to or lower than the limit you specify for the Lower Temp Limit or equal to or greater than the limit you specify for the Upper Temp Limit setting.	**Sea Temperature** • Off (default) • On **Lower Temp Limit** • 60 degrees fahrenheit (or equivalent units) • –09.9 to +99.7 degrees fahrenheit (or equivalent units) **Upper Temp Limit** • 75 degrees fahrenheit (or equivalent units) • –09.7 to 99.9 degrees fahrenheit (or equivalent units)
Waypoint Arrival	When you arrive at a waypoint, an alarm is triggered. This setting allows you to specify the distance from the target waypoint at which the alarm is triggered. The units used for this setting are based on the units you specify for distance in the Units Set-up menu.	0.01 to 9.99 nm (or equivalent units)

Accessing the alarms menu

From the homescreen:

1. Select **Set-up**.
2. Select **Alarms**.
   The Alarms menu is displayed.
3. Select the appropriate alarm category.

Chapter 11: Using waypoints, routes and tracks

Chapter contents

11.1 Waypoints

A waypoint is a position marked on the screen to indicate a site or a place to navigate to.

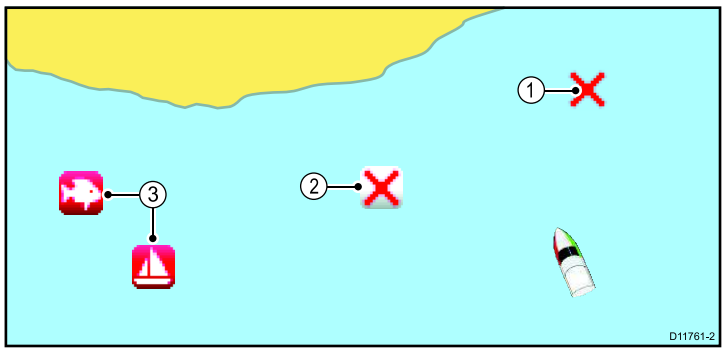
As well as acting as position markers, waypoints are also the building blocks used to create routes.

Common waypoint functions are accessed using the waypoints menu. This can be shown at any time by selecting **WPT** .

Waypoint display examples

Waypoints in the chart application

In the chart application both active and inactive waypoints are shown. The active waypoint (i.e. the one you are heading towards) has the box and symbol colors reversed.

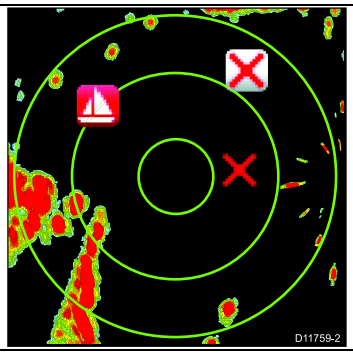


Item	Description
1	Inactive waypoint
2	Active waypoint
3	Alternative waypoint symbols

By default, all waypoints are indicated on screen by a waypoint symbol (**x**). You can assign different symbols if required, or choose which waypoints are shown.

Waypoints in the radar application

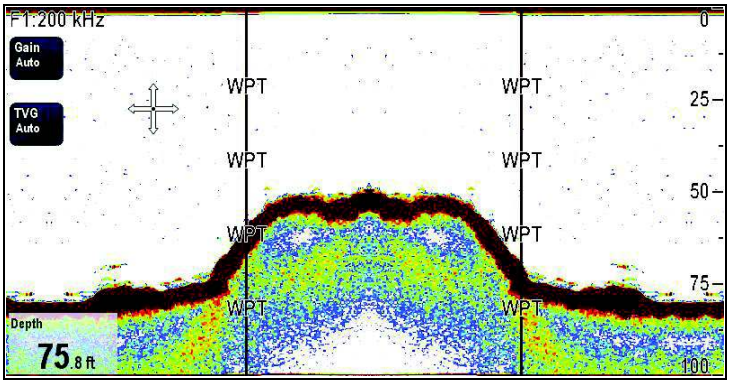
In the radar application both active and inactive waypoints are shown. The active waypoint (i.e. the one you are heading towards) has the box and symbol colors reversed.



By default, all waypoints are indicated on screen by a waypoint symbol (**x**). You can assign different symbols if required, or choose which waypoints are shown.

Waypoints in the fishfinder application

Waypoints in the fishfinder application are represented by a vertical line labelled WPT.



Showing and hiding waypoint groups / symbols

From the chart or radar application:

1. Select **WPT**.
2. Select **Display Wpts on: Chart**, or **Display Wpts on: Radar** depending on the application you have open.
3. The Display Waypoints list is displayed.
4. Select **Change** to switch between Groups and Symbols.
   A list of Symbols or Groups is displayed.
5. Select the Group or Symbol you wish to show/hide from the list.
   Selecting on the Symbol/Group will switch between Show and Hide.
6. Repeat Step 5 for each waypoint group or symbol you want to show or hide.

The list of waypoints and symbols can also be accessed from the Chart and Radar applications menu:

- Chart application: **Menu > My Data > Display My Data > Select WPTs To Display**.
- Radar application: **Menu > Presentation > Select WPTs To Display**.

Waypoint context menu

Placing the cursor over a waypoint in the chart or radar applications displays a context menu showing the waypoint's positional data and menu items.

The context menu provides the following positional data for the waypoint in relation to your vessel:

- Latitude
- Longitude
- Range
- Bearing

For inactive waypoints the following menu items are available:

- **Goto Waypoint**
- **Follow From Here** (only available when waypoint is part of a route.)
- **Edit Waypoint**
- **Erase Waypoint**
- **Remove Waypoint** (only available when waypoint is part of a route.)
- **Move Waypoint**
- **Measure**
- **Build Route**
- **Acquire Target** (only available if Radar overlay is switched on.)
- **Slew thermal camera** (only available when thermal camera is connected and operating.)

For active waypoints the following menu items are available:

- **Stop Goto**
- **Restart XTE**

- **Advance Waypoint**
- **Measure**
- **Build Route**
- **Acquire Target** (only available if Radar overlay is switched on.)
- **Slew thermal camera** (only available when thermal camera is connected and operating.)

Accessing the context menu

You can access the context menu by following the steps below.

1. New e Series or New c Series:
   i. Selecting a location, object or target on-screen and pressing the **Ok** button.
2. Touchscreen multifunction displays:
   i. Selecting an object or target on-screen.
   ii. Selecting and holding on a location on-screen.

Waypoint features

There are a range of features for placing, navigating and managing waypoints.

Waypoint features are accessed from:

- **the waypoint context menu** — by positioning the cursor over an existing waypoint on the screen.
- **any application** — by pressing the **WPT** button (New c Series and New e Series) or the **WPT** icon (New a Series). This displays the **Waypoints** menu.
- **the chart application** — by going to the following menu: **Menu > My Data**.
- **the homescreen** — by going to the following menu: **My Data**.

Note: Pressing the **WPT** button or the **WPT** icon from the homescreen will open the waypoint list.

Waypoint (MOB) button / icon

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

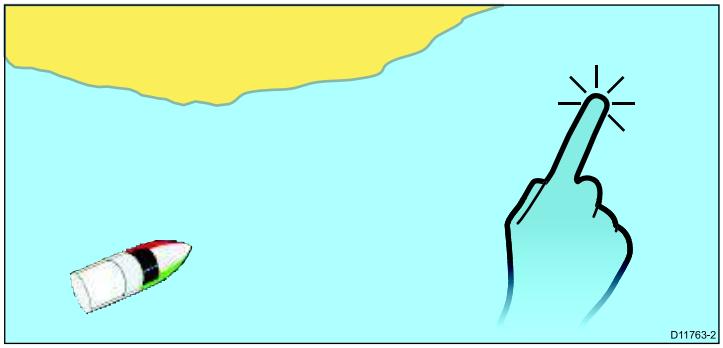
WPT button		• New c Series • New e Series
WPT icons		• New a Series

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

Waypoint placement

Placing a waypoint

You can place a waypoint on a touchscreen multifunction displays by following the steps below.



From the chart, radar or fishfinder application:

1. Select and hold the required location on screen.
   The context menu is displayed.
2. Select **Place Waypoint**.

Placing a waypoint

From the chart, radar or fishfinder application:

1. Position the cursor at the required position.
2. Press the **WPT** button.
   The chart context menu is displayed.
3. Select **Place Waypoint**.
   The waypoint is placed at the location and a confirmation pop up message is displayed.
4. Select **Ok** to confirm waypoint placement, or **Edit** to edit the waypoint details.

Placing a waypoint at your vessel's position

In addition to positional information, a waypoint placed at the vessel position will capture temperature and sounded depth information (if you have the appropriate sensors connected to your system).

From the chart, radar or fishfinder application:

1. Select **WPT**.
   The waypoint menu is displayed.
2. Select **WPT** again.
   A confirmation pop up message is displayed.
3. Select **Ok** to place the waypoint, or Edit to edit the waypoint details.

Note: Alternatively with the waypoint menu displayed you can select **Place Waypoint At Vessel**.

Placing a waypoint at a known position

You can place a waypoint at a specified location using latitude and longitude coordinates:

1. Select **WPT**.
2. Select **Place Waypoint At Lat/Lon**.
3. Select the **Position** field.
4. Enter the Latitude/Longitude position.
5. Select **SAVE**.
6. You can also add a name for the waypoint and add to a group by selecting the **Name** and **Group** fields.

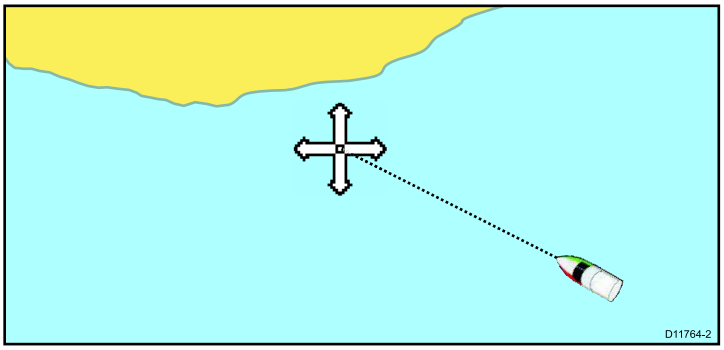
Navigation

Navigating to a location on the chart

From the chart application:

1. Select the required location on-screen.
   The chart context menu is displayed.
2. Select **Goto Cursor**.

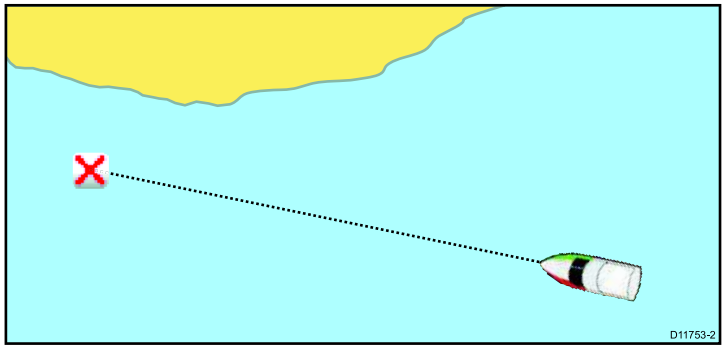
Navigating to the cursor position on the chart using the menu



From the chart application:

1. Position the cursor at the desired destination on the chart.
2. Select **Menu**.
3. Select **Navigate**.
4. Select **Goto Cursor**.

Navigating to a waypoint on the screen



From the chart or radar application:

1. Select the waypoint.
   The waypoint context menu is displayed.
2. Select the **Goto Waypoint**.

Note: With an active waypoint selected you can select **Stop Goto** option from the waypoint context menu at any time to cancel the action.

Navigating to a waypoint in the waypoints list

From any application:

1. Select **WPT**.
   The waypoint menu is displayed.
2. Select **View Waypoint List**.
   The waypoints list is displayed.
3. Select the required waypoint.
   The waypoint options dialog is displayed.
4. Select **Goto Waypoint**.

Note: Selecting **WPT** from the homescreen will take you to the waypoints list.

Cancelling navigation to a waypoint

From the chart or radar application:

1. Select the active waypoint.
   The waypoint context menu is displayed.
2. Select **Stop Goto**.
3. Alternatively, in the chart application, go to: **Menu > Navigate > Stop Goto**.

Note: Once navigation is no longer active, the waypoint symbol returns to its normal state, and the dashed line between your vessel and the waypoint is removed.

Arriving at a waypoint

As your vessel approaches a waypoint, the waypoint arrival alarm provides a warning.

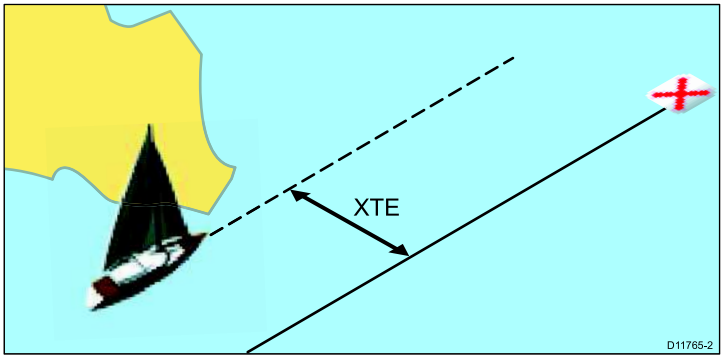
1. Select **Ok** on the waypoint arrival alarm pop up message.

Once the alarm is acknowledged, the next waypoint is selected, and the display updates to indicate the next leg of the route.

Note: You can set the approach distance (radius) at which the waypoint arrival alarm will sound using the **Alarms** menu from the homescreen: **Set-up > Alarms > Waypoint Arrival**.

Cross Track Error (XTE)

Cross Track Error (XTE) is the amount of deviation from your intended route or waypoint, expressed as a distance.



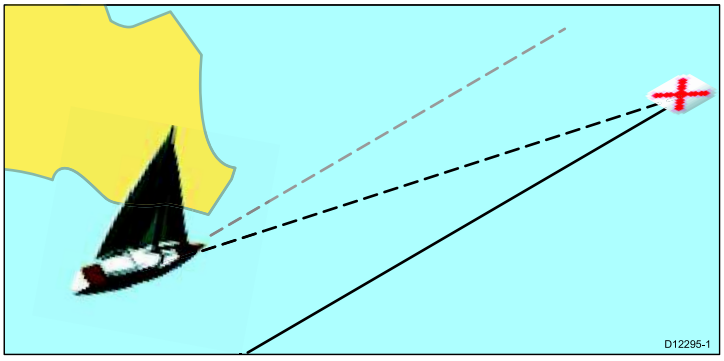
In the event that you steer off-track, you can go straight to your target by resetting XTE.

Resetting Cross Track Error (XTE)

While following a route in the chart application:

1. Select the route.
   The route context menu is displayed.
2. Select **Restart XTE**.

Resetting XTE results in a new course from the current vessel position to the current target waypoint. This does not affect your saved route.



You can also reset the XTE from the Navigate Menu: **Menu > Navigate > Restart XTE**.

Waypoint information

When you create a waypoint, the system assigns information regarding the location marked. You can view and edit the details of any waypoint that has been created and stored.

The following information is assigned or captured for each waypoint:

- Name
- Position (as Lat/Lon and range/bearing from vessel.)
- Temperature (requires appropriate sensor, only for waypoints captured at the vessel position.)
- Depth (requires appropriate sensor, only for waypoints captured at the vessel position.)
- Date and time
- Comment (you can add your own text comments to a waypoint.)
- Symbol (a default symbol is assigned, or you can select an alternative.)

There are 2 features which allow you to view or edit waypoint information:

- Place the cursor over a waypoint on the 2D chart or Radar screen to view selected information.
- Use the waypoint list for comprehensive information to view and edit as required.
- You can allocate waypoints to a waypoint group to make waypoint management easier.

Displaying the waypoint list

1. Select **WPT**.
2. Select **View Waypoint List**.
   The waypoint list is displayed.

Note: You can also access the waypoint list from the homescreen and chart application by going to the **My Data** menu and selecting **Waypoint List**.

Waypoint editing

Editing waypoint details

With the Waypoint List displayed:

1. Select the waypoint you want to edit.
   The waypoint options dialog is displayed.
2. Select **Edit Waypoint**.
3. Select the field you want to edit: Name, Group, Position or Comment.
4. Use the on-screen keyboard to make the changes, then select the on-screen keyboard's **SAVE** button.

Editing a waypoint on the chart or radar screen

From the chart or radar application:

1. Select the waypoint.
   The waypoint context menu is displayed.
2. Select **Edit Waypoint**.
   The edit waypoint dialog is displayed.
3. Select the field you want to edit.
4. Use the on-screen keyboard to make the changes, and then select the on-screen keyboard's **SAVE** key.

Waypoint symbols

There are a range of symbols to represent different waypoint types.

Symbol	Type	Symbol	Type
	Airport		Anchor
	Billfish		Bottom mark
	Bridge		Buoy
	Cans		Car
	Caution		Circle
	Concrete		Cross
	Diamond		Diamond quarter
	Diver down		Diver down (alternative)
	Dolphin		Dot
	Fad		Fish
	Fish (1–star)		Fish (2–star)
	Fish (3–star)		Fish trap
	Hill peak		Ledge
	Lobster		Marker
	Martini		Nuns
	Oil rig		Oyster
	Post		Preferred marks
	Private reef		Public reef
	Reef		Reef ball
	Restriction		Rocks
	Sail boat		Route end
	Route start		School of fish
	Seaweed		Shark
	Skull		Small fish
	Sport fisher		Square
	Swimmer		Tank
	Top mark		Tower
	Trawler		Tree
	Triangle		Wreck

Changing a waypoint symbol

With the Waypoint List displayed:

1. Select the waypoint.
   The edit waypoint dialog is displayed.
2. Select the Symbol field.
3. Select the required symbol in the list.

Moving waypoints

Moving a waypoint on the chart or radar screen

From the chart or radar application:

1. Position the cursor on the relevant waypoint.
   The waypoint context menu is displayed.
2. Select **Move Waypoint**.
3. Select the new position for the waypoint.

Moving a waypoint within a route

From the chart application:

1. Position the cursor over the waypoint you want to move.
   The waypoint context menu is displayed.
2. Select **Move Waypoint**.
3. Select the new location for the waypoint.

Moving a waypoint by entering new coordinates

With the Waypoint List displayed:

1. Select the waypoint.
   The edit waypoint options dialog is displayed.
2. Select **Edit Waypoint**.
3. Select the Position field.
4. Use the on-screen keyboard to make the changes, and then select the on-screen keyboard's **SAVE** key.

Erasing waypoints

Erasing a waypoint on screen

From the chart or radar application:

1. Select the relevant waypoint.
   The waypoint context menu is displayed.
2. Select **Erase Waypoint**.
   The erase waypoint pop up message is displayed.
3. Select **Yes** to confirm, or **No** to cancel.

Note: If you erase a waypoint which is part of a route the erase waypoint in route pop up message is displayed to warn you that the waypoint will be removed from the route.

Erasing a waypoint using the waypoint list

With the Waypoint List displayed:

1. Select the waypoint you want to erase.
   The waypoint options dialog is displayed.

2. Select **Erase Waypoint**.
   The erase waypoint pop up message is displayed.
3. Select **Yes** to confirm, or **No** to cancel.

Note: If you erase a waypoint which is part of a route the erase waypoint in route pop up message is displayed to warn you that the waypoint will be removed from the route.

Erasing all waypoints

From the homescreen:

1. Select **My Data**.
2. Select **Erase Data From System**.
3. Select **Erase Waypoints From System**.
   The erase waypoints from system dialog is displayed.
4. Select **Erase All**.
   The confirm delete pop up message is displayed.
5. Select **Yes** to confirm, or **No** to cancel.

Waypoint groups

In order to make your waypoints easier to manage, you can organize them into groups of your choice. When fishing, for example, you may only wish to see the waypoints that indicate good fishing sites.

Provided that you have not changed the default group, all waypoints are automatically placed in the default “My Waypoints” group when they are created.

Note: A waypoint can only belong to one group.

Displaying the waypoint group list

From any application:

1. Select **WPT**.
2. Select **Waypoint And Group Options**.
3. Select **View Group List**.

The waypoint group list is displayed.
You can now:

- Make a new waypoint group.
- Rename waypoint groups.
- Erase waypoint groups.

Note: You cannot rename or erase the default **My Waypoints** group.

Making a new waypoint group

With the Waypoint Group List displayed:

1. Select **Add New**.
   The on-screen keyboard is displayed.
2. Select the name field.
3. Use the on-screen keyboard to enter the required name for your new waypoint group.
4. select **SAVE** .

Moving waypoints between groups

1. From any application, select **WPT**.
2. Select **View Waypoint List**.
3. Select the Waypoint you wish to change the group of.
   The waypoint options dialog is displayed.
4. Select **Edit Waypoint**.
5. Select the **Group** field.
   A list of available waypoint groups is displayed.
6. Select the group you wish to move the waypoint to.

The waypoint is moved to the new group.

Note: The Waypoints list can also be accessed from the homescreen by selecting **WPT**.

Renaming a waypoint group

With the Waypoint Group List displayed:

1. Select the group you want to rename.
2. Select **Edit Group Name**.
   The on-screen keyboard is displayed.
3. Using the on-screen keyboard, edit the group name.
4. Select **SAVE**.

Changing the default waypoint group or symbol

From the Waypoint And Group Options menu:

- accessed via the homescreen: **My Data > Waypoint And Group Options**, or
- accessed via the chart application: **Menu > My Data > Waypoint And Group Options**, or
- accessed from any application: **WPT > Waypoint And Group Options**

1. Select **Select Default Group**.
   A list of groups is displayed.
2. Select the group you want all new waypoints to be placed in by default.
3. Select **Default Symbol**.
4. Select the symbol you want all new waypoints to be assigned.

Erasing a waypoint group

When you erase a waypoint group, the group name is erased from the system and the waypoints that were in that group are moved to the My Waypoints group. You can erase any waypoint group except the following:

- the ‘My Waypoints’ group,
- a group containing an active waypoint,
- a group that contains waypoints that are part of a stored route.

With the Waypoint Group List displayed:

1. Select the waypoint group that you want to erase.
2. Select **Erase Group (But Keep Waypoints)**.
3. Select **Yes** to confirm the action, or **No** to cancel.

Erasing a waypoint group and its waypoints

To erase a waypoint group and all of the waypoints in that group follow the steps below:

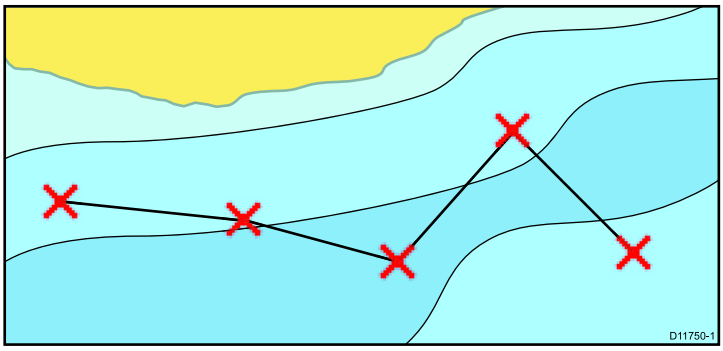
From the homescreen:

1. Select **My Data**.
2. Select **Erase from System**.
3. Select **Erase Wpts from System**.
   The waypoints group list is displayed.
4. Select The waypoint group that you want to erase.
   A confirmation pop-up message is displayed.
5. Select **Yes** to confirm the deletion.
   The waypoint group and all waypoints in that group have now been erased from the system.

11.2 Routes

A route is a series of waypoints typically used to assist with passage planning and navigation.

A route is displayed on screen as a series of waypoints linked by a line.



Route features

There are a range of route features for building, navigating and managing routes.

The route features allow you to:

- Build and save a route for use when required (stored in the route list).
- Navigate (follow) routes.
- Manage and edit routes stored on the system.
- Build a route from an existing track.

Route features are accessed from the chart application:

- by selecting an existing route.
- by using the **Build Route** option in the chart context menu.
- by using the chart application menu: **Menu > Navigate > Follow Route**.

Note: The Route List can also be accessed from the homescreen by selecting **My Data** and then **Route List**.

Route building

A route can consist of a combination of:

- New waypoints which you place on the screen as required and/or
- existing waypoints selected from a list displayed on screen.

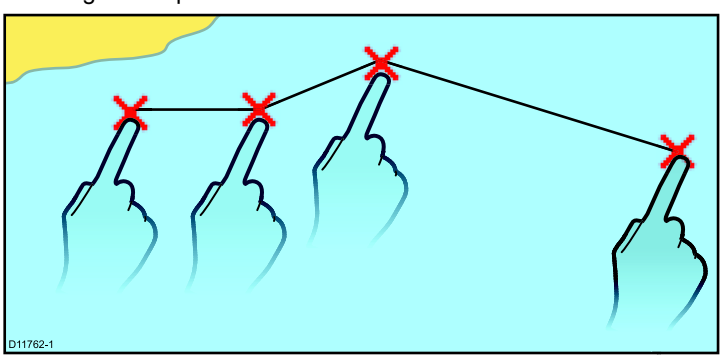
Note: A route can also be created from a track.

As each waypoint is added, it is assigned an index number corresponding to its position in the route and drawn on the chart using the currently specified symbol. The following should be noted:

- When a route is being built it is not active and does not affect any current navigation.
- You cannot save a new route if any of the waypoints within it are currently active.

Building a route

You can build a route on a touchscreen multifunction display by following the steps below.



From the chart application:

1. Select and hold a location on screen.
   The chart context menu is displayed.
2. Select **Build Route**.
   The build route menu is displayed.
3. Select a location on screen to be the starting position.
4. Select relevant locations to place subsequent waypoints in order.
   The route is saved and displayed as each waypoint is placed.
5. When complete select **Finish Build**.
   The finish route build pop up message is displayed.
6. Select **Follow** to immediately follow the route. or
7. Select **Edit** to change the route name or change the route color. or
8. Select **Exit** to save the route and return to the chart application.

Note: If you place a waypoint at the wrong position, select **Undo Waypoint** from the Route Menu.

Building a route

From the chart application:

1. Select **Menu**.
2. Select **Navigate**.
3. Select **Build Route**.
   The build route menu is displayed.
4. Select **Place Wpt**.
5. Using the **Joystick** select a location on screen.
6. Press the **Ok** button to place the first waypoint in the route.
7. Use the **Joystick** and the **Ok** button to place subsequent waypoints.
   The route is saved and displayed as each waypoint is placed.
8. When your route is complete select **Finish Build**.
   The finish route build pop up message is displayed.
9. Select **Follow** to immediately follow the route. or
10. Select **Edit** to change the route name or change the route color. or
11. Select **Exit** to save the route and return to the chart application.

Note: If you place a waypoint at the wrong position, select **Undo Waypoint**.

Building a route using the waypoint list

From the chart application:

1. Select **Menu**.
2. Select **Navigate**.
3. Select **Build Route**.
   The build route menu is displayed.
4. Select **Use WPT List**.
   The waypoint list is displayed.
5. Select the required waypoint.
   You will be taken back to the build route menu.
6. Add subsequent waypoints to the route.
   The route is saved and displayed as each waypoint is placed.
7. When your route is complete select **Finish Build**.
   The finish route build pop up message is displayed.
8. Select **Follow** to immediately follow the route. or
9. Select **Edit** to change the route name or change the route color. or
10. Select **Exit** to save the route and return to the chart application.

Note: If you select the wrong waypoint, select **Undo Waypoint** from the route menu.

Adjusting the chart range while building a route

From the Build Route menu:

1. Use the **Range In** and **Range Out** buttons to range in and out of the chart.

Adjusting chart range while building a route

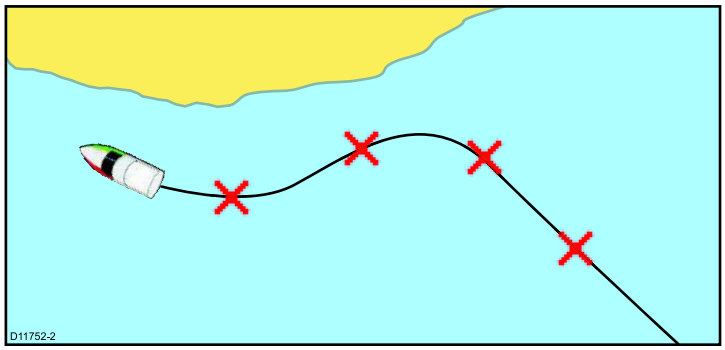
From the Build Route menu:

1. Use the on-screen **Range In** and **Range Out** icons to range in and out of the chart.

Build a route from a track

You can create a route from a recorded track.

When a track is converted the system creates the closest route through the recorded track, using the minimum number of waypoints. Each waypoint created will be saved with the depth and temperature data (if applicable) for that position.



Note: If a track break occurs, only the last segment is converted to a route.

Building a route from a track

From the Track List:

- accessed from the homescreen: **My Data > Track List**
- accessed from the chart application: **Menu > My Data > Track List**

1. Select the Track you want to convert to a route.
   The track options dialog is displayed.
2. Select **Create Route From Track**.
   On completion, the maximum deviation of the route from the recorded track is displayed in a dialog and the new route is added to the route list. It can now be displayed, edited and erased etc. in the same way as other routes in the system.
3. Select **Ok** to confirm.
4. Select **Edit** to change the name and line color of the created route.

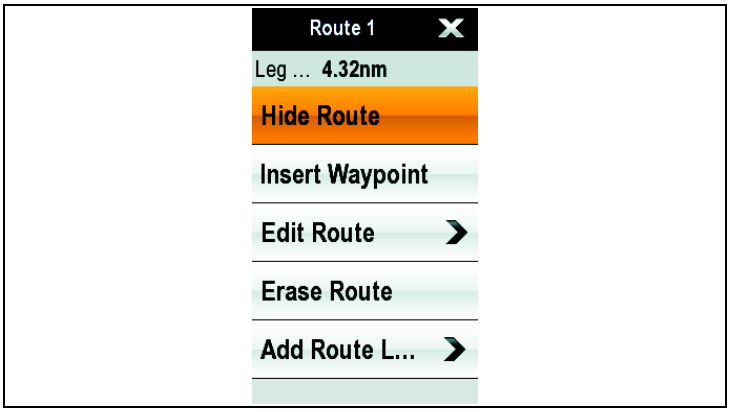
Building a route from a track displayed on the chart

From the chart application:

1. Select the required track.
   The track context menu is displayed.
2. Select **Create Route From Track**.
   On completion, the maximum deviation of the route from the recorded track is displayed in a pop up message and the new route is added to the route list. It can now be displayed, edited and erased etc. in the same way as other routes in the system.
3. Select **Ok** to confirm.
4. Select **Edit** to change the name and line color of the created route.

Route context menu

Placing the cursor over a route in the chart application displays a context menu showing the leg of the route highlighted by the cursor and menu items.



The context menu provides the following menu items:

- **Follow Route**
- **Follow Route In Reverse**
- **Hide Route**
- **Insert Waypoint**
- **Edit Route**
- **Erase Route**
- **Add Route Leg**
- **Acquire Target** (only available if Radar overlay is switched on.)

When following a route the context menu options change to:

- **Stop Follow**
- **Restart XTE**
- **Advance Waypoint**
- **Insert Waypoint**
- **Edit Route**
- **Erase Route** — Disabled
- **Add Route Leg**
- **Acquire Target** (only available if Radar overlay is switched on.)

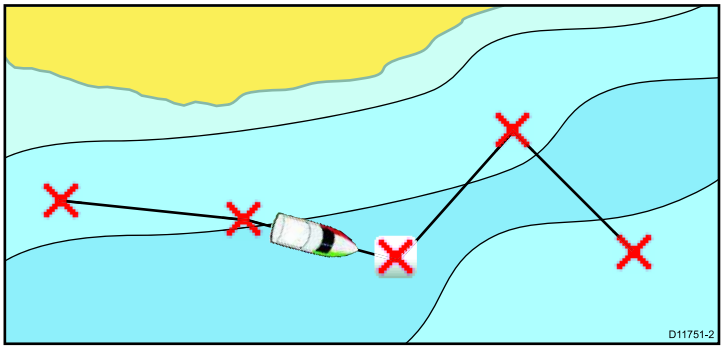
Accessing the context menu

You can access the context menu by following the steps below.

1. New e Series or New c Series:
   i. Selecting a location, object or target on-screen and pressing the **Ok** button.
2. Touchscreen multifunction displays:
   i. Selecting an object or target on-screen.
   ii. Selecting and holding on a location on-screen.

Navigating a route

You can follow any route stored on the display. When following a route you visit each waypoint in order. You may also use the follow route options in conjunction with a compatible autopilot to automatically navigate along your chosen route.



There are a number of ways to select the follow route option:

- Using a stored route within the route list.
- From a selected waypoint or any leg within a route.

You can also follow any route in reverse order.

Following a stored route

From the chart application:

1. Select **Menu**.
2. Select **Navigate**.
3. Select **Follow Route**.
   The Route list is displayed.
4. Select the route you want to follow.
5. Select **Follow Route**.

Cancelling navigation of a route

From the chart application:

1. Select the Route.
   The route context menu is displayed.
2. Select **Stop Follow**.

Arriving at a waypoint

As your vessel approaches a waypoint, the waypoint arrival alarm provides a warning.

1. Select **Ok** on the waypoint arrival alarm pop up message.

Once the alarm is acknowledged, the next waypoint is selected, and the display updates to indicate the next leg of the route.

Note: You can set the approach distance (radius) at which the waypoint arrival alarm will sound using the **Alarms** menu from the homescreen: **Set-up > Alarms > Waypoint Arrival**.

Advancing to the next waypoint in a route

You can skip the current active waypoint and advance to the next waypoint in a route at any time.

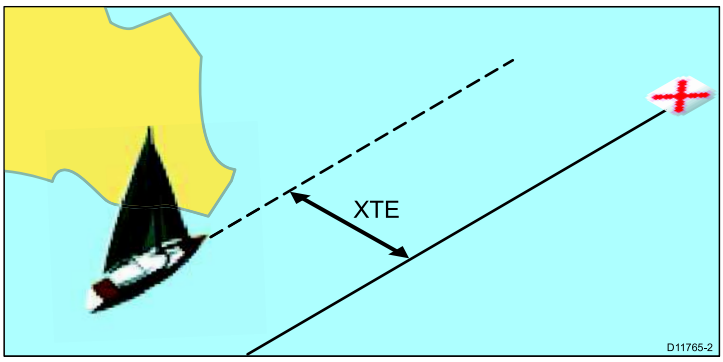
While following a route in the chart application:

1. Select the route.
   The route context menu is displayed.
2. Select **Advance Waypoint**.

Note: If the current destination is the last waypoint, the chart advances on to the first waypoint in the route.

Cross Track Error (XTE)

Cross Track Error (XTE) is the amount of deviation from your intended route or waypoint, expressed as a distance.



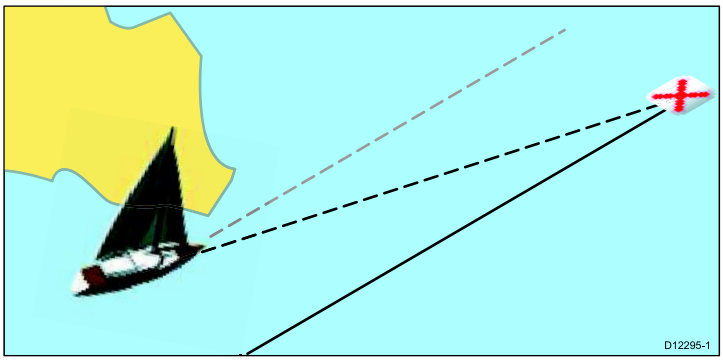
In the event that you steer off-track, you can go straight to your target by resetting XTE.

Resetting Cross Track Error (XTE)

While following a route in the chart application:

1. Select the route.
   The route context menu is displayed.
2. Select **Restart XTE**.

Resetting XTE results in a new course from the current vessel position to the current target waypoint. This does not affect your saved route.



You can also reset the XTE from the Navigate Menu: **Menu > Navigate > Restart XTE**.

Following a route in reverse order

From the chart application:

1. Select the route.
   The route context menu is displayed.
2. Select **Follow Route In Reverse**.

You can also select **Follow Route In Reverse** by selecting a route from the route list: **Menu > Navigate > Follow Route**.

Review or edit a route

There are a variety of attributes associated with routes. These can be reviewed and edited.

You can:

- Show or hide a route on the chart screen.
- Review details of the route
- Change the name or color of a route.
- Add, move and remove waypoints from a route.
- Change the route lines width.

Note: An active route can be edited, with the exception of the active waypoint. If a waypoint being edited becomes active, then the system shall cancel the edit; the waypoint shall remain in its original position.

Showing or hiding a route

From the chart application:

1. Select **Menu**.
2. Select **My Data**.
3. Select **Display My Data**.
4. Select **Select Routes To Display**.
   The display routes dialog is displayed.
5. Select the route to switch between Show and Hide.

Selecting a route to review or edit

1. Do one of the following to select the required route:
   - With the chart application active, select a route on screen to display the route context menu.
   - With the chart application active, select: **Menu > My Data > Route List** and select the required route from the list.
   - From the homescreen, select: **My Data > Route List** and select the required route from the list.

Adding a waypoint to a route on the chart screen

From the chart application:

1. Select the appropriate leg of the route.
   The route context menu is displayed.
2. Select **Insert Waypoint**.
3. Select the location for the new waypoint.
   The leg of the route is stretched to include the new waypoint.

Removing a waypoint from a route

From the chart application:

1. Select the waypoint you want to erase.
   The waypoint context menu is displayed.
2. Select **Erase Waypoint**.
   The erase waypoint pop up message is displayed.

3. Select **Yes** to confirm or **No** to cancel the action.

Moving a waypoint within a route

From the chart application:

1. Position the cursor over the waypoint you want to move.
   The waypoint context menu is displayed.
2. Select **Move Waypoint**.
3. Select the new location for the waypoint.

Erasing routes

Erasing a displayed route

From the chart application:

1. Select the route.
   The Route context menu is displayed.
2. Select **Erase Route**.
   The erase route pop up message is displayed.
3. Select **Yes** to confirm, or **No** to cancel the action.

Erasing a route using the route list

From the chart application menu or the homescreen:

1. Select **My Data**.
2. Select **Route List**.
   The route list is displayed.
3. Select the route you want to erase.
4. Select **Erase route**.
   The erase route pop up message is displayed.
5. Select **Yes** to confirm, or **No** to cancel the action.

Note: You can delete any route, except for the one that you are currently following. When you erase a route, only those waypoints associated with that route are deleted.

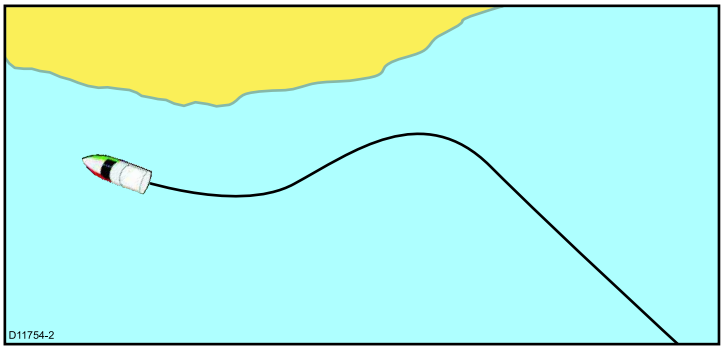
Erasing all routes

From the homescreen:

1. Select **My Data**.
2. Select **Erase Data From System**.
3. Select **Erase Routes From System**.
   The erase routes from system dialog is displayed.
4. Select **Erase All**.
   The confirm delete pop up message is displayed.
5. Select **Yes** to confirm, or **No** to cancel the action.

11.3 Tracks

A track is an on-screen trail that shows the passage you have taken. This trail is made up 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



With tracks you can:

- Review where you have been.
- Create a route from a track.

Creating a track

From the chart application:

1. Select **Menu**.
2. Select **Navigate**.
3. Select **Create Track**.
   The create track pop up message is displayed.
4. Select **Ok**.
   As you navigate your vessel, your journey is automatically recorded as a track.

Note: If the power fails whilst a track is being recorded or the position fix is lost, a break will occur in the track. Only the last segment of a track can be converted into a route.

Note: If the maximum number of tracking points is reached, you will be warned. The track will continue to be recorded with the earlier tracking points being overwritten.

5. To complete your track select **Stop Track** from the **Navigate** menu: **Menu > Navigate > Stop Track**.
   The track stopped pop up message is displayed.
6. Select **Save**, **Erase** or **Cancel**.
   - **Save** — Will save the track and open the Edit track Properties dialog where you can name the track and choose a color for the track line.
   - **Erase** — Will erase the track.
   - **Cancel** — Will cancel the Stop Track action.

Track interval

The track interval specifies the time period or distance between the points in a track.

You can adjust the interval between points which can help ensure best use of the available storage.

The settings are available from the **My Data** menu:

- **Record Track By** — specifies the interval type (Auto / Time / Distance).
- **Track Interval** — specifies the interval value (e.g. 15 minutes).

For example when creating a track for a long journey, an interval set to Auto could result in rapid use of all of the storage available for track points. In this case selecting a higher value for the Track Interval would provide capacity for a longer track.

Setting the track interval

From the chart application:

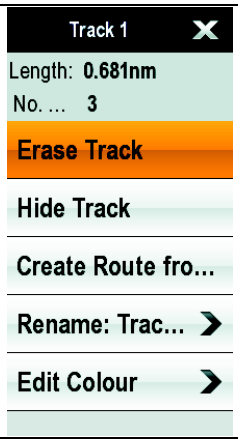
1. Select **Menu**.
2. Select **My Data**.
3. Select **Track Set-up**.
4. Select **Record Track By** and set to the appropriate value:

- Auto— The track interval is automatically set (Auto will minimize track points whilst maintaining correlation between the track and the actual path followed).
- Time— The track points are placed at regular intervals of time.
- Distance— The track points are placed at regular intervals of distance.

5. Select the **Track Interval** and set to the appropriate value:
   - Units of time from the list displayed (available if “record track by” is set to time).
   - Units of distance from the list displayed (available if “record track by” is set to distance).
   - Not available — no Track Interval is available if the “record track by” is set to auto).

Track context menu

Selecting a track in the chart application displays a context menu showing the track length, number of points and menu items.



The context menu provides the following menu items:

- **Stop Goto** (only available during active navigation.)
- **Erase Track**
- **Hide Track**
- **Create Route From**
- **Rename**
- **Edit Color**
- **Acquire Target** (only available if Radar overlay is switched on.)

When creating a track the context menu options change to:

- **Stop Goto** (only available during active navigation.)
- **Stop Track**
- **Erase Route** — Disabled
- **Create Route From**
- **Rename**
- **Edit Color**
- **Acquire Target** (only available if Radar overlay is switched on.)

Accessing the context menu

You can access the context menu by following the steps below.

1. New e Series or New c Series:
   i. Selecting a location, object or target on-screen and pressing the **Ok** button.
2. Touchscreen multifunction displays:
   i. Selecting an object or target on-screen.
   ii. Selecting and holding on a location on-screen.

Reviewing and editing a track

You can review and edit aspects of the tracks stored.

You can:

- Erase a track.
- Create a route from a track.
- Show or hide a track on the chart (only available from the chart application).
- Change the name of a track.
- Change the color of a track.

Selecting a track to review or edit

1. Do one of the following to select the required track:
   - From the chart application, select a track on screen to display the track context menu.
   - From the chart application, go to the following menu: **Menu > My Data > Track List**, and select the required track.
   - From the homescreen, select: **My Data > Track List** and select the required track.

You can then proceed and review or edit the required track using the options available.

Erasing tracks

Erasing a track

From the chart application:

1. Select **Menu**.
2. Select **My Data**.
3. Select **Track List**.
   The track list is displayed.
4. Select the track you want to erase.
5. Select **Erase Track**.
   The erase track pop up message is displayed.
6. Select **Yes** to confirm, or **No** to cancel the action.

Note: You can also erase tracks from the homescreen: **My Data > Track List**.

Erasing all tracks

From the homescreen:

1. Select **My Data**.
2. Select **Erase Data From System**.
3. Select **Erase Tracks From System**.
   The erase tracks from system dialog is displayed.
4. Select **Erase All**.
   The confirm delete pop up message is displayed.
5. Select **Yes** to confirm, or **No** to cancel the action.

11.4 Waypoints, routes and tracks storage capacity

The display can store the following quantities of waypoints, routes and tracks

Waypoints	• 3000 Waypoints • 100 waypoint groups
Routes	• 150 routes, each consisting of up to 50 waypoints.
Tracks	• 15 tracks, each consisting of up to 10000 track points.

Chapter 12: Using the chart

Chapter contents

12.1 Chart application overview

The chart application provides an electronic chart with passage planning and navigation features. It combines 2D and 3D viewpoints and provides a variety of cartographic information regarding your surroundings and charted objects.

Typical uses for the chart application include :

- Monitor your vessel location and heading.
- Interpret your surroundings.
- Measure distance and bearing.
- Navigate using waypoints.
- Plan, and Navigate using routes.
- Monitor fixed and moving objects using radar overlay.
- Monitor vessels in your vicinity using AIS data.
- Keep track and record your course.
- View information for charted objects.
- Overlay NOWRad weather information.
- Overlay aerial photos and other chart enhancements

Note: To obtain full 3D detail, you must have chart cards containing 3D cartography for the appropriate geographic area.

You can also use your multifunction display to customize your chart application to your own particular requirements and circumstances. You can:

- Alter the way the chart is drawn in relation to your vessel and the direction you are travelling in (chart orientation and motion mode).
- Manage and edit chart data you have entered.
- Control the level of detail displayed on-screen.

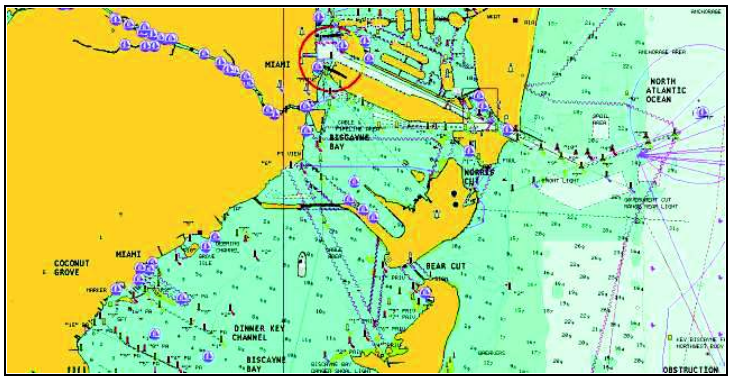


Chart datum

The chart datum setting affects the accuracy of the vessel position information displayed in the chart application.

In order for your GPS receiver and multifunction display to correlate accurately with your paper charts, they must be using the same datum.

The default datum for your multifunction display is WGS1984. If this is not the datum used by your paper charts, you can change the datum used by your multifunction display, using the system preferences page. The system preferences page can be accessed from the homescreen: **Set-up > System Settings > System Preferences > System Datum**.

When you change the datum for your multifunction display, the chart grid will subsequently move according to the new datum, and the latitude/longitude of the cartographic features will also change accordingly. Your multifunction display will attempt to set up any GPS receiver to the new datum, as follows:

- If your multifunction display has a built in GPS receiver it will automatically correlate each time you change the datum.
- If you have a Raymarine GPS receiver using SeaTalk or SeaTalk^{ng}, it will automatically correlate each time you change the datum on the multifunction display.
- If you have a Raymarine GPS receiver using NMEA0183, or a third-party GPS receiver, you must correlate it separately.

It may be possible to use your multifunction display to correlate an NMEA0183 GPS receiver. From the homescreen go to **Set-up > System settings > GPS Set-up > View Satellite Status**. If the datum version is displayed, it may be possible to change it. From the homescreen go to **Set-up > System settings > Data Sources > GPS Datum**.

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

Chart cards overview

Chart cards provide additional cartographic information.

Obtain detailed cartographic information for the area that you navigate using Navionics® chart cards. To check the current availability of Navionics chart card types, please visit www.navionics.com or www.navionics.it. The amount of cartographic detail shown varies for different areas and for different scales. The chart scale in use is indicated by a number and a horizontal line in the status bar — the number represents the distance the horizontal line represents in nautical miles horizontally across the chart.

You can remove and insert chart cards while a chart is displayed provided that you follow the correct procedure. The chart information is retained on-screen until the chart application redraws the screen; for example, when you pan outside the current area, or use the **Range control** to change the chart scale.

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 save data (waypoints, routes, and so on) to a chart card, as the charts may be overwritten.
- DO NOT use a metallic instrument such as a screwdriver or pliers to insert or remove a chart or memory card.
- Safe removal. Always power the unit off before inserting or removing a chart or memory card.

Chart compatibility

Your multifunction display is supplied with a base map and depending on unit a Navionics chart card. You may also purchase Navionics chart cards to get enhanced chart details and additional chart features.

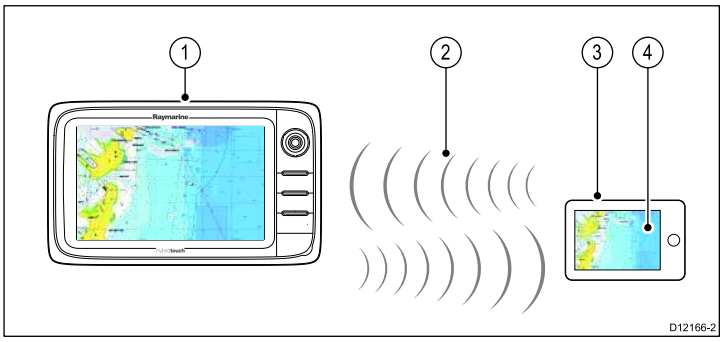
Your multifunction display is compatible with the following Navionics chart cards:

- Ready to Navigate
- Silver
- Gold
- Gold+
- Platinum
- Platinum+
- Fish'N Chip
- Hotmaps

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

Navionics chartplotter sync connection

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



1. Multifunction display.
2. Wi-Fi connection.
3. Tablet / smartphone.
4. Navionics Marine app.

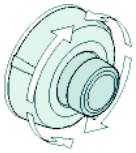
To use this feature you must first:

- Download and install the Navionics Marine app, available from the relevant app store.
- Enable Wi-Fi in the System Settings on the multifunction display.
- Enable Wi-Fi on your tablet / smartphone.
- Select the Raymarine Wi-Fi connection from the list of available Wi-Fi networks on your tablet / smartphone.

12.2 Chart ranging and panning

Ranging in and out

The table below shows the Range controls available for each display variant.

	**Rotary Control**	• New c Series • New e Series
	**Range in** and **Range out** buttons	• New c Series • New e Series (excluding e7 and e7D
	**Range in** and **Range out** on-screen icons	• New a Series • New e Series **Note:** New e Series on-screen range controls can be enabled and disabled from the homescreen: **Customize > Display Preferences > Range Controls**

Panning the chart

You can pan the chart area on a touchscreen multifunction display by following the steps below.

In the chart application:

1. Swipe your finger across the screen from right to left to pan right.
2. Swipe your finger across the screen from left to right to pan left.
3. Swipe your finger across the screen from top to bottom to pan up.
4. Swipe your finger across the screen from bottom to top to pan down.

Panning the chart

You can pan the chart area on a non-touchscreen multifunction display by following the steps below.

From the chart application:

1. Move the **Joystick** in the direction you want to pan.

12.3 Vessel position and orientation

Vessel position on the chart display

Your current position is represented on screen by the vessel symbol.

The symbol used for your vessel will vary depending on the vessel type selected during initial set up of your multifunction display.

Motor Vessels	
Sail Vessels	
Small Vessel	
The vessel symbol will change to a black dot when your vessel is stationary and no heading data is available.	

Note: If positional data has been selected for display, your position will be displayed in the databar under Ves Pos.

Locating your vessel

The vessel icon can be repositioned to the center of the screen by following the steps below.

1. Select the Find Ship icon:  located on the left hand side of the screen.

Locating your vessel

The vessel icon can be repositioned to the center of the screen by following the steps below.

1. Select **Menu**.
2. Select **Find Ship**.

Chart orientation

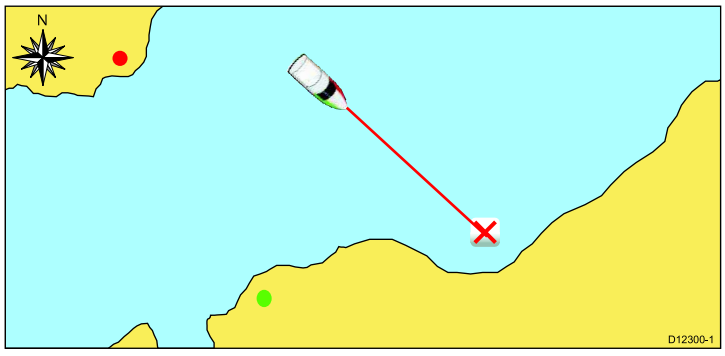
The orientation of a chart refers to the relationship between the chart and the direction that you are travelling in.

It is used in conjunction with motion mode to control how your vessel and chart relate to one another and how they are displayed on screen.

The mode you choose applies to the active chart instance, and is restored at power up.

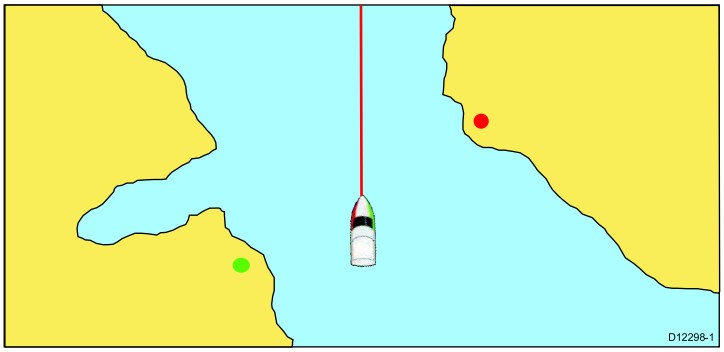
The following options are available:

North–Up



In North Up mode, the chart orientation is fixed with true north upwards. As your heading changes the vessel symbol moves accordingly. This is the default mode for the chart application.

Head-Up

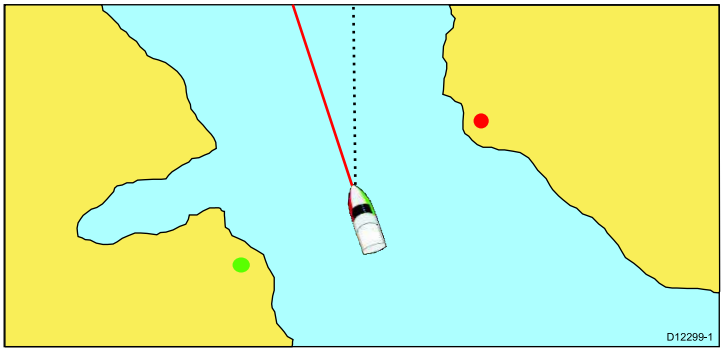


Head Up mode displays the chart with your vessel's current heading upwards. As the heading changes the vessel symbol remains fixed and the chart picture rotates accordingly.

Note: To prevent continuous backwards and forwards rotations as the vessel yaws from side-to-side, the chart will not update unless the heading changes by at least 10 degrees from the last displayed orientation.

Note: It is not possible to select Head Up when the motion mode is set to True.

Course-Up



In Course Up mode, the chart picture is stabilized and shown with your current course upwards. As your vessel's heading changes, the ship symbol moves accordingly. If you select a new course, the picture will reset to display the new course upwards. The reference used for Course Up depends upon the information available at a given time. The system always prioritizes this information in the following order:

1. Bearing from origin to destination, i.e. intended course.
2. Locked heading from an Autopilot.
3. Bearing to waypoint.
4. Instantaneous heading.

If heading data becomes unavailable whilst in this mode, a warning pop up message is displayed and the chart uses 0° heading in relative motion.

Setting the chart orientation

From the chart application:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Chart Orientation**.
4. Select Head Up, North Up, or Course Up option, as appropriate.
   Once selected a tick will be placed next to the chosen orientation and the screen will update to reflect the new orientation.

Chart motion mode

The motion mode controls the relationship between the chart and your vessel.

Whilst motion mode is active, as your vessel moves, the chart is redrawn to keep the vessel on-screen. The 3 motion modes are:

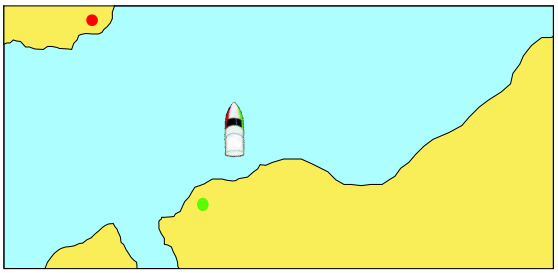
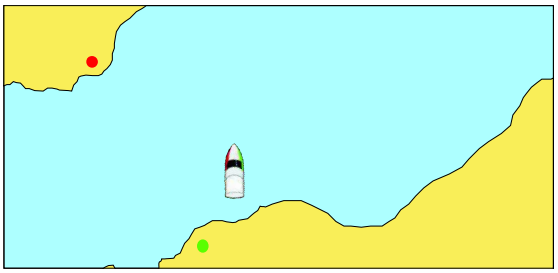
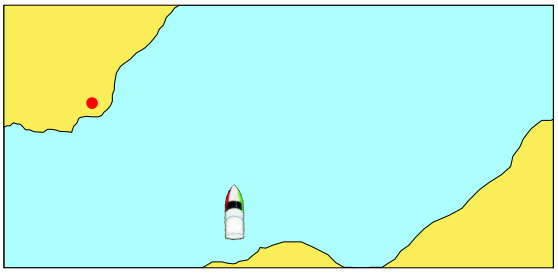
- Relative Motion.
- True Motion.
- Auto Range.

Note: In the 3D chart view, only Relative Motion mode is available.

The current motion mode applies to the active instance of the chart application.

When you pan the chart the motion mode is no longer active. This is indicated in the status bar by brackets around the motion mode — for example, (Relative Motion). This enables you to view another area of the chart whilst navigating. To reset the motion mode and return your vessel to the screen, select the **Find Ship** icon or select **Find Ship** from the menu. Manually changing the range or panning the chart in auto range also suspends motion mode. The default setting is relative motion with zero offset. The mode that you select is restored at power up.

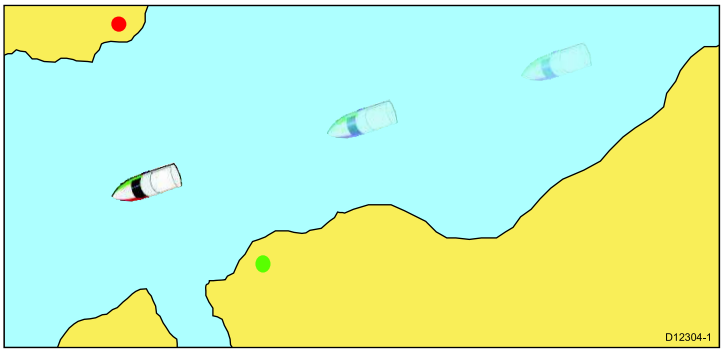
Relative Motion with optional vessel offset

Offset	Example
Zero Offset	
1/3 Offset	
2/3 Offset	

When the motion mode is set to Relative Motion, the position of your vessel is fixed on the screen and the chart picture moves relative to your vessel. You can use the **Menu > Presentation > Vessel Offset** menu item to determine whether the vessel is fixed in the centre of the window (0 offset) or offset by 1/3 or 2/3. If you change the offset to 1/3 or 2/3, the view ahead of your vessel will be increased.

In the example shown above, the motion mode has been set to Relative Motion, with a vessel offset of 1/3. The vessel is fixed in the offset position and the chart moves accordingly:

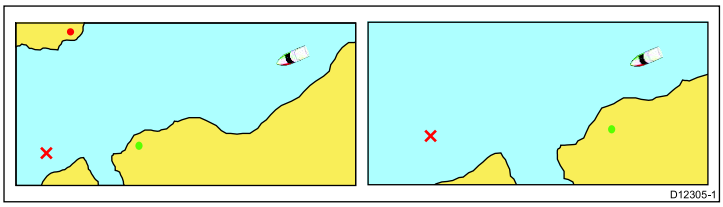
True Motion



When the motion mode is set to True Motion, the chart is fixed and the vessel moves in true perspective to fixed landmasses on the screen. As the vessel's position approaches the edge of the screen, the chart picture is automatically reset to reveal the area ahead of the vessel.

Note: It is not possible to select True Motion when the orientation is set to Head Up.

Auto Range



Auto Range selects and maintains the largest possible scale of chart that will display both the vessel and the target waypoint. Auto range is not available if radar-chart synchronization is on.

Setting the motion mode

From the chart application:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Motion Mode**.
4. Select True Motion, Relative Motion, or Auto Range option as appropriate.

Once selected a tick will be placed next to the chosen motion mode and the screen will update to reflect the new mode.

Changing the vessel offset value

From the chart application:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Vessel Offset** .
4. Select 0, 1/3, or 2/3 option as appropriate.

12.4 Chart views

Switching between 2D/3D chart view

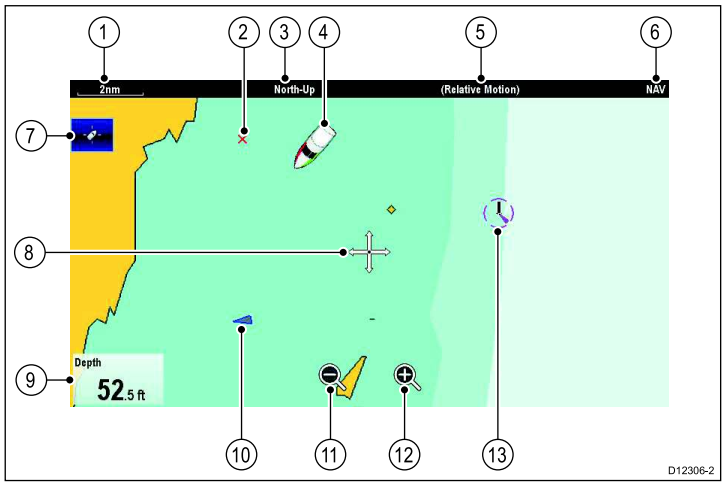
You can switch between 2D and 3D views.

From the chart application:

1. Select **Menu**.
2. Select **Presentation** .
3. Select **Chart View** to switch between 2D or 3D.

2D chart view

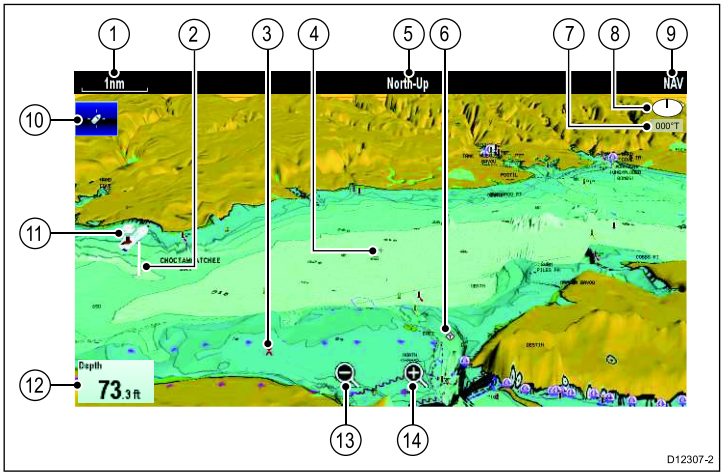
The 2D chart view can display a range of information to help you navigate.



Item	Description
1	**Range** — horizontal chart scale indicator (shown in selected system units).
2	**Waypoint** — optional.
3	**Orientation** — states the orientation mode that the chart is using (North-up, Head-up, or Course-up).
4	**Vessel symbol**— shows your current position.
5	**Motion mode** — states the current motion mode (Relative, True, or Auto Range).
6	**Chart type** — indicates the type of chart in use — Fish or Navigation.
7	**Find ship icon** — used to find and center your vessel on the chart.
8	**Cursor** — used to select chart objects and move around the chart area.
9	**Data overlay** — used to display data such as depth on the chart screen.
10	**AIS target** — a vessel broadcasting AIS information (optional).
11	**Range out** — use icon to to range out (New e Series only).
12	**Range in** — use icon to range in (New e Series only).
13	**Cartographic objects** — use the Cartography menu: **Menu > Set-up > Cartography** to choose which objects to display.

3D chart view

The 3D view can display a range of information to help you navigate.



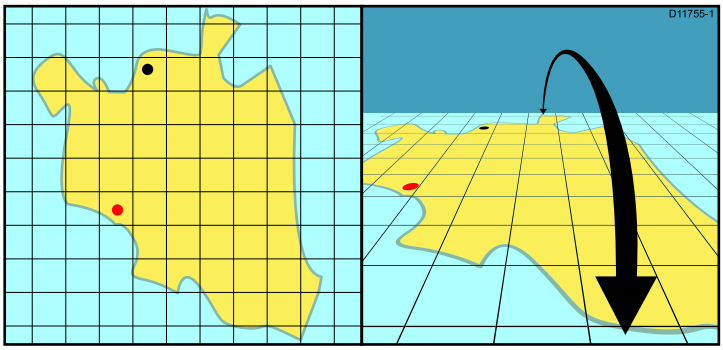
Item	Description
1	**Range** — horizontal chart scale indicator (shown in selected system units).
2	**Depth Scale** — approximate depth beneath your vessel (optional).
3	**Waypoint** — optional.
4	**Center-of-view** — the white cross indicates the center of chart view at the water level (optional).
5	**Orientation** — states the orientation mode that the chart is using.
6	**Cartographic objects** — use the Cartography Set-up menu to choose which objects to display.
7	**Rotation** — shows in degrees true, how far the on-screen view has been rotated from your vessel's heading and the tilt angle of your vessel.
8	**North arrow** – 3D indication of True North in relation to the chart view. The north arrow also tilts to indicate pitch angle.
9	**Chart type** — indicates the type of chart in use — Fish or Navigation.
10	**Find ship icon** — used to find and center your vessel on the chart.
11	**Vessel symbol** — your vessel's current position.
12	**Data overlay** — used to display data such as depth on the chart screen.
13	**Range out** — use icon to range out (New e Series only).
14	**Range in** — use icon to range in (New e Series only).

Manipulating the 3D chart view

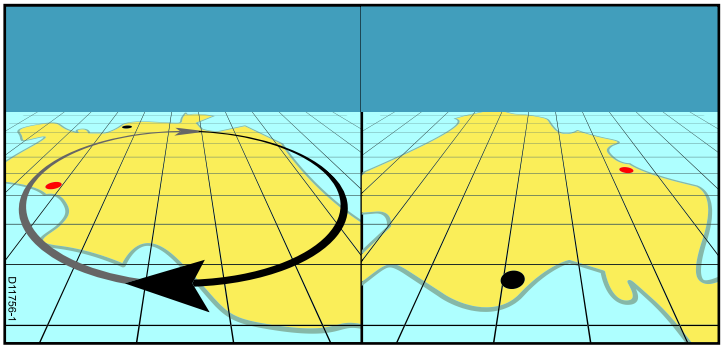
From the chart application:

1. With the chart in 3D mode, go to the Adjust Viewing Angle menu: **Menu > Adjust Viewing Angle**.
2. Select **Adjust:** so that Pitch and rotate is highlighted.
3. To adjust the pitch:
   i. New c Series or New e Series — Move the **Joystick Up** or **Down** to adjust the pitch

ii. New a series or New e Series — Swipe your finger up or down across the screen to adjust the pitch.

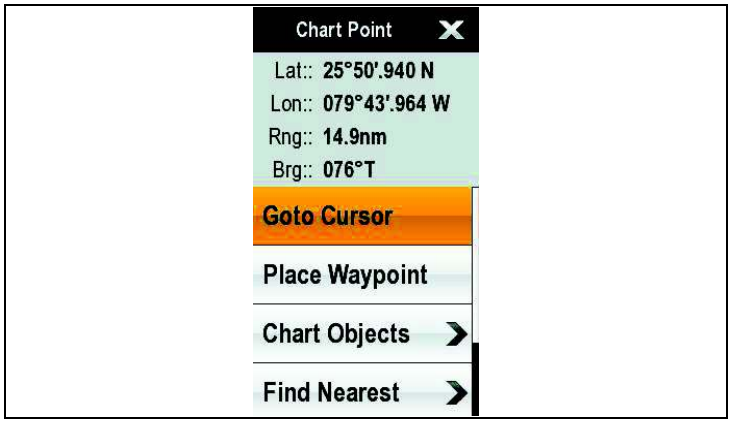


4. To adjust the rotation:
   i. New c Series or New e Series — Move the **Joystick Left** or **Right** to adjust the rotation
   ii. New a Series or New e Series — Swipe your finger left or right across the screen to adjust the rotation.



12.5 Chart context menu

Placing the cursor over an area in the chart application displays a context menu showing the cursors positional data and menu items.



The method of selecting a chart object using touch depends on the **Context Menu** setting in the chart **Set-up** menu, which can be set to Touch or Hold.

The context menu provides the following positional data for the cursor position in relation to your vessel:

- Latitude
- Longitude
- Range
- Bearing

The following menu items are available:

- **Goto Cursor** / **Stop Goto** / **Stop Follow**
- **Place Waypoint**
- **Photo**
- **Tide Station** (only available if a tide station is selected.)
- **Current Station** (only available if a current station is selected.)
- **Pilot Book** (only available at certain ports.)
- **Animate** (only available if a tide or current station is selected.)
- **Chart Objects**
- **Find Nearest**
- **Measure**
- **Build Route**
- **Acquire Target** (only available if Radar overlay is switched on.)
- **Slew thermal camera** (only available when thermal camera is connected and operating.)

Accessing the context menu

You can access the context menu by following the steps below.

1. New e Series or New c Series:
   i. Selecting a location, object or target on-screen and pressing the **Ok** button.
2. Touchscreen multifunction displays:
   i. Selecting an object or target on-screen.
   ii. Selecting and holding on a location on-screen.

Selecting context menu settings

On touchscreen multifunction displays you can choose how chart object context menus are a accessed.

From the chart application:

1. Select **Menu**.
2. Select **Set-up**.
3. Select **Context Menu** to switch between Touch or Hold.
   - Hold — requires you to touch and hold on a chart object to access the context menu.
   - Touch — requires you to touch a chart object to access the context menu.

12.6 My Data options

The chart provides features to help you manage your data and help plan your navigation to a chosen location.

The options are found in the **My Data** menu: **Menu > My Data**.

- **Waypoint List** — View and edit waypoints stored on the system.
- **Route List** — View and edit routes stored on the system.
- **Track List** — View and edit tracks stored on the system. Start or stop a track.
- **Display My Data** — Allows you to choose which waypoints, routes, or tracks to show or hide in the chart application.
- **Create Track / Stop Track** — Allows you to create a new track or stop a track which is in progress.
- **Tracks Set-up** — Allows you to specify the time period or distance between track points.
- **WPT & Group Options** — View and edit waypoint groups and select default waypoint group and symbol.

Refer to the Using waypoints, routes and tracks section for further details.

12.7 Navigation options

The chart application provides features to help navigate to a chosen location.

The navigation options are found in the Navigate menu: **Menu > Navigate**.

- **Goto Cursor** — Will set the cursor position as the active destination.
- **Goto Waypoint** — Provides options to navigate to a waypoint stored on the system
- **Follow Route** — Provides options to navigate to a route stored on the system
- **Create Track** — Will initiate a track on screen to plot your course as you progress.
- **Build Route** — Provides options to build a route.

Refer to the Using waypoints, routes and tracks section for further details.

12.8 Measuring distances and bearings

You can use the databar and context menu information you can use the measure function to measure distances in the chart application.

You can determine the distance and bearing:

- from your vessel to the position of the cursor;
- between two points on the chart.

Measuring from vessel position to cursor

From the chart application:

1. Select the location on screen that you want to measure the distance or bearing from your vessel.
   The chart context menu will be displayed.
2. Select **Measure**.
   The following will happen:
   - The measure menu will be displayed.
   - A line will be drawn from the cursor position to the center of the screen.
   - The cursor location will be moved at the center of the screen.
   - The bearing and distance will be displayed next to the new cursor location.
3. From the measure menu select **From** so that Ship is selected.
   The ruler line is re-drawn from the cursor position to your vessel.
4. You can now adjust the ruler position by moving the cursor to the desired location.
5. If you want the ruler displayed after you have closed the measure menu, select **Ruler:** so that On is highlighted.
   Selecting ruler will switch the ruler On and Off.
6. Select Back or Ok to close the measure menu leaving the current measurement on-screen.

Measuring from point to point

From the chart application:

1. Select the location on screen that you want to measure the distance or bearing from your vessel.
   The chart context menu will be displayed.
2. Select **Measure**.
   The following will happen:
   - The measure menu will be displayed.
   - A line will be drawn from the cursor position to the center of the screen.
   - The cursor location will be moved at the center of the screen.
   - The bearing and distance will be displayed next to the new cursor location.
3. Select **From** so that Cursor is selected.
   Selecting measure from will switch between Ship and Cursor.
4. You can now adjust the end point by moving the cursor to the desired location.
5. You can also **Swap Direction** of the ruler so that the bearing becomes the bearing from end point to start point.
6. If you want the ruler displayed after you have closed the measure menu, select **Ruler** so that On is highlighted.
   Selecting display ruler will switch the ruler On and Off.
7. Select **Back** or **Ok** to exit the measure menu leaving the current measurement on-screen.

Repositioning the ruler

You can reposition a ruler by following the steps below.

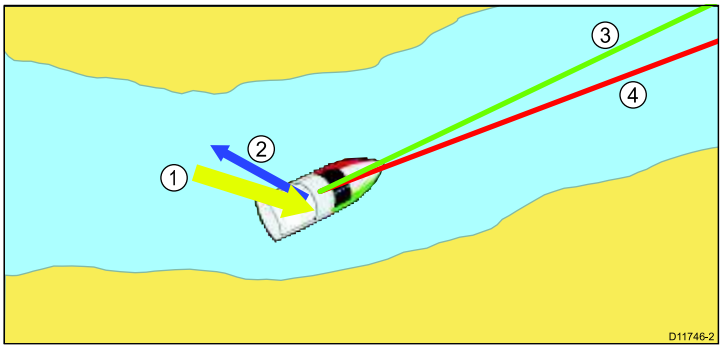
1. Select the current ruler.
   The ruler context menu is displayed.
2. Select **Measure**.

You can now reposition the ruler as required.

12.9 Chart vectors

Chart vectors display indicators for heading, COG, wind direction and tide direction.

A range of vector graphics can be displayed in the chart application when in 2D chart view. The following vectors can be independently enabled or disabled:



Item	Descriptions
1	**Wind arrow** — wind direction is displayed as a yellow line with solid arrow heads pointing towards your vessel, indicating the wind direction. The width of the arrow indicates the wind strength.
2	**Tide arrow** — tide is displayed as a blue line with solid arrow head pointing away from your vessel, in the direction of the tidal set. The width of the arrow indicates the tide strength.
3	**COG (Course Over Ground) vector** — a green line indicates the vessel's actual course. A double arrow head is used if the vector length is set to a value other than infinite.
4	**HDG (heading) vector** — a red line shows the vessel's heading. An arrow head is used if the vector length is set to a value other than infinite.

Note: If Speed Over Ground (SOG) or heading data is not available, vectors cannot be displayed.

Vector length

The length of the HDG and COG vector lines is determined by the distance your vessel will travel in the time you specify at your current speed.

Enabling and disabling chart vectors

In 2D chart view:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Layers**.
4. Select **Vectors**.
5. Select the relevant menu item to switch **Heading Vector**, **COG Vector**, **Tide Arrow**, or **Wind Arrow** On or Off as appropriate.

Setting vector length and width

You can specify the length and width of the heading and cog vectors

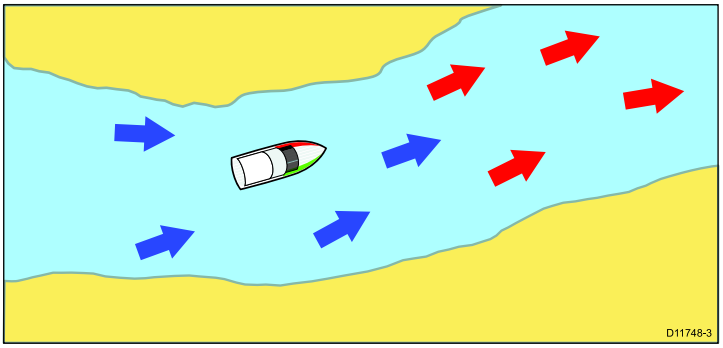
In 2D chart view:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Layers**.
4. Select **Vectors**.
5. Select **Vector Length**.
   A list of times is displayed .
6. Select a time setting or select Infinite.
7. Select **Vector Width**.
   A list of widths is displayed.
8. Select either Thin, Normal or Wide.

12.10 Current information

Animated current information

The electronic charts may allow animation of the current information current stations.



Animated current information is available in the chart application wherever a diamond-shaped symbol with a "C" is displayed:

	This symbol identifies the location of a current station and the availability of current information for the location.

When you select a current station symbol the chart context menu is displayed, which provides the **Animate** option.

When you select **Animate** the animate menu is displayed and the diamond-shaped current symbols are replaced with dynamic current arrows which indicate the direction and strength of the currents:

	Current animation.

- Arrows indicate the direction of current flows.
- The length of the arrow indicates the flow rate.
- The color of the arrow indicates the flow speed:
  - **Red**: increasing current flow speed.
  - **Blue**: decreasing current flow speed.

The animation can be viewed continuously or incrementally at a time interval that you specify. You can also set the date for the animation, and start or restart the animation at any point within a 24-hour period. If the system does not have a valid date and time the date used will be midday for the system default date.

Note: Not all electronic charts support the animated currents feature. Check the Navionics website: www.navionics.com to ensure the features are available on your chosen cartography level.

Viewing animated current information

From the chart application:

1. Select diamond-shaped current icon.
   The chart context menu is displayed.
2. Select **Animate**.
   The animate menu is displayed and the current icons are replaced with dynamic current arrows

Controlling animations

From the chart application, with the animate menu displayed:

1. To start or stop the animation, select **Animate:** to switch between Play and Pause.
2. To view the animation in steps, select **Step Back** or **Step Forward**.
3. To set the animation step interval, pause any playing animations, and then select **Set Time Interval**.
4. To set the animation date, select **Set Date** and then using the on screen keyboard enter the required date.
5. To set the animation date to the current date select **Today**.
6. To set the animation date to 24 hours previous to the current date select **Previous Day**.
7. To set the animation date to 24 hours ahead of the current date select **Next Day**.

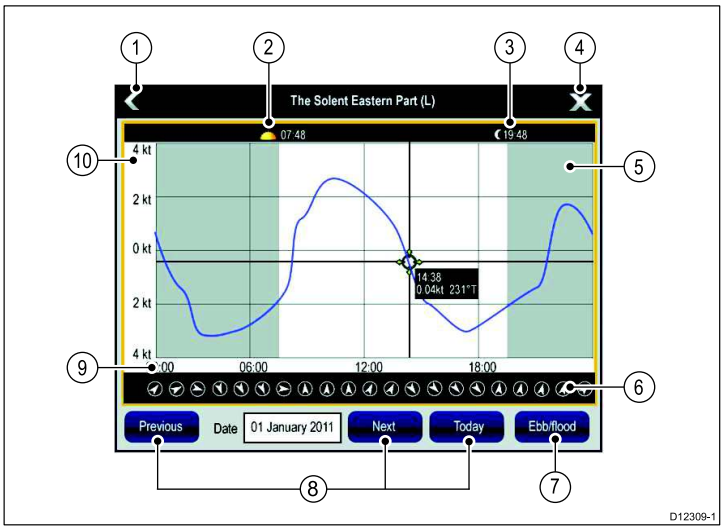
Displaying details of currents

From the chart application:

1. Select diamond-shaped current icon.
   The chart context menu is displayed.
2. Select **Current Station**.
   The current graph for the selected current station is displayed.

Current graphs

Current graphs provide a graphical view of current activity.



1. **Back** — Return to the previous menu or view.
2. **Sunrise indicator** — Indicates when the sun rises.
3. **Sunset indicator** — Indicates when the sun sets.
4. **Exit** — Closes the dialog.
5. **Nightfall indicator** — The greyed-out section of the graph indicates when nightfall occurs.
6. **Current direction** — Indicates the direction of current (relative to north).
7. **Ebb/Flood** — Displays a list showing ebb, slack and flood tides.
8. **Date navigation** — Use the icons to move to the next or previous day.
9. **Time** — The horizontal axis of the graph indicates time, in accordance with the time format specified in the **Units Set-up** options.
10. **Current speed** — The vertical axis of the graph indicates speed, in accordance with the speed preferences specified in the **Units Set-up** options

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

12.11 Tide information

Animated tide information

The electronic charts may allow animation of the tide information tide stations.

Animated tide information is available in the chart application wherever a diamond-shaped symbol with a "T" is displayed:

	This symbol identifies tide stations and the availability of tide information for the location.

When you select a tide station symbol the chart context menu is displayed, which provides the **Animate** option.

When you select **Animate** the animate menu is displayed and the diamond–shaped symbols are replaced with dynamic tide bar which indicates the predicted tide height for the actual time and date:

	Tide animation.

- Tide height is indicated by a gauge. The gauge is comprised of 8 levels, which are set according to the absolute minimum / maximum values of that particular day.
- The color of the arrow on the tide gauges indicates changes in the tide height:
  - **Red**: increasing tide height.
  - **Blue**: decreasing tide height.

The animation can be viewed continuously or incrementally at a time interval that you specify. You can also set the date for the animation, and start or restart the animation at any point within a 24-hour period. If the system does not have a valid date and time the date used will be midday for the system default date.

Note: Not all electronic charts support the animated tides feature. Check the Navionics website: www.navionics.com to ensure the features are available on your chosen cartography level.

Viewing animated tide information

From the chart application:

1. Select diamond-shaped tide icon.
   The chart context menu is displayed.
2. Select **Animate**.
   The animate menu is displayed and the tide icon is replaced with a dynamic tide bar indicator.

Controlling animations

From the chart application, with the animate menu displayed:

1. To start or stop the animation, select **Animate:** to switch between Play and Pause.
2. To view the animation in steps, select **Step Back** or **Step Forward**.
3. To set the animation step interval, pause any playing animations, and then select **Set Time Interval**.
4. To set the animation date, select **Set Date** and then using the on screen keyboard enter the required date.
5. To set the animation date to the current date select **Today**.
6. To set the animation date to 24 hours previous to the current date select **Previous Day**.
7. To set the animation date to 24 hours ahead of the current date select **Next Day**.

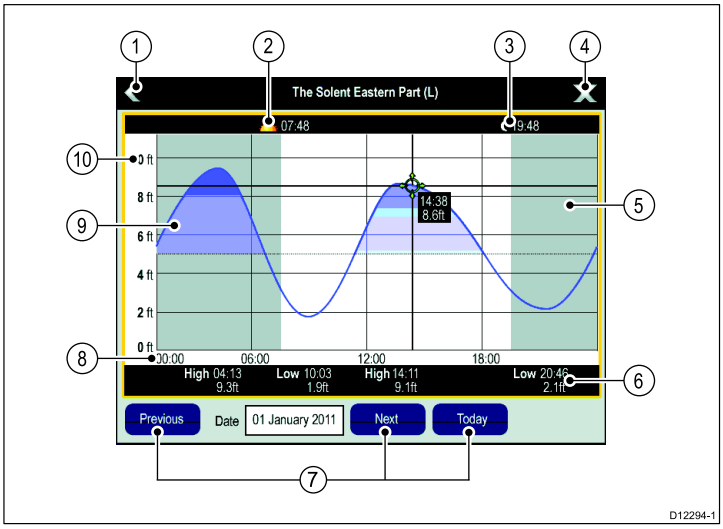
Displaying details of tides

From the chart application:

1. Select diamond-shaped tide icon.
   The chart context menu is displayed.
2. Select **Tide Station**.
   The tide graph for the selected tide station is displayed.

Tide graphs

Tide graphs provide a graphical view of tidal activity.



1. **Back** — return to the previous menu or view.
2. **Sunrise indicator** — indicates when the sun rises.
3. **Sunset indicator** — indicates when the sun sets.
4. **Exit** — closes the dialog.
5. **Nightfall indicator** — the greyed-out section of the graph indicates when nightfall occurs.
6. **Low / High Tide** — Indicates the time at which low or high tide occurs.
7. **Date navigation** — Use the icons to move to the next or previous day.
8. **Time** — The horizontal axis of the graph indicates time, in accordance with the time format specified in the System Settings.
9. **Minimum safe depth** — The blue shaded area of the graph indicates the point during the tide cycle when it is safe to navigate your vessel, based on the water depth at that time and the settings you specified for your vessel in the **Minimum Safe Depth** settings in the Customize menu. For example, the diagram above is based on a minimum safe depth setting of 5 ft.
10. **Depth** — The vertical axis of the graph indicates tidal water depth. The units for the depth measurement are based on those specified in the **Homescreen > Customize > Units Set-up > Depth Units** menu.

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

12.12 Chart object information

You can display additional information on the chart for cartographic objects, ports, and marinas.

You can also search for the nearest instance of a particular chart object and search for ports by name.

Depending on the chart card you are using, you can view some or all of the following additional information:

- Details of each cartographic object that is marked on the chart, including source data for structures, lines, open sea areas, and so on.
- Details of ports, port features, and business services.
- Pilot book information (similar to what you would see in a marine almanac). Pilot book information is available at certain ports.
- Panoramic photos of ports and marinas. The availability of photos is indicated by a camera symbol on the chart display.

This information can be accessed using the **Chart Objects** or **Find Nearest** options from the chart context menu:

- Select a chart object on screen and choose **Chart Objects** from the chart context menu to view information about the selected object.
- Select **Find Nearest** from the chart context menu to search for objects close by.

Note: The amount of object information available depends upon the electronic charts that you are using for your system. For full details of the features available for your chart cards contact your chart card supplier.

Displaying chart object information

From the chart application:

1. Select an object.
   The chart context menu is displayed.
2. Select **Chart Objects** to view detailed information about the selected object
   The Object Info dialog is displayed.
3. Selecting the position in the object info dialog will close the information dialog and position the cursor over the object.
4. Selecting available options will display detailed information about that item.

Searching for the nearest chart object or service

From the chart application:

1. Select a location on screen.
   The chart context menu is displayed.
2. Select **Find Nearest**.
   A list of chart object types is displayed.
3. Select the chart object or service in the list.
   A list is displayed of the available instances of that particular object or service.
4. Select the item that you want to find.
   The cursor will be repositioned over the selected object or a list of instance will be displayed.

Searching for a port by name

From the chart application:

1. Select a location on screen.
   The chart context menu is displayed.
2. Select **Find Nearest**.
   A list of chart object types is displayed.
3. Select **Port (search by name)** from the list.
   The on–screen keyboard is displayed.
4. Use the on-screen keyboard to enter the desired port name.
5. Select **SEARCH**.
   The search results are displayed.
6. Select an entry in the list to display more information.

Displaying pilot book information

From the chart application, when a port symbol is displayed for a port which has a pilot book:

1. Select the port symbol.
   The chart context menu will be displayed.
2. Select **Pilot Book**.
3. Select the relevant chapter.

Displaying panoramic photos

From the chart application, when a camera symbol is displayed, indicating the availability of a photo:

1. Select the camera symbol.
   The chart context menu is displayed.
2. Select **Photo**.
   The photo is displayed on screen.

Note: Not all cartography types are capable of displaying panoramic photos.

12.13 Chart presentation

The chart has a number of presentation options which affect the level of detail, types of objects and aspects of its operation.

The presentation options available are:

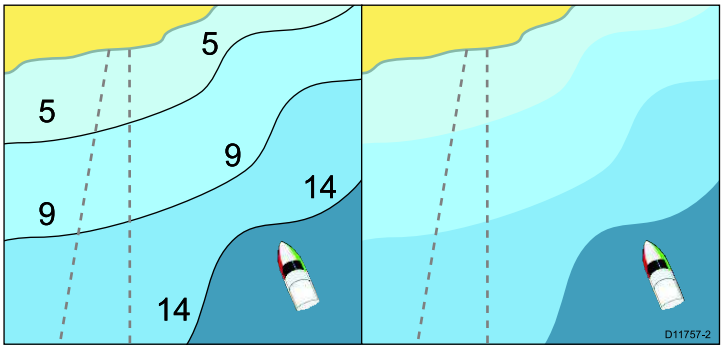
- **Chart detail** — Set the level of object detail shown on the chart.
- **Layers** — Set content layers which can be overlaid.
- **Chart View** — Toggle 2D and 3D perspective view.
- **2D Chart Use** — Select fishing charts (if supported by your chosen chart supplier) or standard navigation.
- **Chart Orientation** — Set the orientation of the chart application.
- **Motion Mode** — Set the motion mode for the chart application (only available in 2D view).
- **Vessel Offset** — Set the vessel offset from the centre of the screen (only available in 2D view).
- **Chart Sync** — Synchronize the radar and chart scales.
- **Data Overlay Set-up** — Enable data cells in the chart application.

Accessing chart presentation options

From the chart application:

1. Select **Menu**.
2. Select **Presentation**.

Chart detail



The chart detail setting determines the amount of cartographic detail shown in the chart application.

Selecting the Low option for the **Chart Detail** hides the following cartographic objects:

- Text.
- Chart boundaries.
- Spot soundings.
- Depth contours.
- Light sectors.
- Caution and routing Data.
- Land and marine features.
- Business services (if available for your chart card).

Selecting the High option shows these objects.

Changing the level of chart detail

From the chart application:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Chart Detail** to switch between the High or Low option, as appropriate.

Chart layers

The chart has a number of content layers providing different kinds of display and information.

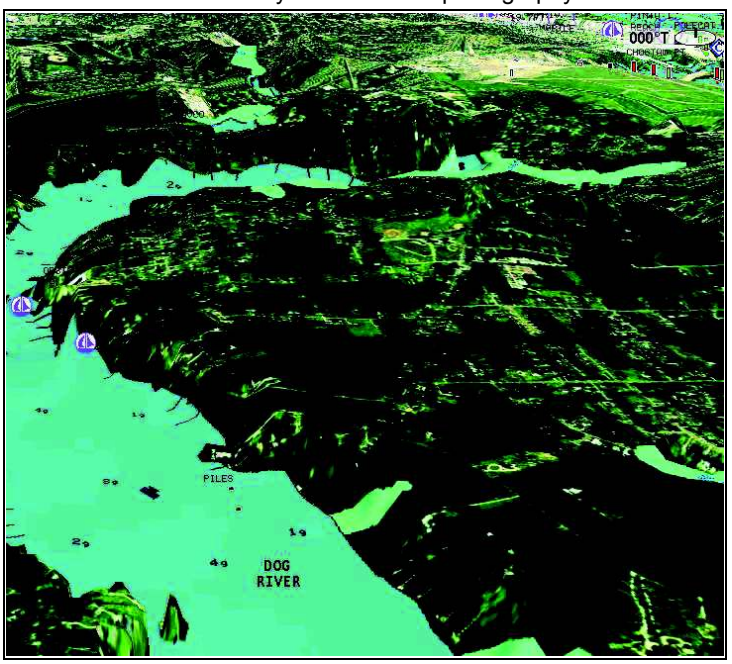
You can overlay the following data onto a 2D chart window to give greater depth of information. The overlays available are:

- **Aerial** — Provides an aerial / satellite photography overlay.
- **AIS** — View and track AIS targets (2D view only) .
- **Radar** — Overlay radar onto the chart (2D view only).
- **NOWRad** — Provides the NOWRad weather radar overlay, without the need to open a separate weather application window (2D view only).
- **Display My Data** — Allows you to select which waypoints, routes and tracks to display.
- **Vectors**— View heading and COG vectors or tide and wind arrows (2D view only).
- **Range Rings**— View radar range rings (2D view only).
- **Safe Zone Ring** — View safe zone ring (2D view only).
- **Fuel Range Ring** — View the fuel range ring (2D view only).
- **3D Display Options** — Provides 3D options: Centre of View, Exaggeration, Transducer Cone and Depth Scale(3D view only).

Note: The layers require electronic charts with the appropriate feature support and may also require additional hardware and service subscriptions.

Aerial photo overlay

Your electronic charts may include aerial photography.



Aerial photos cover the navigable waters up to 3 miles inside the coastline. The resolution is dependent on the region covered by the chart card.

Enabling aerial photo overlay

From the chart application:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Layers**.
4. Select **Aerial**.

   The aerial opacity slider bar control is displayed showing the current opacity percentage.
5. Adjust the slider bar to the required opacity, or
6. Select **Off** to turn the aerial overlay off.

Specifying the aerial overlay area

From the chart application.

1. Select **Menu**.
2. Select **Set-up**.
3. Select **Cartography**.
4. Select **Aerial Overlay**.

   A list of overlay options is displayed.
5. Select either On Land, On Land and Shallows, or On Land and Sea.

   A tick is displayed next to the option and if aerial overlay is switched on the screen is redrawn showing the new overlay selection.

Radar overlay

You can combine the chart with the radar and MARPA functions to provide target tracking or to help you distinguish between fixed objects and other marine traffic.

You can enhance the use of your chart by combining it with the following radar features:

- MARPA.
- Radar overlay (for distinguishing between fixed and moving objects).

Using the radar to view MARPA targets on the chart

The Mini Automatic Radar Plotting Aid (MARPA) function is used for target tracking and risk analysis. When the radar overlay is on, all MARPA targets are displayed in the chart window and associated MARPA functions can be accessed via the chart.

Using radar overlay to distinguish between fixed and moving objects

You can overlay radar image data over your chart image allowing better distinction between fixed objects and other marine traffic. For best results, switch on Radar-Chart synchronization to ensure radar range and chart scale are synchronized.

Note: In order to use the Radar overlay feature you must use an external source for magnetic heading (e.g. fluxgate compass), you cannot use COG data for radar overlay.

Enabling radar overlay

With the radar turned on and transmitting, with the chart application in 2D view:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Layers**.
4. Select **Radar**.

   The radar overlay opacity slider bar control is displayed showing the current opacity percentage.
5. Adjust the slider bar to the required opacity, or
6. Select **Off** to turn the radar overlay off.

Accessing radar controls on the chart

From the chart application:

1. Select **Menu**.
2. Select **Radar Options**.

Note: Any changes made to the radar options from the chart application will be applied to the radar application.

Chart scale and radar range synchronization

You can synchronize the radar range in all radar windows with the chart scale.

When synchronization is switched on:

- The radar range in all radar windows changes to match the chart scale.
- 'Sync' is indicated in the top left-hand corner of the chart window.
- If you change the radar range, in any radar window, all synchronized chart views change scale to match.
- If you change the scale of a synchronized chart window, all radar windows change range to match.

Synchronizing the chart and radar range

In the 2D chart view:

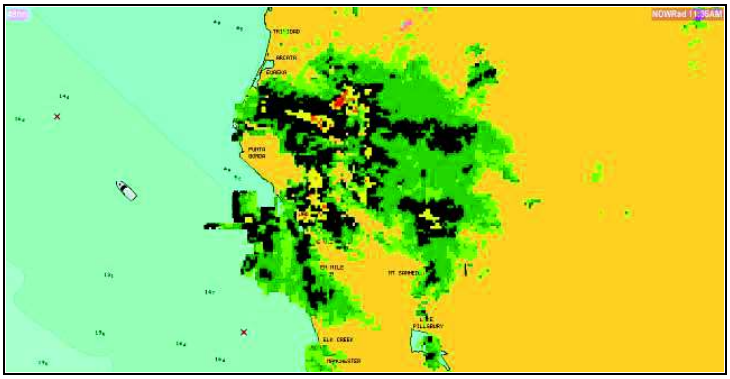
1. Select **Menu**.
2. Select **Presentation**.
3. Select **Chart Sync**.
4. Select **Radar**.

Note: Radar range synchronization is not available when the chart motion mode is set to AUTORANGE.

NOWRad weather overlay

With a suitable weather receiver connected to your multifunction display, you can overlay NOWRad weather information on the chart display.

The NOWRad weather overlay provides NOWRad weather information and reports in the chart application. You can adjust the intensity of the overlay to achieve optimal visibility of both chart and weather information.



Note: The NOWRad weather overlay can only be used in North America and its coastal waters.

Enabling NOWRad weather overlay on the chart

In the 2D chart view:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Layers**.
4. Select **NOWRad**.

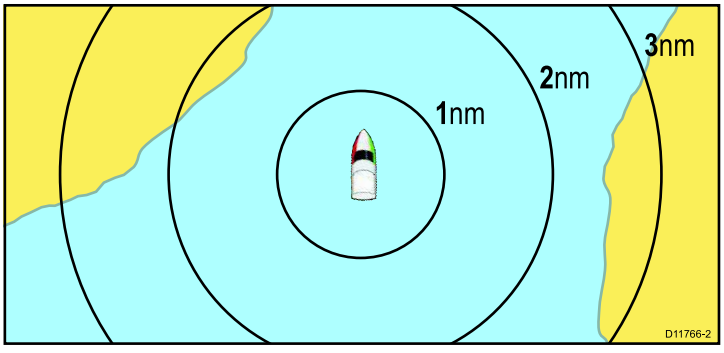
   The NOWRad opacity slider bar control is displayed showing the current opacity percentage.
5. Adjust the slider bar to the required opacity, or
6. Select **Off** to turn the NOWRad overlay off.

Viewing weather reports from the chart application

In the 2D chart view:

1. Select **Menu**.
2. Select **Weather Reports**.
3. Select **Report At** to switch between weather reports from Ship or Cursor location.
4. Select either Tropical Statements, Marine Warnings, Marine Zone Forecasts, or Watchbox Warnings.

Range rings



Range rings give you an incremental representation of distance from your vessel to help you judge distances at a glance. The rings are always centred on your vessel, and the scale varies to suit your current zoom setting. Each ring is labelled with the distance from your vessel.

Enabling range rings

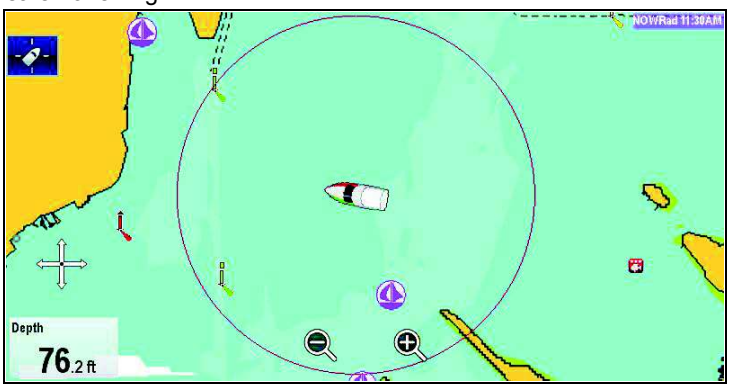
In the 2D chart view:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Layers**.

4. Select **Range Rings** so that On is highlighted.
   Selecting range rings will switch range rings between On and Off.

Safe Zone Ring

The chart application can display and configure a MARPA / AIS safe zone ring.



The safe zone ring shares its configuration with the Radar applications safe zone ring, however can be displayed independently of the safe zone ring in the Radar application.

If a MARPA or AIS target will reach the safe zone ring within the time to safe zone selected an alarm is sounded.

Enabling Safe Zones

To show the Safe Zone ring follow the instructions below:

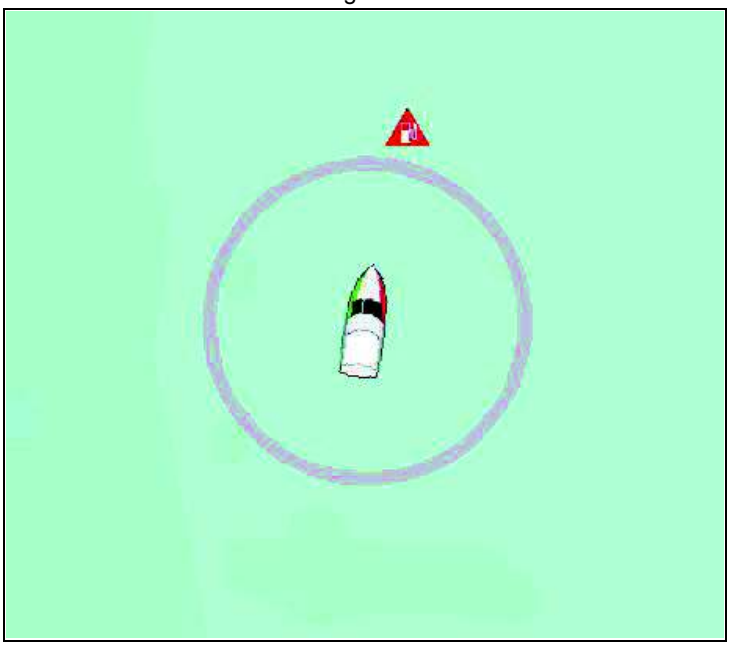
From the chart application go to **Menu > AIS Options > Safe Zone Set-up**

From the radar application go to **Menu > Track Targets > Safe Zone Set-up**

1. Select **Safe Zone Ring** so that **Show** is highlighted.
   Selecting Safe Zone Ring will switch the zone ring from hidden to visible.
2. Select **Safe Zone Radius**.
   i. Select the required radius for the safe zone.
3. Select **Time to Safe Zone**.
   i. Select the required time period.
4. Select **AIS Alarm** so that On is highlighted.
   Selecting AIS Alarm will switch the dangerous target alarm between On and Off.

Fuel range rings

The fuel range ring gives an estimated range that can be reached with the estimated fuel remaining on-board.



The fuel range ring can be displayed graphically in the chart application and indicates an estimated range that can be reached with the:

- Current rate of fuel consumption.
- Estimated fuel remaining on-board.
- Course remaining in a straight line.
- Current speed maintained.

Note:

The fuel range ring is an estimated range that can be reached at the current rate of fuel consumption, of the fuel onboard and based on a number of external factors which could either extend or shorten the projected range.

This estimate is based on data received from external fuel management devices, or via the Fuel Manager. It does not take into account prevailing conditions such as tide, current, sea state, wind etc.

You should not rely on the fuel range ring feature for accurate voyage planning or in emergency and safety critical situations.

Enabling and disabling fuel range ring

From the chart application, in 2D view:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Layers**.
4. Select **Fuel Range Ring**.
   Selecting Fuel Range Ring will switch the function On and Off.

3D Display Options

The following options are available with the chart application in 3D view:

- **Centre Of View** — Switches a cross hair on and off at the centre of the screen at sea level.
- **Exaggeration** — Adjusting the exaggeration has the effect of vertically stretching objects on the chart, making it easier to see their shape and position.
- **Transducer Cone** — Switches on and off a transducer cone indicating the coverage of a fishfinder transducer.
- **Depth Scale** — Switches on and off a depth scale at your vessel position.

Enabling centre of view

To enable the centre of view cross hair at sea level follow the steps below:

In 3D view:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Layers**.
4. Select **3D Display Options**.
5. Select **Centre of View** so that On is highlighted.
   Selecting centre of view will switch the cross hair on and off.

Adjusting the 3D chart exaggeration

In the 3D chart view:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Layers**.
4. Select **3D Display Options**.
5. Select **Exaggeration**.
   The Exaggeration numeric adjust control is displayed.
6. Adjust the numeric adjust control to the required setting, between 1.0 and 20.0
7. Use the **Rotary Control** to adjust the exaggeration to the required setting between 1.0 and 20.0.
8. Select **Ok** to confirm setting and close the numeric adjust control.

Enabling transducer cone

To enable the transducer cone to indicate the coverage of your fishfinder transducer follow the steps below:

In 3D view:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Layers**.

4. Select **3D Display Options**.
5. Select **Transducer Cone** so that On is highlighted.
   Selecting Transducer cone will switch the function on and off.

Enabling depth scale

To enable a depth indicator at your vessels location follow the steps below:

In 3D view:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Layers**.
4. Select **3D Display Options**.
5. Select **Depth Scale** so that On is highlighted.
   Selecting depth scale will switch depth indicator on and off.

2D Chart Use

In addition to normal navigation charts Fish mode provides bathymetric contour data on the chart for use during fishing.

Before you can display bathymetric data in the chart application you must have chart cards with the relevant level of detail.

When you change the **2D Chart Use** to the Fish option, bathymetric data is shown on the chart (providing that the chart card contains bathymetric data for that particular location). Certain chart detail is also removed to ensure the bathymetric data can be seen clearly on the chart display.

If the chart card does NOT contain bathymetric data the chart reverts to the default NAV (navigation) data.

Note: Fish mode is not suitable for navigation.

Selecting fish mode

From the chart application:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **2D Chart Use** so that Fish is highlighted.
   Selecting 2D chart use will switch the chart between Fish and Navigation modes.

Multiple chart synchronization

You can synchronize the heading, range, and position information across multiple chart views and networked displays.

When chart synchronization is enabled:

- It is indicated by “CHRT Sync” in the chart application title bar.
- Any changes made to the heading, range or position in any chart instance will be reflected in all other chart instances.

Note: When the 2D and 3D chart views are synchronized, the Motion Mode is always Relative Motion.

Synchronizing multiple chart instances

From the chart application:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Chart Sync**.
4. Select Chart from the list.
   A tick is placed next to the selected option.
5. Repeat the steps above for each chart instance and if required on each networked multifunction display you want to sync the chart view.

Note: You cannot sync to another chart if radar sync is turned on.

12.14 Chart set-up menu options

The following table describes the various options in the Chart Set-up Menu for your multifunction display.

Menu item	Description	Options
Context Menu	(Touchscreen displays only) Determines how the context menu is accessed using touch	• Touch — touching a chart object opens the context menu. • Hold — Touch and holding on a chart object opens the context menu.
Cartography	Provides access to the Cartography menu options.	
Vessel Size	Determines the size of vessel icon displayed in the chart application.	• Small (default) • Large
Easy View	Easy view increases text size and reduces the number of cartography items displayed to make the chart application more readable.	• On • Off

Selecting the chart set-up menu

From the chart application:

1. Select **Menu**.
2. Select **Set-up**.
   The Chart Set-up menu is displayed.

Cartography set-up menu options

The following table describes the various options in the Cartography Set-up Menu for your multifunction display.

Menu item	Description	Options
Chart Display	Determines the level of detail shown on the chart.	• Simple • Detailed (default) • Extra Detailed
Chart Grid	Determines whether grid lines representing longitude and latitude are displayed on the chart: • **Off** — grid lines are NOT displayed. • **On** — grid lines are displayed.	• Off • On (default)
2D Shading	If supported by your chart card, determines whether terrain shading is displayed in 2D view.	• On • Off
Community Layer	Determines whether community layer is enabled or disabled. With the community layer turned on, in addition to the standard cartography you will be able to see User Generated Content (UGC). The community layer contains: • Modified chart objects — identified by a blue box containing 3 dots. • Added chart objects — identified by a green box containing a plus symbol. • Deleted chart objects — identified by a red box containing a cross symbol. UGC data can be downloaded from the Navionics web store and stored on your Navionics chart card.	• On • Off
Chart Text	Determines whether chart text is displayed (place names and so on). • **Off** — chart text is NOT displayed. • **On** — chart text is displayed.	• Off • On (default)
Chart Boundaries	Determines whether a line indicating the chart boundary is displayed. • **Off** — chart boundary is NOT displayed. • **On** — chart boundary is displayed.	• Off • On (default)
Spot Soundings	Determines whether a number indicating depth is displayed. • **Off** — depth is NOT displayed. • **On** — depth is displayed.	• Off • On (default)
Safety Contour	The chart will use this depth as the deep water boundary. Water areas of depth greater than this will be colored using the appropriate **Deep Water Color**.	• Off • 7 ft • 10 ft • 16 ft • 20 ft • 33 ft • 66 ft (default)
Depth Contour	The depth contour is shown on the chart display as a line indicating the depth at a particular position.	• Off • 16 ft • 20 ft • 33 ft • 66 ft • All (default)
Deep Water Color	Determines the color used to shade areas of deep water. (The depth used to determine areas of deep water is specified by the **Safety Contour** setting)	• White (default) • Blue
Hide Rocks	Determines whether rocks are displayed in the chart application.	• Off (default) • On
Nav. Marks	Determines whether navigation marks are displayed on the chart: • **Off** — navigation marks are NOT displayed. • **On** — navigation marks are displayed.	• Off • On (default)

Menu item	Description	Options
Nav. Marks Symbols	Determines which set of navigation mark symbols is used — International, or US. These symbols correspond to paper charts.	• International (default) • US
Light Sectors	Determines whether the sector of light cast by a fixed beacon is displayed or not. • **Off** — sector of light is NOT displayed. • **On** — sector of light is displayed.	• Off • On (default)
Routing Systems	Determines whether routing data is displayed or not. • **Off** — routing data is NOT displayed. • **On** — routing data is displayed.	• Off • On (default)
Caution Areas	Determines whether caution data is displayed or not. • **Off** — caution data is NOT displayed. • **On** — caution data is displayed.	• OFF • ON (default)
Marine Features	When this menu item is set to On, the following water-based cartographic features are displayed: • Cables. • Nature of seabed points. • Tide stations. • Current stations. • Port information.	• Off • On (default)
Land Features	When this menu item is set to On, land-based cartographic features are displayed.	• Off • On (default)
Business Services	When this menu item is set to On, symbols indicating the location of a business will be shown.	• Off • On (default)
Panoramic Photos	Determines whether panoramic photos are available for landmarks such as ports and marinas.	• Off • On (default)
Roads	Determines whether major coastal roads are displayed on the chart: • **Off** — coastal roads are NOT displayed. • **On** — coastal roads are displayed.	• Off • On (default)
Additional Wrecks	Determines whether extended information for new wrecks is displayed.	• Off • On (default)
Aerial Overlay	Determines the areas of the chart covered by the aerial photo overlay feature.	• On Land (default) • On Land and Shallow • On Land and Sea
Colored Seabed Areas	Provides greater definition of the seabed. This applies only to limited areas where the extra detail is available.	• Off (default) • On

Selecting the cartography set-up menu

From the chart application:

1. Select **Menu**.
2. Select **Set-up**.
3. Select **Cartography**.
   The cartography menu options are displayed.

Chapter 13: Using radar

Chapter contents

13.1 Radar overview

Radar is used to provide information that can help you to track targets and measure distances and bearings.

Radio Detection And Ranging (RADAR) is used at sea to detect the presence of objects (known as 'targets') 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 and displaying the reflections as targets on your display.

Until you are familiar with interpreting the radar display, every opportunity should be taken to compare the radar screen patterns with visual targets, such as other boats, buoys and coastal structures. You should practise harbor and coastal navigation during daylight hours and in clear weather conditions.

HD and SuperHD radar

Your multifunction display can be used with radar scanners.

HD and SuperHD radar scanners provide a range of advantages, making it easier to discern objects around your vessel.

HD and SuperHD radar scanners provide:

- Improved target detection.
- Full-color image.
- Dual Range operation.
- SuperHD option. This effectively increases the transmitter power by a factor of at least 2, and reduces the beamwidth by a similar amount.

Note: You must connect a SuperHD radar scanner in order to use the SuperHD option.

Multiple radar scanners

The multifunction display only supports the use of 1 radar on the network.

When the radar application is opened, if multiple radar scanners are detected then a warning message shall be displayed. Additional scanners will need to be removed from the network before the radar application will function.

Radar Features

Depending on the type of Raymarine radar you have different features will be available to you, the table below shows which features and settings are supported by radar type:

Feature	Non-HD Digital Radome	HD Radome	HD Open Array	SuperHD Open Array
Color Gain	✗	Auto / Manual (0-100%)	Auto / Manual (0-100%)	Auto / Manual (0-100%)
FTC	Off/On (0-100%)	✗	✗	✗
Sea	Harbour / Coastal / Offshore / Manual (0-100%)	Auto / Manual (0-100%)	Auto / Manual (0-100%)	Auto / Manual (0-100%)
Auto Mode: Buoy	✗	✓	✓	✓
Auto Mode: Harbor	✗	✓	✓	✓
Auto Mode: Offshore	✗	✓	✓	✓
Auto Mode: Coastal	✗	✓	✓	✓
Auto Mode: Bird	✗	✓	✗	✓
Power Boost	✗	✗	✗	✓
Antenna Boost	✗	✗	✗	✓
Interference Rejection	Off / Normal / High	Off / On	Off / On	Off / On
Target Expansion	Off / Low / High	Off / On	Off / On	Off / On
MARPA Targets	10	25	25	25
Dual Range	✗	✓	✓	✓
Dual Range Restrictions	N/A	✗	✗	✗
Scanner Speed	24 RPM	24 RPM / Auto	24 RPM / Auto	24 RPM / Auto
Parking Offset	✗	✗	0-360 degrees	0-360 degrees
Antenna Size	✗	✗	4ft / 6ft	4ft / 6ft
Display Timing	0-153.6m	0-767m (range dependant)	0-767m (range dependant)	0-767m (range dependant)
STC Preset	0-100%	✗	✗	✗
Gain Preset	0-100	✗	✗	✗
Tune Correction	✗	✓	✓	✓

Note: Features not listed are supported by all types of Raymarine Non-HD Digital, HD and SuperHD radars.

13.2 Radar scan speed

SuperHD open array radars with software version 3.23 or above or HD radomes support multiple scan speeds.

Radar scan speed is set up using the Radar Set-up menu. When the system detects a scanner that is capable of operating at both 24 RPM and 48 RPM, 2 options are provided for scanner speed:

- 24 RPM
- Auto

If you have a radar scanner that only operates at 24 RPM, the scanner speed option is disabled. If the scanner speed option is enabled, you must select the Auto option if you want to use the higher scan speeds. This option automatically switches between the 24 RPM and 48 RPM scan speeds as appropriate.

Selecting radar scan speed

The speed option requires a 48 RPM compatible Raymarine HD radome or Raymarine SuperHD open array radar scanner.

Select your radar scanner speed from within the radar application.

1. Select **Menu**.
2. Select **Scanner Set-up**.
3. Select **Scanner Speed**
4. Select the required scanner speed:
   - Auto
   - 24 RPM

   The Auto option automatically selects the appropriate speed for your radar range. 48 RPM is used at radar ranges of up to 3 nm. It provides an increased refresh rate, which is useful at high speed or in areas where you have large numbers of radar targets. At radar ranges of greater than 3 nm the display switches the radar speed to 24 RPM.

13.3 Radar scanner status symbols

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

Symbol	Radar power mode	Description
	Transmit (TX)	Rotating icon, signifying that the scanner is on and transmitting. When SCANNER is set to ON, select this mode to activate the scanner. This is the usual mode of operation.
	Standby (STBY)	Static icon, indicating that the scanner is on but not transmitting, and the antenna is not rotating. The scanner does not transmit and the radar data is removed from the screen. This is a power-save mode used when the radar is not needed for short time periods. When you return to transmit mode, the magnetron does not need to warm up again. This is the default mode.
	Off	Scanner powered off when radar not required, but display is in use for other applications, such as the chart. When selected, the system counts down. During this time you cannot re-power the scanner.
 	Timed Transmit	Scanner switches between on/transmitting, and standby mode. Scanner goes into power save mode when constant use of radar is not required.

Powering the radar scanner on and off

In the radar application:

1. Select **Menu**.
2. Select **Power** to switch the Radar's power On and Off.

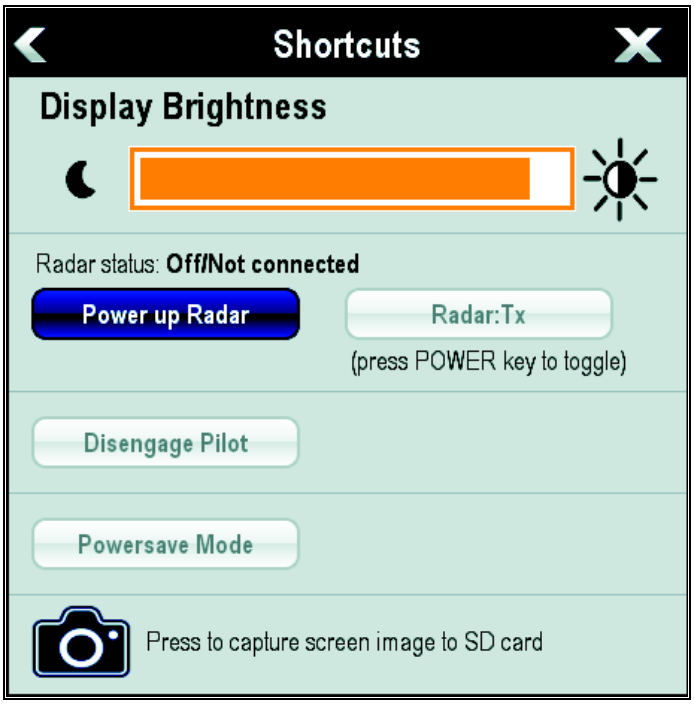
   The radar will always power up in Standby mode.
3. Select **Radar** to switch the radar between Transmit and Standby modes.

Using the power button to switch operating modes

The radar operating modes can also be set using the multifunction displays power button menu.

1. Press and release the **Power** button.

   The shortcuts menu is displayed:



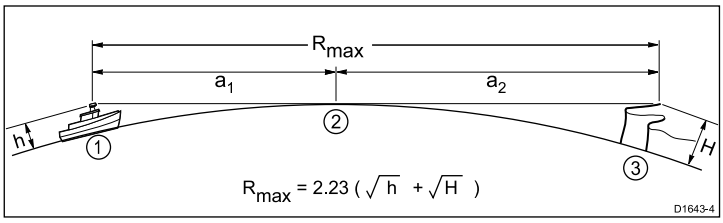
2. Select **Power up Radar** to turn the radar on, or **Power down Radar** to turn the radar off.
3. Select **Radar: Tx** to start the radar transmitting, or **Radar: Stdby** to stop the radar transmitting.

13.4 Radar range and image quality

Maximum radar range

The usable range of the radar is limited by factors such as the height of the scanner, and height of the target.

Maximum radar range is essentially line-of-sight, so is limited by the height of the scanner and the height of the target as illustrated below:



Item	Description
1	Radar equipped vessel.
2	Curvature of the earth.
3	Target (Cliff).
a_1	Radar horizon of antenna.
a_2	Radar horizon of target.
R_{max}	Maximum radar range in nautical miles. $R_{max} = a_1 + a_2$
h	Radar antenna height in metres.
H	Target height in metres.

The table below shows typical maximum radar ranges for various radar antenna heights and target heights. Remember that although the radar horizon is greater than the optical horizon, the radar can only detect targets if a large enough target is above the radar horizon.

Antenna height (meters)	Target height (meters)	Maximum range (Nautical miles)
3	3	7.7
3	10	10.9
5	3	8.8
5	10	12

Radar image quality

A number of factors can affect the quality of a radar image, including echoes, sea clutter, and other interference.

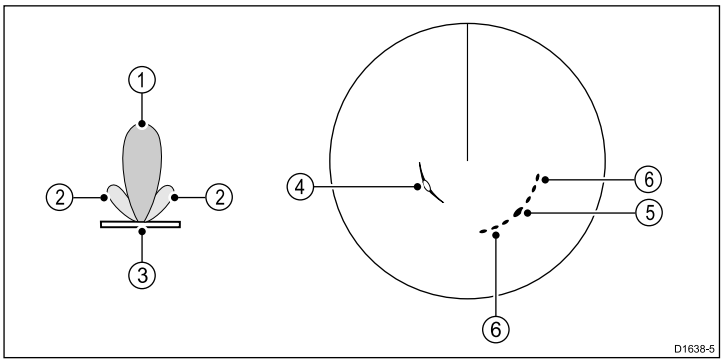
Not all radar echoes are produced by valid targets. Spurious or missing echoes may be caused by:

- Side lobes.
- Indirect echoes.
- Multiple echoes.
- Blind sectors.
- Sea, rain, or snow clutter.
- Interference.

Through observation, practice, and experience, you can generally detect these conditions very quickly and use the radar controls to minimize them.

Side Lobes

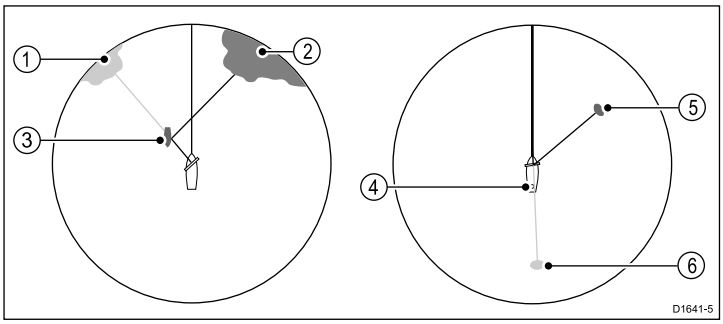
Side lobe patterns are produced by small amounts of energy from the transmitted pulses that are radiated outside the narrow main beam. The effects of side lobes are most noticeable with targets at short ranges (normally below 3 nm), and in particular with larger objects. Side lobe echoes form either arcs on the radar screen similar to range rings, or a series of echoes forming a broken arc.



Item	Description
1	Main lobe
2	Side lobes
3	Antenna
4	Arc
5	True echo
6	Side echoes

Indirect Echoes

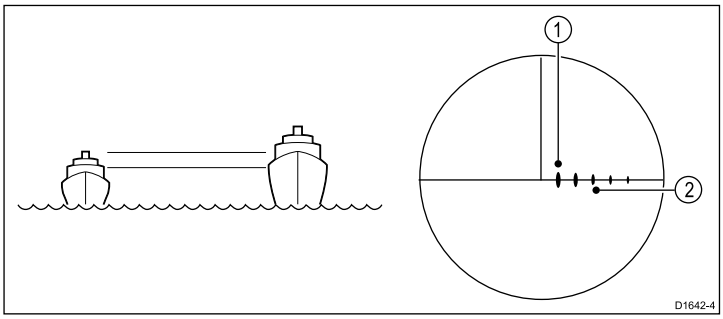
There are several types of indirect echoes or ghost images. These sometimes have the appearance of true echoes, but in general they are intermittent and poorly defined.



Item	Description
1	False echo
2	True echo
3	Passing ship
4	Mast or funnel
5	True echo
6	False echo

Multiple Echoes

Multiple echoes are not very common but can occur if there is a large target with a wide vertical surface at a comparatively short range. The transmitted signal will be reflected back and forth between the target and your own ship, resulting in multiple echoes, displayed beyond the range of the true target echo, but on the same bearing.



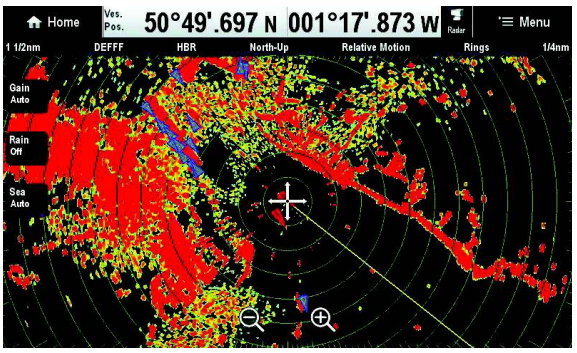
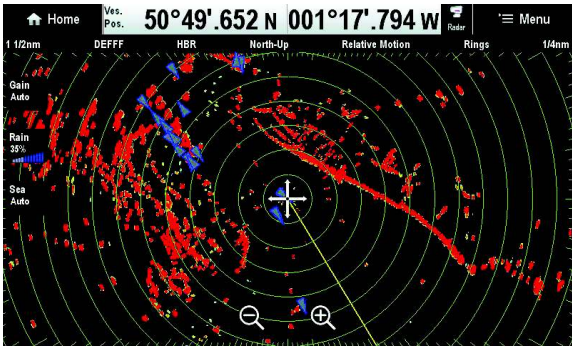
Item	Description
1	True echo
2	Multiple echoes

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 beam intensity, though not necessarily a complete cut-off. However, for wider obstructions there may be a total loss of signal 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 scanner site prior to installation.

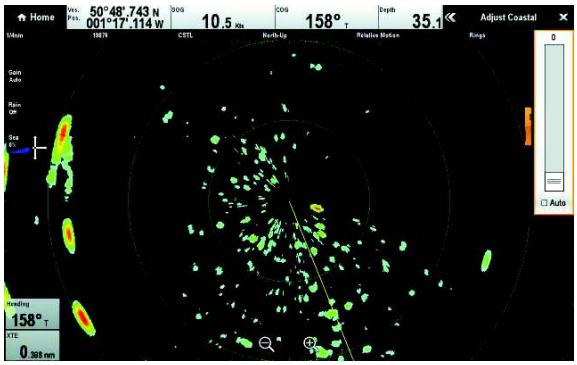
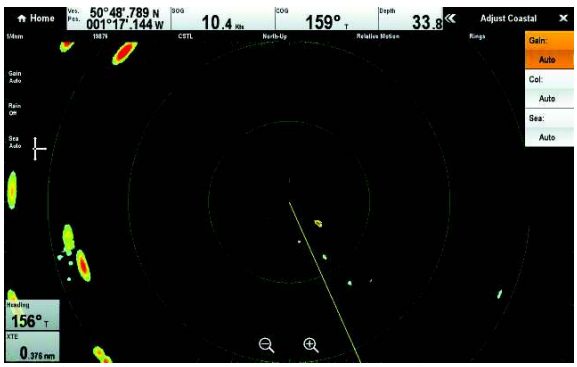
Rain or Snow Clutter

The radar can see echoes from rain or snow. Returns from storm areas and rain squalls consist of countless small echoes that continuously change size, intensity and position. These returns sometimes appear as large hazy areas, depending on the intensity of the rainfall or snow in the storm cell. The images in the table below show how the Rain control can clear up this clutter:

Rain clutter off	
Rain clutter on	

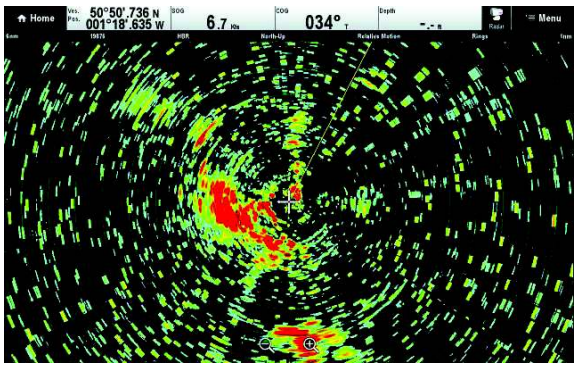
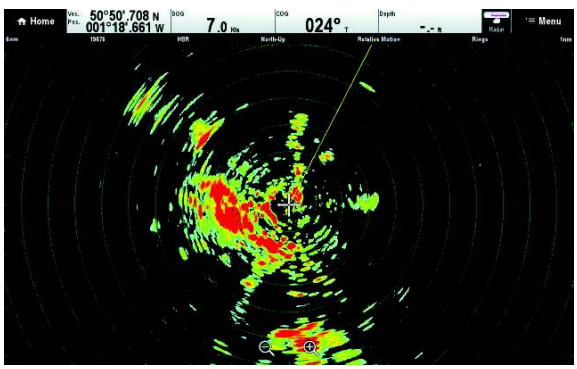
Sea Clutter

Radar returns from waves around the vessel can clutter the centre of the radar picture, making it difficult to detect real targets. Such ‘sea clutter’ usually appears as multiple echoes on the display at short range scales, and the echoes are not repetitive or consistent in position. With high winds and extreme conditions, echoes from sea clutter may cause dense background clutter in the shape of an almost solid disc. Sea clutter can be suppressed using the sea clutter settings. The images in the table below show how the sea clutter settings can clear up some of this clutter:

Sea clutter off	
Sea clutter in auto	

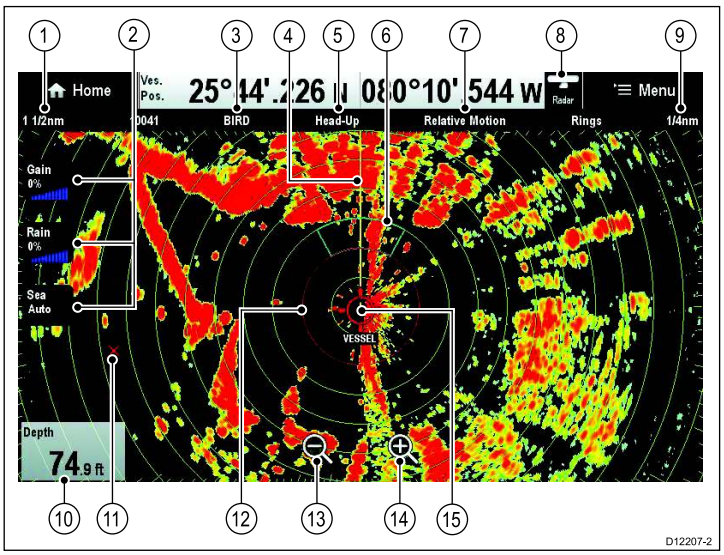
Interference

When two or more radar-equipped vessels are operating within range of each other mutual radar interference can occur. This usually appears as a spiral of small dots from the display centre This type of interference is most noticeable at long ranges. This interference can be suppressed using the interference rejection settings. The images in the table below show how the Interference rejection settings can clear up some of this interference:

Interference rejection off	
Interference rejection on	

13.5 Radar display overview

With your radar scanner connected and the radar in transmit mode, the radar picture provides a map-like representation of the area in which the radar is operating.



Item	Description
1	Range
2	On-screen controls (Touchscreen multifunction displays only.)
3	Gain mode
4	Ship's Heading Marker (SHM)
5	Orientation
6	Guard Zone
7	Motion mode
8	Range status
9	Range ring spacing
10	Data cell overlay
11	Waypoint
12	Safe zone ring
13	Range out (Touchscreen multifunction displays only.)
14	Range in (Touchscreen multifunction displays only.)
15	Ship's position

Note: On-screen range controls can be enabled and disabled from the homescreen: **Customize > Display Preferences > Range Controls**

Additional functionality of the radar application includes:

- Color palettes.
- Adding AIS overlay.
- MARPA targets.
- VRM/EBL markers

Typically, your vessel's position is at the center of the display, and its dead ahead bearing is indicated by a vertical heading line, known as the Ship's Heading Marker (SHM).

Note: If the cursor is placed over the SHM, the SHM will temporarily be removed to help placing markers or acquiring targets etc.

On-screen targets may be large, small, bright or faint, depending on the size of the object, its orientation and surface. If using a non-HD digital radome scanner, strongest target returns are displayed in yellow with weaker returns in 2 shades of blue. If using a HD or SuperHD radar scanner, stronger target returns show as different colors from a range of 256 colors, providing better clarity. Be aware

that the size of a target on screen is dependent on many factors and may not necessarily be proportional to its physical size. Nearby objects may appear to be the same size as distant larger objects.

Note: Colors stated above refer to the default color palette.

With experience, the approximate size of different objects can be determined by the relative size and brightness of the echoes.

You should bear in mind that the size of each on-screen target is affected by:

- The physical size of the reflecting object.
- The material from which the object is made. Metallic surfaces reflect signals better than non-metallic surfaces.
- Vertical objects such as cliffs reflect signals better than sloping objects such as sandbanks.
- 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 until the vessel is closer to shore.
- Some targets, such as buoys and small vessels difficult to discern, because they do not present a consistent reflecting surface as they bob and toss about in the waves. Consequently these echoes tend to fade and brighten, and at times disappear momentarily.
- Buoys and small vessels resemble each other, but vessels can often be distinguished by their motion.

Note: A GPS receiver and a fast heading sensor are required for MARPA operation, and to enable radar/chart overlay.

Radar context menu

The radar application includes a context menu which provides positional data and menu items.

The context menu provides the following positional data for the cursor location in relation to your vessel:

- Latitude
- Longitude
- Range
- Bearing

The context menu also provide the following menu items:

- **Acquire Target**
- **Place VRM/EBL**
- **Place Waypoint At Cursor**
- **Slew thermal camera** (Only available when thermal camera is connected and operating.)

Accessing the context menu

You can access the context menu by following the steps below.

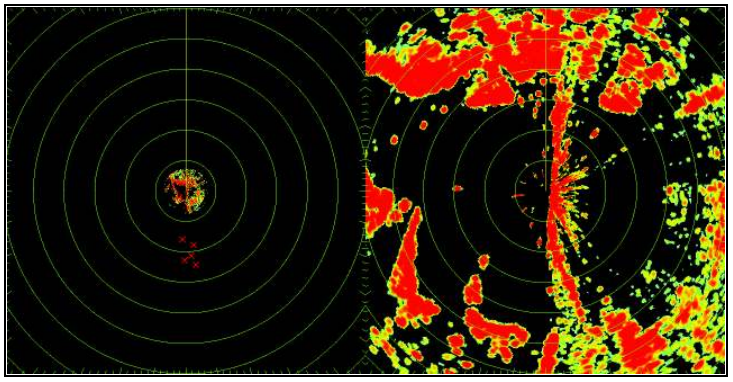
1. New e Series or New c Series:
   i. Selecting a location, object or target on-screen and pressing the **Ok** button.
2. Touchscreen multifunction displays:
   i. Selecting an object or target on-screen.
   ii. Selecting and holding on a location on-screen.

13.6 Dual range radar operation

The Dual Range radar function enables you to view 2 ranges at the same time in separate windows. The function is available with SuperHD and HD radar scanners.

Using your multifunction display and an HD or SuperHD radar scanner, you can view either a short or a long range image in separate radar windows.

The default setting is Long, which provides a standard scanner range.



Limitations

- Dual Range operation is not available if MARPA targets are active.
- You cannot acquire MARPA targets if Dual Range is enabled.
- Radar/chart sync and radar/chart overlay are temporarily disabled when Dual Range is enabled.

Dual range radar compatibility

The range covered by the short Dual Range option depends on the radar scanner you are using, and the software version it is using.

Scanner	Dual range mode	*Range covered by software versions 1.xx to 2.xx	Range covered by software versions 3.xx onwards
4 Kw HD Open Array	Long (1)	1/8 nm to 72 nm	1/8 nm to 72 nm
	Short (2)	1/8 nm to 3 nm	1/8 nm to 72 nm
4 Kw SuperHD Open Array	Long (1)	1/8 nm to 72 nm	1/8 nm to 72 nm
	Short (2)	1/8 nm to 3 nm	1/8 nm to 72 nm
12 Kw HD Open Array	Long (1)	n/a	1/8 nm to 72 nm
	Short (2)	n/a	1/8 nm to 72 nm
12 Kw SuperHD Open Array	Long (1)	1/8 nm to 72 nm	1/8 nm to 72 nm
	Short (2)	1/8 nm to 3 nm	1/8 nm to 72 nm
HD Radome	Long (1)	1/8 nm to 48 nm	1/8 nm to 48 nm
	Short (2)	1/8 nm to 48 nm	1/8 nm to 48 nm

Limitations of software version 1.xx and 2.xx

- The value for the short range setting must be less than or equal to the long range setting.
- With **Dual Range** On and a short range window active Expansion control shall be disabled in the **Enhance Echoes** menu.

Using Dual Range with SuperHD scanners

Dual range radar operation with SuperHD scanners.

When using the short Dual Range option, a SuperHD scanner operates in HD mode only. When using the long Dual Range option, a SuperHD radar operates in SuperHD mode.

Scanner	Dual Range mode	Operating mode
4 Kw SuperHD Open Array	Long	SuperHD
	Short	HD
12 Kw SuperHD Open Array	Long	SuperHD
	Short	HD

Enabling Dual Range radar operation

In the radar application.

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Dual Range** so that On is highlighted.
   Selecting Dual Range will switch between dual range On and Off.

Selecting range operation

With Dual Range set to on and the radar application screen displayed:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Dual Range Channel** to switch between 1 or 2, as appropriate.

13.7 Radar mode and orientation

Radar orientation modes

The radar can operate in a number of orientation modes to suit different types of navigation.

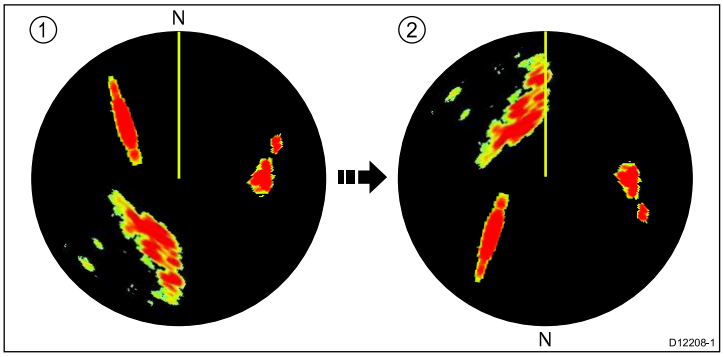
The orientation of the radar refers to the relationship between the radar and the direction that you are travelling in. There are three orientation modes to choose from:

- Head-Up
- North-Up
- Course-Up

These orientation modes are used in conjunction with motion mode to control how your boat and radar relate to one another and how they are displayed on screen. Any changes that you make to the orientation of the radar are retained when you switch off your multifunction display.

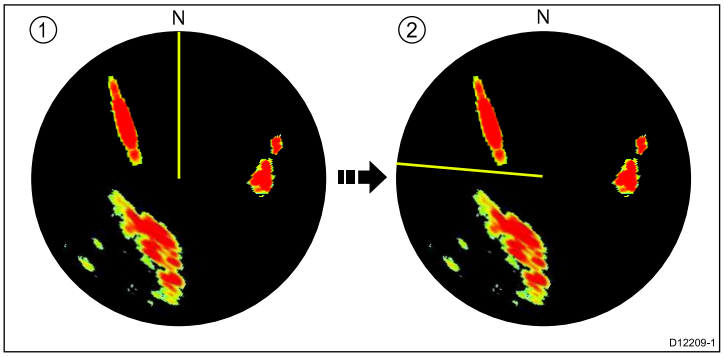
Head-Up

This is the default mode for the radar application.



Item	Description
1	Ship's Heading Marker (SHM) (indicating the vessel's current heading is upwards).
2	As the vessel's heading changes: • SHM is fixed upwards • Radar picture rotates accordingly

North-Up

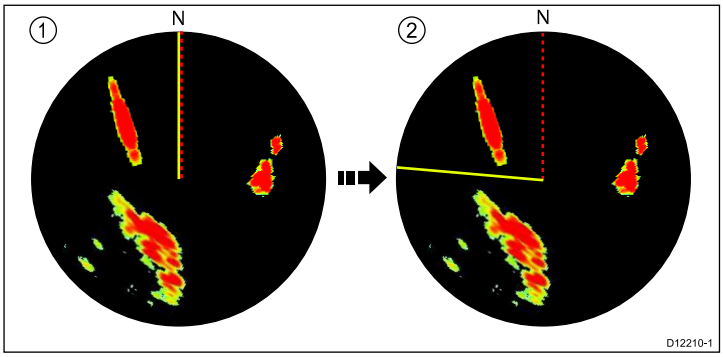


Item	Description
1	True north at top.
2	As your vessel's heading changes: • Radar picture is fixed (north up) • SHM rotates accordingly

Note: If heading data becomes unavailable whilst in this mode, a warning message will be shown, the status bar indicates North-Up in brackets and the radar uses 0° heading in relative motion. When heading data becomes available once more, North-Up mode is reinstated.

Note: It is not possible to select Head Up mode when the motion mode is set to True.

Course-Up



Item	Description
1	Current course upwards.
2	As your vessel's heading changes: • Radar picture is fixed • SHM rotates accordingly

If you select a new course, the picture will reset to display the new course upwards.

The reference used for Course-Up depends upon the information available at a given time. The system always prioritizes this information in the following order:

1. Bearing from origin to destination, that is, intended course.
2. Locked heading from an Autopilot.
3. Bearing to waypoint.
4. Instantaneous heading (when course-up is selected).

Note: If heading data becomes unavailable whilst in this mode, a warning message will be shown, the status bar indicates the Course Up in brackets and the radar uses 0° heading in relative motion. When heading data becomes available once more, Course-Up mode is reinstated.

Selecting the radar orientation mode

From the radar application:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Orientation & Motion Mode**.
4. Select **Orientation**.
5. Select the required orientation.

Radar motion modes overview

The motion mode controls the relationship between the radar and your vessel. There are two modes:

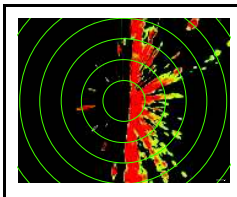
- Relative motion.
- True motion.

The selected motion mode is displayed in the status bar. The default setting is Relative Motion with zero offset.

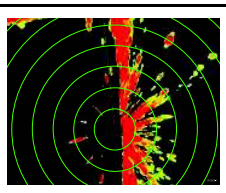
Relative Motion (RM) with optional Vessel Offset

When the motion mode is set to Relative, the position of your vessel is fixed on the screen and all the targets move relative to the vessel. You can specify whether the vessel is fixed in the center of the window (0 offset) or offset by 1/3 or 2/3 to increase the view ahead, as shown below:

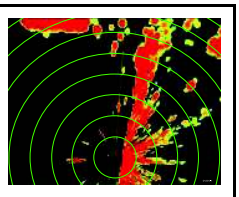
Examples:



0 offset



1/3 offset



2/3 offset

The default motion mode is “Relative”, with zero offset.

True Motion (TM)

When the motion mode is set to True, fixed radar targets maintain a constant position and moving vessels (including your vessel) travel in true perspective to each other and to fixed landmasses on the screen. As the vessel’s position approaches the edge of the screen, the radar picture is automatically reset to reveal the area ahead.

Note: If heading and position data become unavailable when True motion is selected, a warning message will be shown, the mode will revert to relative motion and be noted in the status bar in brackets, for example, (TM).

Note: It is not possible to select True Motion when the orientation is set to Head Up.

Selecting the radar motion mode

From the radar application:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Orientation & Motion Mode**.
4. Select **Motion Mode**.

   Selecting Motion Mode will switch between True and Relative.

Changing the radar vessel offset

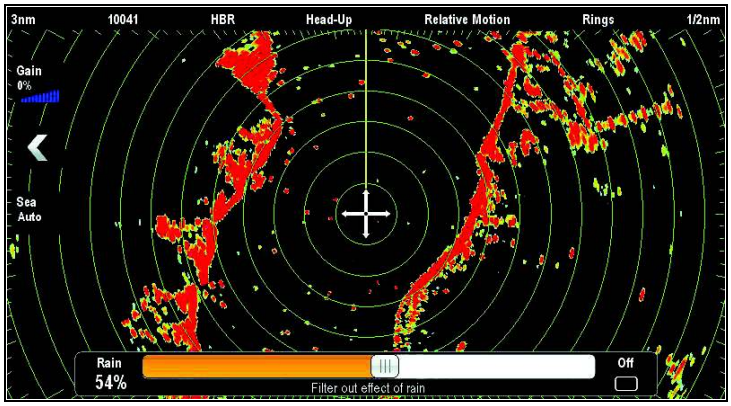
Radar offset is only available in Relative motion mode.

From the radar application:

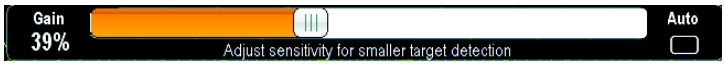
1. Select **Menu**.
2. Select **Presentation**.
3. Select **Orientation & Motion Mode**.
4. Select **Vessel Offset**.
5. Select the required offset value.

13.8 Radar tuning: On-screen gain controls

Touchscreen multifunction displays provide on-screen access to controls for Gain, Rain and Sea clutter.

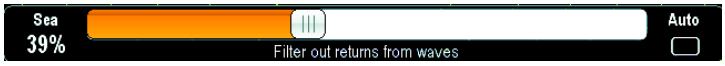


Gain control



Rain control

Sea control



Note: non-touchscreen controls are accessed by the menu options: **Menu > Rain** and **Menu > Adjust Gain**.

Enabling and disabling on-screen gain controls

You can enable and disable the on-screen gain controls by following the steps below.

On a touchscreen multifunction display, with the relevant application displayed.

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Gain Controls**.

   Select Gain Controls will switch between showing and hiding the on-screen controls.

Using the on-screen gain controls

To adjust settings using the on-screen controls follow the steps below.

On a touchscreen multifunction display, with the radar application displayed:

1. Select either the **Gain**, **Rain** or **Sea** on-screen icon.

   The on-screen slider bar control is displayed.
2. Select the **Auto** box (Gain and Sea) or **Off** box (Rain) so that a tick is **placed** in the box to switch to automatic control or switch the control off, or
3. Select the **Auto** box (Gain and Sea) or **Off** box (Rain) so that a tick is **removed** placed in the box to switch to manual control.
4. Adjust the slider bar to the required setting.
5. The slider bar will auto dismiss, or you can select the on-screen icon again to close the slider bar.

13.9 Radar adjustments: HD and SuperHD scanners

You can use the gain presets and other functions to improve the quality of the radar picture.

The following settings are available from the Radar menu and apply to HD radomes, HD and SuperHD open array scanners:

Menu Item	Description	Options
Auto Gain Mode	The radar gain presets enable you to quickly select pre-configured settings to achieve the best picture in different situations. Raymarine strongly recommends the use of these presets to achieve optimum results.	• **Buoy** — a special mode that enhances the detection of small objects like mooring buoys. It is useful at ranges up to 0.75 nm. • **Harbor** — this is the default mode. This setting takes account of land clutter so that smaller targets, like navigation buoys, are not lost. • **Coastal** — accounts for the slightly higher levels of sea clutter you might encounter out of harbor and adjusts the radar display accordingly. • **Offshore** — automatically adjusts for high levels of sea clutter. • **Bird Mode** — a special mode that helps you to identify flocks of birds, useful when identifying suitable fishing locations, for example. **Note:** Bird Mode requires a SuperHD open array with software version 3.23 or above or an HD radome.
Rain	The radar scanner detects echoes from rain or snow. These echoes appear on screen as countless small echoes continuously changing size, intensity and position. Turning the rain clutter function On suppresses the bulk effect of rain returns from around your vessel, making it easier to recognize other objects. You can adjust the intensity of this setting between 0 and 100%.	• **On** — enables the Rain function and allows you to adjust the setting between 0 and 100%. • **Off** — disables the Rain function. This is the default.
Adjust Gain	Each of the gain presets can be manually adjusted using gain, color gain and sea clutter functions.	• **Gain** — enables you to use a preset in automatic mode, or to adjust its gain manually between 0 and 100%. • **Color Gain**— adjusts the intensity (color) of displayed targets, but does not affect the number of targets displayed. Increasing the color gain causes more targets to be displayed in the same color, which may help you to determine whether an object is an actual target, or just background noise. Reducing the color gain may provide better target detail and detection. • **Sea** — radar echoes from waves around your vessel can clutter the center of the radar picture, making it difficult to detect real targets. Adjusting the sea gain reduces this clutter for up to 5 nautical miles (depending on wave and sea conditions) from your vessel. • **SuperHD Controls** — for SuperHD scanners only: – Antenna Boost: scales the effective antenna size. At zero, the effective antenna size matches its actual size. At 95%, the effective antenna size is doubled. Increasing the effective antenna size separates targets that appear merged at lower settings. – Power Boost: adjusts effective transmit power. At zero, the radar operates at its standard power (4 kW or 12 kW). At 90, the effective power is increased by a factor of at least two. Increasing the power makes targets more distinct from noise. For maximum benefit, reduce power boost to prevent saturation of strong targets.

Selecting radar gain presets

These presets require a HD or SuperHD radar scanner. Bird mode requires a SuperHD open array scanner with software version 3.23 or above or an HD radome.

From the radar application:

1. Select **Menu**.
2. Select **Auto Gain Mode**.
3. Select Buoy, Harbor, Costal, Offshore, or Bird as appropriate.

The option is ticked and the display changes to reflect the new mode.

Adjusting radar preset gain

Raymarine strongly recommends the use of the preset gain modes to achieve optimum results. However if required manual adjustments can be made.

From the radar application, with the required **Auto Gain Mode** selected:

1. Select **Menu**.
2. Select **Adjust Gain <Mode>**, where <Mode> shall be the Auto Gain mode already selected.
3. Select **Gain** .
4. The Gain slider bar control is displayed.
5. Adjust the Gain slider bar control to the appropriate setting (between 0 and 100%), or
6. Select the **Auto** box so that a tick is placed in the box for automatic gain control.

Adjusting radar color gain

From the radar application, with the required **Auto Gain Mode** selected:

1. Select **Menu**.
2. Select **Adjust Gain <Mode>**, where <Mode> shall be the Auto Gain mode already selected.
3. Select **Col:** .
4. The Color Gain slider bar control is displayed.
5. Adjust the Color Gain slider bar control to the appropriate setting (between 0 and 100%), or
6. Select the **Auto** box so that a tick is placed in the box for automatic gain control.

Adjusting radar anti sea clutter

From the radar application, with the required **Auto Gain Mode** selected:

1. Select **Menu**.
2. Select **Adjust Gain <Mode>**, where <Mode> shall be the Auto Gain mode already selected.
3. Select **Sea:** .
4. The Sea clutter slider bar control is displayed.
5. Adjust the Sea clutter slider bar control to the appropriate setting (between 0 and 100%), or
6. Select the **Auto** box so that a tick is placed in the box for automatic sea clutter control.

Adjusting radar anti rain clutter

From the radar application:

1. Select **Menu**.
2. Select **Rain**.

   The Rain clutter slider bar control is displayed.
3. Adjust the Rain clutter slider bar control to the appropriate setting (between 0% and 100%), or
4. Select the **Off** box so that a tick is placed in the box to turn off anti rain clutter control.

Adjusting SuperHD radar antenna boost

From the radar application:

1. Select **Menu**.
2. Select **Adjust Gain <Mode>**, where <Mode> shall be the Auto Gain mode already selected.
3. Select **Antenna**.

   The Antenna Boost slider bar control is displayed.
4. Adjust the Antenna Boost slider bar control to the appropriate setting (between 0 and 100%), or
5. Select the **Auto** box so that a tick is placed in the box for automatic boost control.

Adjusting SuperHD radar power boost

From the radar application:

1. Select **Menu**.
2. Select **Adjust Gain <Mode>**, where <Mode> shall be the Auto Gain mode already selected.
3. Select **Power**.

   The Power Boost slider bar control is displayed.
4. Adjust the Power Boost slider bar control to the appropriate setting (between 0 and 100%), or
5. Select the **Auto** box so that a tick is placed in the box for automatic boost control.

13.10 Radar adjustments: non-HD digital radomes

You can use the gain presets and other functions to improve the quality of the radar picture.

The following settings apply to non-HD digital radomes and are available from the Radar menu:

Menu Item	Description	Options
Rain	The radar scanner detects echoes from rain or snow. These echoes appear on screen as countless small echoes continuously changing size, intensity and position. Turning the rain clutter function On suppresses the bulk effect of rain returns from around your vessel, making it easier to recognize other objects. You can adjust the intensity of this setting between 0 and 100%.	• **On** — enables the Rain function and allows you to adjust the setting between 0 and 100%. • **Off** — disables the Rain function. This is the default.
Adjust Gain	Enables you to adjust the sensitivity of the radar reception. In some situations, adjusting the sensitivity may improve the clarity of the radar picture. The following settings are available: • **Gain** • **FTC** — Enables you to remove areas of clutter at a distance from your vessel. It also helps you to distinguish between two very close echoes on the same bearing, which may otherwise merge and appear as one echo. You can adjust the intensity of the FTC function between 0 and 100%: – A higher setting shows only the leading edge of large (rain clutter) echoes, while the effect on smaller (ship) echoes is only slight. – A lower setting reduces background noise and fill-in returns from land and other large targets. • **Sea** — Enable you to quickly select pre-configured settings to achieve the best picture in different situations. Each of the gain presets has a gain function, which is set to automatic mode by default. Raymarine strongly recommends the use of these presets to achieve optimum results. However, you can adjust this gain manually if required. • **Auto Sea Mode**	**Gain** • Auto — the preset operates in automatic mode. This is the default. • Man — allows you to manually adjust the intensity of the gain, from 0 to 100%. **FTC** • On — enables the FTC function and allows you to adjust the setting between 0 and 100%. • Off — disables the FTC function. This is the default. **Sea** • Auto— the preset operates in automatic mode. This is the default. • Man— allows you to manually adjust the intensity of the sea gain, from 0 to 100%. **Auto Sea Mode** • **Harbor** — this is the default mode. This setting takes account of land clutter so that smaller targets, like navigation buoys, are not lost. • **Coastal** — accounts for the slightly higher levels of sea clutter you might encounter out of harbor and adjusts the radar display accordingly. • **Offshore** — Automatically adjusts for high levels of sea clutter.

Adjusting radar anti rain clutter

From the radar application:

1. Select **Menu**.
2. Select **Rain**.
   The Rain clutter slider bar control is displayed.
3. Adjust the Rain clutter slider bar control to the appropriate setting (between 0% and 100%), or
4. Select the **Off** box so that a tick is placed in the box to turn off anti rain clutter control.

Adjusting the radar FTC function

From the radar application:

1. Select **Menu**.
2. Select **Adjust Gain <Mode>**, where <Mode> shall be the Auto Gain mode already selected.
3. Select **FTC**.
   The FTC slider bar control is displayed.
4. Adjust the FTC slider bar control to the appropriate setting (between 0 and 100%), or
5. Select the **Auto** box so that a tick is placed in the box for automatic FTC control.

Adjusting radar anti sea clutter

From the radar application, with the required **Auto Gain Mode** selected:

1. Select **Menu**.
2. Select **Adjust Gain <Mode>**, where <Mode> shall be the Auto Gain mode already selected.
3. Select **Sea:** .
4. The Sea clutter slider bar control is displayed.
5. Adjust the Sea clutter slider bar control to the appropriate setting (between 0 and 100%), or
6. Select the **Auto** box so that a tick is placed in the box for automatic sea clutter control.

Selecting radar auto gain mode

These presets require a digital radar scanner.

From the radar application:

1. Select **Menu**.
2. Select **Gain Mode**.
3. Select Harbor, Costal or Offshore as appropriate.

The option is ticked and the display changes to reflect the new mode.

13.11 Radar presentation menu options

Function	Description	Options
Dual Range	This menu item allows you to turn Dual range mode On and Off.	• On • Off
Dual Range Channel	This menu item allows you to choose long or short channel for dual range.	• 1 • 2
Orientation & Motion Mode	This menu item contains a sub-menu which enables you to adjust the orientation and motion mode: • **Orientation** • **Motion Mode** • **Vessel Offset**	**Orientation** • Head Up • North Up • Course Up **Motion Mode** • True • Relative **Vessel Offset** • 0 • 1/3 • 2/3
Enhance Echoes	This menu item contains a sub-menu which enable you to adjust the follow options: • **Interference Rejection** • **IR Level** — only available on non-HD digital radomes. • **Expansion** • **Expansion Level** — only available on non-HD digital radomes. • **Wakes** • **Wakes Period**	**Interference Rejection** • On • Off **IR Level** — only available on non-HD digital radomes. • Normal • High **Expansion** • On • Off **Expansion Level** — only available on non-HD digital radomes. • Low • High **Wakes** • On • Off **Wakes Time Period** • 10 Secs • 30 Secs • 1 Min • 5 Min • 10 Min
Select Waypoints to Display	This menu item takes you to the **Display Waypoints** dialog where you can choose which waypoint icons to Show/Hide in the radar application.	**Display Waypoint** • Show • Hide
Waypoint Name	This menu item allows you to show or hide waypoint names in the radar application.	• Show • Hide

Function	Description	Options
Data Overlay Set-up	This menu item contains a sub-menu which enables you to turn on and select information to display in data cells located on the bottom left of the radar application (Data cells will be displayed in all radar windows). • **Data Cell 1** • **Select Data Category** • **Data Cell 2** • **Select Data Category**	**Data Cell 1 & 2** • On • Off **Select Data Category** • List of available data by category
Color Palette	This menu item allows you to select a Color Palette for the radar application.	• Bold • Professional 1 • Professional 2 • Classic • Night Vision
Range Rings	This menu item allows you to turn the range rings On and Off.	• On • Off
Safe Zone Ring	This item allows you to show or hid the safe zone ring in the radar application.	• Show • Hide

Enhance echoes functions

Enabling radar interference rejection

From the radar application:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Enhance Echoes**.
4. Select **Interference Rejection** so that On is highlighted.
   Selecting Interference Rejection will switch the function between On and Off.
5. For non-HD digital radomes you can also select an interference rejection level:
   i. Select **IR Level**.
      Selecting IR Level will switch between Normal and High.

Enabling radar expansion

From the radar application:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Enhance Echoes**.
4. Select **Expansion** so that On is highlighted.
   Selecting expansion will switch the function between On and Off.
5. For non-HD digital radomes you can also select an interference rejection level
   i. Select **Expansion Level**.
      Selecting Expansion Level will switch between Low and High.

Enabling radar wakes

From the radar application:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Enhance Echoes**.
4. Select **Wakes** so that On is highlighted.
   Selecting Wakes will switch the function between On and Off.
5. Select **Wakes time period**.
   A list of wake time periods id displayed:
   - 10 sec
   - 30 sec
   - 1 min
   - 5 min
   - 10 min
6. Select the required time period.

13.12 Using radar to measure distances, ranges, and bearings

When you are using the radar application, you can measure distances, ranges and bearings in a variety of ways.

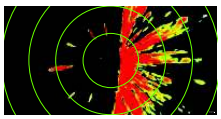
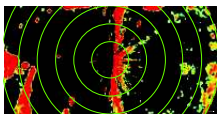
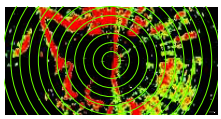
These options are detailed in the table below:

Functions	Distances Between Points	Range From Your Vessel	Bearings
Range Rings	Yes (approximate distance)	Yes (approximate range)	No
Cursor	No	Yes	Yes
Variable Range Markers / Electronic Bearing Lines (VRM/EBL)	No	Yes	Yes
Floating VRM/EBL	Yes	No	Yes

Measuring using the range rings

Use the range rings to gauge the approximate distances between points. Range rings are concentric circles displayed on the screen and centred from your vessel at pre-set distances. The number and spacing of the rings changes as you range in and out.

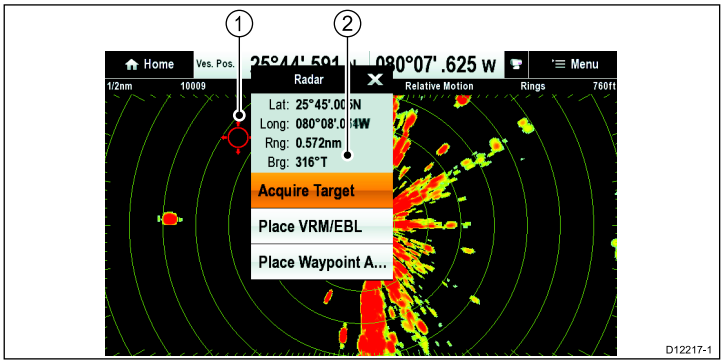
Examples:

		
Range — 1/4 nm Range Rings — 760ft apart	Range — 3/4 nm Range Rings — 1/4 nm apart	Range — 1 1/2 nm Range Rings — 1/4 nm apart

Measuring using the cursor

To measure the bearing and range from your vessel to a specified target, move the cursor to the appropriate position on the screen and press **Ok**, the radar context menu will be displayed which shall provide:

- Latitude
- Longitude
- Range
- Bearing



Item	Description
1.	Cursor
2.	Bearing and range from your vessel to the cursor position

You can also display the cursor position in the databar, from the homescreen select: **Customize > Databar Set-up > Edit Databar**, now select the data box where you want the cursor position to be displayed. Select **Navigation > Cursor Position**.

Measuring using VRM/EBL

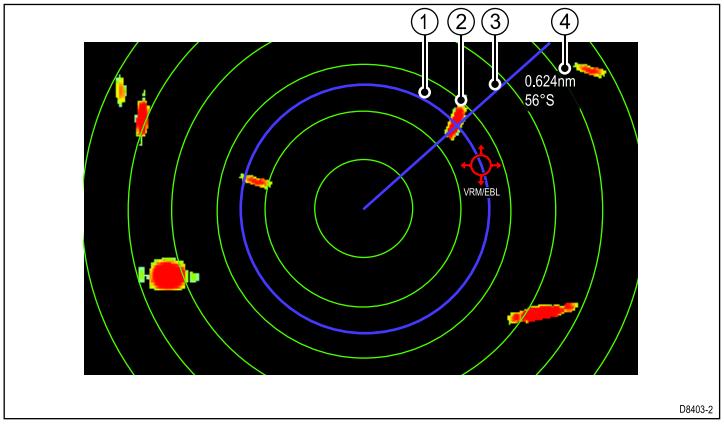
Variable Range Markers (VRM)

A Variable Range Marker (VRM) is a circle centred on your vessel's position and fixed with respect to the heading mode. When this circle is adjusted to align with a target, its range from your vessel is measured and displayed on the Radar context menu when you select the VRM with the cursor.

Electronic Bearing Lines (EBL)

An Electronic Bearing Line (EBL) is a line drawn from your vessel to the edge of the window. When this line is rotated to align with a target, its bearing relative to your vessel's heading is measured and displayed on the Radar context menu when you select the VRM with the cursor.

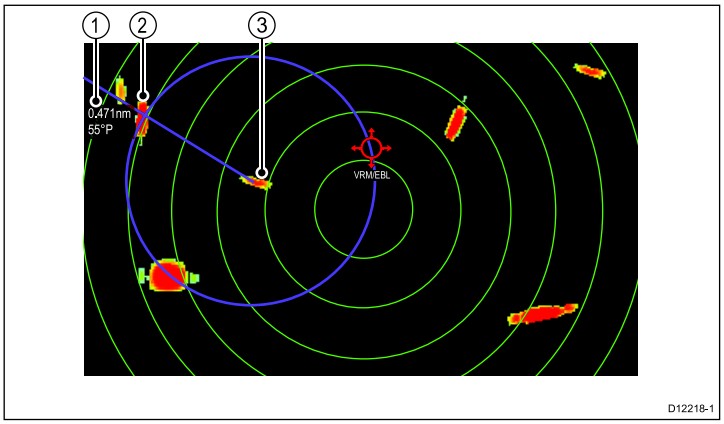
The VRM/EBL are combined to measure both the range and the bearing of the specified target.



Item	Description
1	VRM
2	Target
3	EBL
4	Range and bearing

Measuring using floating VRM/EBL

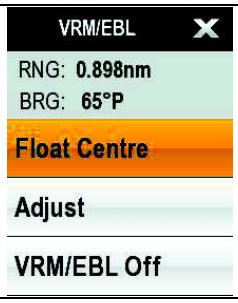
You can use the VRM/EBL float function to measure the range and bearing between any two points on the radar screen. This function allows you to move the VRM/EBL centre away from your vessel's position and onto a target. You can then change the radius of the VRM to determine the distance between two points and change the angle of the EBL, relative to its new origin, to obtain the bearing.



Item	Description
1	Range and bearing
2	Target 1
3	Target 2

VRM/EBL context menu

The VRM/EBL function includes a context menu which provides positional data and menu items.



The context menu provides positional data of the VRM/EBL in relation to your vessel:

- Range
- Bearing

The context menu also provide the following menu items:

- **Float Centre**
- **Adjust**
- **VRM/EBL Off**

Accessing the context menu

You can access the context menu by following the steps below.

1. New e Series or New c Series:
   i. Selecting a location or the relevant object on-screen and pressing the **Ok** button.
2. Touchscreen multifunction displays:
   i. Selecting and holding on a location or relevant object on-screen.

Creating a VRM/EBL on the radar display

To create a VRM/EBL on a touchscreen multifunction display follow the steps below:

From the radar application:

1. Select and hold on the screen.
   The radar context menu is displayed.
2. Select **Place VRM/EBL**.
3. Select the required location / target.
   The VRM/EBL is now set at the selected location.

Creating a VRM/EBL on the radar display

From the radar application:

1. Select a target or location on screen.
2. Press the **Ok** button.
   The radar context menu is displayed.
3. Select **Place VRM/EBL**.
4. Using the **Joystick** adjust the VRM/EBL to the required bearing and range.
5. Press the **Ok** button to save the setting.

Creating a floating VRM/EBL on the radar display

To float a VRM/EBL on a touchscreen multifunction display follow the steps below:

From the radar application with a VRM/EBL already created:

1. Press and hold on the VRM/EBL.
   The VRM/EBL context menu is displayed.
2. Select **Float Center**.
3. Select the desired location for the center position.
   The VRM/EBL is placed at the new location.

Creating a floating VRM/EBL on the radar display

From the radar application with a VRM/EBL already created:

1. Position the cursor over the VRM/EBL.
2. Press the **Ok** button.
   The radar context menu is displayed.
3. Use the **Rotary Control** to select **Float Center**.
4. Press the **Ok** button.
5. Using the **Joystick**, move the center position of the circle to the desired position.
6. Press the **Ok** button to confirm the new position.

Unfloating a VRM/EBL on the radar display

To re-center a VRM/EBL on a touchscreen multifunction display follow the steps below:

From the radar application:

1. Position the cursor over the VRM/EBL.
   The Radar context menu is displayed.
2. Select **Center**.

Unfloating a VRM/EBL on the radar display

From the radar application:

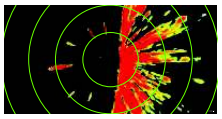
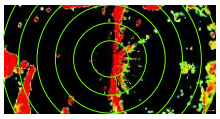
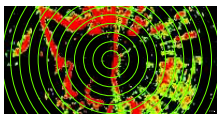
1. Position the cursor over the VRM/EBL.
2. Press the **Ok** button.
   The VRM/EBL context menu is displayed.
3. Select **Center**.

Using the radar range rings

Radar range rings enable you to measure the distance between two points on the radar display.

Use the range rings to gauge the approximate distances between points. Range rings are concentric circles displayed on the screen and centred from your vessel at pre-set distances. The number and spacing of the rings changes as you range in and out.

Examples:

		
Range — 1/4 nm Range Rings — 760ft apart	Range — 3/4 nm Range Rings — 1/4 nm apart	Range — 1 1/2 nm Range Rings — 1/4 nm apart

Enabling and disabling radar range rings

From the radar application:

1. Select **MENU**.
2. Select **Presentation**.
3. Select **Range Rings**.
   Selecting Range rings will switch the range rings On and Off.

13.13 Using radar to track targets and avoid collisions

The **Guard Zone** , **VRM/EBL** and **MARPA** functions will help you track targets and avoid collisions.

With a radar connected to your multifunction display, you can:

- Assess how far away a target is and its bearing (VRM/EBL).
- Set an alarm to trigger when a target is within a specified zone (Guard Zone).
- Display detailed information on tracked targets (MARPA).
- Display the range and bearing of a target.

Setting up a radar guard zone

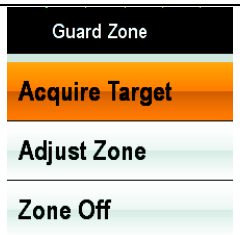
From the radar application:

1. Select **Menu**.
2. Select **Track Targets**.
3. Select **Guard Zone Set-up**.
4. Select **Zone** so that On is highlighted.
   Selecting Zone will switch the zone On and Off.
5. Select **Adjust Zone**.
6. Select **Shape:** to switch between Sector or Circle.
7. Select **Outer:** .
   The Outer numeric adjust control is displayed.
8. Adjust the outer edge of the guard zone to the required distance.
9. Select **Ok** to close the numeric adjust control.
10. Select **Inner:** .
    The Inner numeric adjust control is displayed.
11. Adjust the inner edge of the guard zone to the required distance.
12. Select **Ok** to close the numeric adjust control.
13. Select **Width:** .
    The Width numeric adjust control is displayed.
14. Adjust the width of the guard zone in degrees.
15. Select **Ok** to close the numeric adjust control.
16. Select **Bearing:** .
    The Bearing numeric adjust control is displayed.
17. Adjust the bearing of the guard zone in degrees port or degrees starboard.
18. Select **Ok** to close the numeric adjust control.

Note: Guard zone width and bearing can only be adjusted when the **Shape:** is set to Sector.

Guard zone context menu

The guard zone function includes a context menu which provides additional menu items.



The context menu provides the following menu items:

- **Acquire Target.**
- **Adjust Zone**
- **Zone Off**

Accessing the context menu

You can access the context menu by following the steps below.

1. New e Series or New c Series:
   i. Selecting a location, object or target on-screen and pressing the **Ok** button.
2. Touchscreen multifunction displays:
   i. Selecting an object or target on-screen.
   ii. Selecting and holding on a location on-screen.

Adjusting guard zone sensitivity

You can adjust the threshold at which the alarm is triggered by a target entering the guard zone.

1. Select **Menu**.
2. Select **Track Targets**.
3. Select **Guard Zone Set-up**.
4. Select **Sensitivity**.
   The sensitivity numeric adjust control is displayed.
5. Adjust the sensitivity to the required value.
6. Select **Ok** to confirm setting and close the numeric adjust control.

The guard zone sensitivity setting can also be accessed from the **Alarms** menu: **homescreen > Set-up > Alarms > Guard Zone > Sensitivity**.

MARPA overview

MARPA is used for target tracking and risk analysis in the radar application.

With an accurate heading sensor connected to your multifunction display, you can use the Mini Automatic Radar Plotting Aid (MARPA) functions for target tracking and risk analysis. MARPA improves collision avoidance by calculating information for tracked targets, and provides continuous, accurate, and rapid situation evaluation. The number of targets that you can track at any one time is dependent on the model of radar scanner that you are using.

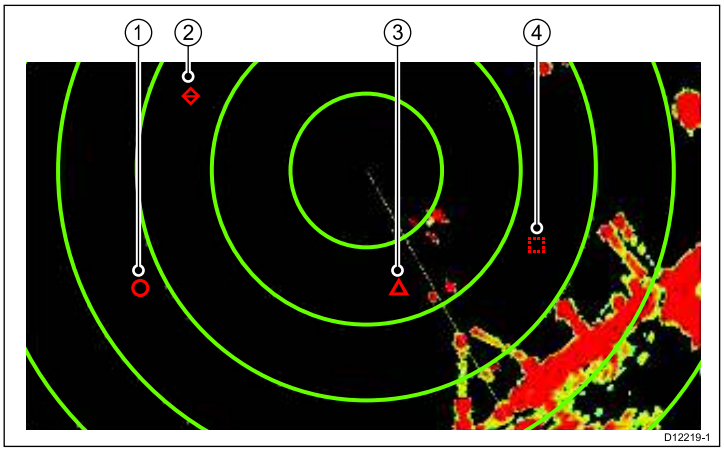
MARPA tracks acquired targets, and calculates the target's speed and course.

Each target tracked can be displayed with a graphic indicating the Closest Point of Approach (CPA), and Time to Closest Point of Approach (TCPA). The calculated target data can also be shown on your screen. Each target is continually assessed and an audible alarm is sounded if a target becomes dangerous, or is lost.

For effective MARPA operation, your multifunction display must have accurate heading and speed data for your vessel. The better the quality of the heading and speed data, the better MARPA will perform. For the best heading data, a Raymarine SMART heading sensor or a gyro-stabilized autopilot is required.

In True Motion mode, Speed Over Ground (SOG) and Course Over Ground (COG) information is required to show true target course and speed.

In Relative Motion mode, heading and speed information is required.



Item	Description
1	Safe target
2	Lost target
3	Dangerous target
4	Target being acquired

Safety notices

MARPA can improve collision avoidance when used wisely. It is your responsibility to exercise common prudence and navigational judgement.

There are conditions where acquiring a target may become difficult. These same conditions may be a factor in successfully tracking a target. Some of the conditions are:

- The target echo is weak. The target is very close to land, buoys or other large targets.
- The target or your own vessel is making rapid manoeuvres.
- Choppy sea state conditions exist and the target is buried in excessive sea clutter or in deep swells.
- Choppy sea state conditions exist yielding poor stability; own vessel's heading data is very unstable.
- Inadequate heading data.

Symptoms of such conditions include:

- target acquisition is difficult and the MARPA vectors are unstable;
- the symbol wanders away from the target, locks-on to another target, or changes to a lost symbol target.

In these circumstances, target acquisition and tracking may need to be re-initiated and in some cases might be impossible to maintain. Better quality heading data might improve performance in these circumstances.

How a MARPA risk is assessed

Each target is monitored to ascertain whether it will be within a certain distance from your vessel within a certain time. If so, the target is designated as dangerous, and an audible warning is sounded and a warning displayed. The target symbol changes to the dangerous target symbol and flashes to indicate that it is a dangerous target. Acknowledging the alarm will remove the warning.

If a target is lost, either because the MARPA software has lost contact with it, or because it has moved out of range, an audible alarm is sounded and an on-screen warning appears. The on-screen symbol will change to the target lost symbol. Acknowledging the warning will silence the alarm and remove the on-screen warning and the target lost symbol.

Effective range for MARPA targets

MARPA target acquisition is only available at radar range scales of up to 12 nm, although tracking continues at all ranges.

If you change to a smaller range scale, targets may be beyond the range of your radar scanner and will be lost. In such cases, an on-screen warning indicates that the target is off-screen.

MARPA context menu

The MARPA function includes a context menu which provides positional data and menu items.

The context menu provides the following target information:

- CPA
- TCPA
- COG
- SOG

The context menu also provide the following menu items:

- **Cancel target**
- **CPA Graphic**
- **MARPA Data**
- **Slew thermal camera** (Only available when thermal camera is connected and operating.)

Accessing the context menu

You can access the context menu by following the steps below.

1. New e Series or New c Series:
   i. Selecting a location, object or target on-screen and pressing the **Ok** button.
2. Touchscreen multifunction displays:
   i. Selecting an object or target on-screen.
   ii. Selecting and holding on a location on-screen.

Configuring MARPA options

From the radar application:

1. Select **Menu**.
2. Select **Track Targets**.
3. Select **MARPA Options**.

Note: If AIS data is available the menu will be **MARPA & AIS Options**.

4. Select **Vector Length**.
5. Select an appropriate time period.
   The distance that your vessel travels in the time period you specify here determines the length of the vector lines.
6. Select **MARPA Target History**.
7. Select an appropriate time period.
   The target's previous position will be plotted on the radar display as a target icon with lighter shading than the actual target.

Note: MARPA and AIS functions share **Safe Zone** and **Vector Length** settings.

Configuring safe zone set up for MARPA

From the Radar application:

1. Select **Menu**.
2. Select **Track Targets**.
3. Select **Safe Zone Set-up**.
4. Select **Safe Zone Radius**.
   i. Select a distance for the Safe Zone.
   This is the distance from your vessel that the safe zone will be set up.
5. Select **Time to Safe Zone**.
   i. Select a time period.
   A target is considered dangerous if it will enter your safe zone within this time period.
6. Select **Safe Zone Ring**.
   Selecting safe zone ring will switch between showing and hiding the safe zone ring in the radar application.

Using MARPA

Acquiring a MARPA target to track

From the radar application:

1. Select the target to be acquired.
   The MARPA context menu is displayed.
2. Select **Acquire Target**.

The "target being acquired" symbol is displayed. If the target is present for several scans, the radar locks-on to the target, and the symbol changes to "safe target" status.

Cancelling a MARPA target using the MARPA context menu

From the radar application:

1. Select the relevant target.
   The MARPA context menu is displayed.
2. Select **Cancel Target** or **Cancel All Targets**.

Cancelling a MARPA target using the menu

1. Select **Menu**.
2. Select **Track Targets**.
3. Select **View MARPA Lists**.

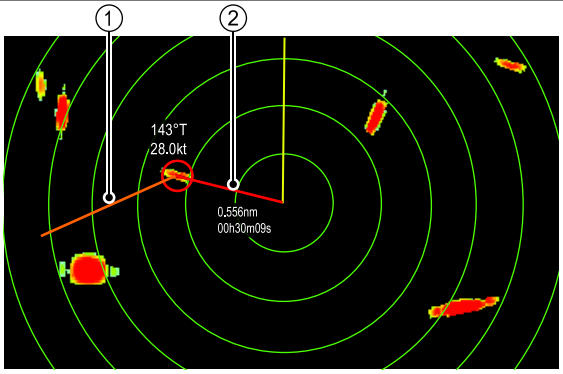
Note: If AIS data is available the menu will be **View MARPA & AIS Lists**.

4. Select View **MARPA List**.
5. Select the relevant MARPA target from the list.
6. Select **Cancel Target** or **Cancel All Targets**.

Vessel vectors (CPA graphics) overview

CPA graphics show vectors for your vessel and a selected target.

A vector is a line on-screen showing the predicted courses of your vessel and the selected target if you both remain on your present course. These vectors vary in length due to vessel speed and vector length set in the MARPA Set-up menu.



Item	Description
1	Target vector
2	CPA graphic

True motion

With the display set in true motion mode, the vectors of your vessel and the target are shown extended to their intersection point. The CPA is shown as a line that is placed on your vessel's vector at the point of the CPA. The length and direction of the line indicates the distance and bearing of the target at CPA. The text indicates CPA and TCPA. The text next to the target symbol indicates its true course and speed.

Relative motion

With the display set in relative motion mode, no vector extension of your vessel is shown. The CPA line emerges from your own vessel, with the target vector extension being shown as relative, not true. The text next to the target indicates its course and speed.

Displaying MARPA target data

1. Select the target.

   The MARPA context menu is displayed which provides the following data:

   - Closest Point of Approach (CPA).
   - Time to Closest Point of Approach (TCPA).
   - COG (if available).
   - SOG (if available).

2. To display CPA graphics select **CPA Graphic** from the context menu:
   i. Select **Auto** to display the CPA graphic when the target is selected.
   ii. Select **On** to display the CPA graphic while the target is being tracked.
   iii. Select **Off** to hide the CPA graphic.
3. To display course and bearing information alongside to the target select **MARPA Data** so that Show is highlighted.
   i. Selecting MARPA Data will switch between Show and Hide.

Viewing full MARPA target information

From the radar application:

1. Select **Menu**.
2. Select **Track Targets**.
3. Select **View MARPA Lists**.
4. Select **View MARPA List**.
5. Select the relevant target.
6. Select **View Full Target Data**.

13.14 Scanner set-up menu options

The Scanner Set-up menu enables you to configure the performance and behavior of your radar scanner.

Function	Description	Options
Timed Transmit Set-up	This menu item contains a sub-menu that enables you to adjust the timed transmit options: • **Timed Transmit** • **Transmit Period** • **Standby Period**	**Timed Transmit** • On • Off **Transmit Period** • 10 Scans • 20 Scans • 30 Scans **Standby Period** • 3 minutes • 5 minutes • 10 minutes • 15 minutes
Tune Adjust	This menu item allows you to fine tune the radar scanner's receiver for maximum returns on the display. Raymarine recommends that this function is set to Auto. If you set this function to Manual and adjust the setting shortly after powering up the radar scanner, you should adjust it again approximately 10 minutes after powering up the scanner, as the required setting will change after the magnetron has warmed up.	**Man** • Auto • Man 0% — 100%
EBL Reference	The measurement point used for reference when measuring distances using Electronic Bearing Lines (EBLs) and range rings in the chart application. The options are Relative to ships heading or referenced to the compass is degrees Magnetic — True as selected in Bearing Mode.	• Relative • Mag-True
Sea Clutter Curve	This menu item allows you to adjust the Sea Clutter — radar echoes from waves can make it difficult to detect real targets. These echoes are known as “sea clutter”. Several factors can affect the level of clutter you see, including the weather and sea conditions, and the mounting height of the radar. The sea clutter curve setting adjusts the radar's sensitivity to sea clutter. The steepest setting for the curve is 1, and the most shallow setting is 8.	• Adjust Curve (1 to 8)
Scanner Speed	SuperHD open array radars with software version 3.23 or above or HD radomes support multiple scan speeds: • 24 RPM • 48 RPM	**Scanner Speed** • 24 RPM • Auto — his option automatically switches between the 24 RPM and 48 RPM scan speeds as appropriate.
Advanced Set-up	This menu item contains a sub-menu that enables you to adjust the following options: • **Bearing Alignment** • **Display Timing** • **Main Bang Suppression** • **Tune Preset** • **STC Preset**— Non-HD Digital radomes only • **Reset Advanced**	**Bearing Alignment** • -180º — 179.5º **Display Timing** • 0.415 n m — selected range **Main Bang Suppression** • On • Off **Tune Preset** • 0 — 255 **STC Preset** • 0 — 100% **Reset Advanced** • Yes • No

Adjusting the radar tune control

From the radar application:

1. Select **Menu**.
2. Select **Scanner Set-up**.
3. Select **Tune Adjust**.
4. Select **Tune Adjust:** .
   The Tune Adjust slider bar control is displayed.
5. Adjust the slider bar control to the appropriate setting, or
6. Select the **Auto** box so that a tick is placed in the box for automatic tuning.

13.15 Resetting the radar

To reset radar settings to defaults follow the steps below:

From in the radar application:

1. Select **Menu**.
2. Select **Scanner Set-up**.
3. Select **Advanced Set-up**.
4. Select **Reset Advanced**.
   A confirmation pop up message is displayed.
5. Select **Yes** to confirm reset.

Chapter 14: Using AIS

Chapter contents

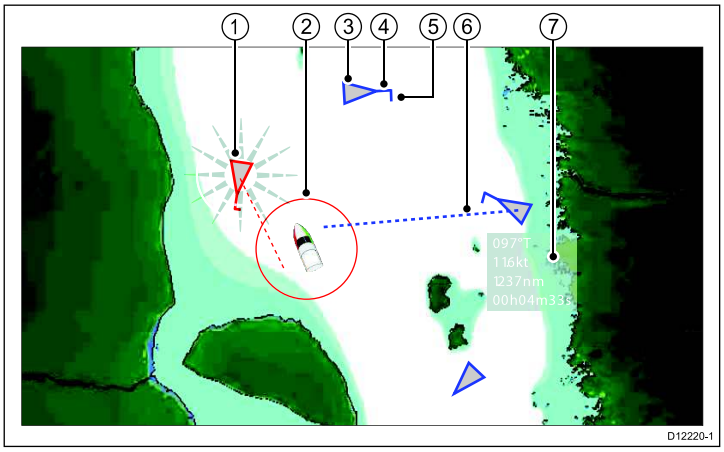
14.1 AIS overview

The AIS feature enables you to receive information broadcast by other vessels, and to add these vessels as targets in the chart and radar applications.

With an optional AIS unit connected to your system you can:

- Display targets for any other AIS-equipped vessels.
- Display voyage information being broadcast by these targets, such as their position, course, speed and rate-of-turn.
- Display basic or detailed information for each target vessel, including safety-critical target data.
- Set up a safe zone around your vessel.
- View AIS alarm and safety-related messages.
- Add AIS-equipped friends and regular contacts to a “Buddy List”

AIS information is displayed in the form of an overlay in the chart and radar applications. Additional data is displayed in a dialog box, for example:



Item	Description
1	Dangerous target (flashes).
2	Safe zone (defined by distance and / or time).
3	AIS target vessel.
4	Heading.
5	Direction of turn.
6	COG/SOG vector.
7	Safety critical data.

AIS-equipped vessels in the surrounding area are displayed in the chart or radar application as triangular targets. Up to 100 targets are displayed. As the vessel’s status changes, the symbol for the target changes accordingly.

Vectors can be displayed for each target. These vectors indicate the vessels direction of travel and the distance it will travel over a specified period of time (COG / SOG vector). Targets displayed with their vectors are referred to as ‘active targets’ and are scaled according to the size of the vessel. The larger the vessel, the larger the target. You can either display all targets or just dangerous targets.

How AIS Works

AIS uses digital radio signals to broadcast ‘real-time’ information between vessels and shore-based stations via dedicated VHF radio frequencies. This information is used to identify and track vessels in the surrounding area and to provide fast, automatic and accurate collision avoidance data. The AIS features complement the radar application, as AIS can operate in radar blind spots and can detect smaller vessels equipped with AIS.

Note: It may not be mandatory for vessels to be fitted with operational AIS equipment. Therefore, you should not assume that your multifunction display will show ALL vessels in your area. Due prudence and judgement should be exercised. AIS should be used to complement radar, NOT substitute it.

AIS Simulator Mode

Raymarine recommends that you use the simulator function to familiarize yourself with the AIS features. When the simulator function is enabled (**homescreen > Set-up > System Settings > Simulator**), it displays 20 AIS targets within a 25 nm range. These targets are displayed using the appropriate AIS target's status symbol, and move around the screen as if they were real targets.

Note: Incoming safety messages are NOT displayed while the simulator is enabled.

14.2 AIS prerequisites

You must have suitable AIS hardware connected to your multifunction display to make use of the AIS functionality.

In order to run AIS, you will need:

- A receive-only AIS unit or a full AIS transceiver (a unit that sends and receives).
- A VHF antenna.
- A GPS - to provide position data.
- The AIS layer enabled in the chart or radar application, as appropriate.

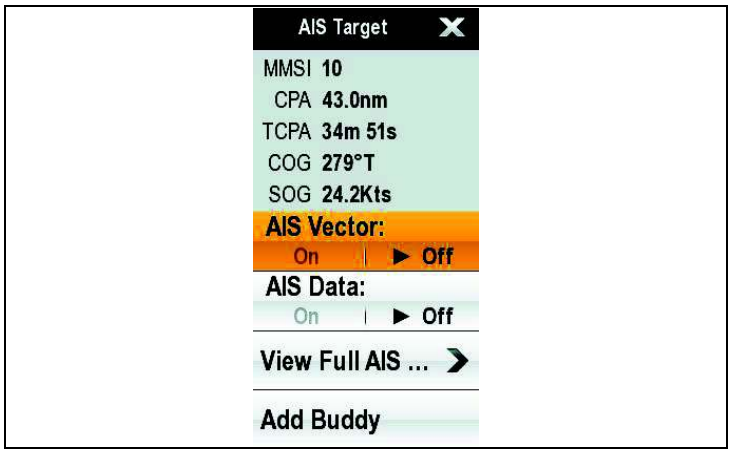
Note: A receiver will allow you to receive data about other vessels in your area but will not allow other vessels to 'see' you. A full transceiver transmits and receives AIS data, and therefore allows you to receive data about other vessels. It also enables other AIS-equipped vessels to see and receive information about your vessel. This could include position, course, speed and rate of turn data.

When the AIS unit is connected to your multifunction display, the status of the unit is indicated by an AIS icon in the status bar.

You can connect an AIS unit to your multifunction display using NMEA0183 or SeaTalk^{ng}, depending on the AIS unit. If connecting using NMEA0183, you will now need to specify the 38,400 baud setting (**homescreen > Set-up > System Settings > NMEA Set-up**) for the NMEA input port that communicates with the AIS transceiver or receiver.

14.3 AIS context menu

The AIS function includes a context menu which provides AIS target information and menu items.



The context menu provides the following AIS target data:

- MMSI
- CPA
- TCPA
- COG
- SOG

The context menu also provide the following menu items:

- **AIS Vector** — Switch target vectors On and Off.
- **AIS Data** — Switch on screen target data On and Off.
- **View Full Data**
- **Add Buddy** — Add target to the buddy directory.
- **Acquire Target** (only available if Radar overlay is switched on.)
- **Slew thermal camera** (only available when thermal camera is connected and operating.)

Accessing the context menu

You can access the context menu by following the steps below.

1. New e Series or New c Series:
   i. Selecting a location, object or target on-screen and pressing the **Ok** button.
2. Touchscreen multifunction displays:
   i. Selecting an object or target on-screen.
   ii. Selecting and holding on a location on-screen.

14.4 Enabling AIS

Enabling AIS in the chart application

To enable AIS overlay in the chart application the chart view must be set to 2D **Menu > Presentation > Chart View**.

From the chart application:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Layers**.
4. Select **AIS:** so that On is highlighted.
   Selecting AIS will switch AIS between On and Off.

Enabling AIS in the radar application

From the radar application:

1. Select **Menu**.
2. Select **Track Targets**.
3. Select **AIS Targets** so that On is highlighted.
   Selecting AIS Targets will switch AIS between On and Off.

14.5 Displaying AIS vectors

You must have the correct data available before AIS vectors can be displayed.

A target is defined as active when it has the following data displayed graphically:

- A COG/SOG vector indicating the predicted distance that a target will travel within a given period of time.
- A heading and direction of turn indicator.

Enabling and disabling AIS vectors

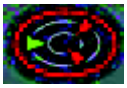
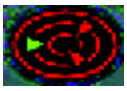
From the chart or radar application:

1. Select an AIS target.
   The AIS target context menu is displayed.
2. Select **AIS Vector**.
   Selecting AIS Vector will switch between On and Off.

Note: The same target vector and safe zone settings apply to both radar MARPA and AIS targets.

14.6 AIS status symbols

AIS status is indicated by a symbol in the databar.

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

14.7 AIS silent mode

AIS silent mode enables you to disable AIS transmissions

AIS silent mode enables you to disable the transmitting functions of your AIS equipment. This is useful when you do not want to transmit your vessel's AIS data to other AIS receivers, but still wish to receive data from other vessels.

Note: Not all AIS equipment supports silent mode. For more information, refer to the documentation that accompanies your AIS unit.

Enabling and disabling AIS silent mode in the chart application

From the chart application:

1. Select **Menu**.
2. Select **AIS Options**.
3. Select **AIS Unit Set-up**.
4. Select **AIS Silent Mode**.

   Selecting AIS Silent Mode will switch between silent mode On and Off.

Enabling and disabling AIS Silent Mode in the radar application

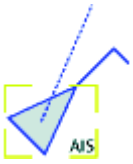
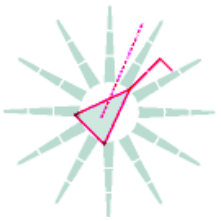
From the Radar application:

1. Select **Menu**.
2. Select **Track Targets**.
3. Select **AIS Unit Set-up**.
4. Select **AIS Silent Mode**.

   Selecting AIS Silent Mode will switch silent mode On and Off.

14.8 AIS target symbols

Your multifunction display shows a range of symbols to represent the different types of AIS target.

Target type	Description	Symbol
Transmitting target	Target is moving or at anchor (Target is not activated, dangerous or lost).	
Activated target	Target activated — that is, AIS vector displayed. Vector line (optional) shows predicted distance travelled within a given time.	
Selected target	Target selected with cursor. Can view detailed data.	
Dangerous target	Targets within specified distance (CPA) or time (TCPA). Dangerous target alarm sounds if enabled. Target red and flashing.	
Uncertain target	Calculated CPA / TCPA value uncertain.	
Lost target	When the signal of a dangerous target not received for 20 seconds. Target in latest predicted position. Alarms sounds if enabled. Target flashes.	
Buddy target	Target has previously been added to the Buddy List.	
Aid To Navigation (AToN) target (Real)	AToN target is ON position.	
Aid To Navigation (AToN) target (Real)	AToN target is OFF position.	
Aid To Navigation (AToN) target (Virtual)	AToN target is ON position.	
Aid To Navigation (AToN) target (Virtual)	AToN target is OFF position.	
Land base station target	Land base station target is ONLINE.	
Search and rescue transponders (SARTS) target	SARTS target	
Search and rescue aircraft (SARS) target	SARS target	
Military and law enforcement target	Only displayed when connected to approved STEDS-EAIS AIS hardware.	

14.9 Displaying detailed AIS target information

From the chart or radar application:

1. Select an AIS target.
   The AIS target context menu is displayed.
2. Select **View Full AIS Data**.

AIS Data

The table below shows the AIS target information which if available will be displayed on the multifunction display:

- Type
- Status
- Destination
- Last Seen
- ETA
- MMSI
- Call Sign
- IMO No.
- Length
- Beam
- Draught
- Heading
- ROT
- Position
- COG
- SOG
- CPA
- TCPA

Note: Available data is dependant upon what information is being transmitted from the target vessel and the type of AIS unit connected to your system.

14.10 Viewing all AIS targets

From the chart application go to **Menu > AIS Options**

From the radar application go to **Menu > Track Targets > View AIS Lists**

1. Select **AIS List**.

   A list of all available AIS targets is displayed. The list will provide the following data:

   - MMSI
   - Range
   - Bearing
   - Buddy
   - Type

   This list can be filtered to show only buddies or all targets.
2. To view full AIS target information Select an AIS target from the list and then select **View Full Target Data**.

   The AIS target info dialog is displayed showing all available data on the target.

14.11 Using AIS to avoid collisions

You can use the AIS safe zone and safety message functions to help you avoid collisions with other vessels and objects.

Safe Zones

A safe zone is a ring centred on your vessel within which a target is considered dangerous. It is displayed in the radar or chart applications as a red ring.

This AIS safe zone uses the same criteria as MARPA and will deem a target dangerous if it comes within a specified distance of your vessel (closest point of approach or CPA) within a specified time (time to closest point of approach or TCPA). The CPA and TCPA are calculated using COG/SOG and position from the AIS target.

When your system recognizes a dangerous AIS target:

- The target symbol changes to red and flashes.
- The dangerous alarm dialog is displayed (this can be disabled if required).
- The dangerous alarm sounds (this can be disabled if required).

Note: When the AIS unit is connected and functioning, the system will check for dangerous targets within the safe zone and if enabled issue an alarm whenever necessary. Dangerous target alarm operates irrespective of the status of the AIS target display, or the safe zone ring.

Safety Messages

When the status of the AIS Safety Messages function is set to On, any incoming safety messages from surrounding vessels, shore stations and mobile stations are displayed in a dialog box. If known, the message will include the sending vessel's position in latitude / longitude. You will have the option to:

- Remove the message (**Ok**).
- Place a waypoint on your chart / radar to mark the sending vessel's position (**Place Waypoint**).
- Goto the sending vessel's position (**Goto Waypoint**).

Note: You will NOT receive any safety messages in Simulator mode (**homescreen > Set-up > System Settings > Simulator**).

Enabling Safe Zones

To show the Safe Zone ring follow the instructions below:

From the chart application go to **Menu > AIS Options > Safe Zone Set-up**

From the radar application go to **Menu > Track Targets > Safe Zone Set-up**

1. Select **Safe Zone Ring** so that **Show** is highlighted.

   Selecting Safe Zone Ring will switch the zone ring from hidden to visible.
2. Select **Safe Zone Radius**.
   i. Select the required radius for the safe zone.
3. Select **Time to Safe Zone**.
   i. Select the required time period.
4. Select **AIS Alarm** so that On is highlighted.

   Selecting AIS Alarm will switch the dangerous target alarm between On and Off.

Enabling and disabling AIS safety messages in the chart application

From in the chart application:

1. Select **Menu**.
2. Select **AIS Options**.
3. Select **AIS Unit Set-up**.
4. Select **AIS Safety Messages**.

   Selecting AIS Safety Messages will switch between safety messages On and Off.

Enabling and disabling AIS safety messages in the radar application

From in the radar application:

1. Select **Menu**.

2. Select **Track Targets**.
3. Select **AIS Unit Set-up**.
4. Select **AIS Safety Messages**.
   Selecting AIS Safety Messages will switch between safety messages On and Off.

Displaying safety-critical AIS information

From the chart or radar application:

1. Select the AIS target.
   The AIS target context menu is displayed.
2. Select **AIS Data** so that On is highlighted.
   Selecting AIS Data will switch between AIS data On and Off.

The Safety critical AIS data will now be displayed next to the target in the application.

14.12 AIS options

The AIS options are accessible in the chart application by selecting **Menu > AIS Options > MARPA & AIS Options** or the radar application by selecting **Menu > Track Targets > MARPA & AIS Options**.

Parameter	Description	Options
Vector Length	The length of the vector lines displayed depends on the distance that an AIS target travels in the time period that you specify for this setting.	• 0.5 min • 1 min • 3 min • 6 min • 12 min • 30 min • 60 min
Display AIS	This option determines whether all or only dangerous / lost targets are displayed in the radar or chart application.	• All • Dangerous
Buddy Tracking	This option allows you to turn the Buddy Tracking function On and Off.	• On • Off
Add New Buddy Vessel	This option allows you to add a buddy to the directory by manually entering the vessel MMSI number.	
AIS Unit Set-up	Provides the following options: • **AIS Silent Mode** — Switches silent mode On or Off. AIS silent mode enables you to disable AIS transmissions. • **Safety Messages** — Allows you to enable or disable the display of AIS safety messages. • **View AIS Unit Log** — Displays a list of AIS alarms, and includes details on when the alarm was raised and a description of the fault.	**AIS Silent Mode** • Off (default) • On **Safety Messages** • On (default) • Off **View AIS Unit Log** • Display Alarms list.

14.13 AIS alarms

The AIS functions generate a number of alarms to alert you to dangerous or lost targets.

In addition to the dangerous target alarm, the system generates an alarm when a dangerous target becomes a lost target i.e. its signal has not been received for 20 seconds.

Your AIS receiver generates local alarms which are displayed and sounded on your multifunction display whenever an alarm condition exists on the unit.

Local AIS alarms

When the connected AIS unit generates an alarm, your multifunction display shows a local alarm message and indicates the alarm status in the status bar.

Active AIS alarms list

The active alarm list shows the status of each local alarm. This list can be accessed from the chart application by going to **Menu > AIS Options > AIS Unit Set-up > View AIS Unit Log**, or from the radar applications by going to **Menu > Track Targets > AIS Unit Set-up > View AIS Unit Log**.

Acknowledging AIS alarms

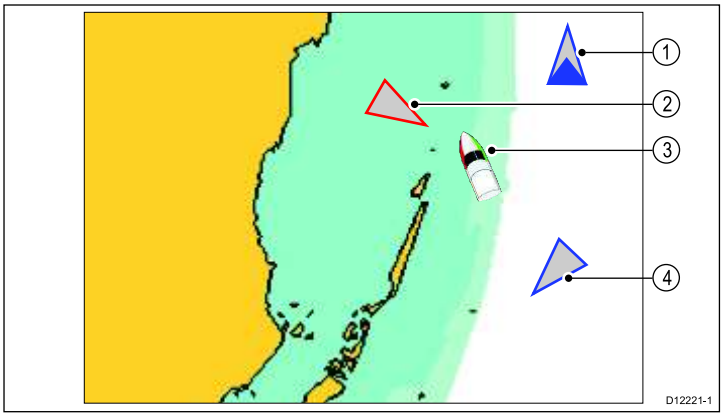
In the chart or radar application:

1. Select **Ok** on the alarm dialog box.

Note: An AIS alarm remains active until it is acknowledged on your multifunction display.

14.14 Buddy tracking

The Buddy Tracking feature enables you to add AIS-equipped friends and regular contacts to a “Buddy List” on your multifunction display. As soon as a vessel on your Buddy List sails into the range of your AIS unit, the vessel icon changes to indicate this.



Item	Description
1	Buddy icon
2	Dangerous target icon
3	Own vessel icon
4	Normal AIS icon

How it works

When the AIS Layer is enabled in the chart or radar application, AIS targets are shown on your display. You can add any AIS target to a “Buddy List”, each entry consisting of an MMSI number, and an optional name. Subsequently, whenever Buddy Tracking is enabled on your multifunction display, and a “Buddy” vessel with an MMSI number sails into the range of your AIS receiver, an AIS Buddy icon is displayed. Up to 100 vessels may be added to the Buddy List.

Pre-requisites

The following items are required for the Buddy Tracking feature:

- For the purposes of using the Buddy Tracking feature, it is assumed that your display is already connected to a suitable AIS unit.
- Only transmitting AIS-equipped vessels will be detected.

Enabling and disabling buddy tracking in the chart application

From the chart application, with the AIS Targets layer enabled:

1. Select **Menu**.
2. Select **AIS Options**.
3. Select **MARPA & AIS Options**.
4. Select **Buddy Tracking** .

   Selecting Buddy Tracking will switch between buddy tracking On and Off.

Enabling and disabling buddy tracking in the radar application

From the radar application, with the AIS Targets layer enabled:

1. Select **Menu**.
2. Select **Track Targets**.
3. Select **MARPA & AIS Options**.
4. Select **Buddy Tracking** .

   Selecting Buddy Tracking will switch between buddy tracking On and Off.

Adding a vessel to your buddy list

In the chart or radar application:

1. Select the AIS target.

   The AIS target context menu is displayed.
2. Select **Add Buddy**.
   i. Select **Yes** to enter a name for the buddy vessel

ii. Select **No** to save the vessel to your buddy list without entering a name for the buddy vessel.

The vessel will now be added to your buddy directory.

Adding a vessel to your buddy list from AIS target list

1. If you are in the chart application, goto **Menu > AIS Options**.
2. If you are in the radar application, goto **Menu > Track Targets > View MARPA & AIS Lists**.
3. Select **View AIS List**.

   The AIS Target List is displayed.
4. Select an AIS target.
5. Select **Add Buddy**.
   i. Select **Yes** to enter a name for the buddy vessel
   ii. Select **No** to save the vessel to your buddy list without entering a name for the buddy vessel.

The vessel will now be added to your buddy directory.

Editing a buddy's details

From the chart or radar application:

1. Select the AIS buddy target.

   The AIS buddy context menu is displayed.
2. Select **View Buddy List**.
3. Select the buddy you wish to edit.

   The Buddy options dialog is displayed.
4. To change the MMSI number select **Edit Buddy MMSI** or.

   The MMSI number must be 9 digits.
5. Select **Edit Buddy Name** to change the buddy name.

   This could be the name of the vessel, or the name of the friend who owns the vessel, for example
6. Enter the new details and select **SAVE**.

   You will be returned to the buddy list.

Deleting a buddy

From the chart or radar application:

1. Select the AIS buddy target.

   The AIS buddy context menu is displayed.
2. Select **Remove Buddy**.
3. Select **Yes** to confirm.

   The buddy has now been removed from the directory.

The buddy directory can also be accessed via the chart application (**Menu > AIS Options > View Buddy Directory**), or the radar application (**Menu > Track Targets > MARPA & AIS Lists > View Buddy Directory**).

Displaying additional buddy information

From the chart or radar application:

1. Select the AIS buddy target.

   The AIS buddy context menu is displayed.
2. Select **Buddy Data** so that On is highlighted.

   Selecting Buddy Data will switch data between On and Off.

The Buddy MMSI and Name will now be displayed next to the buddy icon.

Chapter 15: Using the fishfinder

Chapter contents

15.1 How the fishfinder works

The fishfinder application uses a sonar module and a suitable sonar transducer. The sonar module interprets signals from the transducer and builds up a detailed underwater view.

The transducer is located on the bottom of the boat, it sends pulses of sound waves into the water and measures the time it takes for the sound wave to travel to the bottom and back. The returning echoes are affected by bottom structure and by any other objects in their path, for example reefs, wrecks, shoals or fish.

Colors are used on the display to indicate the strength of the returns. You can use this information to determine the bottom structure, the size of fish and other objects in the water, such as debris or air bubbles

Note: Some transducers include additional sensors to measure water temperature and/or speed.

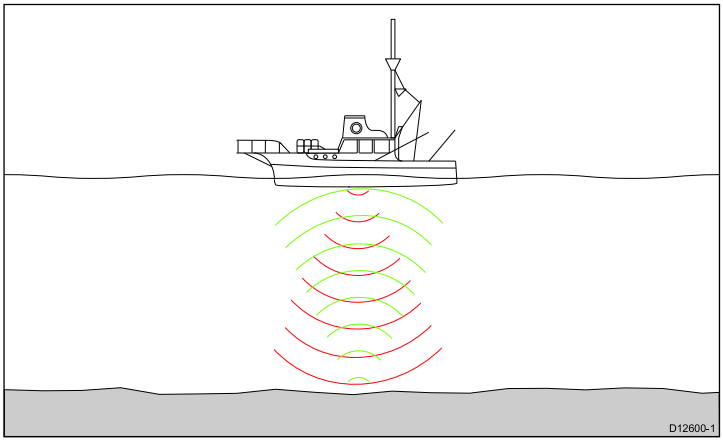
15.2 Raymarine sonar modules

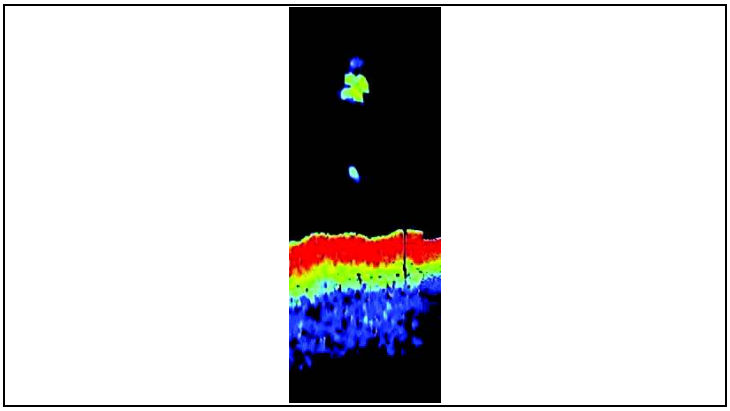
The table below lists Raymarine's sonar modules and whether CHIRP technology is used.

DSM30	clear pulse – non-CHIRP
DSM300	clear pulse – non-CHIRP
CP450C	clear pulse – CHIRP
New a Series (internal sonar)	clear pulse – non-CHIRP
New c Series (internal sonar)	clear pulse – non-CHIRP
New e Series (internal sonar)	clear pulse – non-CHIRP

15.3 Traditional sonar technology

Traditional sounders use a single carrier frequency or carrier wave for the sonar ping. These sounders work by measuring the time it takes the ping echo to return to the transducer to determine target depth. Using this method if 2 targets are close together they can be shown as a single large target, rather than multiple smaller targets



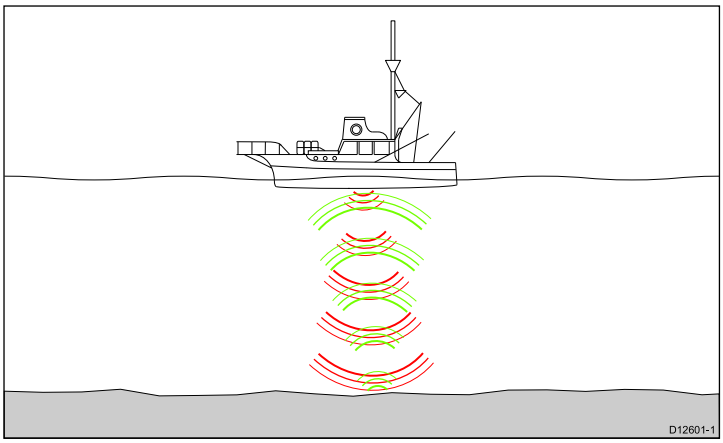


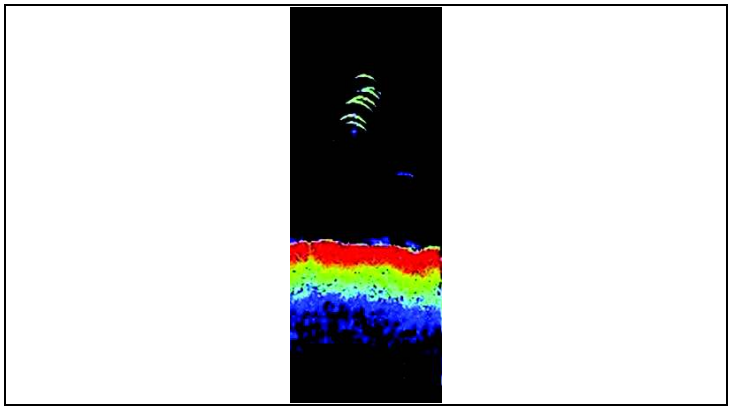
15.4 Broadband CHIRP sonar technology

Broadband sonars use a swept frequency 'CHIRP' signal which can distinguish between multiple close targets, this enables the sonar to display multiple targets instead of large combined targets.

Some of the benefits are improved:

- Target resolution.
- Bottom detection even through bait balls and thermoclines.
- Detection sensitivity.





15.5 Fishfinder introduction

Warning: Sonar operation

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

Fishfinder overview

The fishfinder application provides a detailed view of the fish and seabed under your vessel, enabling you to accurately distinguish between different sizes of fish, bottom structure, and underwater obstacles. The standard fishfinder image is a historical, scrolling bottom graph with range and sonar frequency automatically selected by the system.

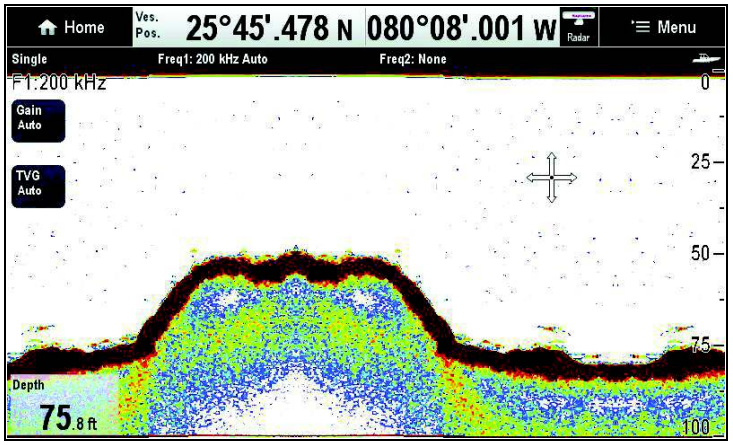
The various functions and features of the fishfinder application include:

- Preset modes for easy optimal operation.
- Display modes (Zoom, A-Scope or Bottom Lock).
- Adjustable range and zoom.
- Finding bottom feeding fish with the **bottom lock** display mode.
- Clutter and gain options to simplify the image.
- Pausing and adjusting the speed of the scrolling image.
- Using waypoints to mark a position.
- Determining depths and distances of targets.
- Fishfinder alarms (fish, depth or water temperature).

Fishfinder screen

The fishfinder displays a scrolling image of the seabed, updating from the right as your vessel makes progress.

Example fishfinder screen



The fishfinder window includes the following aspects:

- The bottom together with any bottom structure such as reefs and shipwrecks etc.
- Target images indicating fish.
- A status bar noting the frequency and gain settings.
- The bottom depth.

Status icon

The fishfinder status icon is located on the Status icon bar:

- **Icon animated** - fishfinder is operating.
- **Icon static** - the fishfinder transducer is connected but not transmitting.
- **Icon greyed-out** - no fishfinder transducer is connected.

Fishfinder context menu

The fishfinder application includes a context menu which provides fishfinder information and shortcuts to menu items.

The context menu provides the data for the position of the cursor:

- Depth
- Range

The context menu also provide the following menu items:

- **Place Waypoint**
- **Place Marker**
- **Move Marker** — (only available if a marker has been placed.)
- **Erase Marker**— (only available if a marker has been placed.)
- **Display mode** — (opens the display mode menu.)
- **Adjust Range**— (opens the Range mode menu.)
- **Range shift**— (opens the Range shift menu.)

Accessing the context menu

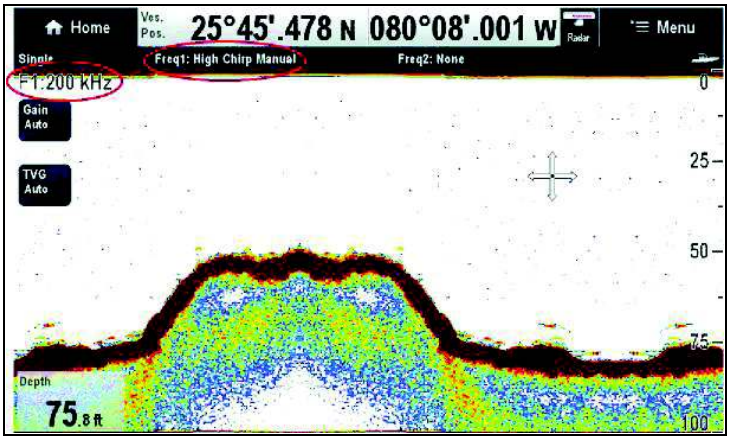
You can access the context menu by following the steps below.

1. New e Series or New c Series:
   i. Selecting a location, object or target on-screen and pressing the **Ok** button.
2. Touchscreen multifunction displays:
   i. Selecting an object or target on-screen.
   ii. Selecting and holding on a location on-screen.

15.6 Transducer bandwidth

The fishfinder application displays the fishfinder frequency, center frequency or CHIRP mode depending on the connected sonar module and transducer.

Example of CHIRP sonar module in CHIRP mode.



- When using a CHIRP sonar module set to CHIRP mode and a wide band transducer the CHIRP mode is shown in the fishfinder application title bar and the center frequency is displayed on-screen.
- When using a CHIRP sonar module set to a non-CHIRP mode and a wide band transducer the center frequency for the transducer is shown in the fishfinder application title bar and is displayed on-screen.
- When using a CHIRP sonar module connected to a non-CHIRP (traditional) transducer the CHIRP sonar module will behave the same a non-CHIRP (traditional) sonar module.
- When using a non-Chirp sonar module the transducer's operating frequency is displayed in the fishfinder application title bar and is displayed on-screen.

Note: When using a CHIRP sonar module in non-CHIRP mode only the transducer's center frequency is displayed, this maybe different to the actual frequency transmitted.

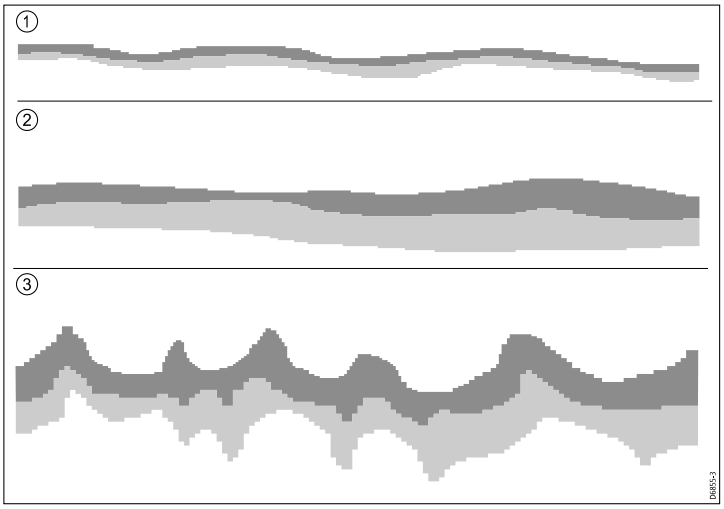
15.7 The sonar image

Interpreting the seabed using sonar

It is important to understand how to correctly interpret the seabed structure represented in the fishfinder display.

The seabed usually produces a strong echo.

The following images show how different seabed conditions are represented in the sonar display:



Item	Description
1	A hard bottom (sand) produces a thin line.
2	A soft bottom (mud or seaweed cover) produces a wide line.
3	A rocky or uneven bottom or a wreck produces an irregular image with peaks and troughs.

The dark layers indicate a good echo; the lighter areas indicate weaker echoes. This could mean that the upper layer is soft and therefore allowing sound waves to pass to the more solid layer below.

It is also possible that the sound waves are making two complete trips – hitting the seabed, bouncing off the vessel, then reflecting off the seabed again. This can happen if the water is shallow, the seabed is hard, or the gain is set to high.

Factors influencing the sonar display

The quality and accuracy of the display can be influenced by a number of factors including vessel speed, depth, object size, background noise and transducer frequency.

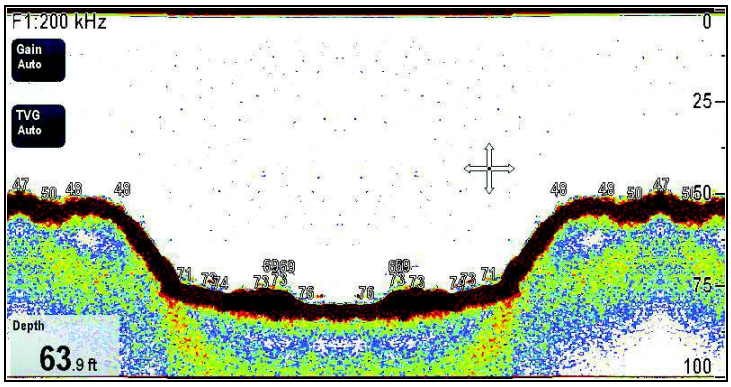
Vessel speed

The shape of the target changes along with your 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.

Target depth

The closer the target to the surface, the larger the mark on screen.

The depth of individual targets can be displayed by switching on the **Target Depth ID** in the fishfinder menu **Menu > Presentation**. The number of target depths displayed is influenced by the fish alarm sensitivity level.



Water depth

As sea depth increases signal strength decreases, resulting in a lighter on-screen image of the bottom.

Size of the target

The larger the target, the larger the return on the fishfinder display. The size of a fish target is also dependent upon the size of the fish's swim bladder rather than its overall size. The swim bladder varies in size between different breeds of fish.

Transducer frequency

The same target will appear differently when the transducer frequency is changed. The lower the frequency the broader the mark.

Clutter / Background noise

The fishfinder picture may be impaired by echoes received from floating or submerged debris, air bubbles or even the vessel's movement. This is known as 'background noise' or 'clutter' and is controlled by the gain modes. The system will automatically control the gain settings according to the depth and water conditions. You can however adjust the gain settings manually if you prefer.

Recovering lost bottom

If the seabed floor (bottom) is lost then follow the steps below to recover the bottom depth.

From the fishfinder application:

1. Ensure your vessel is in clear undisturbed water.
2. If sonar range is set to Manual, adjust the sonar range to the known, charted depth of your location. or
3. If sonar range is set to Auto then switch range to manual **Menu > Range > Adjust Range > Man** and adjust the sonar range to the known, charted depth of your location.
4. Once the sonar module has regained the bottom you can switch range mode back to Auto.

15.8 Fishfinder presets

The fishfinder provides you with four preset configurations available from the fishfinder menu. These enable you to quickly select appropriate settings tailored for various situations.

Each preset has been configured to provide the best operating parameters for the fishfinder. However, it is possible to manually adjust the presets if necessary. The four default presets are:

- **Single** — this preset provides quick access to a single-frequency configuration, suitable for general fishing conditions.
- **Dual** — this preset provides a dual frequency configuration. You can either display two different frequencies at the same time in one window, or display one frequency at full-screen on your master display and the other frequency at full-screen on an additional networked display.
- **Shallow** — this preset optimizes the fishfinder display for shallow waters.
- **Deep** — this preset optimizes the fishfinder display for deep waters.

Display modes

When using presets, you can either select the relevant preset and start using the default configuration immediately, or you can adjust and configure each presets display mode:

- Zoom
- Bottom Lock
- A-Scope

Any changes you make to a preset are retained when you switch off the power to your multifunction display.

Selecting a fishfinder preset

From the fishfinder application:

1. Select **Menu**.
2. Select **Presets**.
3. Select the required preset.

The fishfinder display will change to the new mode. This is indicated in the top left-hand corner of the status bar.

Changing fishfinder preset names

From the fishfinder application:

1. Select **Menu**.
2. Select **Set-up**.
3. Select **Rename Preset**.
4. Select the required characters.
5. Select **Save** to save the new preset name.

Resetting presets to defaults

To reset the preset settings to factory default values follow the steps below:

From the fishfinder application:

1. Select **Menu**.
2. Select **Set-up**.
3. Select **Reset Presets to Default**.
   A confirmation pop-up is displayed.
4. Select **Yes** to confirm reset, or **No** to cancel.

15.9 Dual / Single frequency fishfinder

Dual frequency operation allows the sonar to operate and display 2 frequencies simultaneously. If the preset mode that you are using has two frequencies configured, you can view either one or both of those frequencies in separate windows.

Selecting dual frequency view

From the fishfinder application:

1. Select **Menu**.
2. Select **Presets**.
3. Select **Dual**.
   The main fishfinder menu is displayed.
4. Select **View Freq**.
5. Select the required setting:
   - Frequency 1
   - Frequency 2
   - Both

15.10 Non-CHIRP (traditional) sonar module frequency controls

The frequency of the sonar determines the width of the sonar beam, the depth to which the signals will penetrate and the resolution of the image.

The frequencies supported depend upon the sonar module and transducer in use on your system.

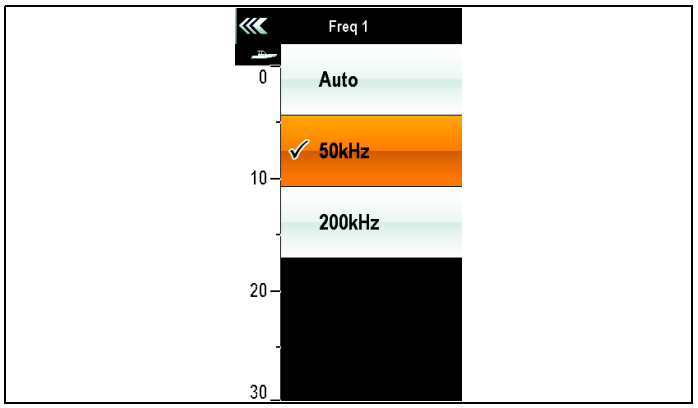
- **Auto**. When operating in automatic the system will set and the frequency automatically to suit your transducer operating conditions.
- **Lower frequencies** (e.g. 50 kHz) produce a wide sonar beam and penetrate the water well. Lower frequencies provide a lower resolution image that may not be as good at detecting small fish. Use lower frequencies if you require a large coverage beneath your vessel or if you are in deep water.
- **Higher frequencies** (e.g. 200 kHz) produce narrow beam and produce a high resolution image. They are most useful in shallower water (up to 1000 ft) and at higher speeds.

The non-CHIRP sonar module will only operate at specific frequencies defined by the connected transducer (e.g. 50 kHz or 200 kHz).

Setting the fishfinder frequency (non-CHIRP sonar module)

With the **Frequency settings** menu options you can configure **frequency 1** or **frequency 2**.

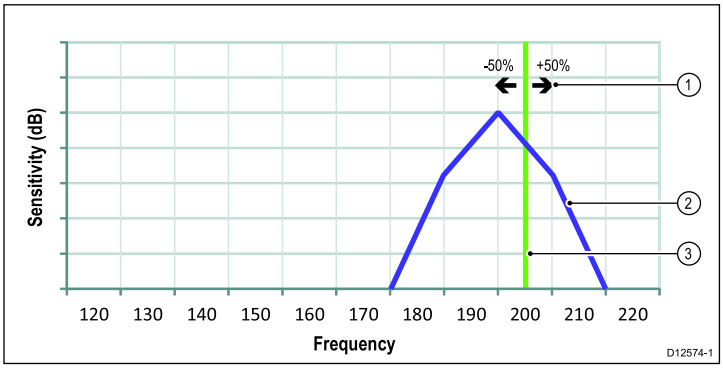
1. From the fishfinder application select **Menu**.
2. Select **Frequency settings**.
3. Select **Freq 1** or **Freq 2** as required.
4. Select the required frequency:
   Example of Frequency setting menu when connected to a non-CHIRP sonar module.



Frequency tuning (non-CHIRP sonar module)

When connected to a non-CHIRP transducer there will be an **optimum** frequency for the maximum sensitivity of the transducer. The sonar module can be fine tuned to this frequency.

Non-CHIRP sonar module frequency



1. Tuning range.
2. Transducer characteristics.
3. Operating frequency.

The graph above depicts an example of the fine tuning (from —50% to +50%) available when the frequency is set to 200 kHz.

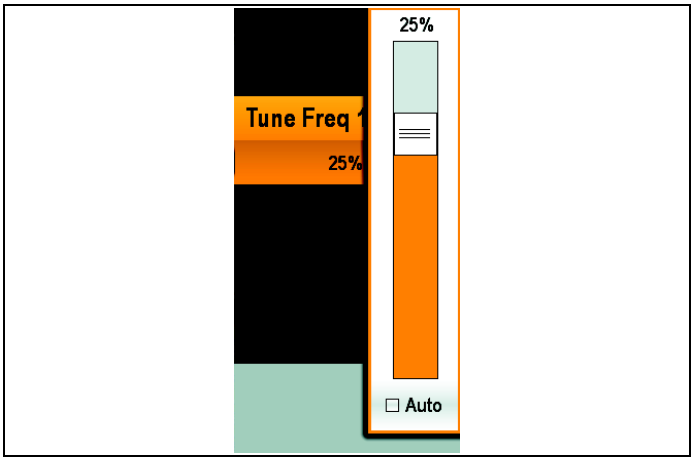
Tuning the fishfinder frequency (non-CHIRP sonar module)

When connected to a non-CHIRP sonar module you can manually tune the fishfinder frequency.

From the fishfinder application:

1. select **Menu**.
2. Select **Frequency settings**.
3. Select either **Tune Freq 1** or **Tune Freq 2** as required.

   The Tune Frequency slider bar is displayed:



4. Adjust the slider to the required value.

   the optimum frequency will be when the echo returns are the strongest on the screen.
5. Select **Back** to close the tune frequency slider bar, or
6. Select **Ok** to set the tune frequency to automatic.

15.11 CHIRP sonar module frequency controls

The frequency of the sonar determines the width of the sonar beam, the depth to which the signals will penetrate and the resolution of the image

The frequencies supported depend upon the sonar module and transducer in use on your system:

- Lower frequencies produce a wider sonar beam and penetrate the water well. A lower frequency provides a lower resolution image that may not be as good at detecting small fish. Use lower frequencies if you require a large coverage beneath your vessel or if you are in deep water.
- Higher frequencies produce narrower beam and produce a high resolution image. They are most useful in shallower water (up to 1000 ft) and at higher speeds.

The options available (dependant upon connected sonar module and transducer) are :

- **Auto**. When operating in automatic the system will select the frequency automatically to suit your transducer and operating conditions.
- **Low frequency** (e.g. 50 kHz) (non-CHIRP mode).
- **Medium frequency** (e.g. 90 kHz) (non-CHIRP mode).
- **High frequency** (e.g. 160 kHz) (non-CHIRP mode).
- **Low Chirp** (e.g. 42 to 65 kHz) (CHIRP mode).
- **Med Chirp** (e.g. 85 to 135 kHz) (CHIRP mode).
- **High Chirp** (e.g.) 130 to 210 kHz) (CHIRP mode).

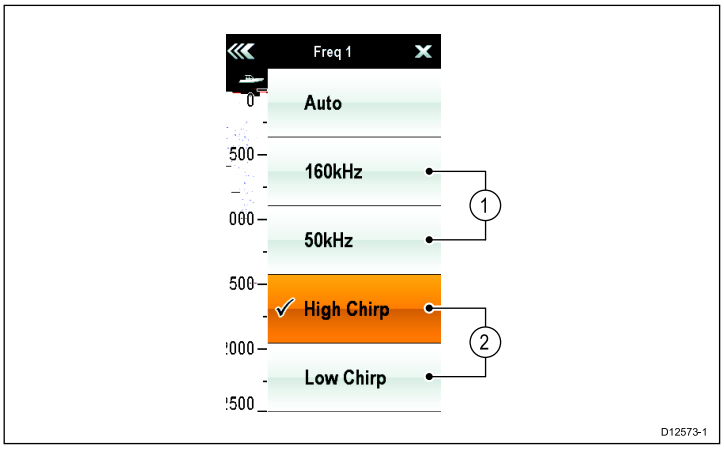
Note: If a CHIRP sonar module is connected to a (traditional) non-CHIRP transducer the CHIRP sonar module operates as a non-CHIRP sonar module.

Setting the fishfinder frequency (CHIRP sonar module)

With the **Frequency settings** menu options you can configure one or two frequencies for each of the four presets.

1. From the fishfinder application select **Menu**.
2. Select **Frequency settings**.
3. Select **Freq 1** or **Freq 2** as required.
4. Select the required frequency:

   Example of Frequency setting menu when connected to a CHIRP sonar module.



1. Non-CHIRP modes
2. CHIRP modes.

Frequency adjustment (CHIRP sonar module in non-CHIRP mode)

When using a CHIRP sonar module in CHIRP mode (Low Chirp, Med Chirp or High Chirp) the frequency cannot be adjusted. When using a CHIRP sonar module in a non-Chirp mode (e.g. 50 kHz or 160 kHz) the frequency at which the transducer is transmitting can be adjusted.

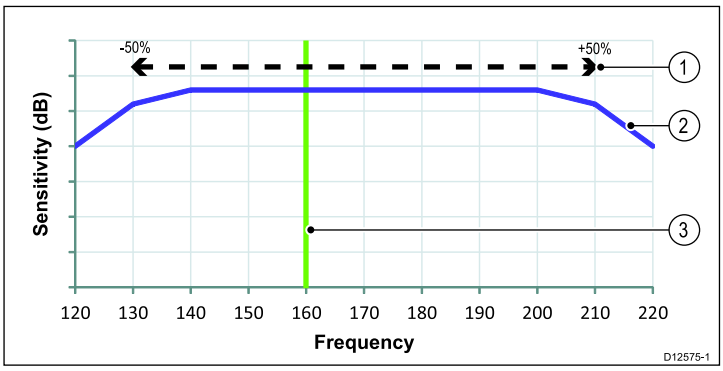
With the CHIRP sonar module set to a CHIRP mode (e.g. Low Chirp or High Chirp) the CHIRP sonar module will sweep the transducer's available frequency range in each ping.

With the CHIRP sonar module set to a non-CHIRP mode (e.g. 50 kHz or 160 kHz) the CHIRP sonar module can adjust the frequency at which the transducer is transmitting. The advantages of being able to adjust the transmit frequency include:

- Optimization for particular species of fish and water conditions.
- Avoiding interference from other sonar operating nearby (at the same frequency).
- Use of wide or narrow beam on a particular transducer.

The graph below depicts the adjustment (selection of a specific) frequency when using a CHIRP sonar set to 160 kHz.

CHIRP sonar module frequency



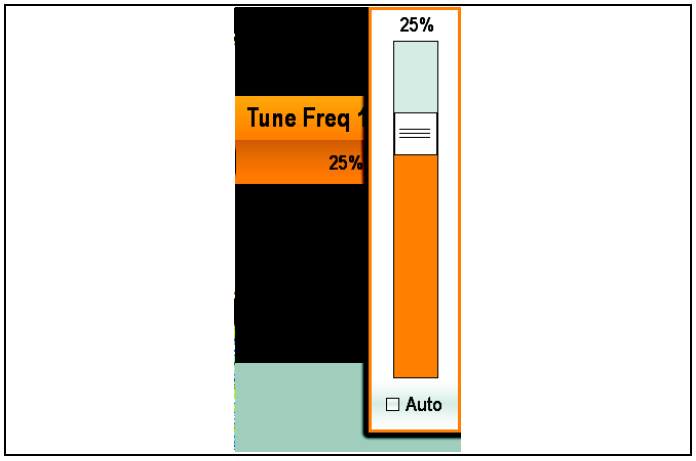
1. Frequency adjustment range.
2. Transducer characteristics.
3. Operating (center) frequency.

Adjusting the fishfinder frequency (CHIRP sonar module in non-CHIRP mode)

When connected to a CHIRP sonar module set to a non-CHIRP mode you can manually adjust the transmit frequency.

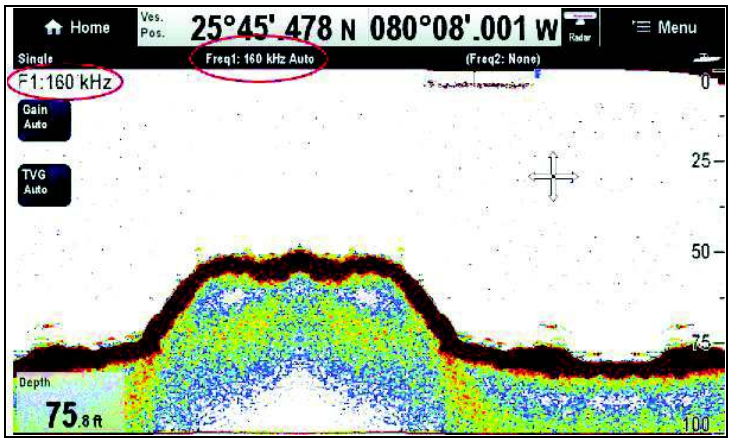
From the fishfinder application:

1. select **Menu**.
2. Select **Frequency settings**.
3. Select either **Tune Freq 1** or **Tune Freq 2** as required.
   The Frequency adjust slider bar is displayed:



4. Adjust the slider to the required value.
5. Select **Back** to close the adjust frequency slider bar, or
6. Select **Ok** to set the adjust frequency to automatic.

Note: When manually adjusting the frequency the actual frequency of operation is not displayed, the fishfinder application title bar displays the transducers center frequency.



15.12 Fishfinder display modes

Selecting a fishfinder display mode

From the fishfinder application:

1. Select **Menu**.
2. Select **Display Mode**.
3. With dual frequency preset set, select **Adjust** to select which frequency display you wish to change.

   Selecting Adjust in Dual frequency preset will switch between Frequency 1 and Frequency 2.
4. Select the **Select Mode** menu item.
5. Select the required display mode:
   - None
   - Zoom
   - Bottom Lock
   - A-Scope

Fishfinder zoom mode

The zoom display mode magnifies a region of the fishfinder screen to display more detail.

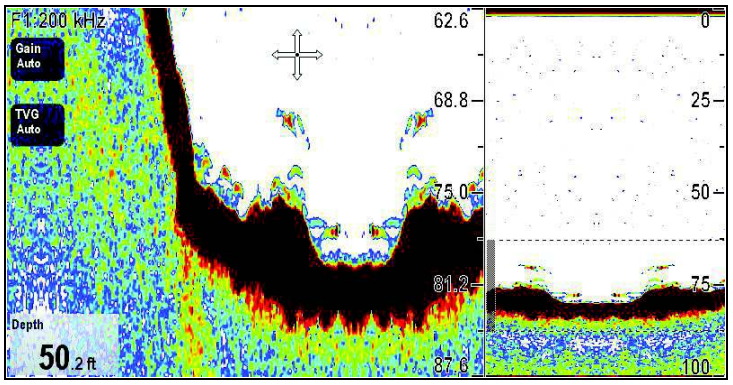
This zoom option enables you to:

- Replace the standard fishfinder image with the zoomed image, or display the zoomed image alongside the standard fishfinder image.
- Set the zoom factor to a predefined level, or adjust it manually.
- Reposition the zoomed portion of the image to a different point in the display.

When the range increases, the area shown in the zoom window also increases.

Zoom split

With the zoom display mode you can split the screen and display the zoomed image alongside the standard fishfinder image (ZOOM SPLIT). The zoomed section is indicated on the standard fishfinder screen by a zoom box.



Selecting split screen in zoom mode

From the fishfinder application, with the zoom display mode selected:

1. Select **Menu**.
2. Select **Display Mode**.
3. Select **Zoom** so that Split is highlighted.

   Selecting Zoom will switch between Split and Full.

Adjusting the fishfinder zoom factor

When the zoom function is active (Zoom Full or Zoom Split), you can either select a predefined zoom factor or adjust it manually.

From the fishfinder application, with Zoom preset selected:

1. Select **Menu**.
2. Select **Display Mode**.
3. Select **Zoom Factor**.
4. Select a preset Zoom Factor (**x2**, **x3**, **x4**) or select **Manual**

   Once selection is made you will be returned to the Display Mode menu.
5. If Manual is chosen select **Manual Zoom**

   The manual zoom factor dialog is displayed.
6. Adjust the setting to the required value.
7. Select **Back** or use the **Ok** button to confirm the setting.

Adjusting the position of the fishfinder zoomed area

When the zoom function is selected, the system automatically selects the zoom position so that the bottom details are always in the lower half of the display. If required you can reposition the portion of the image to be zoomed so that an alternative area is displayed.

From the fishfinder application, with Zoom preset selected:

1. Select **Menu**.
2. Select **Display Mode**.
3. Select **Zoom Position**.

   The zoom position menu is displayed.
4. Select **Zoom Position** .

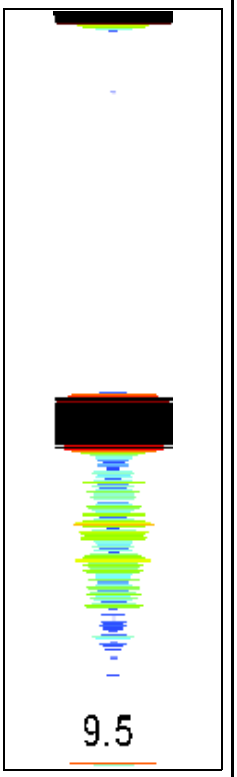
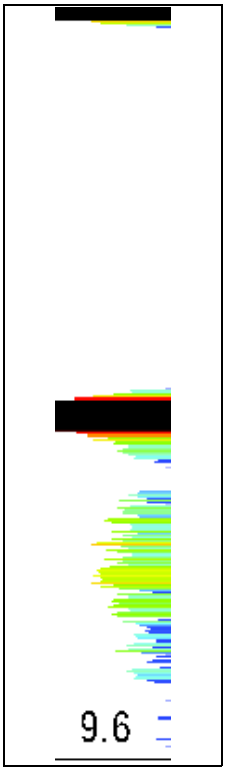
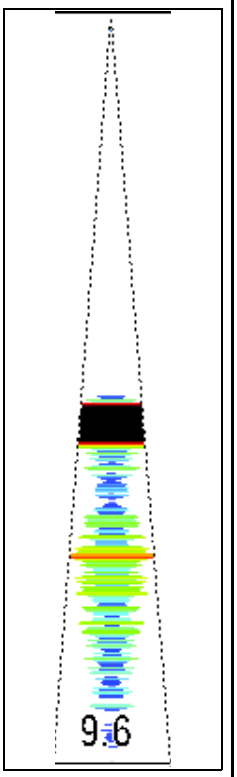
   Selecting the zoom position displays the zoom position slider bar control.
5. Adjust the setting to the required value, or select Auto to switch to automatic.

Fishfinder A-Scope mode

The A-Scope mode enables you to view a live (rather than historical) image of the seabed and fish directly below your vessel.

The standard fishfinder display shows a historical record of fishfinder echoes. If required, you can display a live image of the bottom structure and the fish directly below the transducer by using the A-Scope feature. The width of the bottom covered by the A-Scope is indicated at the bottom of the window. A-Scope provides a more precise and easier to interpret indication of the target strength.

There are three A-Scope modes:

Mode 1	Mode 2	Mode 3
		
The A-scope image is centred in the window.	The left-hand side of the Mode 1 image is expanded to give a more detailed view.	The A-scope image angles outward as signal width increases with depth.

Selecting A-Scope mode

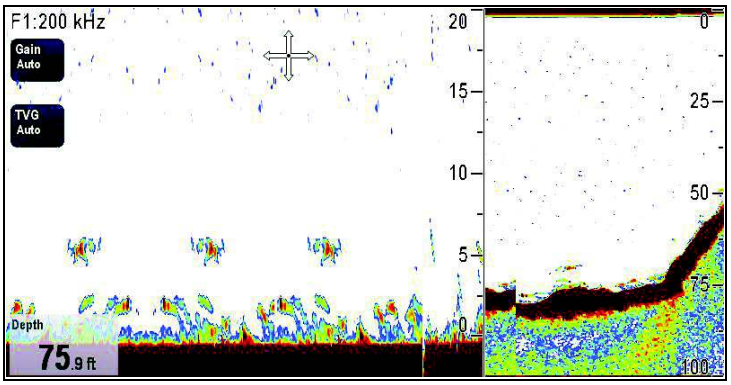
From the fishfinder application, with the A-Scope display mode selected:

1. Select **Menu**.
2. Select **Display Mode**.
3. Select **A-Scope Mode**.
4. Select **A-Scope** to display a list of A-Scope modes.
5. Select the required A-Scope mode.

Bottom Lock

The Bottom Lock function applies a filter to flatten the image of the seabed and make any objects on or just above it easier to discern. This feature is particularly useful for finding fish that feed close to the bottom.

Bottom Lock is selected for individual fishfinder windows and can replace or appear alongside the standard fishfinder image. Adjusting the range of the bottom lock image allows you to view more bottom details. You can also reposition the image on screen to anywhere between the bottom of the window (0%) and the middle of the window (50%) by using the Bottom Shift control.



Bottom Lock is selected for individual fishfinder windows and can either replace (ON) or appear alongside (SPLIT) the standard fishfinder image.

Adjusting the bottom lock range/position

From the fishfinder application, with bottom lock display mode selected:

1. Select **Menu**.
2. Select **Display Mode**.
3. Select **Bottom Lock** to switch between Full screen and Split screen
4. Select **B-Lock Range**.

   Selecting Bottom Lock Range will display the B-Lock Range dialog.
5. Adjust the B-Lock setting to the required value.
6. Select **Back** or use the **Ok** button to confirm the setting.

15.13 Fishfinder range

The Range and Range Shift functions enable you to change the range of depth displayed by the fishfinder.

Range

The Range function enables you to define the range of depth that you see in the fishfinder display.

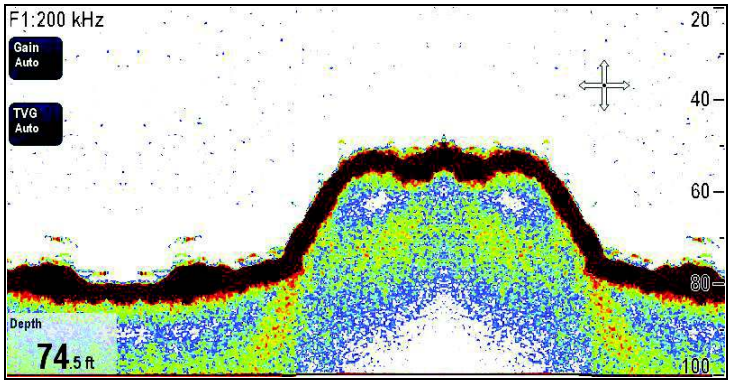
By default, the fishfinder display shows the shallowest required range, enabling you to clearly see what is near the surface of the water under your vessel. This is useful for finding smaller fish that feed nearer the surface. An example of this kind of depth range is 0 to 200 feet. In this case, the range is 200 feet, so 200 feet of water will be displayed on-screen at any one time.

There may be circumstances in which you want to see a less detailed image showing a greater amount of depth beneath your vessel. This is useful for locating bigger fish and other objects located closer to the seabed such as wrecks. An example of this kind of depth range is 0 to 1000 feet or greater. In this case, the range is 1000 feet, and you will be able to see 1000 feet of water beneath your vessel, without needing to scroll the display up or down.

Range Shift

The Range Shift function enables you to define which area of the overall depth you want to be able to see on-screen. For example, if your range is 5000 feet and the display is showing the surface (0 feet) at the very top of the display, and 5000 feet at the bottom of the display, you can use the Range Shift function to focus on a different 5000 feet range. For example, 2000 feet at the very top of the screen, and 7000 feet at the very bottom of the screen.

Example screen with range and range shift used to view the seabed at a depth range of 20–100 ft



Changing the fishfinder depth range

From the fishfinder application

You can choose from either:

- **automatic** adjustment whereby the display automatically shows the shallowest required range.
- **manual** adjustment of the depth range, up to the maximum depth displayed on the scrolling bottom and A-Scope images.

Changes to the range affect all fishfinder windows.

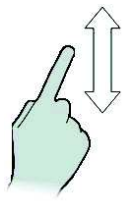
1. Select **Menu**.
2. Select **Range**.
3. Select **Range** to switch between Auto and Man.
4. With manual mode selected you can now use the **Range Controls** to adjust the depth range shown in the fishfinder application.

Note: With the **Range** menu displayed you cannot use the **Rotary Control** to range in and out. To use the **Rotary control** to range in and out, first close the **Range** menu.

Range in and out

The method of ranging in and out of the fishfinder application is dependant upon your multifunction display variant.

The table below shows the Range controls available for each display variant.

	**Rotary Control**	• New c Series • New e Series
	**Range in** and **Range out** buttons	• New c Series • New e Series (excluding e7 and e7D
	Slide the screen **Up** or **Down**	• New e Series

Using fishfinder range shift

The default setting adjusts the display to keep the seabed in the lower half of the display window. Alternatively you can shift the image within the current range. Changes to the range shift are reflected in all fishfinder windows.

From the fishfinder application, with the **Range Mode** set to Manual:

1. Select **Menu**.
2. Select **Range**.
3. Select **Range Shift**.

   The range shift dialog is displayed.
4. Adjust the setting to the require value.
5. Select the **Range Shift** menu.
6. Use the **Rotary Control** to adjust the Range Shift to the required setting.
7. Select **Back** or press the **Ok** button to confirm the setting and close the range shift dialog.

Fishfinder (dual frequency) independent range

When connected to a Raymarine CHIRP sonar module, the range for frequency 1 and frequency 2 can be changed independently or both at the same time.

Adjusting range on each frequency independently

1. Select **Menu**.
2. Select **Range**.
3. Select **Adjust**.
4. Select **Frequency 1**, **Frequency 2** or **Both**.
5. Exit the menu.
6. Use the **Range control** to change the range for the selected frequency.

Adjusting range using the touchscreen

You can adjust the range using the touchscreen.

From the fishfinder application, with the range set to manual:

1. Select an area on-screen for the frequency you want to adjust.
2. Slide your finger **Up** or **Down** to adjust the range for that frequency.

Note: Frequencies can only be adjusted independently when connected to a Raymarine CHIRP sonar module.

15.14 Fishfinder sensitivity settings

The **Sensitivity settings** menu provides access to features and functions which enhance what is displayed on screen.

Sensitivity options include:

- **Gain**
- **Gain Mode** — Only available when connected to a non-CHIRP sonar module including the internal sonar module.
- **Color Gain**
- **TVG**
- **Color Threshold**
- **Power Mode**

Sonar gain

The gain settings alter the way the sonar module processes background noise (also called clutter). Adjusting the gain settings can improve the sonar image, however for optimum performance in most conditions, we recommend that you use the auto settings.

The gain adjusts the return threshold (echo strength) above which the fishfinder will show an object on the screen.

There are two gain modes:

- Auto
- Manual

Auto

In Auto mode, the sonar module automatically adjusts the gain setting to suit current conditions. Any adjustments made apply to all fishfinder windows using that particular frequency.

For Raymarine sonar modules which do not have CHIRP capabilities there are three Auto modes, each suited to different scenarios:

- **Cruising (Low)** is ideal for viewing fishfinder images with a minimum of background noise as you are cruising to your fishing spot. Only the strongest echoes are displayed.
- **Trolling (Medium)** is a slightly higher gain setting that displays more detail. This is the default mode.
- **Fishing (High)** provides the most detail, but also displays the most background noise and surface clutter.

Manual

If necessary you can set the gain controls manually, between a value of 0% to 100%. This value should be set high enough to see fish and bottom detail but without too much background noise. Generally a high gain is used in deep and/or clear water; a low gain in shallow and/or murky water.

The new values remain set even when you switch off the display, they are applied to both the active window and any other fishfinder windows with the same frequency.

Selecting the frequency for gain adjustments

When connected to a Raymarine CHIRP sonar module, the gain for frequency 1 and frequency 2 can be changed independently or both at the same time. If connected to a non-CHIRP sonar module adjustments will be made to both frequencies simultaneously.

From the fishfinder application:

1. Select **Menu**.
2. Select **Sensitivity Settings**.
3. Select **Gain**.
4. Select **Adjust**.
5. Select **Frequency 1**, **Frequency 2** or **Both**.

Adjusting fishfinder gain using the menu

The fishfinder gain setting can be accessed from the fishfinder menu.

From the fishfinder application:

1. Select **Menu**.
2. Select **Sensitivity Settings**.
3. Select **Gain**.

   The Gain adjust dialog is displayed
4. Adjust the gain control to the required setting, or

5. Select **Auto**.
   A tick is displayed in the **Auto** box to signify automatic gain is enabled.

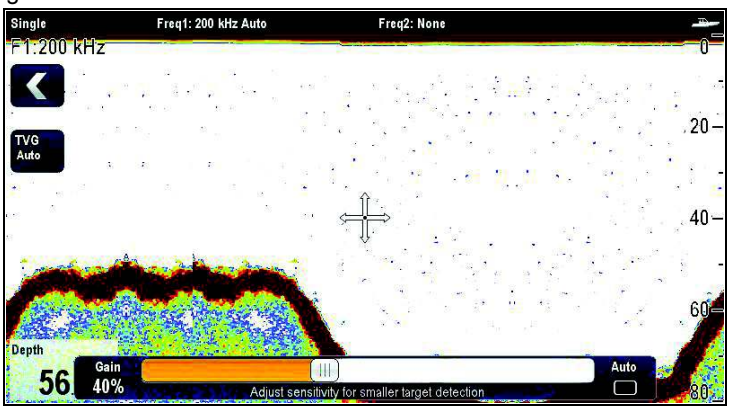
Setting the auto gain mode for non-CHIRP sonar modules

When using a non-CHIRP sonar module, from the fishfinder application:

1. Select **Menu**.
2. Select **Sensitivity Settings**.
3. Select **Gain Mode**.
   A list of available auto gain modes is displayed:
   - Cruising (Low)
   - Trolling (Med)
   - Fishing (High)
4. Select the required auto gain mode.

Fishfinder gain on-screen controls

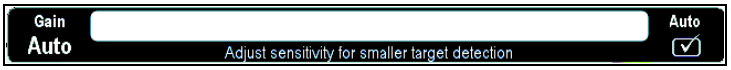
Touchscreen multifunction displays provide on-screen access to the gain controls.



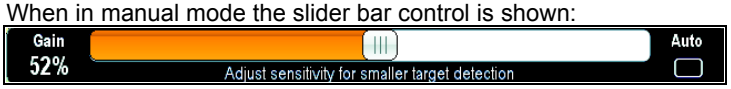
Selecting the on-screen gain control will display the gain settings:

When connected to a non-CHIRP sonar module the automatic gain has 3 modes:

When connected to a CHIRP sonar module no automatic gain modes are required:



When in manual mode the slider bar control is shown:



Note: New c Series gain controls are accessed by the menu options: **Menu > Sensitivity Settings > Gain**.

Enabling and disabling on-screen gain controls

You can enable and disable the on-screen gain controls by following the steps below.

On a touchscreen multifunction display, with the relevant application displayed.

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Gain Controls**.
   Select Gain Controls will switch between showing and hiding the on-screen controls.

Adjusting fishfinder gain manually using on-screen controls

Touchscreen multifunction displays provide on-screen access to the gain controls.

1. Select the on-screen **Gain** control located on the left hand side of the fishfinder application.
2. Select the **Auto** box to switch between Auto and Manual gain.
3. With **Auto** deselected, select and hold the **Slider** and move **Left** to decrease value or **Right** to increase value.

Setting auto gain using the on-screen controls

Touchscreen multifunction displays provide on-screen access to the gain controls.

1. Select the on-screen **Gain** control located on the left hand side of the fishfinder application.
2. Select the **Auto** box to select Auto gain mode.
3. When connected to a non-CHIRP sonar module you can select the Auto gain mode:
   - Cruising
   - Trolling
   - Fishing

Fishfinder color gain

You can adjust the color gain to change the signal strength threshold for the strongest color in your fishfinder display.

Color gain sets the lower limit for the strongest echo color. All echoes with a signal strength above this value are displayed in the strongest color. Those with a weaker value are divided equally between the remaining colors.

- Setting a low value produces wide band for the weakest color, but a small signal band for the other colors.
- Setting a high value gives a wide band for the strongest color, but a small signal band for the other colors.

There are two color gain modes:

- **Auto** — In Auto mode the color gain setting is automatically adjusted to suit current conditions. Any adjustments made apply to all fishfinder windows.
- **Manual** — You can set the color gain manually, between a value of 0% to 100%.

Adjusting the fishfinder color gain

From the fishfinder application:

1. Select **Menu**.
2. Select **Sensitivity settings**.
3. Select **Color Gain**.
   The color gain slider bar control is displayed.
4. Adjust the control to the required value.
5. Select **Back** to confirm setting and close slider bar, or
6. Select **Auto** to enable automatic color gain.

The new values remain set even when you switch off the display and are applied to all fishfinder windows.

Fishfinder TVG (Time Varied Gain)

The Time Varied Gain (TVG) function reduces the amount of clutter in the fishfinder display by varying the gain throughout the column of water. This function is useful for reducing the appearance of ‘noise’.

The operation of the TVG settings is dependant upon the connected sonar module.

Non-CHIRP sonar modules

- Increasing the TVG value increases the maximum depth to which TVG is applied. A high value decreases the gain in shallow water so that only the strongest echoes are displayed.
- Decreasing the TVG value reduces the maximum depth. A low TVG value has little effect on gain in shallow water.

TVG adjustment can be made automatically or manually.

CHIRP sonar modules

- A high value increases the gain in shallow water so that more targets are displayed.
- A low value reduces the gain in shallow water so that less clutter is displayed

TVG adjustment can be made automatically or manually.

TVG Presets and auto settings

When connected to a Raymarine CHIRP sonar module 3 preset TVG options are available:

- Low

- Medium
- High

When connected to a Raymarine sonar module without CHIRP capabilities an automatic setting is available:

- Auto

Selecting the frequency for TVG adjustments

When connected to a Raymarine CHIRP sonar module, the TVG for frequency 1 and frequency 2 can be changed independently or both at the same time. If connected to a non-CHIRP sonar module adjustments will be made to both frequencies simultaneously.

From the fishfinder application:

1. Select **Menu**.
2. Select **Sensitivity Settings**.
3. Select **TVG**.
4. Select **Adjust**.
5. Select **Frequency 1**, **Frequency 2** or **Both**.

Selecting a preset TVG setting

TVG preset options are only available when connected to a Raymarine CHIRP sonar module.

With TVG set to Auto, from the fishfinder application:

1. Select **Menu**.
2. Select **Sensitivity Settings**.
3. Select **TVG**.
4. Select **TVG Mode**.
5. Select the required setting: Low, Medium or High.

Selecting the TVG Auto setting

The Auto setting for TVG is only available on Raymarine non-CHIRP sonar modules.

From the fishfinder application:

1. Select **Menu**.
2. Select **Sensitivity Settings**.
3. Select **TVG**.
   The TVG slider bar control is displayed.
4. Select **Auto** so that a tick is placed in the auto box.

Manually adjusting the fishfinder TVG

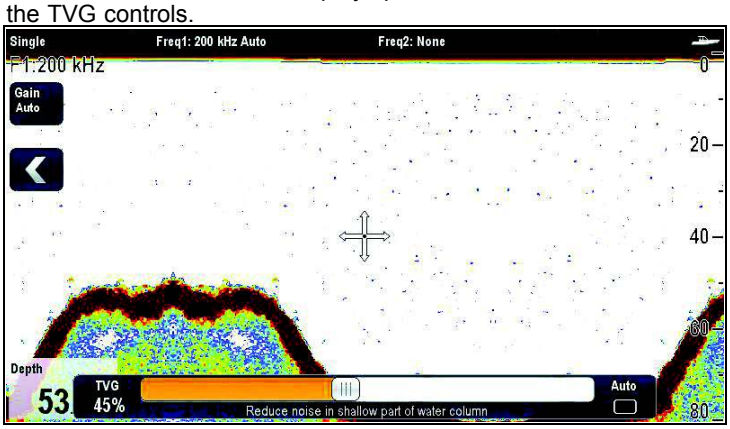
From the fishfinder application:

1. Select **Menu**.
2. Select **Sensitivity Settings**.
3. Select **TVG**.
   The TVG slider bar control is displayed.
4. Select **Auto** so that the tick is removed from the Auto box.
5. Adjust the slider bar control to the required setting.
6. Select Back to confirm setting and close slider bar control.

Note: TVG has no effect in fishfinder simulator mode.

TVG on-screen controls

Touchscreen multifunction displays provide on-screen access to the TVG controls.

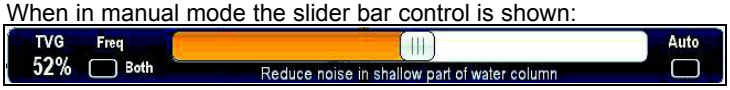


Selecting the on-screen TVG control will display the TVG settings:

CHIRP controls

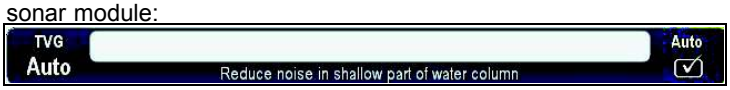
When connected to a CHIRP sonar module the automatic TVG has 3 modes:

When in manual mode the slider bar control is shown:

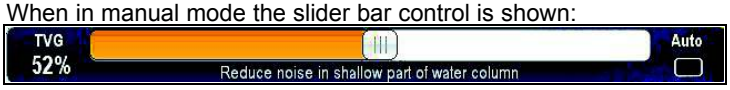


Non-CHIRP controls

TVG auto modes are not available when connected to a non-CHIRP sonar module:



When in manual mode the slider bar control is shown:



Note: New c Series TVG controls are accessed by the menu options: **Menu > Sensitivity Settings > TVG**.

Enabling and disabling on-screen gain controls

You can enable and disable the on-screen gain controls by following the steps below.

On a touchscreen multifunction display, with the relevant application displayed.

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Gain Controls**.
   Select Gain Controls will switch between showing and hiding the on-screen controls.

Setting the frequency for TVG using the on-screen controls

When connected to a Raymarine CHIRP sonar module, the TVG for frequency 1 and frequency 2 can be changed independently or both at the same time.

1. Select the on-screen **TVG** control located on the left hand side of the fishfinder application.
2. Select the **Freq** box so that a tick is placed in the box to adjust both frequencies at the same time, or
3. Select a frequency on-screen so that the window is highlighted, adjustments will then only be made to the selected frequency.

Adjusting fishfinder TVG manually using on-screen controls

Touchscreen multifunction displays provide on-screen access to the TVG controls.

1. Select the on-screen **TVG** control located on the left hand side of the fishfinder application.
2. Select the **Auto** box to switch between Auto and Manual TVG.
3. With **Auto** deselected, select and hold the **Slider** and move **Left** to decrease value or **Right** to increase value.

Setting auto TVG using the on-screen controls

Touchscreen multifunction displays provide on-screen access to the TVG controls.

1. Select the on-screen **TVG** control located on the left hand side of the fishfinder application.
2. Select the **Auto** box to select Auto TVG mode.
3. When connected to a CHIRP sonar module you can select the Auto TVG mode:
   - Low
   - Medium
   - High

Fishfinder color threshold

The color threshold setting determines the range of colors used on screen. The effect of this is to set a color threshold below which targets are not shown. For example a low setting would result in only the strongest (orange and red) targets being displayed.

Adjusting the fishfinder color threshold

From the fishfinder application:

1. Select **Menu**.

2. Select **Sensitivity Settings**.
3. Select **Color Threshold**.
   Selecting color threshold displays the numeric adjust control.
4. Adjust the color threshold to the required setting.
5. Select **Ok** to confirm setting and close the numeric adjust control.

Fishfinder power

The power setting controls the power level of the transducer.

Power options:

- **Auto**. This is the default setting. When it is selected the sonar module automatically determines the required power setting based on the current depth, speed, and (bottom) signal strength. .
- **Manual**. If you wish to manually adjust the power to suit current conditions, you can adjust the power level between 0% and 100%, in 10% increments. Lower power levels are normally used in depth ranges less than 8 ft. (2.4 m) and higher power levels are typically selected for depths greater than 12 ft. (3.7 m).

Setting the frequency for power mode

When connected to a Raymarine CHIRP sonar module, the power mode for frequency 1 and frequency 2 can be changed independently or both at the same time. If connected to a non-CHIRP sonar module adjustments will be made to both frequencies simultaneously.

1. Select **Menu**.
2. Select **Sensitivity Settings**.
3. Select **Power Mode**.
4. Select **Adjust**.
5. Select **Frequency 1**, **Frequency 2** or **Both**.

Adjusting the fishfinder power

From the fishfinder application:

1. Select **Menu**.
2. Select **Sensitivity settings**.
3. Select **Power Mode**.
   The power mode slider bar control is displayed.
4. Adjust the slider bar to the required setting, or
5. Select **Auto** to place power mode into automatic.

The new values remain set even when you switch off the display and are applied to all fishfinder windows.

15.15 Fishfinder presentation options

The **Presentation** menu gives you access to features and functions which provide additional on-screen functionality.

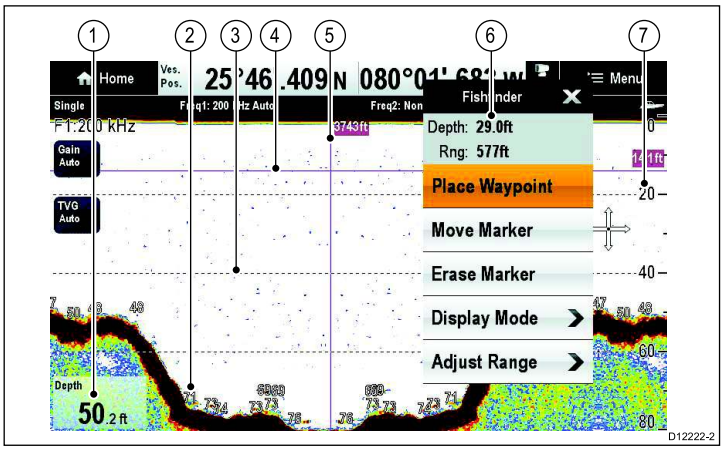
Presentation options include:

Menu Item	Description	Options
Target Depth ID	Controls whether the depth of identified targets are displayed. The level of targets displayed is directly linked to the level of Fish Alarm sensitivity.	• On • Off
Depth Lines	Controls whether horizontal lines indicating depth are displayed.	• On • Off
White Lines	When set to On, this option displays a white line along the contour of the seabed. This helps to distinguish objects close to the bottom.	• On • Off
Bottom Fill	When set to On, this option displays a solid color fill for the seabed.	• On • Off
Color Palette	Various color palettes are available to suit different conditions and your personal preference.	• Classic Blue • Classic Black • Classic White • Sunburst • Greyscale • Inverse Greyscale • Copper • Night Vision
Ping Rate	Hyper Ping is a fishfinder setting for use when travelling at high speed in shallow waters. When set to Hyper the display will provide an accurate, undistorted image of the bottom at speeds of up to 40 kt. **Note:** The ping rate option is not available when connected to a Raymarine CHIRP sonar module.	• Normal • Hyper
Scroll Speed	Specify the fishfinder scroll speed.	• 10% — 100%
Gain controls	Controls whether or not the on-screen Gain and TVG controls are shown or not **Note:** Gain controls setting is only available on touchscreen multifunction displays.	• Show (default) • Hide
Data Overlay Set-up	Allows you to set up and display/hide up to 2 data cells in the bottom left corner of the screen: • Data Cell 1	**Data Cell 1** • On • Off **Select Data Category**

Menu Item	Description	Options
	• Select Data Category • Data Cell 2 • Select Data Category	Allows selection of a data type by category. **Data Cell 2** • On • Off **Select Data Category** Allows selection of a data type by category.

15.16 Depth and distance with the fishfinder

The fishfinder display provides a number of features to help you determine depths and distances. These features are illustrated and described in more detail below:



Item	Description
1	**Depth reading** — current depth of seabed.
2	**Depth Target ID** — depths are displayed against recognized targets. The sensitivity of these IDs is directly linked to the Fish Alarm sensitivity; the greater the fish alarm sensitivity, the greater the number of labelled returns.
3	**Depth lines** — horizontal dashed lines drawn at regular intervals to indicate the depth from the surface.
4	**Horizontal VRM marker** — indicates the depth of the target.
5	**Vertical VRM marker** — indicates the distance behind your vessel.
6	**Cursor Depth** — this is the depth of the cursor position.
7	**Depth markers** — these numbers indicate depth.

Measuring depth and distance with VRM

You can use a Variable Range Marker (VRM) to determine an object's depth and distance behind your vessel. These markers consist of a horizontal (depth) line and a vertical (distance) line, each of which are labelled with the appropriate measurement.

From the fishfinder application:

1. Select **Menu**
2. Select **Scroll** so that Pause is highlighted (This may make it easier to position the marker).

   Selecting Scroll will switch the scroll between Pause and Resume.
3. Open the **fishfinder context menu**.
4. Select **Place Marker**.
5. Select the location you want to place the marker.

Note: Once placed you can move the marker by selecting **Move Marker** from the fishfinder context menu.

Fishfinder marker context menu

The fishfinder marker includes a context menu which provides marker information and menu items.

The context menu provides data for the position of the marker:

- Depth
- Range

The context menu also provides the following menu items:

- **Place Waypoint**
- **Move Marker**
- **Erase Marker**
- **Display Mode**
- **Adjust Range**

Accessing the context menu

You can access the context menu by following the steps below.

1. New e Series or New c Series:
   i. Selecting a location, object or target on-screen and pressing the **Ok** button.
2. Touchscreen multifunction displays:
   i. Selecting an object or target on-screen.
   ii. Selecting and holding on a location on-screen.

15.17 Fishfinder scrolling

The fishfinder image scrolls from right to left. You can pause the scrolling or adjust the scroll speed, to ease placing of waypoints or VRMs on-screen.

Scroll speed

You can adjust the speed at which the fishfinder image scrolls. A faster speed provides more detail which may be useful when you are looking for fish. If you select a slower speed the information remains on the display for longer.

Scroll pause

You can pause the display to see a 'snapshot' of the fishfinder image. When the image is paused scrolling stops but the depth indication continues to be updated. Scroll pause/resume affects the currently selected fishfinder frequency.

If you are in dual frequency mode, you can pause one frequency while the other continues to scroll. This allows you to inspect a paused image while the other frequency continues to scroll and detect fish.

Note: Scrolling will resume if the frequency changes. For example an automatic change of frequency resulting from a change in depth.

Adjusting the fishfinder scrolling speed

From the fishfinder application:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Scroll Speed**.
   The Scroll speed numeric adjust control is displayed.
4. Adjust the value to the required setting.
5. Select **Ok** to confirm and close the numeric adjust control.

Pausing the fishfinder scrolling image

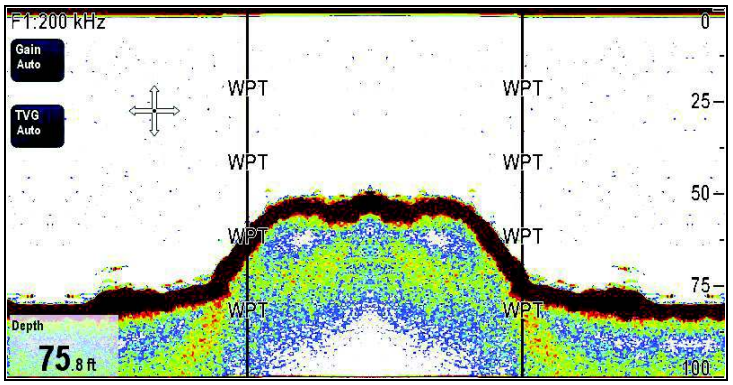
From the fishfinder application:

1. Select **Menu**.
2. Select **Scroll** so that Pause is highlighted.
   Selecting Scroll will switch between Scroll Pause/Resume.

15.18 Fishfinder waypoints

Placing a waypoint on the fishfinder display enables you to mark a position so that you can return to it later.

When a waypoint is placed, its details are added to the waypoint list and a vertical line labelled WPT is displayed on-screen. The waypoints can then be navigated to using the chart application.



Placing a Waypoint in the fishfinder application

From the fishfinder application:

1. Select and hold the required location.
   The fishfinder context menu is displayed.
2. Select **Place Waypoint**.

Placing a waypoint using the WPT button or icon

From the fishfinder application:

1. Select **WPT**.
   The waypoint menu is displayed.
2. Whilst the waypoint menu is open:
   - Select **WPT** again to place a waypoint at your vessels position, or
   - Select the appropriate option: Place Waypoint At Vessel, Place Waypoint At Cursor or Place Waypoint At Lat/lon.

Placing a Waypoint using the context menu

You can place a waypoint in the fishfinder application using the context menu.

1. Open the **fishfinder context menu**.
2. Select **Place Waypoint**.
   The Waypoint is placed at the cursors location and a confirmation pop-up is displayed.
3. Select **Ok** to confirm waypoint placement, or
4. Select **Edit** to edit the new waypoints details.

15.19 Fishfinder alarms

The display can be configured to provide a number of fishfinder alarms.

The following fishfinder alarms can be set when a sonar module is detected, or when the simulator is on:

- **Fish** — alarm sounds when a target meets the specified sensitivity level and, is within the depth limits (if enabled). The greater the fish alarm sensitivity, the greater the number of target image depths displayed.
- **Fishfinder Deep** — alarm sounds when the sonar module detects that the depth is greater than the deep limit.
- **Fishfinder Shallow** — alarm sounds when the sonar module detects that the depth is less than the shallow limit.

Setting up fish alarms

From the Alarms menu **homescreen > Set-up > Alarms**:

1. Select **Fish**.
   The Fish alarms menu is displayed.
2. Select **Fish** so that On is highlighted.
3. Select **Fish Sensitivity**.
   The fish sensitivity numeric adjust control is displayed.
4. Adjust the fish sensitivity to the require value.
   The greater the fish alarm sensitivity, the greater the number of target image depths displayed.
5. Select **Fish Depth Limits** so that **On** is highlighted.
   The shallow and deep fish limit settings will be activated in the menu.
6. Select **Shallow Fish Limit**.
   The shallow fish limit numeric adjust control is displayed.
7. Adjust the value to the require setting.
8. Select **Ok** to confirm the new value and close the numeric adjust control.
9. Select **Deep Fish Limit**.
   The deep fish limit numeric adjust control is displayed.
10. Adjust the value to the require setting.
11. Select **Ok** to confirm the new value and close the numeric adjust control.

Setting up fishfinder deep alarm

From the Alarms menu **homescreen > Set-up > Alarms**:

1. Select **Fishfinder Deep**.
2. Select Deep so that On is highlighted.
   Selecting Deep will switch between On and Off.
3. Select **Deep Limit**.
   The deep limit numeric adjust control is displayed.
4. Adjust the setting to the required value.
5. Select **Ok** to confirm the new value and close the numeric adjust control.

Note: The Deep Limit cannot be set to less than the Shallow Limit.

Setting up fishfinder shallow alarm

From the Alarms menu **homescreen > Set-up > Alarms**:

1. Select **Fishfinder Shallow**.
2. Select Shallow so that On is highlighted.
   Selecting Shallow will switch between On and Off.
3. Select **Shallow Limit**.
   The shallow limit numeric adjust control is displayed.
4. Adjust the setting to the required value.
5. Select **Ok** to confirm the new value and close the numeric adjust control.

Note: The Shallow Limit cannot be set to greater than the Deep Limit.

15.20 Sounder set–up menu options

This section describes the settings you can change using the sounder set up menu: (**Menu > Set-up > Sounder Set-up**). The set up menu contains settings that are likely to be changed infrequently.

Menu Item	Description	Options
Internal Sounder	Switch the built in sonar on and off, for use when you have more than one multifunction display with internal sonar. **Note:** Disabled on non-sonar variants. **Note:** Must be set to Off if an external sonar is connected.	• On • Off
Ping Rate Limit	Provides a speed limiter; it is useful to adjust the ping rate to suit local conditions. For example, the ping rate may be too fast when there is a hard bottom in shallow water. The internal sonar reverts to 26 pings per second when the sonar module is powered off. **Note:** Ping rate limit is disabled if Ping rate is set to hyper in the presentation menu.	• Internal sonar: 5 — 50 pings per second • CHIRP sonar: 5 — 80 pings per second
Ping Enable	The sonar ping is normally enabled. It can be disabled. This is useful when other equipment is being tested, or if someone is diving beneath the boat. This setting reverts to Enabled when the sonar module is powered off.	• On • Off
Interference rejection	Removes spikes caused by other fishfinder-equipped vessels. **Note:** Interference rejection will be disabled in Hyper Ping mode	• Auto • Low • Medium • High
2nd Echo IR	Adjusts the ping rate in small increments, according to the 2nd echo level. This results in better sensitivity of the image. **Note:** 2nd Echo IR will be disabled in Hyper Ping mode	• Off • Low • High
Sonar reset	Restore all settings on the sonar module to factory default. When performing a sonar Reset, it is normal to briefly loose connection with the sonar module.	• Yes • No
Trip Counter Reset	Resets the Trip Counter of the sonar module	• Yes • No

15.21 Transducer set-up menu options

The **Transducer Set-up** menu should be used when setting up your multifunction display for the first time or when installing a depth transducer.

Menu Item	Description	Options
Transducer	Select the appropriate transducer type from those displayed. Some transducer may be detected by the system automatically.	Options available are dependant on the sonar module connected.
Speed Transducer	Select the appropriate speed transducer from those available. This option is only available if you are not using a combined Depth/Speed or Depth/Speed/Temperature transducer.	Options available are dependant on the sonar module connected.
Depth Offset (waterline)	Offset represents the depth of the transducer (relative to the waterline).	• –9.9 to +9.9 feet — or equivalent units
Speed Offset	Offset applied to the speed log.	• 0 to 100%
Temperature Offset	Offset applied to the temperature transducer value.	• –9.9 to +9.9 °F — or equivalent units

Fishfinder Transducer Calibration

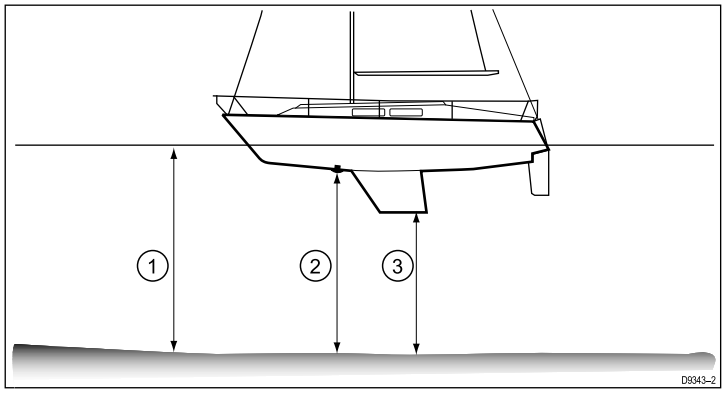
Your fishfinder transducer must be calibrated correctly to achieve accurate depth readings.

The multifunction display receives the image from a sonar module which processes sonar signals from a transducer mounted in the water. If the transducer is equipped with a speed paddle wheel and temperature-sensing thermistor, the sonar module calculates speed and temperature. To ensure accurate readings, it may be necessary to calibrate the transducer(s) by applying offsets to depth, speed and temperature. As these settings are held in the sonar module and relate to the transducer, they are applied system-wide.

Depth Offset

Depths are measured from the transducer to the sea bed, but you can apply an offset value to the depth data, so that the displayed depth reading represents the depth to the sea bed from either the keel or the water-line.

Before attempting to set a waterline or keel offset, find out the vertical separation between the transducer and either the waterline or the bottom of the keel on your vessel, as appropriate. Then set the appropriate depth offset value.



1	Waterline offset
2	Transducer / Zero offset
3	Keel offset

If an offset is not applied, displayed depth readings represent the distance from the transducer to the sea bed.

Setting the depth offset

From the fishfinder application:

1. Select **Menu**.
2. Select **Set-up**.
3. Select **Transducer Set-up**.
4. Select **Depth Offset**.
   The depth offset numeric adjust control is displayed.
5. Adjust the offset to the required value.
6. Select **Ok** to confirm setting and close the numeric adjust control.

Setting the speed offset

From the fishfinder application:

1. Select **Menu**.
2. Select **Set-up**.
3. Select **Transducer Set-up**.
4. Select **Speed Offset**.
   The speed offset numeric adjust control is displayed.
5. Adjust the offset to the required value.
6. Select **Ok** to confirm setting and close the numeric adjust control.

Setting the Temperature offset

1. Select **Menu**.
2. Select **Set-up**.
3. Select **Transducer Set-up**.
4. Select **Temperature Offset**.
   The temperature offset numeric adjust control is displayed.
5. Adjust the offset to the required value.
6. Select **Ok** to confirm setting and close the numeric adjust control.

15.22 Resetting the sonar

The reset function restores the unit to its factory default values.

Note: Performing a factory reset will clear speed and temperature calibration settings and the depth offset.

1. Using a compatible Raymarine multifunction display go to the Fishfinder application page.
2. Select **Menu** from the side menu.
3. Select **Set-up**.
4. Select **Sounder Set-up**.
5. Select **Sonar reset**.
6. Select **Yes** to confirm.

The unit will now be reset to factory default settings.

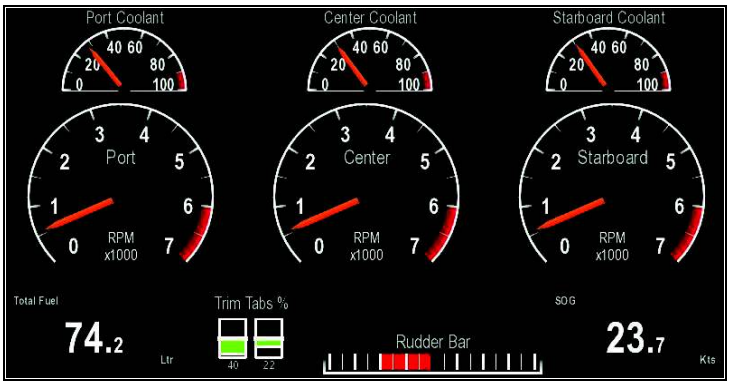
Chapter 16: Using the data application

Chapter contents

16.1 Data application overview

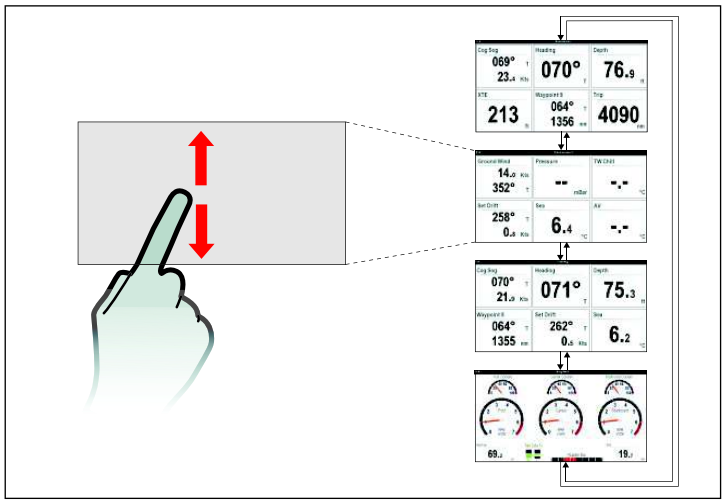
The data application displays system and instrument data on your multifunction display.

The data application enables you to view numeric data generated by the system. It also shows data from instruments connected to your multifunction display using the NMEA or SeaTalkng protocols.



Selecting datapages

You can scroll through pre-configured and custom datapages using the touchscreen.



From the data application:

1. Touch the screen.
2. Slide your finger up and let go of the screen to go to the next datapage.
3. Slide your finger down and let go of the screen to go to the previous datapage.

Selecting datapages

To select datapages using a non-touch multifunction display follow the steps below.

From the data application:

1. Move the **Joystick Down** to goto the next page, or
2. Move the **Joystick Up** to goto the previous page.

16.2 Pre-configured datapages

By default, a pre-configured range of data is displayed in a number of datapages. Each datapage consists of a number of 'cells', each containing a different item of data.

Note: The datapages available, by default are dependant upon the type of vessel selected during the initial set up wizard and the number of engines selected in the data application menu.

Default page data items

Datapage	a65 / a67 / e7 / e7D	e95 / e97 / c95 / c97 / e125 / e127 / c125 / c127 / e165
Navigation panel	• COG & SOG • Heading • Depth • Cross Track error (XTE) • Waypoint . Goto Info • Trip	• Rolling road • COG & SOG • Heading • Depth • Waypoint Info
Environ-mental panel	• GWS & GWD • Pressure • True Wind Chill • Set & Drift • Sea Temperature • Air Temperature	• GWS & GWD • Pressure • True Wind Chill • AWA & AWS • Set & Drift • Sea Temperature • Air Temperature • Humidity
Sailing panel	• COG & SOG • Heading • Depth • AWS & AWA • VMG Wind • VMG wpt	• COG & SOG • Compass • Depth • Speed through water • AWS & AWA • VMG Wind • VMG wpt • TWS & TWA
Fishing panel	• COG & SOG • Heading • Depth • Waypoint / Goto Info • Set & Drift • Sea Temperature	• COG & SOG • Heading • Depth • Live well • Waypoint / Goto Info • Set & Drift • Sea Temperature • Local time
Engine (Number of engines = 1)	• Oil Pressure • Engine RPM • Coolant Temperature • Total Fuel • Rudder • SOG	

Datapage	a65 / a67 / e7 / e7D	e95 / e97 / c95 / c97 / e125 / e127 / c125 / c127 / e165
Engine (Number of engines = 2)	• Port Oil Pressure • Port Coolant temperature • Port RPM • Trim tabs • Starboard Oil Pressure • Starboard Coolant temperature • Starboard RPM • Total Fuel • Rudder • SOG	
Engine (Number of engines = 3)	• Port Coolant temperature • Port RPM • Center Coolant temperature • Center RPM • Starboard Coolant temperature • Starboard RPM • Total Fuel • Trim tabs • Rudder • SOG	
Engine (Number of engines = 4)	• Port RPM • Center Port RPM • Center Starboard RPM • Starboard RPM • Engine economy total • Total fuel • Port Coolant temperature • Center Port Coolant temperature • Center Starboard Coolant temperature • Starboard Coolant temperature	
Engine (Number of engines = 5)	• Port RPM • Center RPM • Starboard RPM • Center Port RPM • Center Starboard RPM • Rudder	

Datapage	a65 / a67 / e7 / e7D	e95 / e97 / c95 / c97 / e125 / e127 / c125 / c127 / e165
Fuel	• Port Coolant temperature • Port Oil Pressure • Port Fuel remaining • Starboard Coolant temperature • Starboard Oil Pressure • Starboard Fuel remaining • Port RPM • Port alternator • Starboard RPM • Starboard alternator **Note:** The data shown on the fuel page may vary depending on how many engines your system has configured.	
Rolling road	Rolling road	

Note: Datapage selection is a local setting, and therefore only affects the individual display that you are currently using. It does not affect any networked displays.

16.3 Customizing the data application

You can customize the data application to show the system and instrument data that you require.

In addition to displaying the default, pre-configured datapages in the data application, you can also:

- Change the order datapages appear.
- Customize datapages content to your specific requirements.
- Rename the datapages.
- Add new custom datapages.
- Delete existing datapages.
- Set the number of engines your vessel has (1 to 5).
- Set the maximum engine RPM range.
- Change page color theme and dial color.
- Reset all pages to default.

Changing datapage order

You can change the order that datapages appear.

From the data application:

1. Scroll to the datapage you want to move.
2. Select **Menu**.
3. Select **Edit Page**.

   The edit page menu is displayed.
4. Select **Move Page Up** or **Move Page Down**.

   Each time move page up or move page down is selected the datapage will be moved 1 space up or down in the data application.

Customizing datapage content

From the data application:

1. Select **Menu**.
2. Select **Edit Page**.
3. Select the cell you want to change.
4. Select **Select Data Category**.
5. Select a data category.

   Selecting a data category will display a list of data items for that category.
6. Select the data item you want to display.

   Once selected a tick will be placed next to the data item in the menu and the cell on screen will display the new data item
7. Repeat steps 3 to 6 for all the data items you want to change.

List of data items

Depending on connected devices the categories of data available to display in the data application, data overlay, databar, and expanded databar are shown below.

The following table shows the data items available by category.

Data Category	Description	Data Item	Digital	Dial	Graphical
Boat	Types of data generated by your vessel. For example, tank levels.	Fresh Water	✓	✓	✗
		Grey Water	✓	✓	✗
		Black Water	✓	✓	✗
		Live Well	✓	✓	✗
		Trim Tabs (Only available in the Data application.)	✗	✗	✓
Depth	Depth data.	Depth	✓	✗	✗
Distance	Types of data related to distance travelled by your vessel. For example, trip distance.	Log & Trip	✓	✗	✗
		Log	✓	✗	✗
		Trip	✓	✗	✗
		Ground Log, Trip	✓	✗	✗
		Ground Log	✓	✗	✗
		Ground Trip 1	✓	✗	✗
		Ground Trip 2	✓	✗	✗
		Ground Trip 3	✓	✗	✗
		Ground Trip 4	✓	✗	✗
Engine	Types of data generated by engines. For example, oil pressure.	RPM	✓	✓	✗
		Coolant Temperature	✓	✓	✗
		Coolant Pressure	✓	✓	✗
		Oil Pressure	✓	✓	✗
		Boost Pressure	✓	✓	✗
		Alternator	✓	✓	✗
		Engine Load	✓	✓	✗
		Engine Hours	✓	✗	✗
		Engine Tilt	✓	✗	✗

Data Category	Description	Data Item	Digital	Dial	Graphical
Fuel	Types of data related to the fuel system. For example, fuel levels. **Note:** The options displayed are dependant on the number of engines set in the data application.	Fuel Level 1 (vol)	✓	✗	✗
		Fuel Level 2 (vol)	✓	✗	✗
		Fuel Level 3 (vol)	✓	✗	✗
		Fuel Level 1 (%)	✓	✓	✗
		Fuel Level 2 (%)	✓	✓	✗
		Fuel Level 3 (%)	✓	✓	✗
		Total Fuel	✓	✓	✗
		Total Fuel Flow	✓	✗	✗
		Total Engine Economy	✓	✗	✗
		Estimated Fuel Remaining	✓	✗	✗
		Estimated Distance to Empty	✓	✗	✗
		Estimated Time to Empty	✓	✗	✗
		Fuel Used (trip)	✓	✗	✗
		Fuel Used (season)	✓	✗	✗
Environment	Environmental-related data. For example, air temperature.	Pressure	✓	✗	✗
		Air Temperature	✓	✗	✗
		Set & Drift	✓	✗	✗
		App Wind Chill	✓	✗	✗
		True Wind Chill	✓	✗	✗
		Humidity	✓	✗	✗
		Dew Point	✓	✗	✗
		Sea Temperature	✓	✗	✗
GPS	GPS-related data. For example, vessel position.	Vessel Position	✓	✗	✗
		COG & SOG	✓	✗	✗
		COG	✓	✗	✗
		SOG	✓	✗	✗
Heading	Heading-related data. For example, locked heading.	Heading	✓	✗	✗
		Locked Heading	✓	✗	✗

Data Category	Description	Data Item	Digital	Dial	Graphical
Navigation	Types of data related to navigation. For example, bearing to waypoint.	Cursor Position (Only available in the Databar and data overlay.)	✓	✗	✗
		Cursor info	✓	✗	✗
		Cross Track Error	✓	✗	✗
		Rolling Road (Only available in the Data application.)	✗	✗	✓
		Compass	✗	✓	✗
		Target Position	✓	✗	✗
		Bearing to Waypoint	✓	✗	✗
		Distance to Waypoint	✓	✗	✗
		WPT TTG	✓	✗	✗
		Waypoint Info	✓	✗	✗
Pilot	Pilot-related data. For example, rudder.	Rudder	✓	✗	✗
Speed	Speed-related data. For example, VMG (Velocity Made Good) to Waypoint.	Speed	✓	✗	✗
		VMG to Waypoint	✓	✗	✗
Time	Time-related data. For example, local time.	Local Time	✓	✗	✗
		Local Date	✓	✗	✗
Wind	Wind-related data. For example, VMG (Velocity Made Good) to Windward.	TWS & TWA	✓	✗	✗
		AWS & AWA	✓	✗	✗
		GWS & GWD	✓	✗	✗
		VMG to Windward	✓	✗	✗
None					

Note: The engine data category shown above will contain one set of data items per engine.

Renaming a datapage

From the data application:

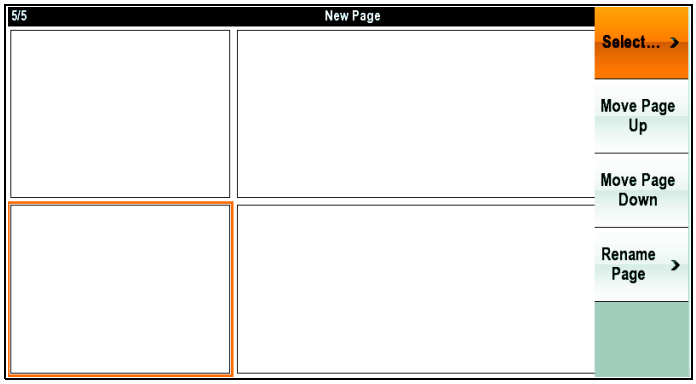
1. Select **Menu**.
2. Select **Edit Page**.
3. Select **Rename Page**.
   The on screen keyboard is displayed.
4. Enter the new name for the datapage.
5. Select **SAVE**.

Adding a new datapage

You can add your own customized datapages to the data application. The total number of datapages including pre-configured pages is 10.

From the data application:

1. Select **Menu**.
2. Select **Create New Page**.
   A list of available page layouts is displayed.
3. Select the required page layout.
   The new page is displayed on screen.



4. Select the blank cell on the new page layout that you want to add a data item to.
5. Select **Select Data Category**.
6. Select a data category.
   Selecting a data category will display a list of data items for that category.

7. Select the data item you want to display.
   Once selected a tick will be placed next to the data item in the menu and the cell on screen will display the selected data item.
8. Repeat steps 3 to 6 for all the data items you want to change.
9. Select **Rename Page**.
   The on screen keyboard is displayed.
10. Enter the new name for the datapage.
11. Select **SAVE**.

Deleting a datapage

You can delete custom or pre-configured datapages from the data application. The minimum number of datapages allowed is 1.

From the data application:

1. Scroll to the datapage you want to delete.
2. Select **Menu**.
3. Select **Delete Page**.
   The confirm delete pop up message is displayed.
4. Select **Yes** to delete the datapage, or **No** to cancel the action.

Note: You cannot create a new engine page with the same layout as the pre-configured engine datapages.

Setting number of engines

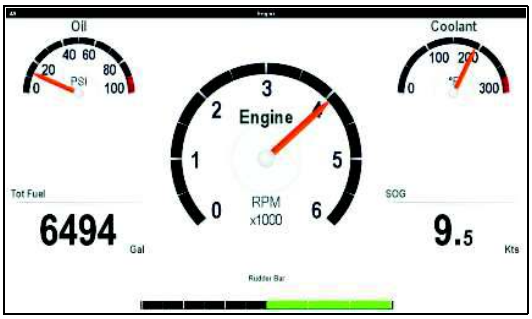
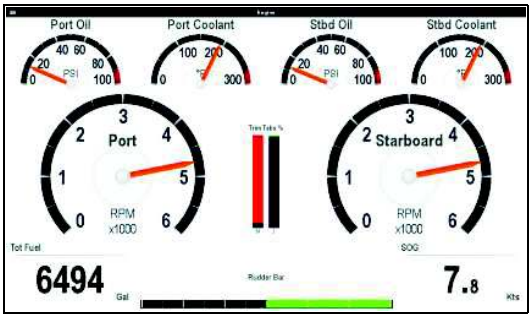
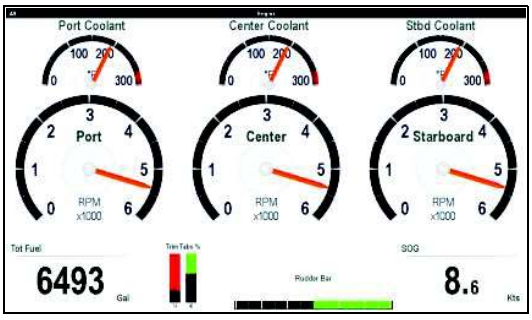
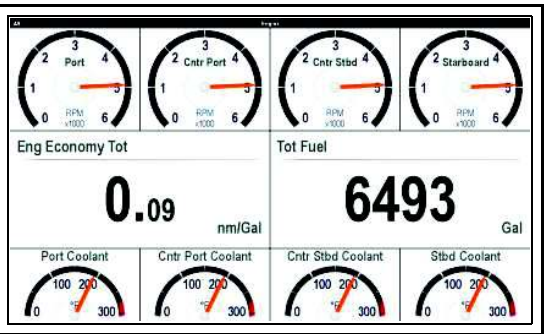
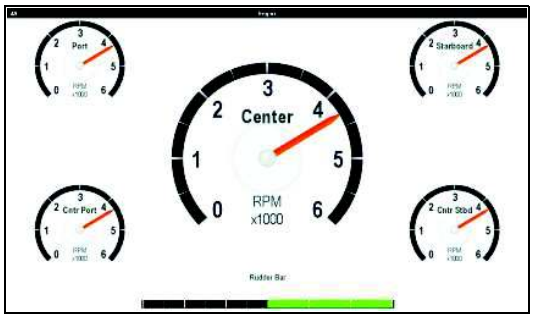
You can set the number of engines your vessel has up to a maximum of 5.

From the data application:

1. Select **Menu**.
2. Select **Num. Of Engines**.
3. Select either 1, 2, 3, 4 or 5.
   Once selected, a tick will be placed next to the item in the menu and the engine datapage will be reset to display the correct number of engines.

Engine datapages

Depending on the number of engines you choose you will see one of the following datapages:

1 Engine	
2 Engines	
3 Engines	
4 Engines	
5 Engines	

Note: The default number of engines is determined by the vessel type selected during the initial start up wizard, if a sail boat is chosen then default is 1 engine for motor boats default is 2 engines.

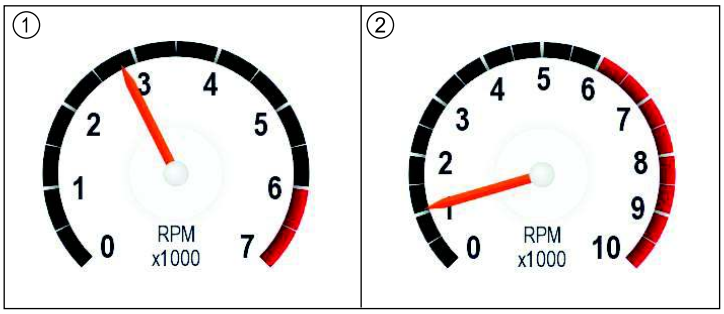
Setting maximum engine RPM

You can set the maximum RPM range to display on the RPM data item.

From the data application:

1. Select **Menu**.
2. Select **Max RPM Range**.
   A list of available RPM settings is displayed.
3. Select the required RPM range.
   A tick will be placed next to the selected RPM range in the menu and the RPM range on the engine datapage will be changed to your new setting.

Example



1	Auto*
2	10,000 RPM

Note: *The maximum RPM when in auto mode is set by the engine.

Changing color theme and dial colors

You can change both the color theme and the dial color.

From the data application:

1. Select **Menu**.
2. Select **Presentation**.
3. Select **Color Theme**.
   Selecting color theme will switch color between Light and Dark.
4. Select **Dial Color**.
   Selecting dial color will switch the color between Light and Dark.