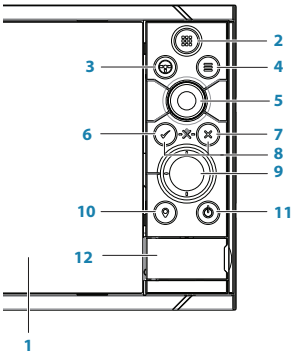
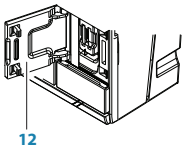
SIMRAD

NSS evo3
Quick Start Guide

EN

Front panel





No.	Description
1	Touch screen.
2	**Pages/Home key** - press to open the Home page for page selection and setup options.
3	**WheelKey** - user configurable key, refer to Operator manual. *Default without autopilot in system:* Short press toggles between panels on split screen. Long press maximizes active panel on split screen. *Default with autopilot in system:* Short press opens autopilot controller and places autopilot in standby mode. Long press toggles between panels on split screen.
4	**Menu key** - press to display the active panel's menu.
5	**Rotary knob** - turn to zoom or scroll the menu, press to select an option.
6	**Enter key** - press to select an option or save settings.
7	**Exit key** - press to exit a dialog, return to previous menu level, and clear cursor from panel.
8	**MOB keys** - press simultaneously the **Enter** and **Exit** keys to create a MOB (Man Over Board) at the vessel's position.
9	**Arrow keys** - press to activate cursor or to move cursor. Menu operation: press to navigate through menu items and to adjust a value.
10	**Mark key** - press to place waypoint at vessel position, or at cursor position when cursor is active.
11	**Power key** - press and hold to turn the unit ON/OFF. Press once to display the System control dialog, additional presses will toggle through 3 default dimming levels.
12	Card reader door

System Control dialog

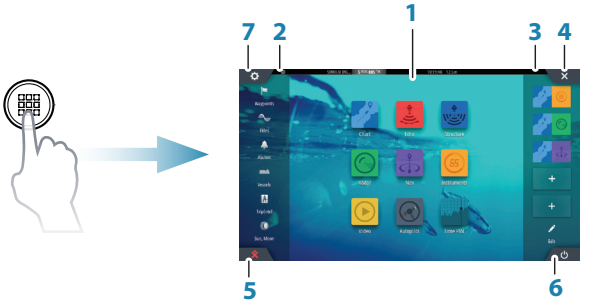
Used for quick access to system settings.

Activate the dialog by pressing the **Power** key, or by swiping from the top of the screen.

➔ ***Note:*** The content of the System Control dialog depends on connected equipment and active panel.

Home page

Activate the Home page by pressing the **Home** key.

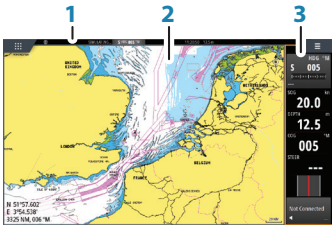


1. Application buttons
2. Tools
3. Favorites
4. Close button
5. Man Over Board (MOB) button
6. Power button
7. Settings button

Application pages

Activate an application page:

- Tap the application button (full page panel), or
- tap a favorites button, or
- press and hold an application button to select a predefined split page.

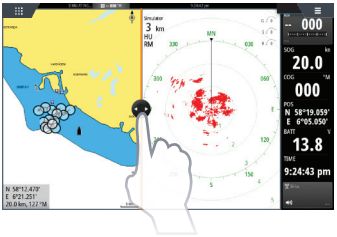


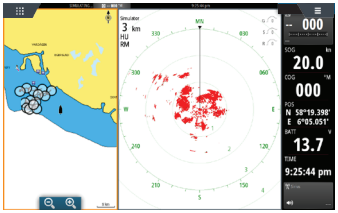
1. Status panel
2. Application panel
3. Instrument bar

Adjust panel size

You can adjust the panel sizes in a split page.

1. Tap the adjust split button in the System Control dialog to show the resize icon.
2. Drag the resize icon to set preferred panel size.
3. Save the changes by tapping the screen.





Edit a favorite page

Enter the Favorites edit mode:

- Tap the Edit icon, or
- press and hold a favorite button.

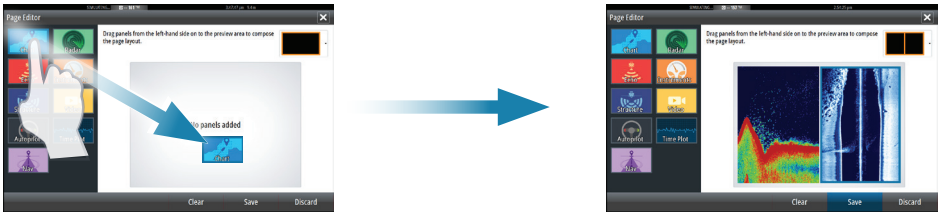
Edit favorite page

Delete favorite page

\+ Add new favorite page

Edit an existing favorite page or configure a new page by dragging panel icons into or out from the preview area.

Save the changes by tapping the **Save** button.

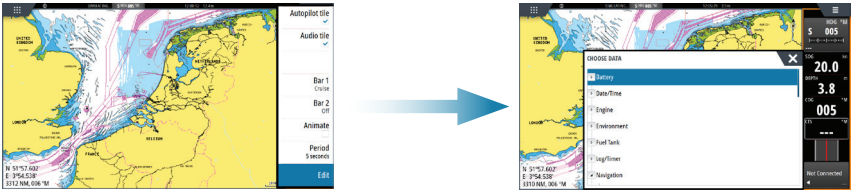


Instruments bar

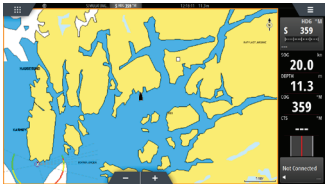
Tap the Instrument bar button in the System Control dialog to turn the bar on/off.

To edit the content of the Instrument bar:

1. Tap the Instrument bar to make it active.
2. Select the edit option from the menu.
3. Tap the item you want to change.
4. Select the information you want to display in the Instrument bar.
5. Save the changes by selecting the save option in the menu.



Charts



A

- Zoom the chart by using spread or pinch gestures, by using the zoom buttons (**A**), or by turning the **Rotary** knob.
- Move the view in any direction by panning the chart.
- Display information about a chart item by tapping the item.

Waypoints

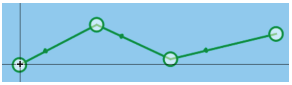
→ ***Note:*** With cursor inactive, the waypoint will be placed at vessel's position. With cursor active, the waypoint will be placed at selected cursor position.

To create a waypoint:

- Press the **Mark** key to instantly add a waypoint.
- Press the **Rotary** knob, or use the new waypoint option in the menu to open a New waypoint dialog.

Route

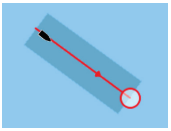
To create a route:



1. Tap the screen or use the arrow keys to activate cursor mode.
2. Select the new route option in the menu.
3. Tap the chart to position the first routepoint. Alternatively, use the arrow keys to position the routepoint, then press the **Rotary** knob to confirm the position.
4. Repeat point 3 to position additional routepoints.
5. Save the route by selecting the save option from the menu.

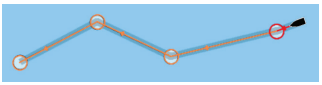
Navigating

To navigate to cursor position:



1. Tap the screen or use the arrow keys to position the cursor.
2. Select the goto cursor option in the menu.

To navigate a predefined route:

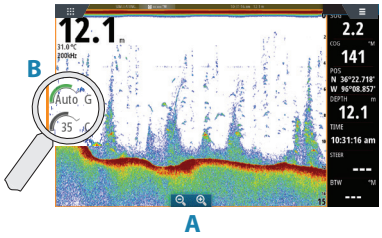


- Tap the route to make it active, then select the goto route option in the menu, or
- select the route from the Routes dialog, then select the goto option in the dialog.

Overlay

Add a radar, weather, SonarChart Live (Navionics' charts only), or StructureScan overlay on the chart by selecting the option in the menu.

Echosounder



- Zoom the image by tapping the zoom buttons (**A**) or by turning the **Rotary** knob.
- View echosounder history by panning the image.
- Adjust gain and color from the slide bar, displayed by tapping the gain or color icon (**B**), or by pressing the **Rotary** knob.
- Toggle auto gain on/off from the menu, or by pressing and holding the **Rotary** knob.

Toggle available echosounder frequencies from the menu. Available options depend on type of transducers connected to the system.

Single frequency transducers	50 kHz	Lower resolution images. Best performance in deep water
	83 kHz	Greater water coverage
	200 kHz	High resolution images and better target separation in shallow water
Chirp transducers	Low CHIRP	Lower resolution images. Best performance in deep water
	Medium CHIRP	Better depth penetration than High CHIRP, but with minimal loss of target definition
	High CHIRP	High resolution images and better target separation in shallow water

StructureScan

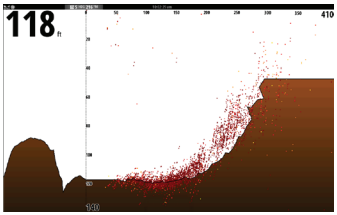
- Select Downscan or Sidescan view from the menu.
- Zoom the image by tapping the screen to position the cursor, then tap the zoom buttons (**A**) or turn the **Rotary** knob.
- Adjust contrast manually from the slide bar, displayed by tapping the Contrast icon (**B**), or by pressing the **Rotary** knob.

Toggle between available StructureScan frequencies from the menu.

455 kHz	Excellent resolution and greater range than 800 kHz
800 kHz	Better definition than 455 kHz at shallower depths

ForwardScan

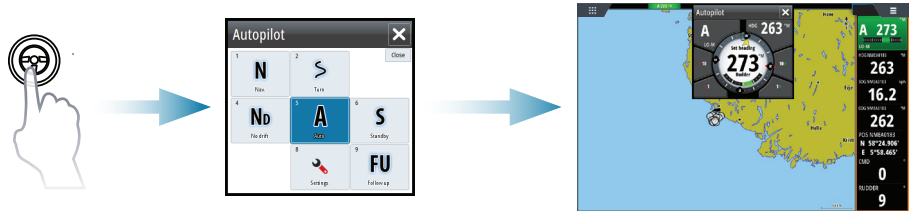
- Adjust depth, range and noise rejection from the menu.
- Start recording ForwardScan logs from the menu.
- Use the heading extension to monitor ForwardScan on the chart panel. Heading extension colors are based on the ForwardScan alarm values.



Autopilot

You can activate the autopilot from any panel.

1. Press the Autopilot tile in the Instrument bar or the **WheelKey** when this is configured for Autopilot control.
2. Select the autopilot mode in the Autopilot pop-up.



S	Standby	Autopilot is passive. Used when manually steering at the helm
FU	Follow-up	Manual steering. The rudder angle is set by the **Rotary** knob or by another FU unit
NFU	Non-Follow-up	Manual steering. The rudder movement is controlled by the **Port** and **Starboard** buttons in the Pilot pop-up, or by another NFU unit
A	Auto	Automatic steering, maintaining the set heading
ND	NoDrift	Automatic steering, keeping the vessel on a straight bearing line by compensating for drift
N	Navigation	Automatic steering, navigating the vessel to a specific waypoint or through a route using GPS data
W	Wind *	Automatic steering, maintaining the set wind angle
WN	Wind navigation *	Automatic steering, navigating the vessel to a specific waypoint or through a route using both wind and GPS data

* Only available if the boat type is set to Sailboat.

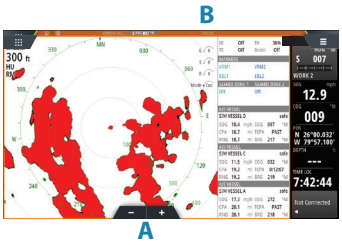
→ ***Note:*** You switch the autopilot to Standby mode from any automatic mode by a short press on the **WheelKey** configured for Autopilot control.

Adjust set heading / course / wind angle

Adjust set heading (Auto mode), set wind angle (Wind mode) and set course (NoDrift mode):

- Tap the **Port** or **Starboard** button in the autopilot pop-up, or
- turn the **Rotary** knob.

Radar



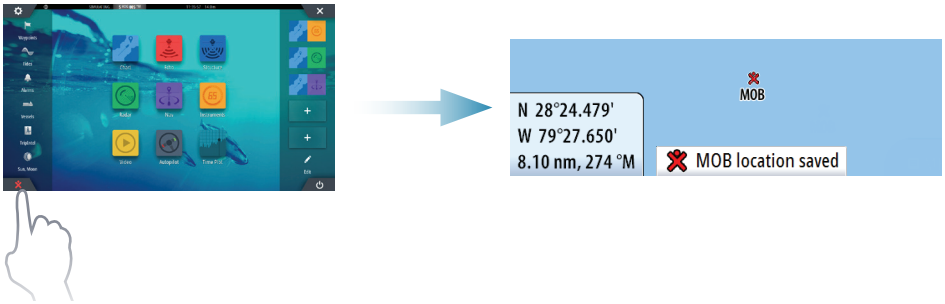
- Turn the radar transmitting on/off from the menu.
- Set the range by using the zoom icons (**A**) or by turning the **Rotary** knob.
- Adjust gain, sea clutter and rain clutter settings from the slide bar, displayed by tapping the settings icons (**B**), or by pressing the **Rotary** knob.

Audio

Activate the Audio overlay by tapping the **Audio** tile in the Instrument bar.

Positioning a MOB mark

Save a Man Over Board (MOB) mark at vessel position by tapping the button on the Home page or by simultaneously pressing the **Enter** and **Exit** keys from the keypad.



For more details, see the NSS evo3 Operator manual.

SIMRAD

NSS evo3

Operator Manual

ENGLISH

www.simrad-yachting.com

Preface

Disclaimer

As Navico is continuously improving this product, we retain the right to make changes to the product at any time which may not be reflected in this version of the manual. Please contact your nearest distributor if you require any further assistance.

It is the owner's sole responsibility to install and use the equipment in a manner that will not cause accidents, personal injury or property damage. The user of this product is solely responsible for observing safe boating practices.

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Navico product references

This manual can refer to the following Navico products:

- Broadband Radar™ (Broadband Radar)
- Broadband 3G™ Radar (Broadband 3G Radar)
- Broadband 4G™ Radar (Broadband 4G Radar)

- Broadband Sounder™ (Broadband Sounder)
- DownScan Imaging™ (DownScan)
- DownScan Overlay™ (Overlay)
- ForwardScan™ (ForwardScan)
- GoFree™ (GoFree)
- Halo™ Pulse Compression Radar (Halo Radar)
- INSIGHT GENESIS® (Insight Genesis)
- SonicHub® (SonicHub)
- StructureMap™ (StructureMap)
- StructureScan® (StructureScan)
- StructureScan® HD (StructureScan HD)

Copyright

Warranty

The warranty card is supplied as a separate document.

In case of any queries, refer to the brand website of your display or system: www.simrad-yachting.com.

Compliance statements

This equipment complies with:

- CE under 2014/53/EU Directive
- The requirements of level 2 devices of the Radio communications (Electromagnetic Compatibility) standard 2008
- Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The relevant Declaration of conformity is available in the product's section at the following website: www.simrad-yachting.com.

Internet usage

Some features in this product use an internet connection to perform data downloads and uploads. Internet usage via a connected mobile/cell phone internet connection or a pay-per-MB type internet connection may require large data usage. Your service provider may charge you based on the amount of data you transfer. If you are unsure, contact your service provider to confirm rates and restrictions.

About this manual

The manual assumes that the user has basic knowledge of navigation, nautical terminology and practices.

Important text that requires special attention from the reader is emphasized as follows:

→ ***Note:*** Used to draw the reader's attention to a comment or some important information.

⚠ Warning: Used when it is necessary to warn personnel that they should proceed carefully to prevent risk of injury and/or damage to equipment/personnel.

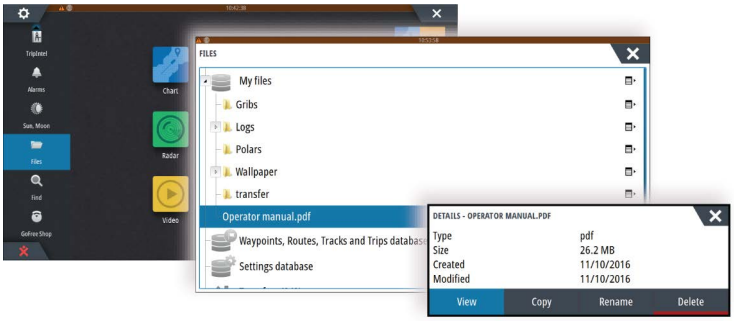
Manual version

This manual is written for software version 1.0. The manual is continually updated to match new software releases. The latest available manual version can be downloaded from www.simrad-yachting.com.

Viewing the manual on the screen

The PDF viewer included in the unit makes it possible to read the manuals and other PDF files on the screen. Manuals can be downloaded from www.simrad-yachting.com.

The manuals can be read from a card inserted in the card reader or copied to the unit's internal memory.



Use the menu options or the keys and on-screen buttons to maneuver in the PDF file as described below:

- Search, Goto page, Page Up and Down
  Select the relevant panel button.
- Scroll pages
  Turn the rotary knob.
- Panning on the page
  Drag finger on the screen in any direction.
- Zoom In/Out
  Use pinch or spread gestures.
- Exit the PDF viewer
  Press the **X** key or select the **X** in the upper right corner of the panel.

The Software version

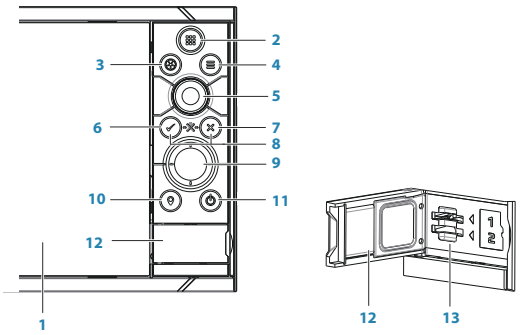
The software version currently on this unit can be found in the About dialog. The About dialog is available in the System Settings.

For information regarding upgrading your software, refer to *"Software upgrades"* on page 125.

Contents

1 Introduction

Front controls



1 **Touch screen**

2 **Pages/Home** - press to open the Home page for page selection and setup options

3 **WheelKey** - user configurable key, refer to *"Configuring the WheelKey"* on page 19.
Default without an autopilot connected to the system:
- Short press: toggles between panels on split screen
- Long press: maximizes active panel on split screen

Default with an autopilot connected to the system:
- Short press: opens the autopilot controller and puts the autopilot in standby mode
- Long press: toggles between panels on split screen

4 **Menu key** - press to display the active panel's menu

5 **Rotary knob** - turn to zoom or scroll the menu, press to select an option

6 **Enter key** - press to select an option or to save settings

7 **Exit key** - press to exit a dialog, return to previous menu level, and clear the cursor from the panel

8 **MOB** - press simultaneously the **Enter** and **Exit** keys to create a MOB at the vessel's position

9 **Arrow keys** - press to activate the cursor or to move the cursor
Menu operation: press to navigate through menu items and to adjust a value

10 **Mark key** - press to place waypoint at vessel position or at cursor position when cursor is active

11 **Power key** - press and hold to turn the unit ON/OFF
Press once to display the System Controls dialog, additional presses to toggle through three default dimming levels

12 **Card reader door**

13 **Dual card reader slots**

The Home page

1 Applications
Select a button to display the application as a full page panel.
Press and hold a button to display pre-configured split page options for the application.

2 Settings button
Select to access Settings dialogs.

3 Tools
Select a button to access dialogs used for carrying out a task, or for browsing stored information.

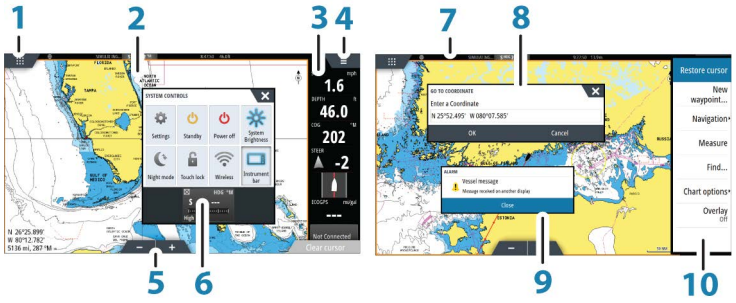
4 Favorites
Select a button to display the panel combination.
Press and hold a favorite button to enter edit mode for the Favorites panel.

5 Close button
Select to exit the **Home** page and return to the previous active page.

6 Power button
Select to power off the unit.

7 Man Over Board (MOB) button
Select to save a Man Over Board (MOB) waypoint at the current vessel position.

Application pages



Each application connected to the system is presented on panels. The application can be presented as a full page, or in combination with other panels in a multiple panel page.

All application pages are accessed from the **Home** page.

1 **Home button**

2 **Application panel**

3 **Instrument bar**
Navigation and sensor information. The bar can be turned off and it can be configured by the user.

4 **Menu button**

5 **Zoom buttons**

6 **System controls dialog**
Quick access to basic system settings.
Display the dialog by a short press on the **Power** key or by swiping down from top of the screen.

7 **Status bar**

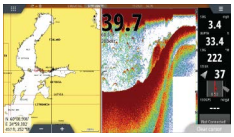
8 **Dialog**
Information to or input from the user.

9 **Alarm message**
Displayed if dangerous situations or system faults occur.

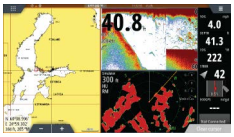
10 **Menu**
Panel specific menu.

Split pages

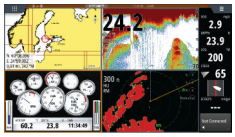
You can have up to 4 panels on each page.



2 panels page



3 panels page



4 panels page

Panel sizes in a split page can be adjusted from the **System Controls** dialog.

Pre-configured split pages

Each full screen application has several pre-configured split pages, featuring the selected application combined with each of the other panels.

→ ***Note:*** The number of pre-configured split pages cannot be changed, and the pages cannot be customized or deleted.

Access a pre-configured split page by pressing and holding the main panel button.

Favorite pages

All preconfigured favorite pages can be modified and deleted, and you can create your own. You can have a total of 12 favorite pages.

For more information, refer to *"Adding new favorite pages"* on page 20.

Integration of 3rd party devices

Several 3rd party devices can be connected to the NSS evo3. The applications are displayed on separate panels or integrated with other panels.

A device connected to the NMEA 2000 network should automatically be identified by the system. If not, enable the feature from the advanced option in the System settings dialog.

The 3rd party device is operated by using menus and dialogs as on other panels.

This manual does not include specific operation instructions for any 3rd party device. For features and functionality, refer to the documentation included with the 3rd party device.

SmartCraft VesselView integration

SmartCraft data can be displayed and interaction are enabled through the unit when a Mercury VesselView® 4, 7, 403, 502, 702, 703, or Link is present on the network.

When the features are enabled, the display may prompt the user for some basic configuration information. Refer to the VesselView® manual or engine supplier for further information.

The engine supplier icon appears on the **Home** page when a device is available.

Suzuki Engine panel

If a Suzuki C10 gauge is available on the network, a Suzuki engine icon is added to the **Home** page. An icon is also added to the Page editor. You can select to display the Suzuki engine panel as a full page panel or as part of a multi-panel page.

The layout and content of the engine panel depends on selected panel size. The digital gauges can be customized, refer to *"Customizing the panel"* on page 103.

FUSION-Link integration

FUSION-Link devices connected to the NMEA 2000 network can be controlled from the NSS evo3 system.

The FUSION-Link devices appear as additional sources when using the audio function. No additional icons are available.

Refer to *"Audio"* on page 104 for more information.

FLIR camera integration

If a FLIR M-series camera is available on the Ethernet network, you can display the video and control the camera from the NSS evo3.

The FLIR camera is controlled from the Video panel, and no additional icons appear on the Home page.

Refer to *"Video"* on page 115 for more information.

BEP CZone integration

The NSS evo3 integrates with BEP's CZone system used for controlling and monitoring a distributed power system on your vessel.

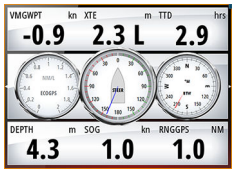
The CZone icon is available in the Tools panel on the **Home** page when a CZone system is available on the network.

A separate manual is provided with your CZone system. Refer to this documentation and to the NSS evo3 Installation manual for how to install and configure the CZone system.

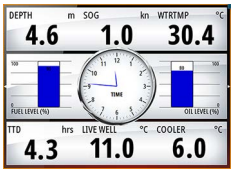
CZone dashboard

When the CZone is installed and configured, an additional CZone dashboard is added to the Instruments panels.

Vessel dashboard



Navigation dashboard



Angler dashboard

CZone dashboard

You switch between a panel's dashboards by selecting the left and right arrow symbols or by selecting the dashboard from the menu.

Editing a CZone dashboard

You can customize a CZone dashboard by changing the data for each of the gauges. Available editing options depend on the type of gauge and which data sources that are connected to your system.

For more information, refer to *"Instrument panels"* on page 103.

Remote controllers

You can connect a remote controller to the network and remotely control the unit. To find out which remote controllers can be used, refer to the product web page at:

www.simrad-yachting.com.

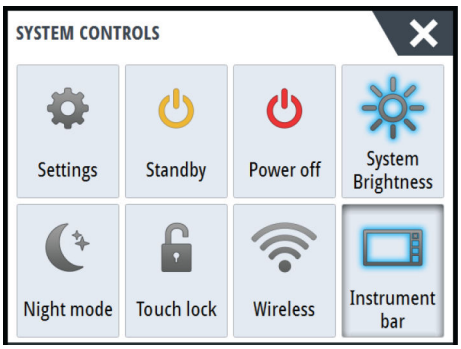
A separate manual is included with the remote controller.

2 Basic operation

System Controls dialog

The System Controls dialog provides quick access to basic system settings. You display the dialog by making a short press on the **Power** key or by swiping down from the top of the screen.

The icons displayed on the dialog can vary. For example, the adjust splits option is only available if you are viewing a split page when you open the **System Controls** dialog.



Activating functions

Select the icon of the function you want to set or toggle on or off. For those functions that toggle on and off, a highlighted icon indicates the function is activated, as shown in the Instrument bar icon above.

Turning the system on and off

You turn the system off by pressing the **Power** key, or by selecting the **Power** option on the Home page or in the **System Controls** dialog.

If the **Power** key is released before the shut-down is completed, the power off process is cancelled.

→ ***Note:*** If the unit is configured as a slave, you cannot power off the unit by the **Power** key, and the **System Controls** dialog does not display the power off option.

First time startup

When the unit is started for the first time, or after a factory default, the unit displays a setup wizard. Respond to the setup wizard prompts to select some fundamental setup options.

You can perform further setup using the system settings option and later change settings made with the setup wizard.

Standby mode

In Standby mode, the backlight for screen and keys are turned off to save power. The system continues to run in the background.

You select Standby mode from the **System Controls** dialog.

Display illumination

Brightness

The display backlighting can be adjusted at any time from the **System Controls** dialog.

You can also cycle the preset backlight levels by short presses on the **Power** key.

Night mode

The night mode option optimizes the color palette and backlight for low light conditions.

→ ***Note:*** Details on the chart may be less visible when the Night mode is selected!

Wireless

Provides wireless connection options dependent on the status of the wireless. For example, connect to a hotspot or change to access point. For option explanations refer to *"Wireless connection"* on page 95.

Locking the touchscreen

You can temporarily lock a touchscreen to prevent accidental operation of the system. Lock the touchscreen when large amounts of water are on the screen, for example, in heavy seas and weather. This feature is also useful when cleaning the screen while the unit is turned on.

When the touch lock is active you can only operate the unit from the keys.

You lock the touchscreen from the **System Controls** dialog.

You remove the lock function by a short press on the **Power** key.

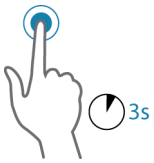
Instrument bar

Toggles the Instrument bar on/off for the current page only.

Touchscreen operation

Basic touchscreen operation on the different panels is shown in the table below.

The panel sections in this manual have more information about panel specific touchscreen operation.

Icon	Description
	Tap to: • Activate a panel on a multi-panel page • Position the cursor on a panel • Select a menu and a dialog item • Toggle a checkbox option on or off • Show basic information for a selected item
	Press and hold: • On any panel with a cursor to either activate the cursor assist feature or open the menu. Refer to *"Customizing the long press feature"* on page 19 • On the Instrument panel to open the **Choose data** dialog • On a panel button to see available split screen options • On a favorite button to enter edit mode
	Scroll through a list of available options without activating any option.
	Flick to quickly scroll through e.g. the waypoint list. Tap the screen to stop the scrolling.
	Pan to position a chart or Echosounder image on the panel.

Icon	Description
	Pinch to zoom out on the chart or on an image.
	Spread to zoom in on the chart or on an image.

Using menus and dialogs

Menus

You display a page menu by selecting the **MENU** button in the upper right corner of the page.

- Activate a menu item and toggle on/off an option by selecting it
- Adjust a slide bar value by either:
  - dragging the slide bar
  - selecting the **+** or **-** icons

You can also operate the menus by using the rotary knob:

- Turn the knob to scroll through menu items
- Press the knob to select a highlighted item
- Turn the knob to adjust the value of a selected item

Select the **Back** menu option or the **X** key to return to the previous menu level, and then exit.

The status of the cursor (active vs. inactive) changes the menu options.

Dialog boxes

You select entry fields and keys in a dialog box by tapping the screen or by using the rotary knob.

Numeric and alphanumeric keyboards are automatically displayed when required for entering user information in dialogs. You operate the keyboard by selecting the virtual keys, and you confirm your entry by selecting the virtual **Enter** key or by pressing the rotary knob.

A dialog is closed by saving or cancelling the entry.

A dialog can also be closed by selecting the **X** in the dialog's upper right corner or by pressing the **X** key.

Selecting pages and panels

Selecting a page

- Select a full page panel by selecting the relevant application button on the **Home** page
- Select a favorite page by selecting the relevant favorite button
- Select a predefined split panel by pressing and holding the relevant application icon

Select active panel

In a multiple panel page, only one panel can be active at a time. The active panel is outlined with a border.

You can only access the page menu of an active panel.

You activate a panel by tapping it.

Displaying the Favorites panel as a pop-up on a page

You can display the Favorites panel as a pop-up on any page by pressing and holding the **Home** key.

Select a favorites page in the pop-up to display it. The panel will switch to the selected favorite after 3 seconds.

Creating a Man Overboard waypoint

If an emergency situation should occur, you can create a Man Overboard (MOB) waypoint at the vessel's current position by selecting the **MOB** button on the **Home** page.

You can also save a Man Overboard (MOB) waypoint at the vessel's current position by pressing the **Enter** and **Exit** keys simultaneously. Simultaneous pressing the Enter and Exit keys creates a MOB at the vessel's location

When you activate the MOB function the following actions are automatically performed:

- a MOB waypoint is created at the vessel's position
- the display switches to a zoomed chart panel, centered on the vessel's position
- the system displays navigation information back to the MOB waypoint

Multiple MOB waypoints are saved by repeatedly pressing the **MOB** buttons. The vessel continues to show navigation information to the initial MOB waypoint. Navigation to subsequent MOB waypoints needs to be done manually.

Cancel navigation to MOB

The system continues to display navigational information towards the MOB waypoint until you cancel the navigation from the menu.

Delete a MOB waypoint

1. Select the MOB waypoint to activate it
2. Tap the MOB waypoint's pop-up or press the **Enter** key or the rotary knob to display the MOB waypoint dialog
3. Select the delete option in the dialog.

A MOB waypoint can also be deleted from the menu when it is activated.

Screen capture

Simultaneously press the **Home** and **Power** keys to take a screen capture. Screen captures are saved to internal memory.

You need to turn on the Screen capture option in the System Settings dialog to be able to take a screenshot on a touch screen. When the function is activated, you can take a screenshot on a touch screen by double-selecting the title bar of an open dialog, or by double-selecting the status bar if no dialog is open.

To view files, refer to *"Files"* on page 120.

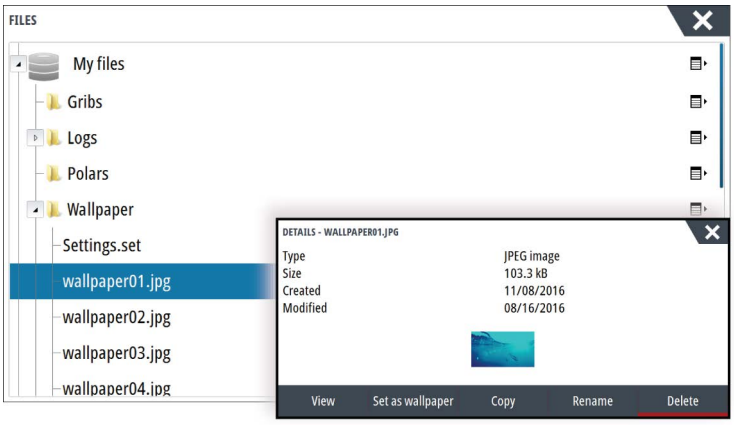
3

Customizing your system

Customizing the Home page wallpaper

The Home page's wallpaper can be customized. You can select one of the pictures included with the system, or you can use your own picture in .jpg or .png format.

The images can be available on any location that can be seen in the files browser. When a picture is chosen as the wallpaper, it is automatically copied to the Wallpaper folder.



Configuring the WheelKey

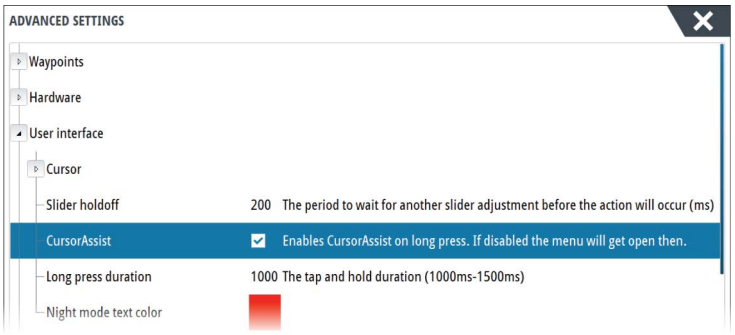
You can define what happens with a short or long press of the WheelKey on the front of the unit.

To configure the Wheel key, select **Configure WheelKey** on the System Setting dialog.

Select the **Short press** option or **Long press** option in the WHEELKEY CONFIGURATION dialog and then an option from the list displayed.

Customizing the long press feature

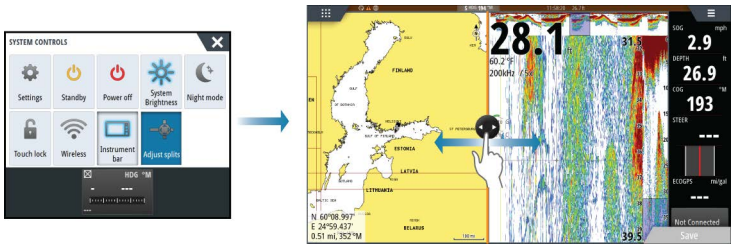
Use the **Advanced settings** dialog to specify if the long press on the panel opens the menu or displays the cursor assist feature on the panel.



Adjusting panel size

You can change the panel size for an active split page. The panel size can be adjusted for both favorite pages and for predefined split pages.

1. Activate the **System Controls** dialog
2. Select the adjust splits option in the dialog
3. Adjust the panel size by dragging the adjustment icon
4. Confirm your changes by tapping one of the panels, by pressing the rotary knob or the **Enter** key.



The changes are saved to the active favorite or split page.

Password protection

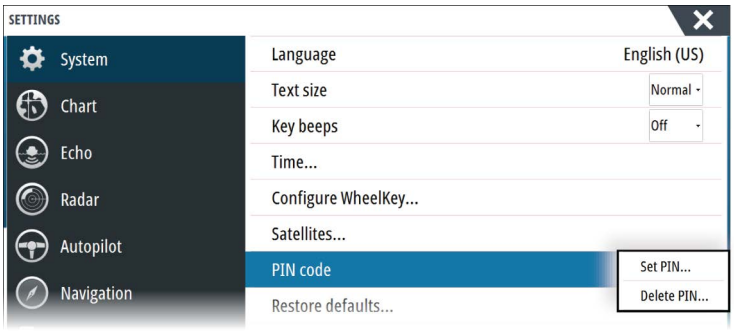
You can set a PIN code to prevent unauthorized access to your system settings.

Note: We recommend you record the PIN code (password) and store it in a safe place if you use this feature.

When you establish password protection, the PIN code must be entered when any of the following are selected. After the correct PIN code is entered, all of them can be accessed without re-entering the PIN code.

- Settings, activated from the Tools panel or System Controls dialog
- Alarms, activated from the Tools panel
- Files, activated from the Tools panel
- GoFree Shop, activated from the Tools panel
- Settings, activated from the Chart menu under Chart Options

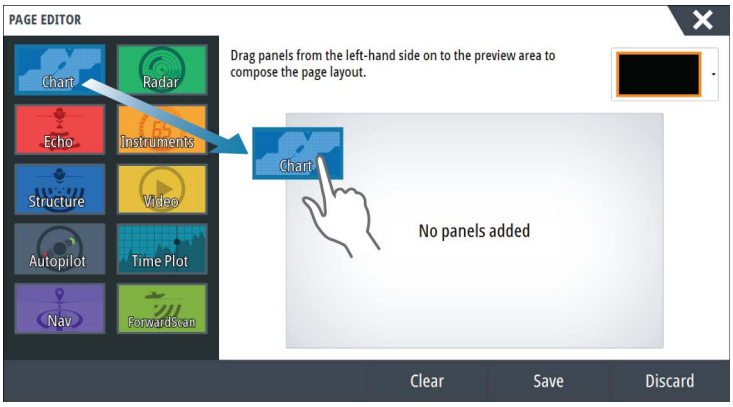
You set and remove password protection from the system Settings dialog.



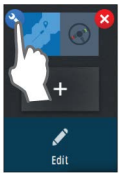
Adding new favorite pages

1. Select the **New** icon in the favorite panel on the **Home** page to open the page editor dialog
2. Drag and drop page icons to set up a new page
3. Change the panel arrangement (only possible for 2 or 3 panels), if required
4. Save the page layout.

The system displays the new favorite page, and the new page is included in the list of favorite pages on the **Home** page.



Edit favorite pages



1. Select the edit icon in the Favorite panel:
   - Select the X icon on a favorite icon to remove the page
   - Select the tool icon on a favorite icon to display the page editor dialog
2. Add or remove panels in the page editor dialog
3. Save or discard your changes to leave the favorite edit mode.

Setting the appearance of the Instrument bar

Data sources connected to the system can be viewed in the Instrument bar.

You can configure the Instrument bar to display either one or two bars. If you specify to display two bars you can set it to alternate the bars automatically. You can specify the information displayed in the instrument bars.

Use the menu to select a predefined activity for one or both of the bars. When an activity bar is selected, predefined instrument gauges are displayed in the instrument bar.

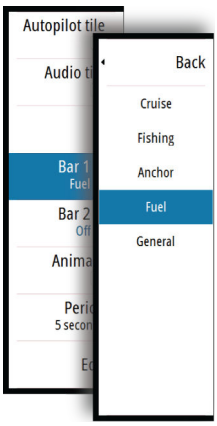
You can turn the Instrument bar off from the **System controls** dialog.

→ ***Note:*** This only turns the Instrument bar off for the current page.

Turning the Instrument bar on/off

1. Activate the **System controls** dialog
2. Deactivate/activate the instrument bar icon to toggle the bar on and off.

Select a predefined activity bar



1. Activate the Instrument bar by selecting it
2. Select the **MENU** button to open the menu
3. Select **Bar 1** or **Bar 2** and then a predefined activity bar.

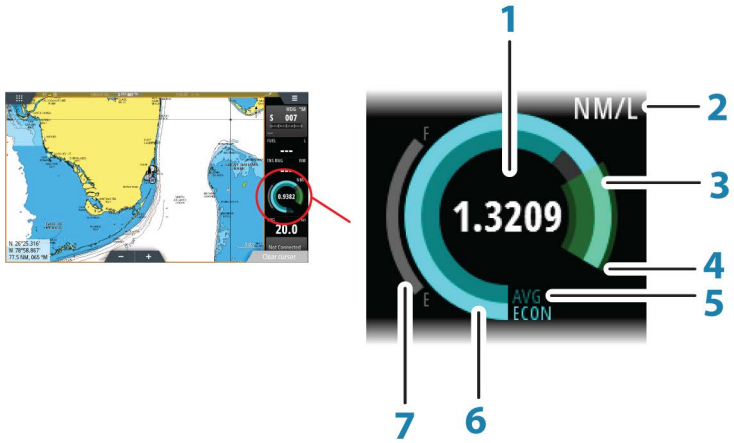
Predefined gauges are displayed in the instrument bar. You can change a gauge in the activity Instrument bar, refer to Edit the content of the Instrument bar below.

Edit the content of the Instrument bar

1. Activate the Instrument bar by selecting it
2. Select the **MENU** button to open the menu
3. Select **Edit** to change an instrument gauge followed by the gauge you want to change
4. Select the content you want to display from the Choose Data dialog
5. Select **Menu** and then **Finish editing** to save your changes.

Fuel economy gauge

You can display a fuel economy gauge in the instrument bar on application pages (Chart, Radar, Echo, Nav, and so on). Select the predefined Fuel activity bar or change a gauge source to Fuel Economy. To change a gauge source, refer to *"Setting the appearance of the Instrument bar"* on page 21.



1. Digital readout of current economy
2. Fuel economy measurement units
3. 100% efficiency, this equates to the 'nominal consumption'
4. 120% efficiency
5. Average fuel economy
6. Instantaneous economy
7. Current fuel level

The fuel economy gauge displays the instantaneous versus historical average fuel efficiency. The start of the green zone represents 'Nominal Fuel Economy', and it displays an additional 20% area to allow your fuel efficiency to be displayed above the nominal fuel economy.

The more efficient you consume fuel, the more the outer blue dial creeps up towards the green portion of the scale. If you achieve the nominal efficiency of your vessel you will be at the green zone. If you manage to achieve an efficiency better than your nominal efficiency, you will be somewhere in the upper green zone.

Nominal fuel economy can be entered in the Vessel Setup dialog displayed from the Fuel settings dialog.

You can reset your average fuel economy from the Reset Fuel Economy button on the Fuel settings dialog. When you reset it, the system starts calculating the new average.

Set the measurement units for the fuel economy gauge in the Economy field in the Units settings dialog.

Bridge Control

The Bridge Control feature allows you to control which pages are shown on several displays at the same time. The feature is used on vessels with multiple displays mounted in the same place to quickly configure what information is displayed.

There can be a maximum of four different bridges on your system, and you can have up to four displays grouped into one bridge. Each display can be configured to only one bridge.

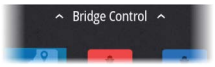
When the displays are included in a bridge, you can configure twelve page configurations (presets) for each bridge.

Adding displays to a Bridge

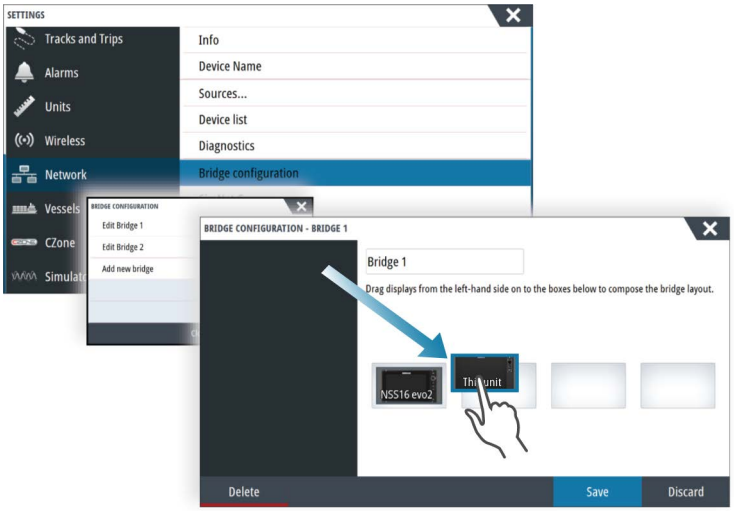
→ ***Note:*** All displays must be turned on to be available for bridge configuration.

1. Open the **Bridge Configuration** dialog

2. Select to configure a new bridge or to edit an existing
   - The **Bridge Configuration** for the selected bridge will be shown, and all displays that are not already assigned to a bridge will be listed
3. Select the display you want to add to the bridge
   - Arrange the displays from left to right in the same physical layout as the displays on your current bridge/dashboard/helm
4. Rename the bridge if required
5. Save the configuration



Bridge Control will be displayed on the **Home page** of all units that are configured for a bridge.



Configuring the preset pages for displays in a bridge

1. Activate the Bridge Control panel by swiping down on **Bridge Control** on the **Home** page
2. Enter edit mode by selecting the edit icon
3. Select the display for which you want to define the preset page
   - The page layout option for the selected display will be read from the network, showing main features and configured favorite pages
4. Select the preferred page
   - Select the blank page if you do not want that display to be included in the selected **Bridge preset**
5. Repeat step 3 and 4 until a page is configured for all displays in all **Bridge presets**
6. Select the edit icon again to leave the edit mode and to save your configuration

Selecting Bridge presets

You display an overview of available **Bridge presets** by swiping down on **Bridge Control** on the **Home** page.

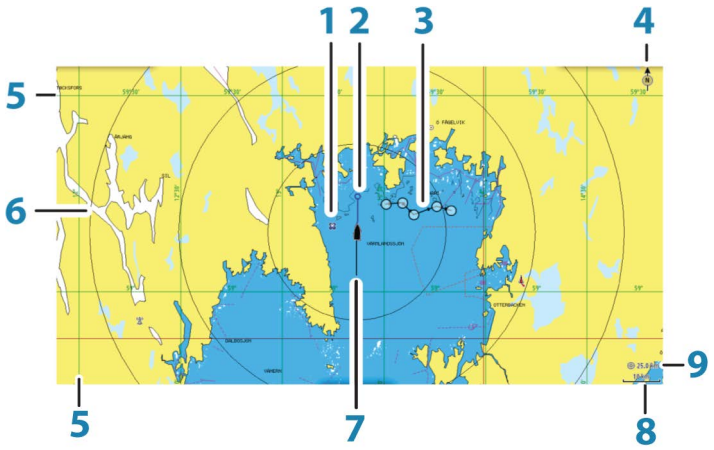
When you select one of the preset configurations all devices included in that bridge will switch to the pre-configured pages.

4

Charts

The chart function displays your vessel's position relative to land and other chart objects. On the chart panel you can plan and navigate routes, place waypoints, and display AIS targets.

The Chart panel



1. Waypoint*
2. Vessel with extension line (extension line is optional)
3. Route*
4. North indicator
5. Grid lines*
6. Range rings*
7. Track*
8. Chart range scale
9. Range rings interval (only displayed when Range rings are turned on)

* Optional chart items. You turn the optional chart items on/off individually from the Chart settings dialog.

Chart data

The system is delivered with different embedded cartography depending on region.

All units support Insight charts from Navico including Insight Genesis. The system also supports charts from Navionics and C-MAP as well as content created by a variety of third party mapping providers in the AT5 format. For a full selection of available charts, visit www.gofreeshop.com, www.c-map.com, or www.navionics.com.

→ ***Note:*** In this manual, all possible chart menu options are described. These options vary depending on the chart you are using.

Charts on chart cards are shared over the Ethernet network, so only one chart card per vessel is required.

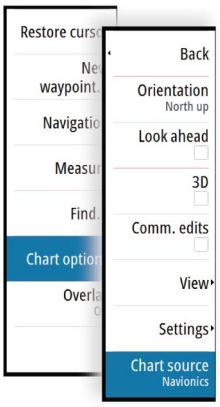
→ ***Note:*** The system does not automatically switch to embedded cartography if the chart card is removed. A low-resolution chart will be displayed until you re-insert the card or manually switch back to the embedded cartography.

Showing dual chart types

If you have different chart types available - embedded, in the card slot, or on the Ethernet network - you can show two different chart types simultaneously on a page with two chart panels.

You can select a dual chart panel by pressing and holding the Chart application button on the **Home** page, or by creating a favorite page with two chart panels.

Selecting chart type



You specify the chart type in the Chart panel by selecting one of the available chart types in the chart source menu option.

If you have a multiple Chart panel, the chart type is set individually for each chart panel. Activate one of the chart panels, and then select one of the available chart types in the chart source menu option. Repeat the process for the second chart panel, and select an alternative chart type for this panel.

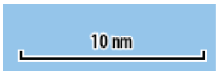
If you have identical charts available - built in, in the card slot or on the Ethernet network - the system automatically selects the chart with most chart details for your displayed region.

Panning the chart

You can move the chart in any direction by dragging your finger on the screen.

Select the **Clear cursor** menu option or press the **X** key to remove the cursor and cursor window from the panel. This also centers the chart to the vessel position.

Chart scale



You zoom in and out on the chart by using the zoom panel icons, the rotary knob, or by using 2 fingers to pinch (zoom out) and spread (zoom in).

Chart range scale and range rings interval (when turned on) are shown in the lower right corner of the chart panel.

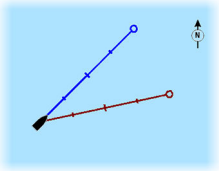
Vessel symbol

When the system has a valid GPS position lock, the vessel symbol indicates vessel position. If no GPS position is available, the vessel symbol includes a question mark.

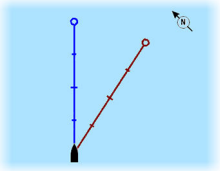
Positioning the vessel on the chart panel

Chart orientation

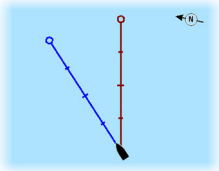
Several options are available for how the chart is rotated in the panel. The chart orientation symbol in the panel's upper right corner indicates the north direction.



North up



Heading up



Course up

North up
Displays the chart with north upward.

Heading up
Displays the chart with the vessel's heading directed upward. Heading information is received from a compass. If heading is not available, then the COG from the GPS is used.

Course up
Displays the chart with the direction the vessel is ACTUALLY traveling directed upward, which in some cases is not the direction the vessel is headed.

Look ahead

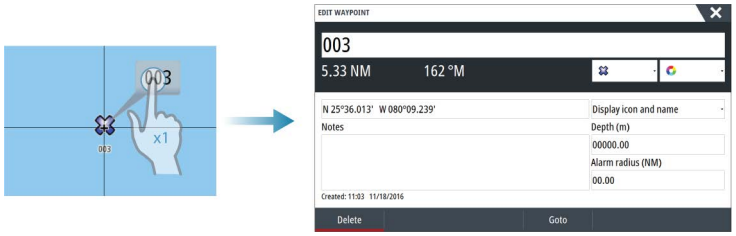
Moves the vessel icon closer to the bottom of the screen so that you can maximize your view ahead.

Displaying information about chart items

When you select a chart item, a waypoint, a route, or a target, basic information for the selected item is displayed. Select the chart item's pop-up to display all available information for that item. You can also activate the detailed information dialog from the menu.

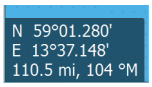
→ ***Note:*** If you are viewing applicable C-MAP charts on your system, you can select marine objects to display information about services and available multimedia (photos) associated with the location or object.

→ ***Note:*** Pop-up information has to be enabled in chart settings to see basic item information.



Using the cursor on the chart panel

By default, the cursor is not shown on the chart panel.



When you activate the cursor, the cursor position window is displayed. When the cursor is active, the chart does not pan or rotate to follow the vessel.

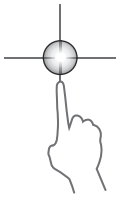
Press the **X** key or select the **Clear cursor** menu option to remove the cursor and the cursor window from the panel. This also centers the chart to the vessel position.

Select the **Restore cursor** menu option to display the cursor in its previous location. The **Clear cursor** and **Restore cursor** options are useful features for toggling between the vessel's current location and the cursor position.

GoTo cursor

You can navigate to a selected position on the image by positioning the cursor on the panel, then using the **Goto Cursor** option in the menu.

The cursor assist function



→ ***Note:*** The cursor assist function is available if it is enabled. Refer to *"Customizing the long press feature"* on page 19.

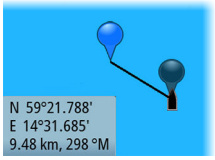
The cursor assist function allows for fine tuning and precision placement of the cursor without covering details with your finger.

Activate the cursor on the panel, then press and hold your finger on the screen to switch the cursor symbol to a selection circle, appearing above your finger.

Without removing your finger from the screen, drag the selection circle to the desired position.

When you remove your finger from the screen the cursor reverts to normal cursor operation.

Measuring distance



The cursor can be used to measure the distance between your vessel and a selected position, or between 2 points on the chart panel.

1. Position the cursor on the point from where you want to measure the distance. Start the measure function from the menu
   - The measuring icons appear with a line drawn from the vessel center to the cursor position, and the distance is listed in the cursor information window.
2. You can reposition the measuring points by dragging either icon as long as the measuring function is active

→ ***Note:*** The bearing is always measured from the grey icon to the blue icon.

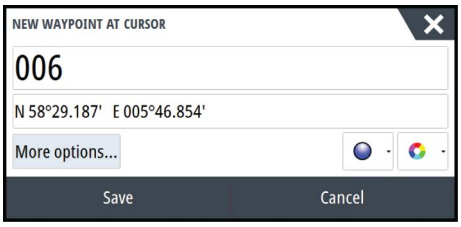
You can also start the measuring function without an active cursor. Both measuring icons are then initially located at the vessel position. The grey icon follows the vessel as the vessel moves, while the blue icon remains at the position given when you activated the function.

You terminate the measuring function by selecting the **Finish measuring** option or by pressing the **X** key.

Saving waypoints

A waypoint is saved at the cursor position if active or at the vessel's position if the cursor is not active on the panel, by doing the following:

- Pressing the rotary knob
- Pressing the **Mark** key
- Using the new waypoint option in the menu



Creating routes

You can create routes as follows on the chart panel.

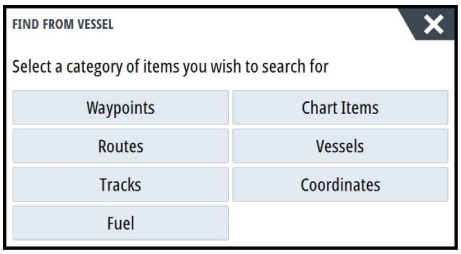
1. Position the cursor on the chart panel
2. Select **New** followed by **New route** in the menu
3. Tap the chart panel to position the first routepoint
4. Continue positioning the remaining routepoints
5. Save the route by selecting the save option in the menu.

→ ***Note:*** For more information, refer to *"Waypoints, Routes, and Tracks"* on page 37.

Find objects on chart panels

You can search for other vessels or various chart items from a chart panel.

Activate the cursor on the panel to search from the cursor position. If the cursor is not active, the system searches for items from the vessel's position.



→ ***Note:*** You must have a SIRIUS data package subscription to search for fueling stations and an AIS receiver connected to search for vessels.

3D charts

The 3D option provides a three dimensional graphical view of land and sea contours.

→ ***Note:*** All chart types work in 3D mode, but without 3D cartography for the appropriate area the chart appears flat.

When the 3D chart option is selected, the Pan and the Rotate icons appear on the chart panel.

Panning the 3D chart

You can move the chart in any direction by selecting the Pan icon and then panning in the desired direction.

Press the **X** key or select the **Return to vessel** menu option to stop panning, and to center the chart to vessel position.

Controlling the view angle

You can control the view angle by selecting the Rotate icon and then panning the chart panel.

- To change the direction you are viewing, pan horizontally
- To change the tilt angle of the view, pan vertically

➔ ***Note:*** When centered on the vessel position, only the tilt angle can be adjusted. The view direction is controlled by the chart orientation setting. See *"Positioning the vessel on the chart panel"* on page 26.

Zooming a 3D chart

You zoom in and out on a 3D chart by using the zoom panel icons or the rotary knob.

Chart overlay

Radar, structure, SonarChart Live (Navionics charts only) and weather data can be displayed as overlay on your chart panel.

When an overlay is selected, the chart menu expands to include basic menu functions for the selected overlay.

Radar, structure and weather functions are described in separate sections in this manual. For more information about SonarChart Live, see section *"SonarChart Live"* on page 32.

Insight and C-MAP charts

All possible menu options for Insight and C-MAP charts are described below. The features and menu options available can vary depending on the charts you use. This section shows menus from an Insight chart.

➔ ***Note:*** A menu option is greyed out if it is not available on the chart displayed. For example, raster charts are not available with Insight, so the Raster charts menu option is greyed out when Insight charts are displayed.

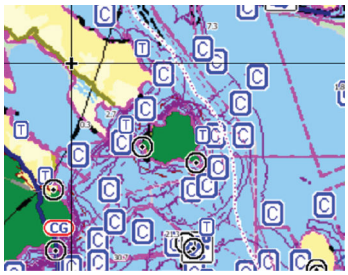
Insight and C-MAP tides and currents

The system can display Insight and C-MAP tides and currents. With this information it is possible to predict the time, level, direction and strength of currents and tides. This is an important tool when considering planning and navigation of a trip.

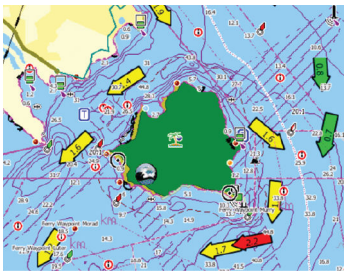
In large zoom ranges the tides and currents are displayed as a square icon including the letter **T** (Tides) or **C** (Current). When you select one of the icons, tidal or current information for that location are displayed.

Dynamic current data can be viewed by zooming inside a 1-nautical mile zoom range. At that range, the Current icon changes to an animated dynamic icon that shows the speed and direction of the current. Dynamic icons are colored in black (greater than 6 knots), red (greater than 2 knots and less than or equal to 6 knots), yellow (greater than 1 knot and less than or equal to 2 knots) or green (equal to or less than 1 knot), depending on the current in that location.

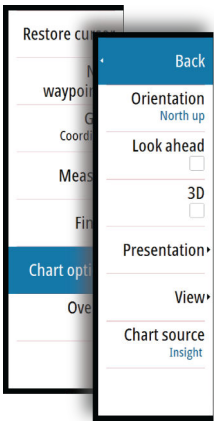
If there is no current (0 knots) this will be shown as a white, square icon.



Static Current and Tide icons



Dynamic Current icons



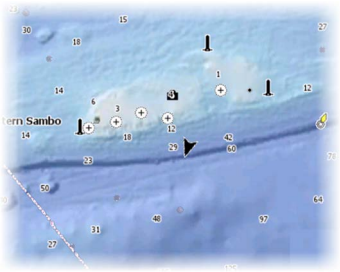
Insight and C-MAP specific chart options

Orientation, Look ahead, 3D, and change Chart source (previously described in this section) are common for all chart types.

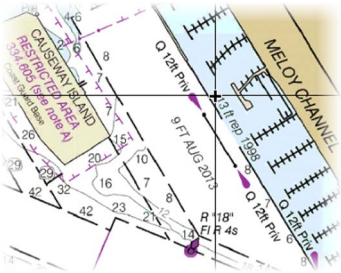
Presentation

The charts can be displayed in different imagery styles.

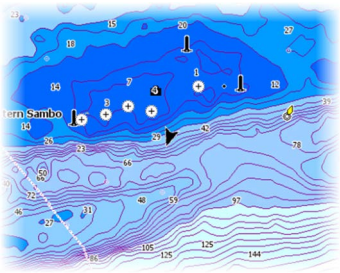
Shaded relief



No contours



Raster imagery



High resolution bathymetry

Shaded relief

Shades seabed terrain.

No contours

Removes contour lines from the chart.

Raster charts

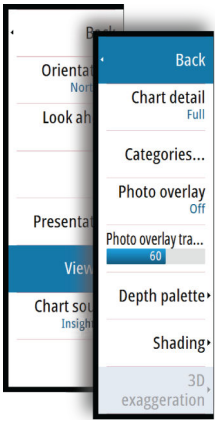
Changes the view to that of a traditional paper chart.

Raster transparency

Controls the transparency of raster imagery.

High resolution bathymetry

Enables and disables higher concentration of contour lines.



Insight and C-MAP view options

Chart detail

- **Full**
  All available information for the chart in use.
- **Medium**
  Minimum information sufficient for navigation.
- **Low**
  Basic level of information that cannot be removed, and includes information that is required in all geographic areas. It is not intended to be sufficient for safe navigation.

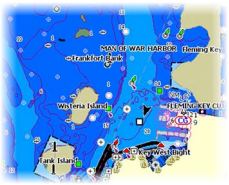
Insight and C-MAP chart categories

Insight and C-MAP charts include several categories and sub-categories that you can turn on/off individually depending on which information you want to see.

Photo overlay

Photo overlay enables you to view satellite photo images of an area as an overlay on the chart. The availability of such photos is limited to certain regions, and cartography versions.

You can view photo overlays in either 2D or 3D modes.



No Photo overlay

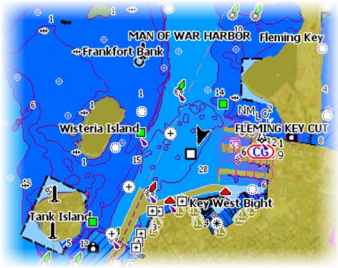
Photo overlay, land only

Full Photo overlay

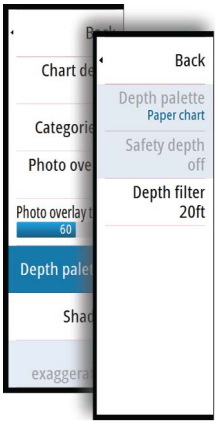
Photo transparency

The Photo transparency sets the opaqueness of the photo overlay. With minimum transparency settings the chart details are almost hidden by the photo.

Minimum transparency



Transparency at 80



Depth palette

Controls the Depth palette used on the map.

Paper chart

Changes the appearance of the map to a paper chart style.

Safety depth

Insight and C-MAP charts use different shades of blue to distinguish between shallow (lighter shades) and deep (darker shades) water. After enabling Safety depth, specify the desired safety depth limit. The Safety depth sets the limit at which depths will be drawn without blue shading.

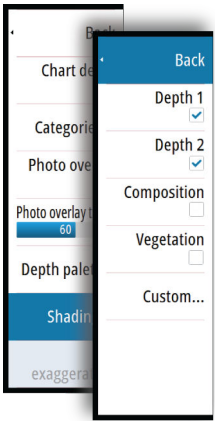
Depth filter

Filters out depth values shallower than the selected depth filter limit.

Shading

Shades different areas of the seabed, depending on the selected Shading category.

→ ***Note:*** Composition and Vegetation shading are not applicable to C-MAP charts.



Depth 1 and Depth 2

Depth presets that shade different depths in different colors.

Custom

You can adjust the depth threshold, color and opacity (transparency) of color shading for Depth 1 and Depth 2.

3D exaggeration

Graphical settings that are available in 3D mode only. Exaggeration is a multiplier applied to the drawn height of hills on land, and troughs in water to make them look taller or deeper.

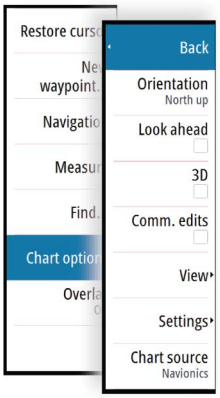
→ ***Note:*** This option is grayed out if the data is not available in the map card inserted.

Navionics charts

Some Navionics features require the most current data from Navionics. For those features, a message is displayed stating that the feature is unavailable if you do not have the appropriate Navionics charts or chart card inserted. For more information on what is required for these features, refer to www.navionics.com

Navionics specific chart options

Orientation, Look ahead, 3D and change Chart source (previously described in this section) are common for all chart types.



Community edits

Toggles on the chart layer including Navionics edits. These are user information or edits uploaded to Navionics Community by users, and made available in Navionics charts.

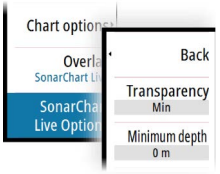
For more information, refer to Navionics information included with your chart, or to Navionics website: www.navionics.com.

SonarChart Live

SonarChart Live is a real-time feature where the device creates an overlay of depth contours based on your own live sonar soundings.

In the Navionics chart menu, select **Overlay** and then **SonarChart Live** to display it as an overlay on the chart.

When you select SonarChart Live overlay the menu expands to display SonarChart Live Options. Use the options to set the transparency and minimum depth.

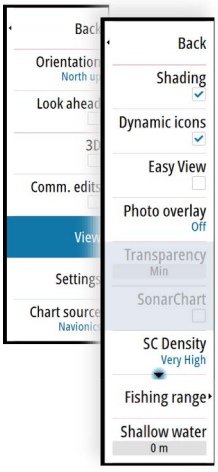


Transparency

The SonarChart Live overlay is drawn on top of other chart data. The chart data is completely covered at minimum transparency. Adjust the transparency to allow the chart details to be seen.

Minimum depth

Adjusts what SonarChart Live rendering treats as the safety depth. This affects the coloring of the SonarChart Live area. As the vessel approaches the safety depth, the SonarChart Live area will gradually change from a simple grey/white to red.



Navionics view options

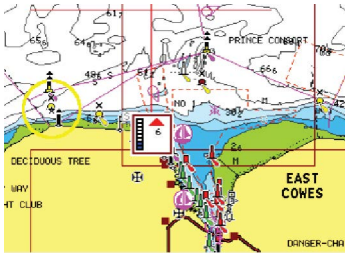
Chart shading

Shading adds terrain information to the chart.

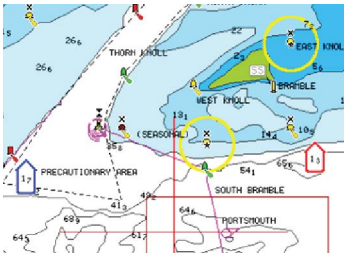
Navionics dynamic tide and current icons

Shows tides and currents with a gauge and an arrow instead of the diamond icons used for static tides and current information.

The tide and current data available in Navionics charts are related to a specific date and time. The system animates the arrows and/or gauges to show the tides and currents evolution over time.



Dynamic tide information



Dynamic current information

The following icons and symbology are used:

Current speed

The arrow length depends on the rate, and the symbol is rotated according to flow direction. Flow rate is shown inside the arrow symbol. The red symbol is used when current speed is increasing, and the blue symbol is used when current speed is decreasing.

Tide height

The gauge has 8 labels and is set according to absolute max/min value of the evaluated day. The red arrow is used when tide is rising, and the blue arrow is used when tide is falling.

→ ***Note:*** All numeric values are shown in the relevant system units (unit of measurement) set by user.

Easy View

Magnifying feature that increases the size of chart items and text.

→ ***Note:*** There is no indication on the chart showing that this feature is active.

Photo overlay

Photo overlay enables you to view satellite photo images of an area as an overlay on the chart. The availability of such photos is limited to certain regions, and cartography versions.

You can view photo overlays in either 2D or 3D modes.

No Photo overlay

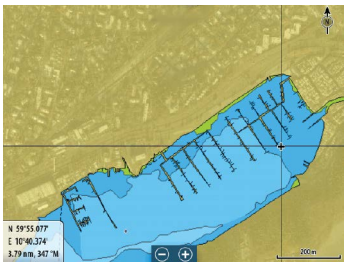
Photo overlay, land only

Full Photo overlay

Photo transparency

The Photo transparency sets the opaqueness of the photo overlay. With minimum transparency settings the chart details are almost hidden by the photo.

Minimum transparency



Maximum transparency

SonarChart

The system supports the Navionics SonarChart feature.

SonarChart displays a bathymetry map showing high resolution contour detail and standard navigational data. For more information, refer to www.navionics.com.

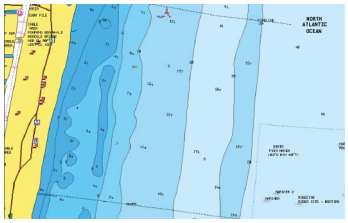
SC Density

Controls the density of the SonarChart and SonarChart Live contours.

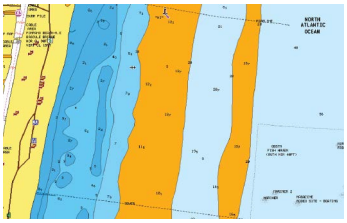
Fishing range

Select a range of depths between which Navionics fills with a different color.

This allows you to highlight a specific range of depths for fishing purposes. The range is only as accurate as the underlying chart data, meaning that if the chart only contains 5 meter intervals for contour lines, the shading is rounded to the nearest available contour line.



No Depth highlight range

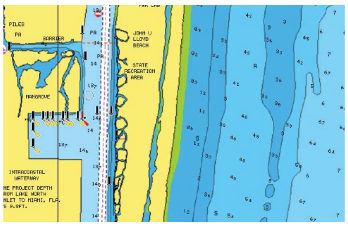


Depth highlight range: 6 m - 12 m

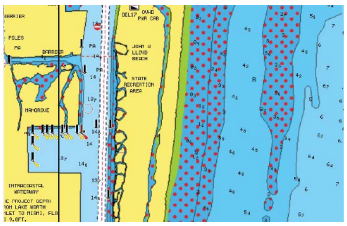
Shallow water highlight

Highlights areas of shallow water.

This allows you to highlight areas of water between 0 and the selected depth (up to 10 meters/30 feet).



No shallow water highlighted



Shallow water highlight: 0 m - 3 m

Navionics chart settings

Colored seabed areas

Used for displaying different depth areas in different shades of blue.

Presentation type

Provides marine charting information such as symbols, colors of the navigation chart and wording for either International or U.S. presentation types.

Annotation

Determines what area information, such as names of locations and notes of areas, is available to display.

Chart details

Provides you with different levels of geographical layer information.

Safety depth

The Navionics charts use different shades of blue to distinguish between shallow and deep water.

Safety depth, based on a selected limit, is drawn without blue shading.

→ ***Note:*** The built in Navionics database features data down to 20 m, after which it is all white.

Contours depth

Determines which contours you see on the chart down to the selected safety depth value.

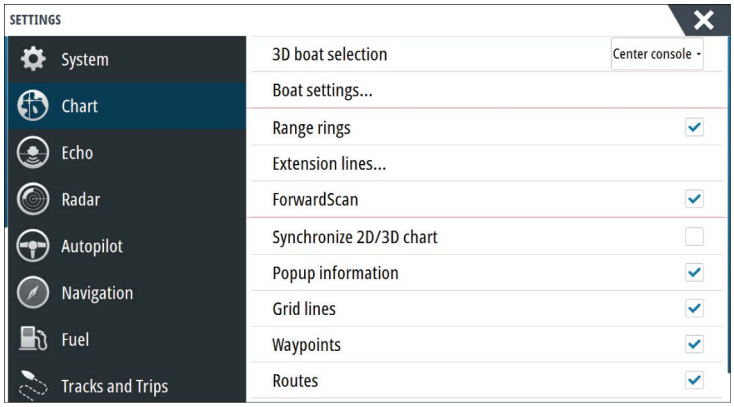
Rock filter level

Hides rock identification on the chart beneath a given depth.

This helps you to declutter charts in areas where there are many rocks located at depths well below your vessel's draught.

Chart settings

Settings and display options made in the Chart settings page are common for all chart panels.



3D boat selection

Determines which icon to use on 3D charts.

Boat settings

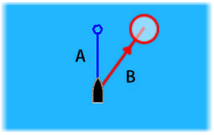
The boat settings are used when calculating an automatic route. The boat's draught, width and height must be input to use Navionics Dock-to-dock autorouting and easy routing features.

→ ***Note:*** Dock-to-doc Autorouting is not available in units used in U.S. territorial waters.

Range Rings

The range rings can be used to present the distance from your vessel to other chart objects.

The range scale is set automatically by the system to suit the chart scale.



Extension lines

Sets the lengths of the extension lines for your vessel and for other vessels shown as AIS targets.

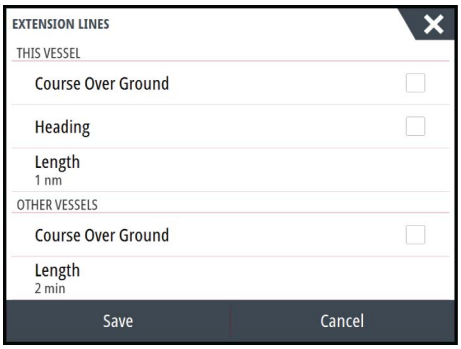
A: Heading

B: Course Over Ground (COG)

The lengths of the extension lines are either set as a fixed distance, or to indicate the distance the vessel moves in the selected time period. If no options are turned on for the vessel then no extension lines are shown for your vessel.

Your vessel heading is based on information from the active heading sensor and the COG is based on information from the active GPS sensor.

For other vessels, COG data is included in the message received from the AIS system.



ForwardScan

If you have ForwardScan and this option is selected, the ForwardScan heading extension is shown on the chart. Refer to *"Heading extension"* on page 91.

SonarChart Live tide correction

When selected, the tide correction feature uses information from nearby tide stations (if available) to adjust the depth values used by SonarChart Live as the sonar is recorded.

Synchronize 2D/3D chart

Links the position shown on one chart with the position shown on the other chart when a 2D and a 3D chart are shown side by side.

Pop-up information

Selects whether basic information for chart items is displayed when you select the item.

Grid lines

Turns on/off viewing of longitude and latitude grid lines on the chart.

Waypoints, Routes, Tracks

Turns on/off displaying of these items on chart panels. Also opens the Waypoints, Routes and Tracks dialogs you can use to manage them.

5 Waypoints, Routes, and Tracks

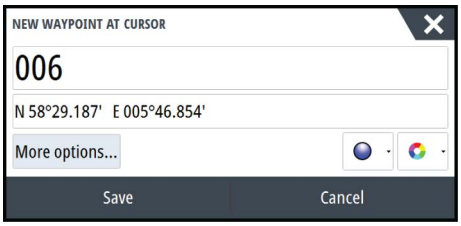
Waypoints

A waypoint is a user generated mark positioned on a chart, on a radar image or on the Echosounder image. Each waypoint has an exact position with latitude and longitude coordinates. A waypoint positioned on the Echosounder image has a depth value, in addition to position information. A waypoint is used to mark a position you later may want to return to. Two or more waypoints can also be combined to create a route.

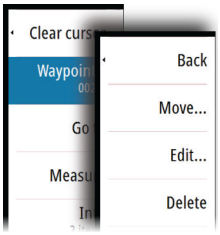
Saving waypoints

A waypoint is saved at the cursor position if active or at the vessel's position if the cursor is not active on the panel, by doing the following:

- Pressing the rotary knob
- Pressing the **Mark** key
- Using the new waypoint option in the menu



Moving a waypoint



1. Select the waypoint you want to move. The waypoint icon expands to indicate that it is active.
2. Activate the menu and select the waypoint in the menu
3. Select the move option
4. Select the new waypoint position
5. Press the **Enter** key or the rotary knob to confirm the new position.

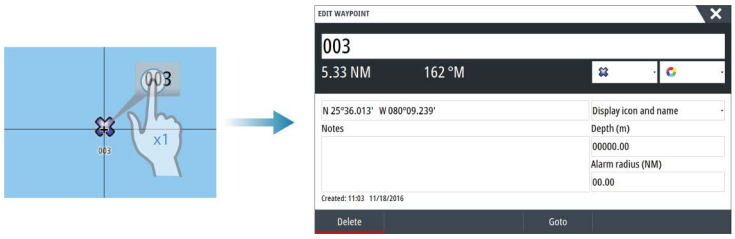
The waypoint is now automatically saved at the new position.

Edit a waypoint

You can edit all information about a waypoint from the **Edit Waypoint** dialog.

This dialog is activated by selecting the waypoint's pop-up, by pressing the rotary knob, or from the menu when the waypoint is activated.

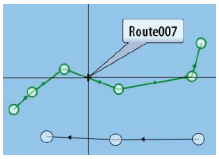
The dialog can also be accessed from the Waypoints tool on the **Home** page.



Waypoint alarm settings

You can set an alarm radius for each individual waypoint you create. The alarm is set in the **Edit Waypoint** dialog.

→ ***Note:*** The waypoint radius alarm must be toggled ON in the alarm dialog to activate an alarm when your vessel comes within the defined radius. For more information, refer to *"Alarms dialog"* on page 118.



Routes

A route consists of a series of routepoints entered in the order that you want to navigate them.

When you select a route on the chart panel it turns green, and the route name is displayed.

The system includes support for Navionics Autorouting and C-MAP Easy Routing. This feature automatically suggests routepoints between the first and last routepoint of a route, or between selected routepoints in a complex route. You can use the feature when you create a new route, or you can use it to edit already saved routes.

Creating a new route on the chart panel

1. Activate the cursor on the chart panel
2. Select the new route option from the menu
3. Position the first waypoint on the chart panel
4. Continue positioning new routepoints on the chart panel until the route is completed
5. Save the route by selecting the save option in the menu.

Edit a route from the chart panel

1. Select the route to make it active
2. Select the route edit option in the menu
3. Position the new routepoint on the chart panel:
   - If you set the new routepoint on a leg, a new point is added between existing routepoints
   - If you set the new routepoint outside the route, the new routepoint is added after the last point in the route
4. Drag a routepoint to move it to a new position
5. Save the route by selecting the save option in the menu.

→ ***Note:*** The menu changes depending on the selected edit option. All edits are confirmed or cancelled from the menu.

Dock-to-dock Autorouting and Easy Routing

The Dock-to-dock Autorouting and Easy Routing suggest new routepoint positions based on information in the map and on your boat's size. Before you can start using this feature the boat draught, width and height must be entered into the system. The boat settings dialog is automatically displayed if the information is missing when you start the feature.

→ ***Note:*** Units designed for sale in the U.S. region do not have Autorouting capabilities. Autorouting features are disabled on all non-U.S. units when they are used in U.S. territorial waters.

→ ***Note:*** It is not possible to start the Dock-to-dock Autorouting or Easy Routing if one of the selected routepoints is located in an unsafe area. A warning dialog is displayed, and you have to move the relevant routepoint(s) to a safe area to proceed.

→ ***Note:*** If no compatible cartography is available, the Dock-to-dock Autorouting or Easy Routing menu option is not available. Compatible cartography includes C-MAP MAX-N+, Navionics+ and Navionics Platinum. For a full selection of available charts, visit www.gofreemarine.com, www.c-map.com or www.navionics.com.

1. Position at least two routepoints on a new route, or open an existing route for editing.
2. Select **Dock-to-dock Autorouting**, followed by:
   - **Entire Route** if you want the system to add new routepoints between the first and the last routepoint of the open route.
   - **Selection** if you want to manually select the routepoints that define the limits for the autorouting, then select the relevant routepoints. Selected routepoints are colored red. Only two routepoints can be selected, and the system discards any routepoints between your selected start and end points.
3. Select **Accept** to start the automatic routing.

- When the automatic routing is completed the route appears in preview mode, and the legs are color coded to indicate safe or unsafe areas. Navionics uses red (unsafe) and green (safe), while C-MAP uses red (unsafe), yellow (dangerous) and green (safe).

4. Move any routepoints if required when the route is in preview mode.
5. Select **Keep** to accept the routepoints positions.
6. Eventually repeat step 2 (**Selection**) and step 3 if you want the system to automatically position routepoints for other parts of the route.
7. Select **Save** to complete the automatic routing and save the route.

Dock-to-dock Autorouting and Easy Routing examples

- **Entire route** option used when first and last route points are selected.

First and last routepoint

Result after automatic routing

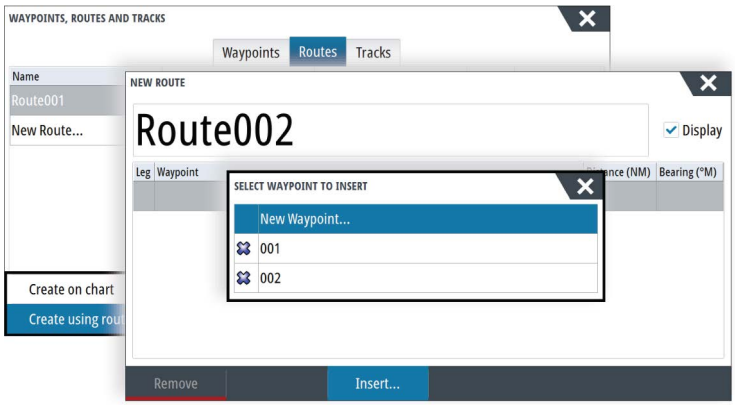
- **Selection** option used for autorouting part of a route.

Two routepoints selected

Result after automatic routing

Creating routes using existing waypoints

You can create a new route by combining existing waypoints from the **Routes** dialog. The dialog is activated by using the **Waypoints** tool on the **Home** page and then selecting the **Routes** tab.

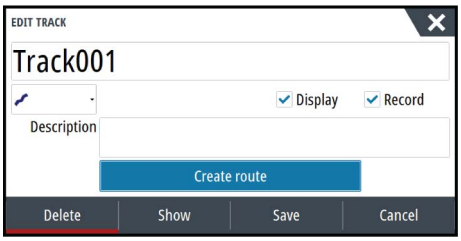


Converting Tracks to Routes

You can convert a track to a route from the Edit Track dialog. The dialog is activated by activating the track, then selecting the track's pop-up, pressing the rotary knob or selecting the info options from the menu.

You can convert a track to a route from the Edit Track dialog. The dialog is activated by activating the track, then selecting the track's pop-up, pressing the rotary knob or selecting the info options from the menu.

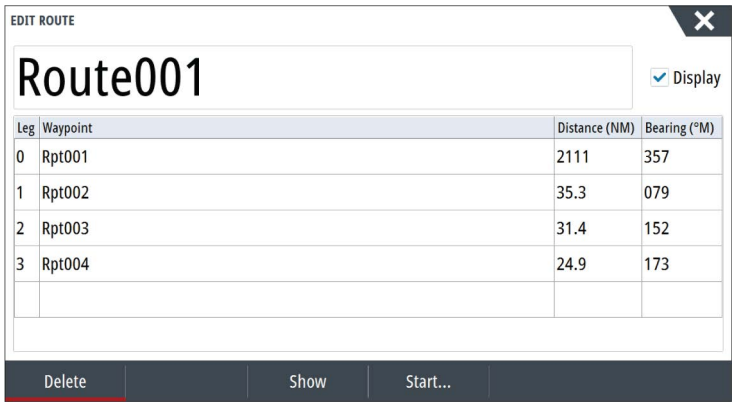
The Edit Tracks dialog can also be accessed by selecting the Tracks tool on the **Home** page.



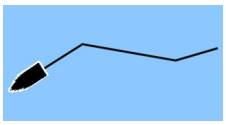
The Edit Route dialog

You can add and remove routepoints from the **Edit Route** dialog. This dialog is activated by selecting an active route's pop-up, by pressing the rotary knob, or from the menu.

The dialog can also be accessed by using the **Waypoints** tool on the **Home** page.



Tracks



Tracks are a graphical presentation of the historical path of the vessel, allowing you to retrace where you have travelled. Tracks can be converted to routes from the **Edit** dialog.

From the factory, the system is set to automatically track and draw the vessel's movement on the chart panel. The system continues to record the Tracks until the length reaches the maximum points, and then automatically begins overwriting the oldest points.

The automatic tracking function can be turned off from the Tracks dialog.

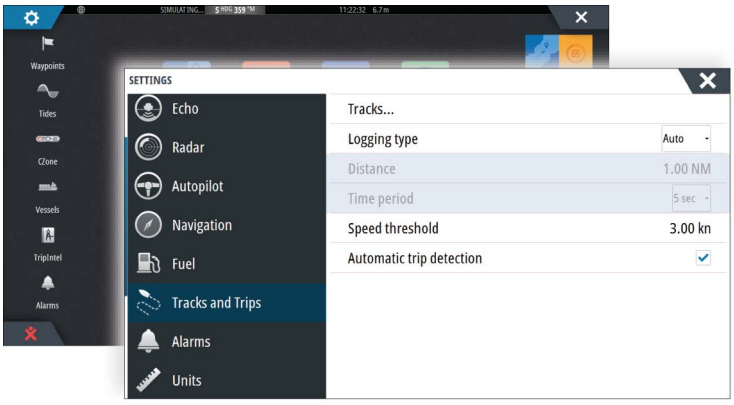
Creating new Tracks

You can start a new trail from the Trails dialog, activated by using the **Waypoints** tool on the **Home** page.

Tracks settings

Tracks are made up of a series of points connected by line segments whose length depends on the frequency of the recording.

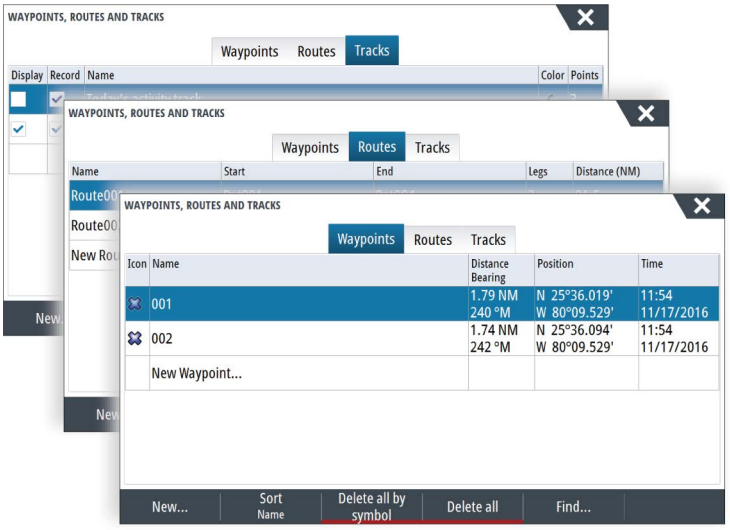
→ ***Note:*** The Tracks option must also be turned ON in the chart settings to be visible.



Waypoints, Routes, and Tracks dialogs

The Waypoints, Routes, and Tracks dialogs give access to advanced edit functions and settings for these items.

The dialogs are accessed by selecting the **Waypoints** button on the **Tools panel** on the **Home** page.



6 Navigating

The navigation function included in the system allows you to navigate to the cursor position, to a waypoint, or along a predefined route.

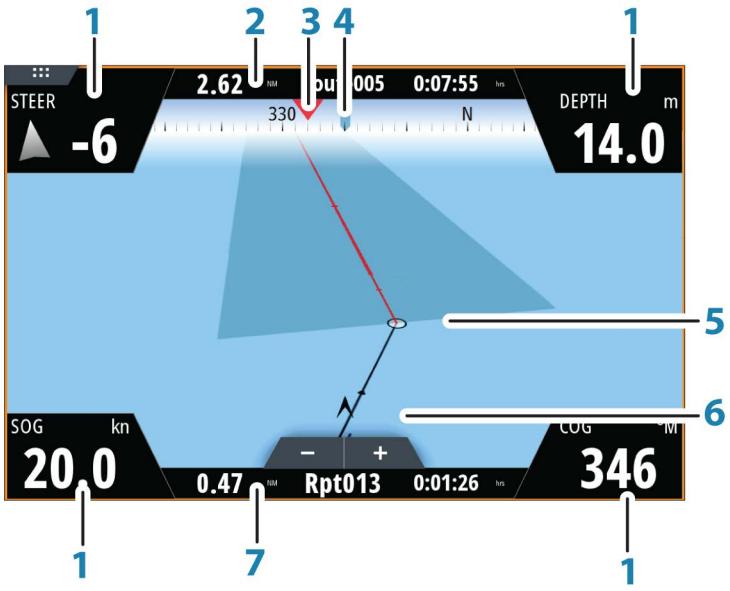
If autopilot functionality is included in your system, the autopilot can be set to automatically navigate the vessel.

For information about positioning waypoints and creating routes, refer to *"Waypoints, Routes, and Tracks"* on page 37.

Navigation panels

The Nav and Position panels can be used to display information when you are navigating.

The Nav panel



The Nav panel is activated from the Home page, either as a full page panel or as part of a multiple panel page.

1 **Data fields**

2 **Route information**

3 **Vessel heading**

4 **Bearing to next routepoint**

5 **Bearing line with allowed off course limit**
When travelling on a route the bearing line shows the intended course from one waypoint towards the next. When navigating towards a waypoint (cursor position, MOB or an entered lat/lon position), the bearing line shows the intended course from the point at which navigation was started towards the waypoint.

6 **Vessel symbol**
Indicates distance and bearing relative to the intended course. If the XTE (Cross Track Error) exceeds the defined XTE limit, this is indicated with a red arrow including the distance from the track line. Refer to *"XTE limit"* on page 45.

7 **Routepoint information**

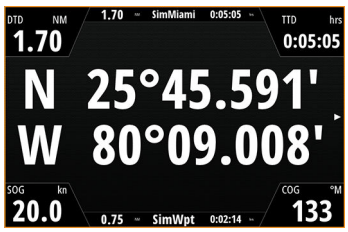
Position panels

You can switch between displaying the Nav panel or the Position panel. The Position panel is activated from the menu.

By default, there is one position panel available showing GPS position.

If Loran is enabled, there are two position panels. This is indicated with arrow symbols on left and right side of the panel.

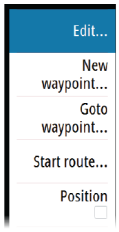
You toggle between the panels by selecting the left or right arrow symbols, or by using the arrow keys.



GPS position info

Loran position info

Edit data fields



To change the data fields displayed on the Navigation panels:

1. Activate the menu
2. Select the edit option from the menu
3. Activate the field you want to edit
4. Select the information type
5. Save your changes.

Navigate to cursor position

You can start navigating to a cursor position on any chart, radar, or Echosounder panel.

Position the cursor at the selected destination on the panel, and then select the **Goto Cursor** option in the menu.

→ ***Note:*** The **Goto Cursor** menu option is not available if you are already navigating.

Navigate a route

You can start navigating a route from the chart panel or from the **Route** dialog.

When route navigation is started, the menu expands and shows options for canceling the navigation, for skipping a waypoint, and for restarting the route from current vessel position.

Starting a route from the chart panel

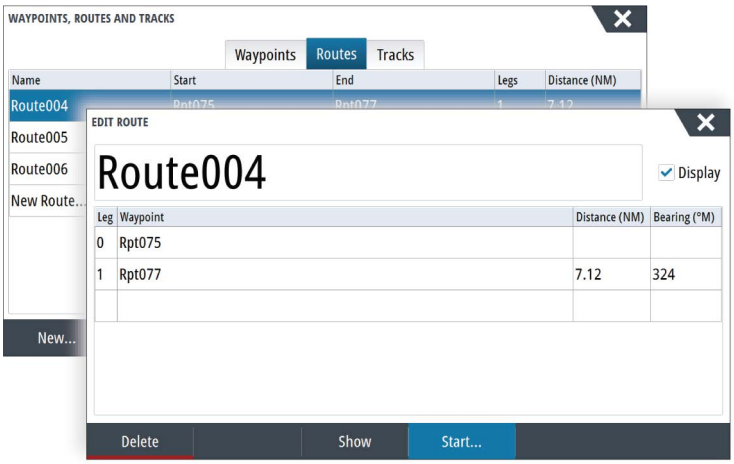
Activate a route on the panel, and then select the route navigation option from the menu.

You can select a routepoint to start navigating from a selected position.

Start navigating a route from the Route dialog

You can start navigating from the **Route** dialog, activated by:

- Selecting the **Waypoint** tool from the **Home** page and then the **Routes** tab
- Selecting the route details from the menu



Cancel navigation

When you are navigating, the menu includes an option for cancelling the navigation.

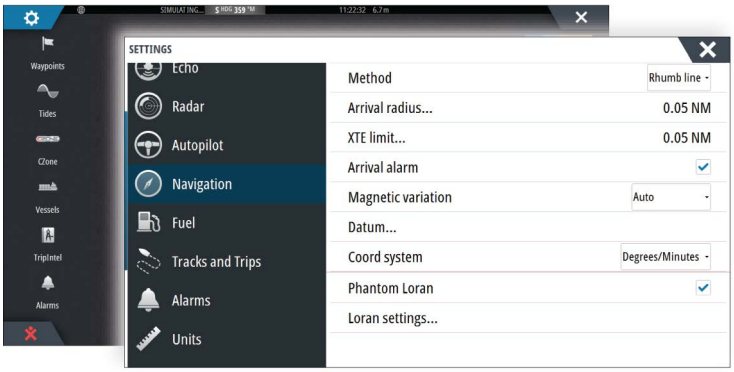
Navigating with the autopilot

When you start navigation on a system with autopilot functionality, you are prompted to set the autopilot to navigation mode.

→ ***Note:*** The prompt to set the autopilot to navigation mode is disabled if the boat type is set to SAIL in the Autopilot Commissioning dialog.

If you choose not to engage the autopilot or if your boat is set to SAIL, the autopilot can be set to navigation mode from the Autopilot Controller later on. For more information about autopilot functionality, refer to *"Autopilot"* on page 50.

Navigation settings



Navigation method

Different methods are available for calculating the distance and bearing between any two points on a chart.

The Great circle route is the shortest path between two points. However, if you are to travel along such a route, it would be difficult to steer manually as the heading would constantly be changing (except in the case of due north, south, or along the equator).

Rhumb lines are tracks of constant bearing. It is possible to travel between two locations using Rhumb line computation, but the distance would usually be greater than if Great circle is used.

Arrival radius

Sets an invisible circle around the destination waypoint.

The vessel is considered arrived at the waypoint when it is within this radius.

XTE limit

This setting defines how far the vessel can deviate from the selected route, if the vessel goes beyond this limit, an alarm is activated.

Arrival alarm

When the arrival alarm is enabled, an alarm is activated when the vessel reaches the waypoint or when it is within the specified arrival radius.

Magnetic variation

Magnetic variation is the difference between true bearings and magnetic bearings, caused by different locations of the Geographic and the Magnetic north poles. Any local anomalies such as iron deposits might also affect the magnetic bearings.

When set to Auto, the system automatically converts magnetic north to true north. Select manual mode if you need to enter your own local magnetic variation.

Datum

Most paper charts are made in the WGS84 format, which also is used by the NSS evo3.

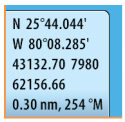
If your paper charts are in a different format, you can change the datum settings accordingly to match your paper charts.

Coordinate system

Several coordinate systems can be used to control the format for latitude and longitude coordinates displayed on the chart panel.

Phantom Loran

Enables use of Phantom Loran positioning system.



Loran settings

Defines Loran chains (GRI) and preferred station for waypoint entry, cursor position and position panel.

The graphic example shows a cursor position window with Loran position information.

For more information refer to your Loran system documentation.

7

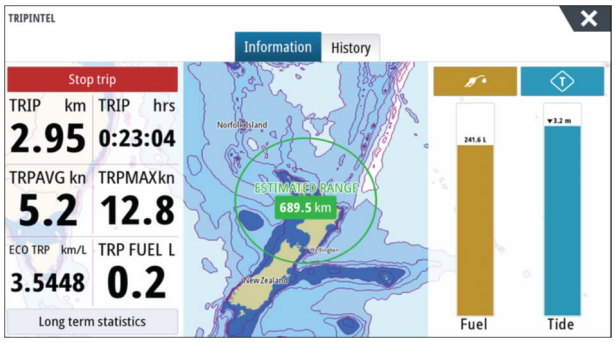
TripIntel

TripIntel lets you store and recall information on trips. You can use the information to make informed decisions prior to commencing a trip, or when a trip is underway.

→ ***Note:*** Vessel Fuel setup is required for this feature. Refer to the unit's separate installation manual.

→ ***Note:*** For best results, it is recommended to run software version 2.4.0 or newer in your EP-85R Storage Device or latest software in your Fuel Data manager.

Select the TripIntel button on the Tool panel to display the TripIntel page.



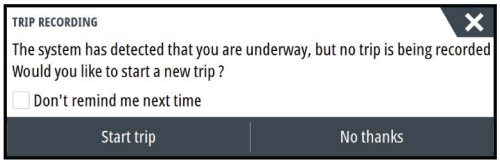
Current trip statistics

The Information tab on the TripIntel page shows current trip statistics:

- Distance traveled
- Time traveled
- Average speed
- Maximum speed
- Fuel economy
- Fuel used

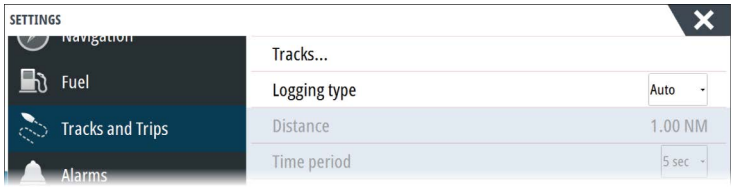
Automatic trip recording

There is an automatic trip detection feature. When you start navigating you are prompted to start recording the trip if no trip is currently underway and your speed has been more than 2 knots for 20 seconds. You will be prompted to continue a trip or start a new trip if the trip was not explicitly saved before a power off.



You can manually start the recording later from the TripIntel page.

You can turn off the automatic trip detection feature from the Tracks and Trip settings dialog.



Start and stop trip recordings

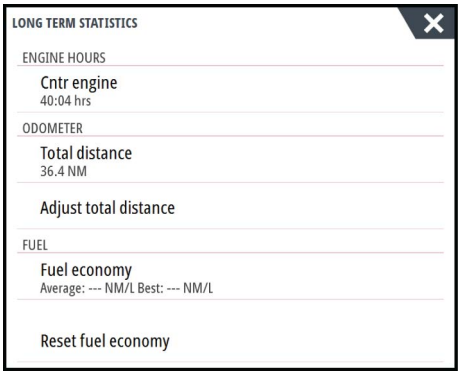
If you have selected to not start recording a trip from the automatic trip detection prompt, you can manually start a recording from the TripIntel page.

The **Start** and **Stop** trip options let you specify a trip recording. You can use them to segment a single passage into multiple trips providing a finer level of control of the information that is logged for a journey.

Long-term statistics

Long term statistics

Select Long Term Statistics to view seasonal trip information such as engine running hours, total distance traveled, and fuel economy.



Adjust total distance

Select the Adjust total distance button to change the Total distance. Use this option if you have not recorded a trip or part of a trip that you have taken and want to include the distance in the Total distance statistic.

Reset fuel economy

Select **Reset fuel economy** to reset the fuel economy in the Fuel economy gauge on the Instrument bar.

Estimated fuel range ring

The Estimated fuel range ring on the TripIntel page represents the estimated total distance that the boat can travel based on historical consumption, and the amount of fuel left in the tanks.

→ ***Note:*** The Estimated fuel range ring represents fuel consumption on a one way trip only, it does not include fuel estimates for the return trip to your current location. It represents the distance in which your boat will completely run out of fuel.

→ ***Note:*** The Estimated fuel range ring is calculated from the Vessel Fuel Remaining only, not level sensors. When recording your refueling, you must 'Set to full' or 'Add fuel' for the range ring to be accurate.

Fuel gauge

The Fuel Gauge on the TripIntel page, and on the economy gauge is displayed based on the setting in the Vessel Setup page. You must select the Fuel Remaining measurement type.

- Fuel consumed by engine(s)
- Fuel tank level sensor(s)

→ ***Note:*** This is only for the TripIntel page and the economy graph.

Record your refueling

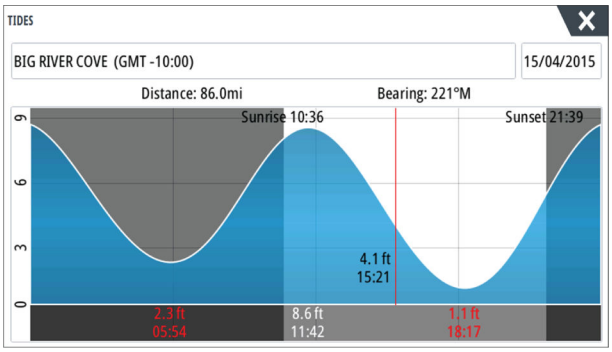
Select the Fuel button to record the amount of your refuel. The refuel information is used for calculating the Vessel Fuel Remaining amount.

Tide gauge

The Tide gauge on the TripIntel page shows the tide height at the selected tide station.

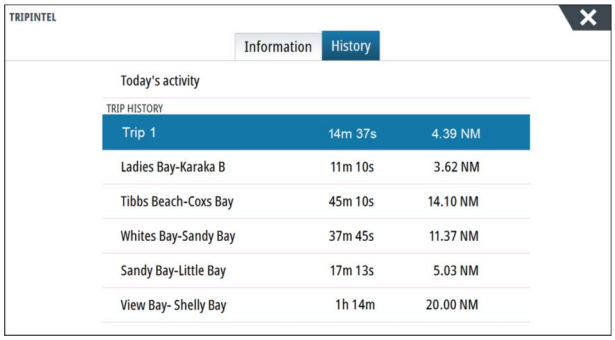
Tide graphs and stations

Tide stations on Chart cards provide tide information. Select the Tide button to view tide graphs and specify which Tide station provides tide information. If no tide station is chosen, tide information from the nearest tide station is used.



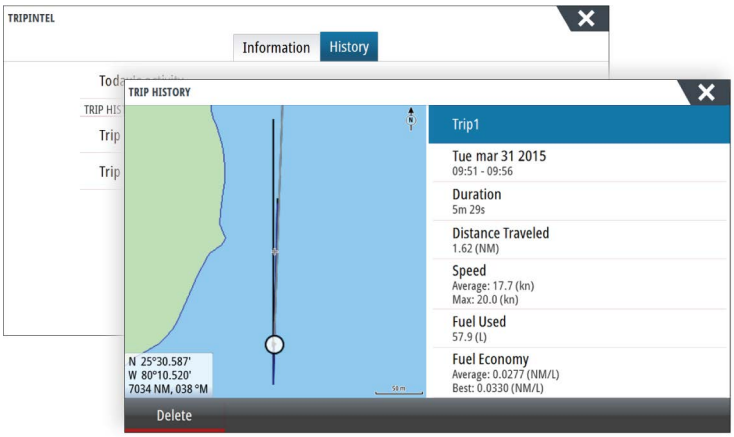
View trip recordings

Recorded trips are listed in the History tab on the TripIntel page. To view detailed trip information select a trip in the list.



Change trip recording names

Trips are given generic names when they are created. You can change the trip name to a more meaningful one by selecting it on the History list and then select the name in the Trip History details dialog. This opens the Trip name dialog where you can change the trip name.


TRIPINTEL
Information
History
TRIP HISTORY
Trip1
Tue mar 31 2015
09:51 - 09:56
Duration
5m 29s
Distance Traveled
1.62 (NM)
Speed
Average: 17.7 (kn)
Max: 20.0 (kn)
Fuel Used
57.9 (L)
Fuel Economy
Average: 0.0277 (NM/L)
Best: 0.0330 (NM/L)
N 25°30.587'
W 80°10.520'
7034 NM, 038 °M
Delete

8 Autopilot

If a compatible autopilot computer is connected to the system, autopilot functionality is available in the system.

The system does not allow for more than one autopilot computer on the network.

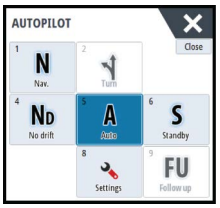
The display unit automatically detects the autopilot computer available on the network and presents settings, configuration and user options for the connected computer.

For details about installing and configuring an autopilot computer, refer to the separate manuals that come with the autopilot computer.

Safe operation with the autopilot

⚠ Warning: An autopilot is a useful navigational aid, but DOES NOT replace a human navigator.

Activating the autopilot

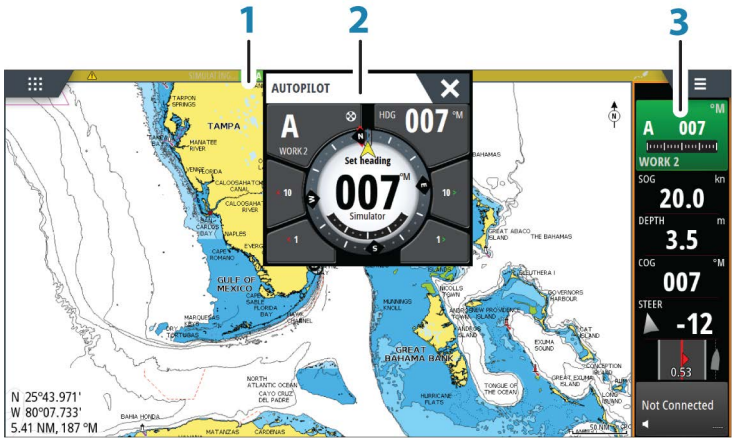


You activate the autopilot from any panel by selecting the autopilot tile in the Instrument bar, followed by selecting a mode in the **Autopilot Controller**.

Switching from automatic mode to manual steering

You switch the autopilot to STBY mode from any automatic operation mode from the autopilot pop-up or using a physical standby key.

Autopilot indication on the pages



1 Autopilot indication in Status bar

2 Autopilot pop-up

3 Autopilot tile in Instrument bar

Autopilot mode indication in the Status bar

The Status bar shows autopilot information as long as an autopilot computer is connected to the network.

Icons are included if the autopilot is passive or locked by another autopilot control unit.

Autopilot pop up

You control the autopilot from the autopilot pop-up.

The pop-up has a fixed position on the page, and it is available for all pages except when an Autopilot panel is active.

As long as the autopilot pop-up is active, you cannot operate the background panel or its menu.

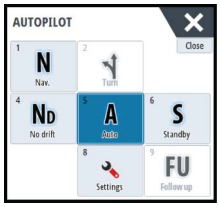
You remove the pop-up from a page by selecting the **X** in the upper right corner, or by pressing the **X** key. You turn it on again by selecting the autopilot tile in the instrument bar.

The following pop-ups are available:

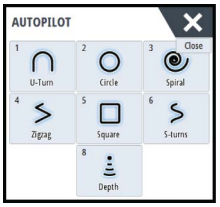
- **Autopilot controller**, showing active mode, heading, rudder and various steering information depending on active autopilot mode. Manual adjustments to the set heading can only be made when the port and starboard arrow indicators are illuminated red and green.
- **Mode selection**, includes access to turn pattern selection.
- **Turn pattern selection**

→ ***Note:*** The turn steering option is not available if the boat type is set to SAIL in the Autopilot Commissioning dialog, instead the tack/gybe feature is implemented. Refer to *"Tacking in AUTO mode"* on page 52 and *"Tacking in WIND mode"* on page 55.

Autopilot controller



Mode selection



Turn pattern selection

Autopilot tile in Instrument bar

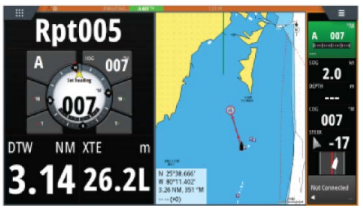
You can select to show the autopilot tile in the Instrument bar.

If the autopilot pop-up is turned off you can turn it on by selecting the tile in the Instrument bar.

The Autopilot panel

The autopilot panel is used to display navigation data. It can be shown as a full screen panel, or in a multi-panel page.

The number of data fields included in the autopilot panel is dependent on available panel size.



Data fields

The following abbreviations are used in the autopilot panel:

CTS	Course to steer
DTD	Distance to destination
DTW	Distance to next waypoint
SOG	Speed over ground
COG	Course over ground
XTE	Cross track error (L: left or R: right)

Autopilot modes

The autopilot has several steering modes. The number of modes and features within the mode depend on the autopilot computer, the boat type and available inputs, as explained in the description of the following steering modes.

Standby mode

Standby mode is used when you steer the boat at the helm. Switch the autopilot to Standby mode from any operation by selecting the **Standby** mode button in the autopilot pop-up or using a physical standby key.

Non-Follow Up (NFU, Power steering)

In NFU mode you use the port and starboard arrow buttons in the autopilot pop-up to control the rudder. The rudder will move as long as the button is pressed.

- Activate NFU mode by selecting the port or starboard arrow button in the pop-up when the autopilot is in Standby or FU mode.

You return to Standby mode by selecting the **Standby** mode button in the autopilot pop-up or using a physical standby key.

Follow-up steering (FU)

In FU mode you use the rotary knob to control the rudder angle. Press the rotary knob, then turn the knob to set the rudder angle. The rudder moves to the commanded angle and then stop.

- You select FU mode from the autopilot pop-up

➔ ***Note:*** If the autopilot pop-up is closed or if an alarm dialog is activated on the unit controlling the autopilot in FU mode, the autopilot automatically changes to Standby mode.

⚠ Warning: While in FU mode you cannot take manual control of the wheel.

AUTO mode (auto compass)

In AUTO mode the autopilot issues rudder commands required to steer the vessel automatically on a set heading.

- You select AUTO mode from the autopilot pop-up. When the mode is activated, the autopilot selects the current boat heading as the set heading.

Changing set heading in AUTO mode

You adjust the set heading by using the rotary knob, the Port/Starboard arrow buttons in the autopilot pop-up, or by selecting the Heading tile in the autopilot pop-up and then entering the desired heading value.

An immediate heading change takes place. The new heading is maintained until a new heading is set.

Heading capture

When the vessel is turning in AUTO mode, an instant reset of the mode activates the heading capture function. This automatically cancels the turn, and the vessel continues on the heading read from the compass the very moment you re-activated the mode.

Tacking in AUTO mode

➔ ***Note:*** The tack function is only available when the system is set up for boat type SAIL in the Autopilot Commissioning dialog and is not available for NAC-1 autopilot computers.

Tacking should only be performed into the wind and must be tried out in calm sea conditions with light wind to find out how it works on your boat. Due to a wide range of boat characteristics (from cruising to racing boats) the performance of the tack function may vary from boat to boat.

Tacking in AUTO mode is different from tacking in WIND mode. In AUTO mode the tack angle is fixed and as defined by the user. For more details, refer to *"Tacking in WIND mode"* on page 55.

You initiate the tack function from AUTO mode.

When tacking direction is selected the autopilot changes the current set course according to the set fixed tacking angle.

You can interrupt the tack operation as long as the tack dialog is open by selecting the opposite tacking direction. When interrupted the boat returns to the previous set heading.

NoDrift mode

NoDrift mode combines the autopilot and the positioning information from the GPS.

In NoDrift mode the vessel is steered along a calculated track line in a direction set by the user. If the vessel's heading is drifting away from the original heading due to current and/or wind, the vessel follows the line with a crab angle.

1. Turn the vessel to the desired heading
2. Activate the NoDrift mode. The autopilot draws an invisible bearing line based on current heading from the boat's position

Unlike in AUTO (compass) mode, the autopilot now uses the position information to calculate the cross track error, and automatically keeps your track straight.

You use the port/starboard arrow panel buttons in the autopilot pop-up or the rotary knob to reset the bearing line while in NoDrift mode.

Dodging

If you need to avoid an obstacle when using NoDrift mode, you can set the autopilot to Standby mode and power steer or use the helm until the obstacle is passed.

If you return to NoDrift mode within 60 seconds you can select to continue on previous set bearing line.

If you do not respond, the dialog disappears and the autopilot goes to NoDrift mode with current heading as set bearing line.

NAV mode

> ⚠ Warning: **NAV** mode should only be used in open waters.

You can use the autopilot to automatically steer the boat to a specific waypoint location, or along a pre-defined route. The position information from the GPS is used to change the course to steer to keep the boat on the track line and to the destination waypoint.

→ ***Note:*** To obtain satisfactory navigation steering, the NSS evo3 must have valid position input. Autosteering must be tested and determined satisfactory prior to entering the NAV mode.

Start automatic navigating

When you start navigating a route or to a waypoint from the chart panel, you are prompted to set the autopilot to NAV mode. If you reject this request, you can start NAV mode from the Autopilot controller.

→ ***Note:*** The prompt to set the autopilot to navigation mode is disabled if the boat type is set to SAIL in the Autopilot Commissioning dialog. To start navigating, you must select NAV mode from the Autopilot controller.

When NAV mode is initiated, the autopilot automatically keeps the vessel on the leg.

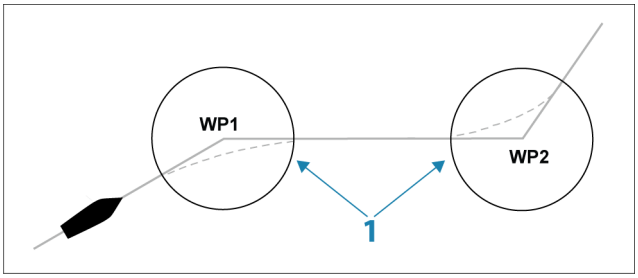
When the vessel reaches the arrival circle for a routepoint, the autopilot gives an audible warning and displays a dialog with the new course information. If the required course change to the next waypoint is less than the Navigation change limit, the autopilot automatically changes the course. If the required course change to next waypoint in a route

is more than the set limit, you are prompted to verify that the upcoming course change is acceptable.

→ ***Note:*** For information about navigation settings, refer to *"Navigation settings"* on page 44.

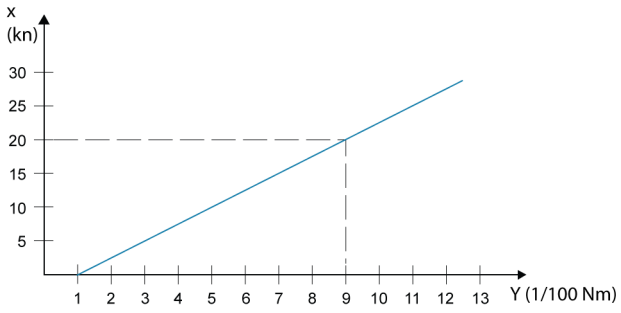
Waypoint arrival circle

The Arrival radius defines the point at which a turn is initiated when you are navigating a route.



The arrival circle (**1**) should be adjusted according to boat speed. The higher the speed, the wider the circle. The intention is to make the autopilot start the heading change in due time to make a smooth turn onto the next leg.

The figure below may be used to select the appropriate waypoint circle when creating the route.



X axis = Boat speed in knots
Y axis = Arrival circle, radius in 1/100 Nm

Example: With the speed of 20 knots you should use a waypoint circle with radius 0.09 Nm.

→ ***Note:*** The distance between any waypoints in a route must not be smaller than the radius of the waypoint arrival circle.

WIND mode

→ ***Note:*** The WIND mode is only available if the system has been set up for sailboat in the Autopilot Commissioning dialog. This mode is not available for NAC-1 autopilot computers.

Before the WIND mode is started it must be verified that valid input from wind transducer is available.

Initiate wind steering as follows;

1. Switch the Autopilot to AUTO mode
2. Adjust the boat heading until wind angle is according to the angle you want to maintain
3. Select the mode indication in the autopilot controller to activate the autopilot menu, and select WIND mode

The set course to steer (CTS) and set wind angle are entered from the compass heading and the wind transducer at the moment the WIND mode is selected. From that point the autopilot changes the course to maintain the wind angle as the wind direction may change.

Tacking in WIND mode

→ ***Note:*** The tack function is only available when the system is set up for boat type SAIL in the Autopilot Commissioning dialog and is not available for NAC-1 autopilot computers

Tacking should only be performed into the wind and must be tried out in calm sea conditions with light wind to find out how it works on your boat. Due to a wide range of boat characteristics (from cruising to racing boats) the performance of the tack function may vary from boat to boat.

Tacking in WIND mode as compared to AUTO mode is performed when sailing with apparent or true wind as the reference. The true wind angle should be less than 90 degrees.

The rate of turn during the tack will be given by the Tack time defined in the sailing parameter setup. The tack time is also controlled by the speed of the boat to prevent loss of speed during a tack.

You can initiate the tack function from WIND mode.

When you initiate the tacking, the autopilot immediately mirrors the set wind angle to the opposite side of the bow.

You can interrupt the tack operation as long as the tack dialog is open by selecting the opposite tacking direction. When interrupted, the boat returns to the previous set heading.

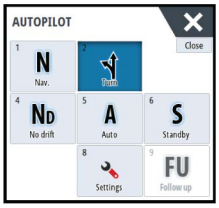
Gybing

Gybing is possible when the true wind angle is larger than 120°.

The time to make a gybe is determined by the speed of the boat to make it as quick as possible within control.

Turn pattern steering

The autopilot includes a number of automatic turn steering features when the autopilot is in AUTO mode.



→ ***Note:*** The turn steering option is not available if the boat type is set to SAIL in the Autopilot Commissioning dialog, instead the tack/gybe feature is implemented.

Initiating a turn

You start the turn by selecting the relevant turn icon, followed by selecting the port or starboard options in the turn dialog to select the turn direction.

Stopping the turn

You can stop the turn from within the turn dialog.

At any time during a turn you can select **Autopilot standby** in the System Controls dialog to return to Standby mode and manual steering.

You can also stop a turn by pressing a physical standby key to return to Standby mode and manual steering.

Turn variables

The turn steering options, except the C-turn, have settings that you can adjust before you start a turn and at any time when the boat is in a turn.

U-turn

U-Turn changes the current set heading to be 180° in the opposite direction.

The turn rate is identical to Rate limit settings. This cannot be changed during the turn.

→ ***Note:*** Refer to the separate NSS evo3 Installation manual for information about Rate limit settings.

C-turn

Steers the vessel in a circle.

You can adjust the Rate of turn from the turn dialog before the turn is initiated and during the turn. Increasing the turn rate makes the vessel turn a smaller circle.

Spiral turn

Spiral-turn makes the vessel turn in a spiral with a decreasing or increasing radius. You set the initial radius before the turn is initiated, and the change per turn during the turn. If the change per turn is set to zero, the vessel turns in a circle. Negative values indicate decreasing radius while positive values indicate increasing radius.

Zigzag turns

Steers the vessel in a zigzag pattern.

For navigating in a zigzag pattern, you set the initial heading change before the turn is started.

During the turn you can alter the main heading, the heading change, and the leg distance.

Square turn

Makes the vessel automatically turn 90° after having travelled a defined leg distance.

At any time during the turn you can change the main heading and the distance of the leg until the vessel makes a new 90° turn.

Lazy S-turn

Makes the vessel yaw around the main heading.

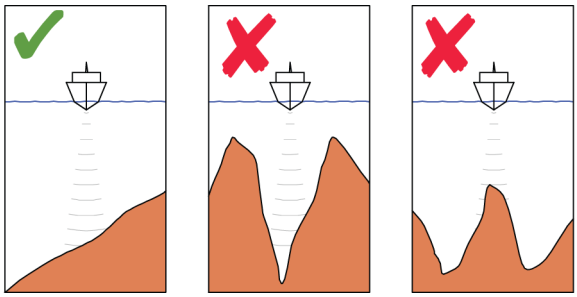
You set the selected heading change before the turn is started.

During the turn you can alter the main heading, the heading change and the turn radius from within the turn dialog.

Depth contour tracking, DCT™

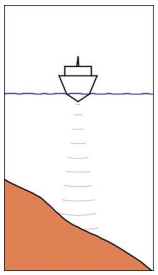
If the system has Echosounder input, the autopilot can be set to follow a depth contour.

> ⚠ Warning: Do not use this feature unless the seabed is suitable. Do not use it in rocky waters where the depth is varying significantly over a small area.

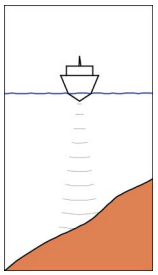


Use the following process to initiate DCT steering:

1. Ensure that you have depth reading on the panel or on a separate depth instrument.
2. Steer the boat to the depth you want to track, and in the direction of the depth contour.
3. Activate **AUTO** mode, select depth contour steering and monitor the depth reading.
4. Select the port or starboard option in the turn dialog to initiate the depth contour steering to follow the bottom sloping to starboard or to port:



Port option
(depth decreases to port)



Starboard option
(depth decreases to starboard)

The following parameters are available for depth contour tracking:

Depth gain

This parameter determines the ratio between commanded rudder and the deviation from the selected depth contour. The higher depth gain value the more rudder is applied.

If the value is too small, it takes a long time to compensate for drifting off the set depth contour, and the autopilot fails to keep the boat on the selected depth.

If the value is set too high, the overshoot increases and the steering is unstable.

Contour Cross Angle (CCA)

The CCA is an angle that is added to or subtracted from the set course.

With this parameter you can make the boat yaw around the reference depth with lazy-s movements.

The larger the CCA, the bigger yawing is allowed. If you the CCA set to zero there are no lazy-s movements.

Using the NSS evo3 in an AP24/AP28 system

Command transfer

If your NSS evo3 is connected to an autopilot system including an AP24 or AP28 control unit, only one control unit can be active at the same time. An inactive control unit is indicated with a square with a cross symbol in autopilot controller pop-up.

Locking remote stations

The AP24/AP28 includes a Remote Lock function that disables autopilot control from other units. A locked control unit is indicated with a key symbol in autopilot controller pop-up.

When the remote lock function is enabled on an AP24/AP28 control unit, only the active control unit stays in command. No transfer of command to NSS evo3 or other autopilot control units on the system can take place.

You can only unlock the remote stations from the AP24/AP28 unit in command.

Using the autopilot in an EVC system

When the NSS evo3 is connected to an EVC system via the SG05, you can take manual control of the steering regardless of the autopilot mode.

The mode indicator on the pilot pop-up is replaced by a dash to indicate EVC override.

The system returns to NSS evo3 control in standby mode if no rudder command is given from the EVC system within a predefined period.

Using the NSS evo3 in an AP70/AP80 system

If your MFD is connected to an AP70/AP80 autopilot system, the MFD can be used to operate the autopilot.

In an AP70/AP80 autopilot system, only one control unit can be active at the same time.

→ ***Note:*** The MFD cannot be used to configure or commission an AP70/AP80 system.

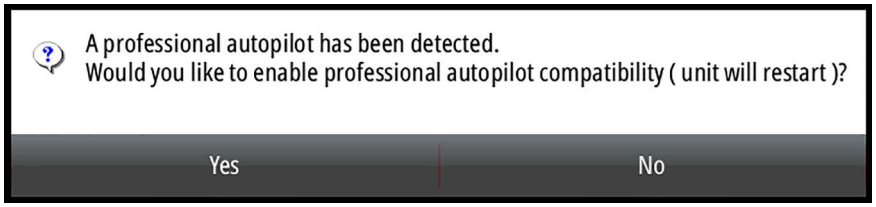
	The thruster symbol on the MFD Mode button indicates thrusters are defined in the AP70/AP80 autopilot system.

For more information about AP70/AP80 autopilot system, refer to the separate AP70/AP80 documentation.

Autopilot detection

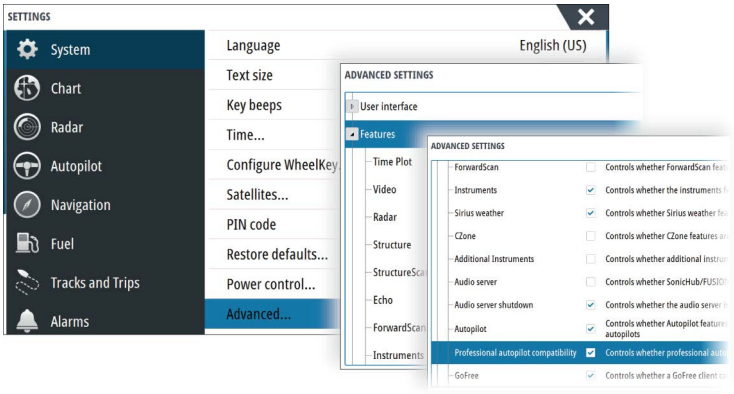
The AP70/AP80 system has its own source groups. For compatibility reasons if the MFD is going to be used to run the AP70/AP80 system, the MFD must use the same source groups as the AP70/AP80 system.

When a MFD is connected to an AP70/AP80 system, it detects the AP70/AP80 system and a prompt is displayed asking if the MFD should restart and use the AP70/AP80 system source groups (restart in professional autopilot compatibility mode).



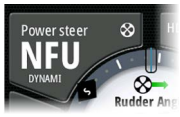
If yes is selected, then the MFD restarts using the same source groups as the AP70/AP80 system. If No is selected then the question is not asked again and the MFD cannot be used to operate the AP70/AP80 system.

This setting can be changed by selecting Professional autopilot compatibility in the Advanced settings dialog.



Running thruster symbols

When thrusters are running in an AP70/AP80 system, thruster symbols are displayed in the MFD Autopilot controller pop-up.



	Clockwise thrust rotation.
	Counter-clockwise thrust rotation.

Command transfer

An AP70/AP80 system can be set up as a Master system or an Open system.

In a Master setup, the master controller gives control to other control units. An MFD cannot be the master controller in a Master setup. In a Master setup, the MFD can request to control the autopilot and the MFD must accept control from the master controller after the master controller approves transfer of control to the MFD. Once control is accepted, the MFD is active and can be used to operate the autopilot.

In an Open system setup, the MFD can take control of the autopilot by selecting the Mode button on the Autopilot controller pop-up and then selecting **Take cmd** in the CMD transfer

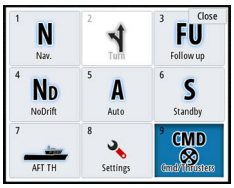
dialog. When this occurs the MFD becomes active and the other control units become passive.

In an Open system, control stations can be temporarily locked to avoid accidental control from another control unit. When the MFD has control in an Open system, the MFD can lock and unlock all passive control units. If the MFD is passive and locked, it can request control of the autopilot from the active control unit. The MFD must accept control from the active controller after the active controller approves transfer of control to the MFD.

The following indicators are displayed in the Mode button of the Autopilot controller pop-up:

	Passive - MFD does not have control of the autopilot. If only the passive icon is displayed, it means it is an Open unlocked system and selecting the Mode button takes control of the autopilot.
	Locked system - The key icon indicates it can be a Master system or a locked Open system. If the key icon is displayed, and the <10, <1, 10>, 1> buttons are enabled (red or green colored arrows and white numbers) then the MFD is active and controls the autopilot.  If the key icon is displayed, and the <10, <1, 10>, 1> buttons are disabled (black arrows and numbers) then the MFD is passive and does not control the autopilot. Select the Mode button to request control from the active control unit if it is a locked Open system, or the master controller if it is a Master system. 
none	Active in Open system - the MFD has control of the autopilot in an Open system.

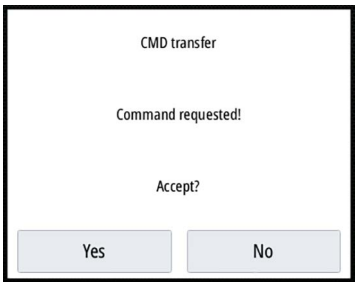
Locking and un-locking other control units

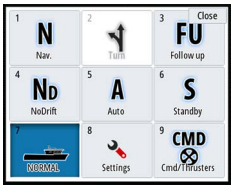


Select the Cmd/Thruster option in the Mode selection pop-up to open the Cmd/Thruster selection pop-up.

Unlock other stations - allows other control units to take control of the autopilot without requesting permission.

Lock other stations - locks other control units from taking control of the autopilot. When other control units are locked, they must request control of the autopilot from the MFD. When control of the autopilot is requested from another control unit, a prompt is displayed in the MFD to authorize command transfer.



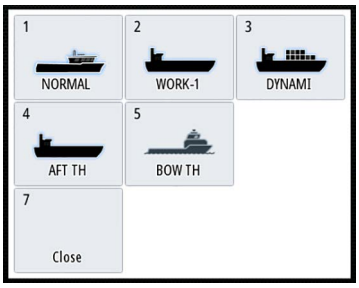


Selecting the work profile

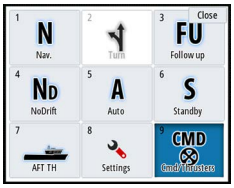
The AP70/AP80 can be set up with 6 different work profiles associated with different work modes or preferences. Use the AP70/AP80 controller to set up the different work profiles. In the MFD, the active work profile is displayed in the Mode button of the MFD Autopilot controller pop-up and the Mode selection pop-up. If the MFD has control of the autopilot, you can use it to select which work profile is active.

To change the work profile using the MFD, the autopilot must be in standby mode.

1. Select the Mode button in the Autopilot controller pop-up to display the Mode selection pop-up
2. Select the Work profiles button to display defined work profiles in the Work profiles selection pop-up



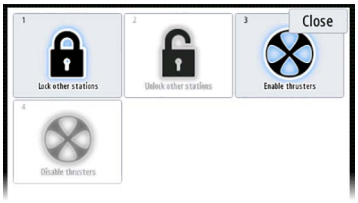
3. Select the work profile you want to activate
4. Select Close to close the Work profiles selection pop-up.



Enabling and disabling thrusters

Select the Cmd/Thrusters button in the Modes selection pop-up to open the Cmd/Thrusters selection pop-up.

The Cmd/Thrusters selection pop-up provides options to enable or disable thrusters.

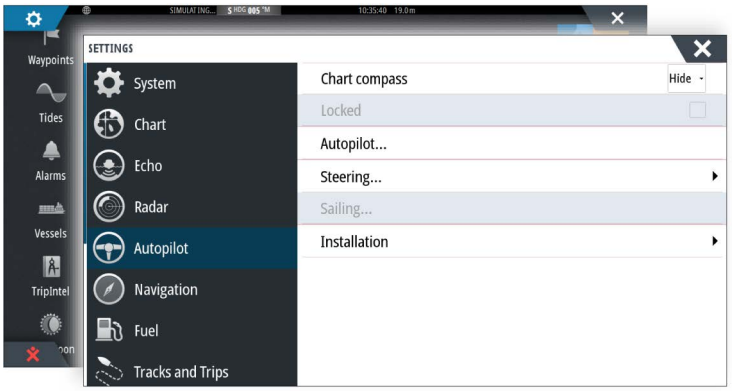


Autopilot settings

The autopilot settings can be split between settings done by the user, and settings done during installation and commissioning of the autopilot system.

- User settings can be changed for various operational conditions or user preferences
- Installation settings are defined during commissioning of the autopilot system. No changes should later be done to these settings

Both user settings and installation settings depends on which autopilot computer that is connected to the system.



The following sections describe the settings that can be changed by the user. The settings are described per autopilot computer.

Installation settings are available in the documentation following the autopilot computers.

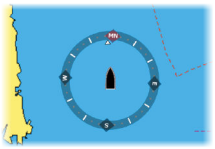


Chart compass

You can select to show a compass symbol around your boat on the chart panel. The compass symbol is off when the cursor is active on the panel.

Locking autopilot operation from a unit

You can lock a unit to prevent unauthorized operation of the autopilot. When the unit is locked, it is indicated with a lock symbol and with text in the pop up. No automatic modes can be selected from a locked display.

➔ ***Note:*** The lock function is not available on a unit which has autopilot control!

If the NSS evo3 is part of an AP24/AP28 system, all other autopilot control units can be locked for autopilot control from the AP24/ AP28 control unit.

NAC-2/NAC-3 Autopilot computer

Steering (NAC-2/NAC-3)

These options allow for manually changing parameters that were set during the commissioning of the autopilot computer. For more details, refer to the separate documentation for the autopilot computer.

- Turn rate: Preferred turn rate used while turning in degrees per minute
- Rudder gain: This parameter determines the ratio between commanded rudder and the heading error. The higher rudder value the more rudder is applied. If the value is too small it will take a long time to compensate for a heading error, and the autopilot will fail to keep a steady course. If the value is set too high the overshoot will increase and the steering will be unstable.
- Counter rudder: Relation between change in heading error and applied rudder. Higher counter rudder will reduce applied rudder faster when approaching the set heading
- Autotrim: Controls how aggressively the autopilot will apply rudder to compensate for a constant heading offset, e.g. when external forces such as wind or current affects the heading. Lower autotrim will give faster elimination of a constant heading offset

➔ ***Note:*** In VRF mode this parameter controls the time constant of the rudder estimate. A lower value makes the rudder estimate faster, i.e. that it will more quickly catch up with the boat's movements.

- Init rudder: Defines how the system moves the rudder when switching from manual steering to an automatic mode.
  - Center: Moves the rudder to zero position
  - Actual: Maintains the rudder offset
- Rudder limit: Determines the maximum rudder movement in degrees from midship position that the autopilot can command the rudder in the automatic modes. The Rudder

limit setting is only active during autosteering on straight courses, NOT during course changes. Rudder limit does not affect Non-Follow-up steering

- Off heading limit: Sets the limit for the off heading alarm. An alarm occurs when the actual heading deviates from the set heading more than the selected limit
- Track response: Defines how fast the autopilot shall respond after having registered a cross track distance
- Track approach angle: Defines the angle used when the vessel is approaching a leg. This setting is used both when you start navigating and when you use track offset
- Course change confirm angle: Defines the limits for course change to next waypoint in a route. If the course change is more than this set limit, you are prompted to verify that the upcoming course change is acceptable.

Sailing (NAC-2/NAC-3)

➔ ***Note:*** Sailing parameters are only available when the boat type is set to Sail.

- Wind mode: Select what wind function the autopilot will use when in wind mode
  - Auto:
    If TWA is <70º: Wind mode will use AWA
    If TWA is ≥70º: Wind mode will use TWA
  - Apparent
  - True
- Tack time: Controls the rate of turn (tack time) when performing a tack in wind mode.
- Tack angle: Controls the angle that the boat will tack to between 50º - 150º in AUTO mode
- Manual speed: If neither boat speed or SOG data is available and or deemed reliable a manual value for speed source can be entered and used by the autopilot to aid steering calculations

Steering response

➔ ***Note:*** Only available for NAC-1 autopilot computers.

Used to increase or decrease the steering sensitivity. A low response level reduces the rudder activity and provides a more ***loose*** steering. A high response level increases the rudder activity and provides more ***tight*** steering. Too high a response level will cause the boat to make ***S*** movements.

Installation

Used for autopilot installation and commissioning. See the separate NSS evo3 Installation manual.

Commissioning

➔ ***Note:*** Only available for NAC-1 autopilot computers.

Used for commissioning the rudder or virtual rudder feedback. See the separate NSS evo3 Installation manual.

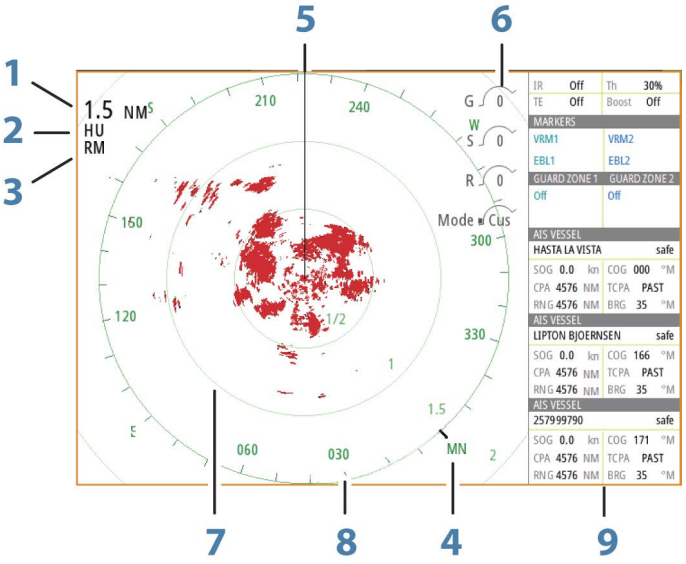
9 Radar

The radar panel can be set up as a full screen view or combined with other panels.

The radar image can also be displayed as an overlay on a chart panel. For more information, see *"Chart overlay"* on page 29.

→ ***Note:*** Radar overlay requires data from a heading sensor or compass to ensure proper orientation with the chart.

The radar panel



1 Range
2 Orientation
3 Motion
4 Compass*
5 Heading line*
6 Rotary controls
7 Range rings*
8 Range markers*
9 Data bar

* Optional radar symbology.

Radar symbology can be turned ON/OFF collectively from the Radar menu, or individually as described in *"Radar settings panel"* on page 73.

Dual radar

You can connect to any combination of two supported radars and see both radar images at the same time.

→ ***Note:*** Interference will be seen on the Broadband Radar on most ranges when a pulse or Halo radar, and a Broadband radar are transmitting at the same time on the same boat. We recommend to only transmit on one radar at a time. For example, transmit Broadband radar for typical navigational usage, or pulse or Halo radar to locate weather cells, defined coastlines at a distance and to trigger Racons.

You can select a dual radar panel by pressing and holding the Radar application button on the **Home** page, or by creating a favorite page with two radar panels.

Selecting the radar source

You specify the radar in the Radar panel by selecting one of the available radars in the radar source menu option. If you have a multiple Radar panel, the radar is set individually for each radar panel. Activate one of the radar panels, and then select one of the available radars in the radar source menu option. Repeat the process for the second radar panel, and select an alternative radar for this panel.

→ ***Note:*** The 3-digit radar source number is the last 3 digits of the radar's serial number.

Radar overlay

You can overlay the Radar image on the Chart. This can help you to easily interpret the radar image by correlating the radar targets with charted objects.

→ ***Note:*** A heading sensor must be present in the system for radar overlay.

When the radar overlay is selected, basic radar operational functions are available from the Chart panel's menu.

Selecting radar overlay source on chart panels

To select the radar source of the radar overlay displayed on the chart panel, use the **Radar options** and then **Source** chart panel menu options to select the radar source.

For chart pages with more than one chart with radar overlay, it is possible to set up different radars sources for each chart panel. Activate one of the chart panels and then select one of the available radars in the radar source menu option. Repeat the process for the second chart panel with radar overlay, and select an alternative radar for this panel.

Radar operational modes

The radar's operational modes are controlled from the Radar menu. The following modes are available:

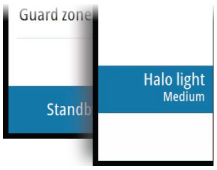
Power off

The power to the radar scanner is turned off. **Power off** is only available when radar is in standby mode.

Standby

The power to the radar scanner is on, but the radar is not transmitting.

→ ***Note:*** You can also put the radar in standby mode from the **System Controls** dialog.



Halo light

Controls the levels of the Halo Radar pedestal blue accent lighting. There are four levels possible for the lighting. The accent lighting can only be adjusted when the radar is in standby mode.

→ ***Note:*** The blue accent pedestal lighting might not be approved for use in your boating location. Check your local boating regulations before turning the blue accent lights ON.

Transmit

The scanner is on and transmitting. Detected targets are drawn on the radar PPI (Plan Position Indicator).

→ ***Note:*** You can also put the radar in transmit mode from the **System Controls** dialog.

Radar Range

You adjust radar range by turning the rotary knob or by selecting the zoom icons on the radar panel.

Dual range

(Broadband 4G and Halo Radar only)

When connected to a Broadband 4G or Halo radar, it is possible to run the radar in Dual Range mode.

The radar appears in the radar sources menu as two virtual radar sources A and B. Range and radar controls for each virtual radar source are fully independent and the source can be selected for a particular chart or radar panel in the same manner as dual radar described in *"Selecting the radar source"* on page 64.

→ ***Note:*** Some controls that are related to physical properties of the radar itself are not independent of source. These are Fast Scan, Antenna Height and Bearing alignment.

MARPA is fully independent and up to 10 targets may be tracked for each virtual radar source.

Up to two independent Guard Zones may also be defined for each virtual radar source.

Using the cursor on a radar panel

By default, the cursor is not shown on a radar panel.

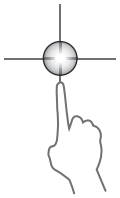
When you position the cursor on the radar panel, the cursor position window is activated and the cursor menu options are displayed.

To remove the cursor and cursor elements from the panel, select **Clear cursor** or press the **X** key.

GoTo cursor

You can navigate to a selected position on the image by positioning the cursor on the panel, then using the **Goto Cursor** option in the menu.

The cursor assist function



→ ***Note:*** The cursor assist function is available if it is enabled. Refer to *"Customizing the long press feature"* on page 19.

The cursor assist function allows for fine tuning and precision placement of the cursor without covering details with your finger.

Activate the cursor on the panel, then press and hold your finger on the screen to switch the cursor symbol to a selection circle, appearing above your finger.

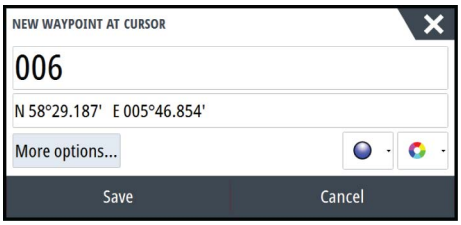
Without removing your finger from the screen, drag the selection circle to the desired position.

When you remove your finger from the screen the cursor reverts to normal cursor operation.

Saving waypoints

A waypoint is saved at the cursor position if active or at the vessel's position if the cursor is not active on the panel, by doing the following:

- Pressing the rotary knob
- Pressing the **Mark** key
- Using the new waypoint option in the menu

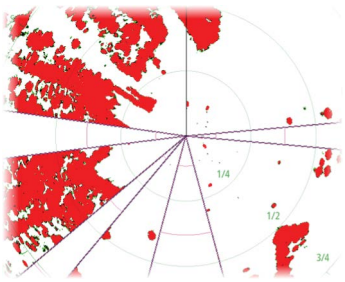


Radar sector blanking

(Halo Radar only)

You can define up to four sectors on the PPI inside which no radar data is transmitted. This enables you to blank-out interference caused by features on your boat or from a secondary radar. The blanking occurs on the main radar image and radar overlay on a chart. An enabled sector is shown as a magenta outline with 3 arcs crossing the blanking area. To specify radar sector blanking, refer to the Halo Radar Installation Manual.

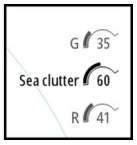
→ ***Note:*** Radar sector blanking is only available for Halo radars.



Main radar PPI

Radar overlay on a chart

Adjusting the radar image

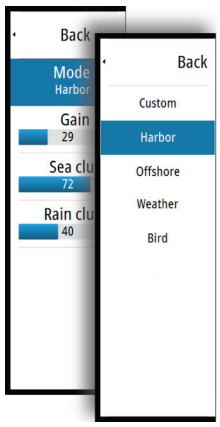


You may be able to improve the radar image by adjusting the radar sensitivity, and by filtering out the random echoes from sea and weather conditions.

The radar control images are located in the upper right corner of the radar panel. You can adjust the image settings by selecting the radar control image or by pressing the rotary knob. The selected control expands and displays its name in full and a slide bar is displayed. You can then adjust the value by turning the rotary know or by using the slide bar.

You can also adjust the image settings from the radar menu.

Radar use modes



(Halo Radar only)

Radar modes are available with default optimal control settings for different environments. The following modes are available:

- **Custom** - In this mode all radar controls can be adjusted and will be retained after a mode change or radar power cycle. Radar defaults are set for general purpose use.
- **Harbor** - In this mode the radar settings are optimized for areas such as busy waterways and large man-made structures where good target discrimination and rapid image updates are needed.
- **Offshore** - In this mode the radar settings are optimized for offshore sea conditions and making isolated targets larger and easy to see.
- **Weather** - In this mode the radar settings are optimized for best detection and presentation of rain clutter. Image update rate is slowed and color depth is increased.
- **Bird** - In this mode the radar settings are optimized for best detection of birds. The radar is set up for maximum sensitivity. This mode is not recommended for use in congested harbor environments.

Not all controls are adjustable in each mode. The following list shows preset controls and adjustability for each control.

Range
Custom: Adjustable
Harbor: Full*
Offshore: Full*
Weather: Full*
Bird: Up to 24nm

Threshold
Custom: Adjustable
Harbor: 30%
Offshore: 30%
Weather: 0%
Bird: 0%

Gain
Custom: Adjustable
Harbor: Adjustable
Offshore: Adjustable
Weather: Adjustable
Bird: Adjustable

Sea
Custom: Adjustable
Harbor: Adjustable
Offshore: Adjustable
Weather: Adjustable
Bird: Adjustable

Rain
Custom: Adjustable
Harbor: Adjustable
Offshore: Adjustable
Weather: Adjustable
Bird: Adjustable

Noise Rejection
Custom: Adjustable
Harbor: Medium
Offshore: High
Weather: Medium
Bird: High

Target Expansion
Custom: Adjustable
Harbor: Low
Offshore: Medium
Weather: OFF
Bird: OFF

Interference Reject
Custom: Adjustable
Harbor: Adjustable
Offshore: Adjustable
Weather: Adjustable
Bird: Adjustable

Target Separation
Custom: Adjustable
Harbor: Medium
Offshore: OFF
Weather: OFF
Bird: OFF

Fast scan
Custom: Adjustable
Harbor: High
Offshore: High
Weather: OFF
Bird: OFF

* Maximum range is dependent on antenna length.

Modes in dual ranges

(Halo Radar only)

Modes can be set independently for each range. For example, you can have Offshore mode for range A and Weather mode for range B. However, interaction between ranges occurs in some cases:

- When using Bird mode for both ranges, maximum range is restricted to 24 NM and range resolution is reduced.
- Fast scan - The antenna rotation speed is set to the slower of the two modes selected. For example, Fast Scan is disabled when using Harbor and Weather modes because Fast Scan is Off in Weather mode.
- The Interference reject setting can affect the interference seen or removed on both ranges.

Directional clutter rejection

(Broadband 4G Radar only)

This mode automatically works when GAIN = AUTO and SEA = HARBOR or OFFSHORE. The purpose is to allow smaller vessels to be seen in the leeward direction of the sea clutter. The GAIN of the radar receiver is increased dynamically during the sweep, in the leeward direction, for increased target sensitivity in heavier sea states.

When GAIN or SEA = MANUAL, the Directional Clutter Rejection mode will be OFF (non-directional).

In addition, CALM, MODERATE or ROUGH STC Curve settings are available in the Radar options menu to better optimize the radar image to your liking.

Gain

The gain controls the sensitivity of the radar receiver.

A higher gain makes the radar more sensitive to radar returns, allowing it to display weaker targets. If the gain is set too high, the image might be cluttered with background noise.

Gain has a manual and an automatic mode. You toggle between automatic and manual mode in the slide bar, or by pressing and holding the rotary knob.

Sea clutter

Sea clutter is used to filter the effect of random echo returns from waves or rough water near the vessel.

When you increase Sea clutter, filtering the on-screen clutter caused by the echoes of waves is reduced.

The system includes predefined Sea clutter settings for harbor and offshore conditions for all radar systems except Halo, in addition to the manual mode where you can adjust the settings. For all radar systems except Halo, you select Sea clutter modes from the menu, or by a long press on the rotary knob. You can only adjust the Sea clutter value in manual mode.

Auto Sea Offset

(Halo Radar only)

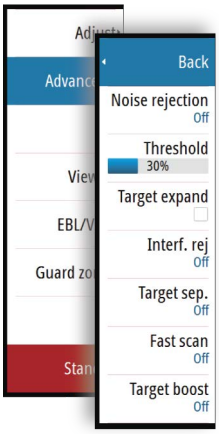
To allow fine tuning of the Sea control while in Auto mode (Auto uses directional adaptive clutter rejection), the Auto setting may be offset.

Rain clutter

Rain clutter is used to reduce the effect of rain, snow or other weather conditions on the radar image.

The value should not be increased too much as this may filter out real targets.

Advanced radar options



Noise Rejection

(Broadband 4G and Halo radar only)

The Noise Rejection control sets the amount of noise filtering applied by the radar. Target sensitivity is increased at longer ranges when this control is set to Low or High, but does cause some loss of target discrimination.

Tip: To get maximum range performance from Broadband 4G Radar, transmit on one range only, set the Noise Reject control to High and the threshold as low as possible. The default is 30% for less clutter on the screen. If OFF is selected for the NSS evo3, the range performance is about equal to 3G radar. In some areas where extreme high interference may exist, try OFF for best radar image.

Radar threshold

The threshold sets required signal strength for the lowest radar signals. Radar returns below this limit are filtered and are not displayed.

Default value: 30%.

Target expansion

Target expansion increases the length of targets in range, making them easier to see.

Rejecting radar interference

Interference could be caused by radar signals from other radar units operating in the same frequency band.

A high setting reduces the interference from other radars.

In order not to miss weak targets, the interference rejection should be set to low when no interference exists.

Target separation

(Broadband 4G and Halo Radar only)

The **Target separation** control allows you to control the target discrimination of the radar (separation between objects is more prominent).

Fast scan

(Broadband and Halo radar only).

Sets the speed of the radar antenna rotation. This option gives faster target updates.

→ ***Note:*** Maximum speed may not be achieved depending on the radar Settings, Mode, and Range selected. The radar will only rotate as fast as the current control settings allow.

Sea State

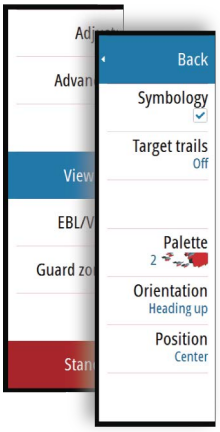
Set the Sea State control according to current sea conditions for best sea clutter rejection.

Target boost

(3G and 4G Broadband, and Pulse Radar only)

The target boost control increases pulse length or reduces radar bandwidth to make targets appear larger in range and increase radar sensitivity.

Radar view options



Radar symbology

Radar symbology defined in the Radar Settings panel can be turned on/off collectively. See the radar panel illustration showing optional radar items.

Target trails

You can set how long the trails generated from each target on your radar panel remain. You can also turn OFF target trails.

→ ***Note:*** True motion is recommended when using Target trails

Clearing target trails from the panel

When target trails are displayed on the panel, the radar menu expands to include an option where you can clear target trails from your radar panel temporarily. The target trails start to appear again unless you switch them off as described above.

The radar palette

Different colors (palettes) can be used to represent detail on your radar panel.

Radar orientation

Radar orientation is indicated on the upper left corner of the radar panel as either HU (Heading UP), NU (North Up) or CU (Course up).

Heading up

Rotates the radar image to display the current heading directly up on the radar image.

North up

Rotates the radar image with the north direction upwards.

Course up

Rotates the radar image to display the current navigation course directly up.

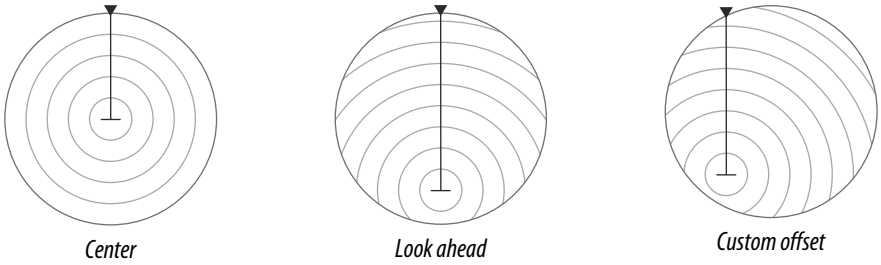
This option works only when the system is navigating an active route. If you are not navigating an active route, the heading up orientation is used until the navigation function is started.

Positioning the radar center

You can move the radar PPI (Plan Position Indicator) center to different positions within the radar panel, and select how your vessel symbol moves on the radar image.

Radar motion is indicated on the upper left corner of the radar panel as either TM (True motion) or RM (Relative motion).

The radar position can only be changed when the radar is transmitting.



Center
Default setting. The radar PPI center is centered on the radar panel.

Look Ahead
Moves the radar PPI center to the bottom of the panel to maximize the view ahead.

Offset

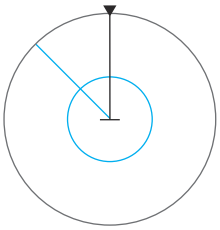
Allows you to move the PPI center to any location on the radar panel.

1. Select the offset option from the menu
2. Move the cursor to where you want to position the radar center
3. Confirm the setting by selecting the **Save offset** button in the bottom right corner of the panel.

True motion

In True motion, your vessel and moving targets move across the Radar screen as you travel. All stationary objects remain in a fixed position. When the vessel's symbol reaches the edge of the screen, the radar image is redrawn with the vessel symbol repositioned in the center of the screen.

When True motion is selected, the menu expands to include a reset true motion option. This allows for manually resetting the radar image and vessel symbol to the center of the screen.



EBL/VRM markers

The electronic bearing line (EBL) and variable range marker (VRM) allows quick measurements of range and bearing to vessels and landmasses within radar range. Two different EBL/VRMs can be placed on the radar image.

The EBL/VRMs are by default positioned from the center of the vessel. It is, however, possible to offset the reference point to any selected position on the radar image.

When positioned, you can turn the EBL/VRM on/off by selecting the relevant markers on the data bar, or by deselecting the marker from the menu.

Defining an EBL/VRM marker

1. Ensure that the cursor is not active
2. Activate the menu, select **EBL/VRM**, then select **EBL/VRM 1** or **EBL/VRM 2**
   - The EBL/VRM is now positioned on the radar image
3. Select the adjustment option from the menu if you need to reposition the marker, then adjust the marker by dragging it into position on the radar image
4. Select the save option to save your settings

Placing EBL/VRM markers by using the cursor

1. Position the cursor on the radar image
2. Activate the menu
3. Select one of the EBL/VRM markers
   - The EBL line and the VRM circle are positioned according to the cursor position.

Offsetting an EBL/VRM marker

1. Ensure that the cursor is not active
2. Activate the menu, select **EBL/VRM**, then select the marker you wish to offset
3. Select the set offset option
4. Position the cursor on the radar panel to set the offset position

5. Select the save option to save your settings.

You can reset the EBL/VRM center to vessel position from the menu.

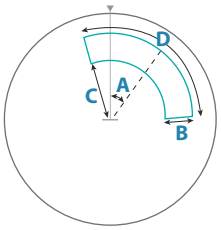
Setting a guard zone around your vessel

A guard zone is an area (either circular or a sector) that you can define on the radar image. When activated, an alarm alerts you when a radar target enters or exits the zone.

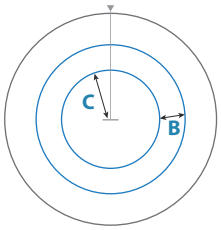
Defining a guard zone

1. Ensure that the cursor is not active
2. Activate the menu, select **Guard zones**, then select one of the guard zones
3. Select the shape for the zone
   - The adjustment options depend on the guard zone shape
4. Select **Adjust** to define the settings for the guard zone. The values can be set from the menu or by dragging on the radar panel.
   - **A**: Bearing, relative to the vessel heading
   - **B**: Depth
   - **C**: Range, relative to vessel center
   - **D**: Width
5. Select the save option to save your settings.

When positioned, you can turn the guard zones on/off by selecting the relevant section on the data bar.



Shape: Sector



Shape: Circle

Alarm settings

An alarm is activated when a radar target breaches the guard zone limits. You can select if the alarm is activated when the target enters or exits the zone.

Sensitivity

The guard zone sensitivity can be adjusted to eliminate alarms for small targets.

MARPA targets

If the system includes a heading sensor, the MARPA function (Mini Automatic Radar Plotting Aid) can be used to track up to ten radar targets.

You can set alarms to notify you if a target gets too close. Refer to *"Radar settings"* on page 73.

MARPA tracking is an important tool for collision avoidance.

→ ***Note:*** MARPA requires heading data for both the radar and the NSS evo3.

MARPA target symbols

The system uses the target symbols shown below.

	Acquiring MARPA target. Typically it takes up to 10 full rotations of the scanner.
	Tracking MARPA target, not moving or at anchor.
	Tracking and safe MARPA target with extension lines.

	Dangerous MARPA target. A target is defined as dangerous when it enters the guard zone defined on the radar panel.
	When no signals have been received within a time limit a target will be defined as lost. The target symbol represents the last valid position of the target before the reception of data was lost.
	Selected MARPA target, activated by positioning the cursor on the target icon. The target returns to the default target symbol when the cursor is removed.

Tracking MARPA targets

1. Position the cursor on the target on the radar image
2. Select **Acquire targets** from the menu
3. Repeat the process if you want to track more targets

After your targets are identified, it may take up to 10 radar sweeps to acquire and then track the target.

Cancelling MARPA target tracking

When targets are being tracked, the radar menu expands to include options for cancelling individual targets or to stop the tracking function.

Cancel tracking individual targets by selecting the target icon before activating the menu.

Viewing MARPA target information

If the pop-up is activated, you can select a MARPA target to display basic target information. Information for the 3 MARPA targets closest to the vessel is also displayed in the data bar.

When a target is selected, detailed information for the target can be displayed from the menu.

You can display information about all MARPA targets by using the **Vessels** option on the Home page.

MARPA alarm settings

You can define the following MARPA alarms:

- **MARPA target lost**
  Controls whether an alarm is activated when a MARPA target is lost.
- **MARPA unavailable**
  Controls whether an alarm is activated if you do not have the required inputs for MARPA to work (valid GPS position and heading sensor connected to the radar server).

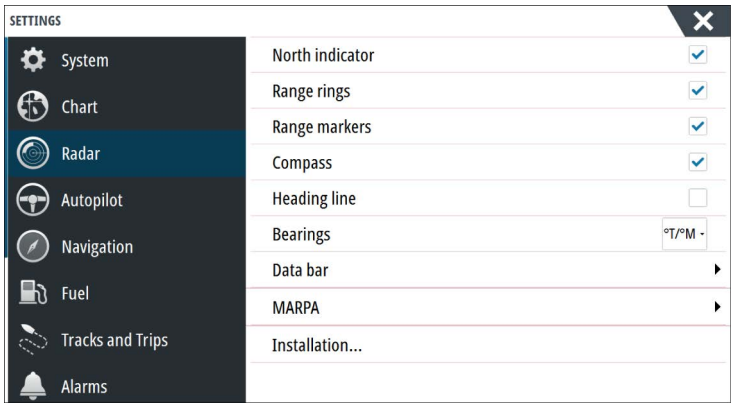
Recording radar data

You can record radar data and save the file internally in the NSS evo3 unit, or save it onto a memory card inserted into the unit's card reader.

A recorded radar file can be used for documenting an event or an operational error. A logged radar file can also be used by the simulator.

If more than one radar is available, you can select which source you want to record.

Radar settings



Radar symbology

You can select which optional radar items that should be turned on/off collectively from the menu. Refer to the Radar panel illustration.

Bearings

Used for selecting whether the radar bearing should be measured in relation to True/Magnetic North (°T/°M) or to your relative heading (°R).

Data bar

Turns on/off the radar data bar. Refer to the radar panel illustration.

The data bar can show up to 3 targets, arranged with the most dangerous targets on top. You can select to show MARPA targets on top and before any AIS targets, even if the AIS targets are closer to your vessel.

MARPA settings

You can define the length of the MARPA trail making it easier to follow target movement.

A circle can be added around your vessel to present the danger zone. The radius of the ring is the same as the closest point of approach as set in the Dangerous Vessels dialog. Refer to *"Defining dangerous vessels"* on page 102. An alarm triggers if a vessel is tracking into your safe zone.

Installation

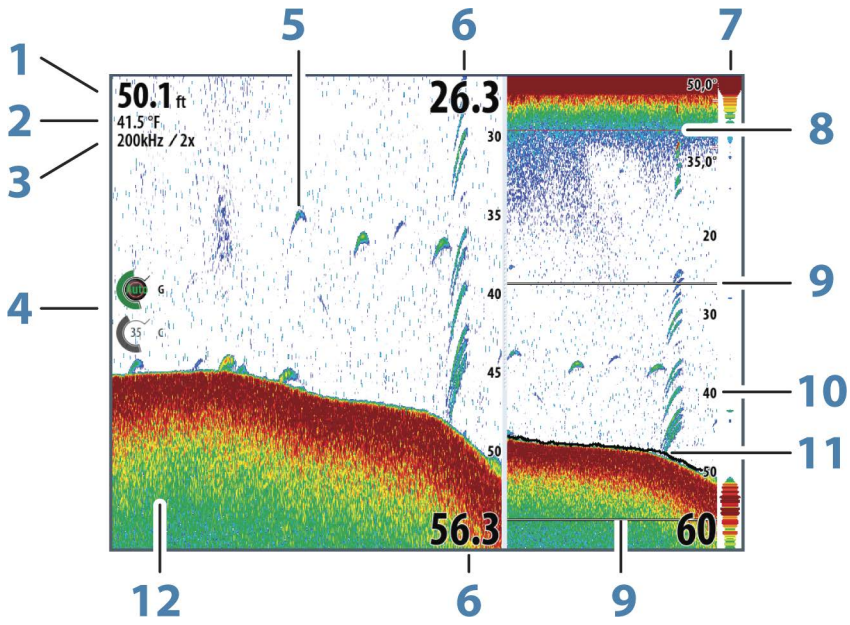
The Installation option is used for radar installation, described in the separate Radar or NSS evo3 Installation manuals.

10 Echosounder

The Echosounder function provides a view of the water and bottom beneath your vessel, allowing you to detect fish and examine the structure of the sea floor.

The unit has internal CHRIP, Broadband, StructureScan, TotalScan, and ForwardScan Echosounder.

The Echosounder image



1	Depth
2	Temperature
3	Frequency / Zoom
4	Gain / Color adjustment icons
5	Fish arches
6	Upper and Lower range
7	A-Scope*
8	Temperature graph*
9	Zoom bars*
10	Range scale
11	Depth line*
12	Bottom

* Optional Echosounder items.

→ ***Note:*** You turn the optional Echosounder items on/off individually. Refer to *"Echosounder View options"* on page 79.

Multiple Echosounder

You can specify the Echosounder source for the image in the Echosounder panel. You can display two different sources simultaneously, using a split panel configuration. For more information how to select the source for a panel, refer to *"Source"* on page 77.

Zooming the image

You can zoom the image by:

- turning the rotary knob
- using the panel zoom icons
- pinching or spreading on the screen

Zoom level is shown on the upper left side of the image.

When zooming in, the sea floor is kept near the bottom of the screen, irrespective of whether it is in auto-range or manual range.

If the range is set considerably less than the actual depth, the unit is not able to find the bottom when zooming.

If the cursor is active, the unit zooms in where the cursor is pointed.

Zoom bar

The zoom bar is displayed when you zoom the image.

Drag the zoom bar vertically to view different parts of the water column.

Using the cursor on the image

The cursor can be used to measure a distance to a target, to mark a position, and to select targets.

By default, the cursor is not shown on the image.

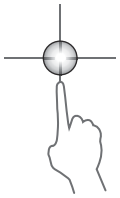
When you position the cursor on the image; the screen pauses, the depth at the cursor position is shown, and the information window and the history bar are activated.

To remove the cursor and cursor elements from the panel, select **Clear cursor** or press the **X** key.

GoTo cursor

You can navigate to a selected position on the image by positioning the cursor on the panel, then using the **Goto Cursor** option in the menu.

The cursor assist function



→ ***Note:*** The cursor assist function is available if it is enabled. Refer to *"Customizing the long press feature"* on page 19.

The cursor assist function allows for fine tuning and precision placement of the cursor without covering details with your finger.

Activate the cursor on the panel, then press and hold your finger on the screen to switch the cursor symbol to a selection circle, appearing above your finger.

Without removing your finger from the screen, drag the selection circle to the desired position.

When you remove your finger from the screen the cursor reverts to normal cursor operation.

Measuring distance

The cursor can be used to measure the distance between the position of two observations on the image.

1. Position the cursor on the point from where you want to measure the distance
2. Start the measuring function from the menu
3. Position the cursor on the second measuring point
   - A line is drawn between the measuring points, and the distance is listed in the Cursor Information panel
4. Continue selecting new measuring points if required

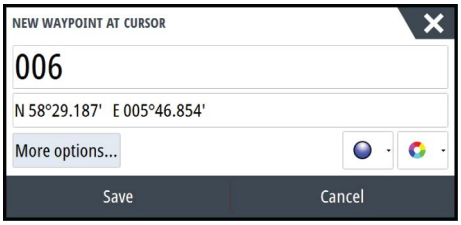
You can use the menu to re-position the start point and the end point as long as the measuring function is active.

When you select **Finish measuring** or press the **X** key, the image resumes to normal scrolling.

Saving waypoints

You can save a waypoint at a selected location by positioning the cursor on the panel, and then doing one of the following:

- Pressing the rotary knob
- Pressing the **Mark** key
- Using the new waypoint option in the menu



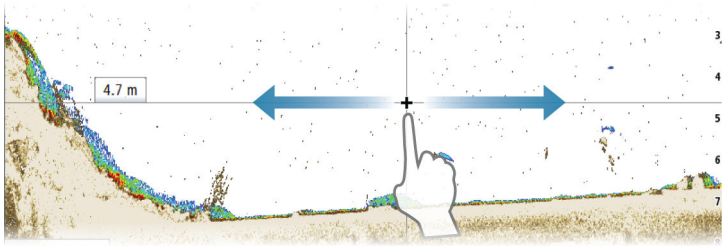
Viewing history

Whenever the cursor is shown on the Echosounder panel, the scroll bar is shown at the top of the panel. The scroll bar shows the image you are currently viewing in relation to the total Echosounder image history stored.

If the scroll bar is on the far right side, it indicates that you are viewing the latest soundings. If you position the cursor to the left side of the screen, the history bar starts scrolling towards the left, and the automatic scrolling as new soundings are received is turned off.

You can view echosounder history by panning the image.

To resume normal scrolling, select **Clear cursor** or press the **X** key.



Setting up the image

Use the Echosounder menu options to set up the image. When the cursor is active, some options on the Echosounder menu are replaced with cursor mode features. Select **Clear cursor** to return to the normal Echosounder menu.

The range

The range setting determines the water depth that is visible on the screen.

Frequency

The unit supports several transducer frequencies. Available frequencies depend on the transducer model that is connected.

You can view two frequencies at the same time by selecting dual Echosounder panels from the **Home** page.

Frequency is the 'tone' the transducer transmits. Transducers are designed to operate on different frequencies as the various frequencies have different qualities.

- A low frequency, for example 50 kHz, will go deep. It generates a wide cone but is somewhat more sensitive to noise. It is good for bottom discrimination and wide area search.
- A high frequency, for example 200 kHz, offers higher discrimination and is less sensitive to noise. It is good for separating targets and for higher speed vessels.

Color and gain settings

You can also adjust the image settings from the Echosounder menu.

Gain
The gain controls the sensitivity of the Echosounder.

The more you increase the gain, the more details are shown on the image. However, a higher gain setting may introduce more background clutter on the image. If the gain is set too low, weak echoes might not be displayed.

Auto gain
The Auto gain option keeps the sensitivity at a level that works well under most conditions.

With the gain in auto mode, you can set a positive or negative offset that gets applied to the auto gain.

Color
Strong and weak echo signals have different colors to indicate the different signal strengths. The colors used depend on which palette you select.

The more you increase the Color setting, the more echoes is displayed in the color at the strong return end of the scale.

Structure options

When a StructureScan source is connected to your system, you can overlay a DownScan image on the regular echo image.

Provides options for specifying the DownScan image. This menu option is available when **Overlay downscan** is selected in Echo settings dialog. For more information see *"settings"* on page 81.

Source

Select to specify the source for the image in the selected panel.

You can display two different sources simultaneously, using a split panel configuration. Menu controls for each panel are independent.

The source can be the internal Echosounder, another MFD on the Ethernet network, or a Echosounder module. To define sources, refer to the separate NSS evo3 Installation manual.

→ ***Note:*** Using two transducers at the same frequency ranges can cause interference between the two, and they can show up on the image as vertical lines. To avoid this, set one transducer at one frequency range (such as Medium CHIRP) and the other transducer at a different frequency range (such as High CHIRP) using the Frequency menu option.

Pausing the image

You can pause the image, allowing you to examine it.

This function is useful when you need to position a waypoint exactly on the image, and if you are using the cursor to measure a distance between 2 elements on the image.

The pause function stops the Echosounder from pinging the transducer. The system is not collecting Echosounder data when paused in this manner.

Advanced options

The Advanced option is only available when the cursor is not active.

Noise rejection

Signal interference from bilge pumps, engine vibration and air bubbles can clutter the image.

The noise rejection option filters the signal interference and reduces the on-screen clutter.

TVG

Wave action and boat wakes can cause onscreen clutter near the surface. The TVG (Time Variable Gain) option reduces surface clutter by decreasing the sensitivity of the receiver near the surface.

➔ ***Note:*** For optimal image return and clarity in most conditions, the default value is set to 3, the maximum (range is 0-3).

Scroll speed

You can select the scrolling speed of the image on the screen. A high scroll speed updates the image fast, while a low scroll speed presents a longer history.

➔ ***Note:*** In certain conditions it may be necessary to adjust the scroll speed to get a more useful image. Such as adjusting the image to a faster speed when vertically fishing without moving.

Ping speed

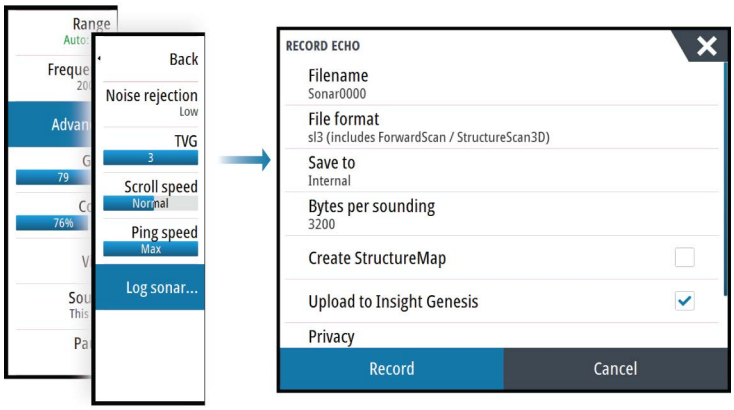
Ping speed controls the rate the transducer transmits the signal into the water. By default, the ping speed is set to max. It may be necessary to adjust the ping speed to limit interference or to adjust for specific fishing conditions.

Start recording log data

You can start recording log data and save the file internally in the unit, or save it onto a card inserted into the unit's card reader.

The record function is activated from the **Advanced** menu option.

When the data is being recorded, there is a flashing red symbol in the top left corner and a message appears periodically at the bottom of the screen.



Filename

Specify the name of the recording (log).

File format

Select a file format from the drop-down, slg (Echosounder only), xtf (Structure only*), sl2 (Echosounder and Structure) or sl3 (includes ForwardScan).

➔ ***Note:*** XTF format is for use only with select 3rd party Echosounder viewing tools.

Save to

Select whether the recording is to be saved internally or to a memory card in the card reader.

Bytes per sounding

Select how many bytes per seconds that are to be used when saving the log file. More bytes yield better resolution, but cause the record file to increase in size compared to using lower byte settings.

Create StructureMap

If StructureScan is available on the network, you can convert the .sl2 logs to StructureMap format (.smf) when recording completes. The log file can also be converted to StructureMap format from the Files option.

Upload to Insight Genesis

Files are transmitted to Insight Genesis when recording completes, if you are connected to a wireless hotspot. For information about wireless hotspots, refer to *"Wireless connection"* on page 95.

Privacy

If allowed by your selected Insight Genesis account, you can choose between setting the recorded log files as Private or Public at Insight Genesis.

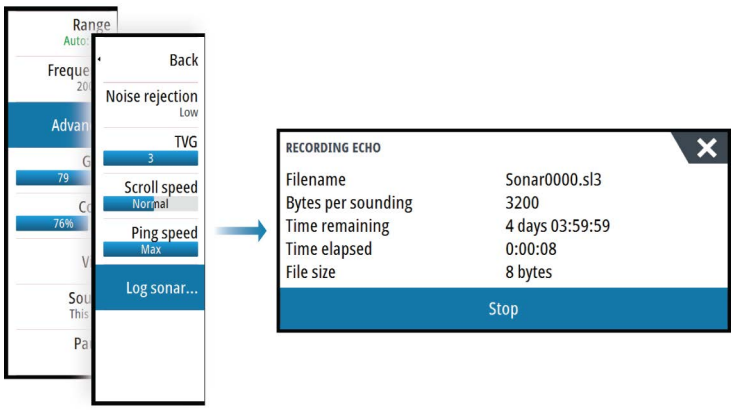
Time remaining

Shows the remaining allocated space available for recordings.

Stop recording log data

Select **Stop** in the Recording Echo dialog to fully stop the recording of all echosounder data.

→ ***Note:*** If you have selected the **Upload to Insight Genesis** option and are connected to a wireless hotspot, your recorded files are transmitted to Insight Genesis when you select **Stop**.



Viewing the recorded sounder data

Both internally and externally stored sounder records may be reviewed when the view sonar log option is selected in the Echo settings dialog. Refer to *"Echosounder settings"* on page 81.

The log file is displayed as a paused image, and you control the scrolling and display from the replay menu option.

You can use the cursor on the replay image, and pan the image as on a normal echo image.

If more than one channel was recorded in the selected echo file, you can select which channel to display.

You exit the replay mode by pressing the **X** key or by selecting the **X** symbol in the upper right corner of the replay image.

Echosounder View options

Split screen options

Zoom

The Zoom mode presents a magnified view of the sounder image on the left side of the panel.

By default the zoom level is set to 2x. You can select up to 8x zoom from the drop-down menu, using the **+/-** keys, or the zoom (**+** or **-**) buttons.

The range zoom bars on the right side of the display shows the range that is magnified. If you increase the zooming factor the range is reduced. You see this as reduced distance between the zoom bars.

Bottom lock

The bottom lock mode is useful when you want to view echoes close to the bottom. In this mode, the left side of the panel shows an image where the bottom is flattened. The range scale is changed to measure from the seabed (0) and upwards. The bottom and the zero line are always shown on the left image, independent of the range scale. The scaling factor for the image on the left side of the panel is adjusted as described for the Zoom option.

Palettes

You can select between several display palettes optimized for a variety of fishing conditions.

Temperature graph

The temperature graph is used to illustrate changes in water temperature.

When toggled on, a colored line and temperature digits are shown on the Echosounder image.

Depth line

A depth line can be added to the bottom surface to make it easier to distinguish the bottom from fish and structures.

A-Scope

The A-scope is a display of real-time echoes as they appear on the panel. The strength of the actual echo is indicated by both width and color intensity.

Zoom bars

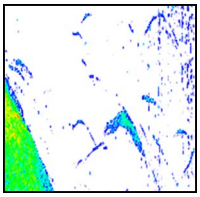
The zoom bars shows the range that is magnified on a split panel with zoom views.

The range zoom bars on the right side of the display shows the range that is magnified and displayed on the left side. If you increase the zooming factor, the range is reduced. You see this as reduced distance between the zoom bars.

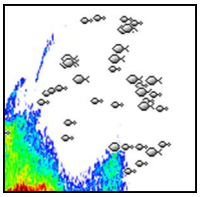
You can move the zoom bars on the right side up or down to cause the left side image to show different depths of the water column.

Fish ID

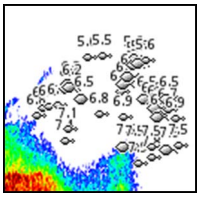
You can select how you want the echoes to appear on the screen. You can also select if you want to be notified by a beep when a fish ID appears on the panel.



Traditional fish echoes



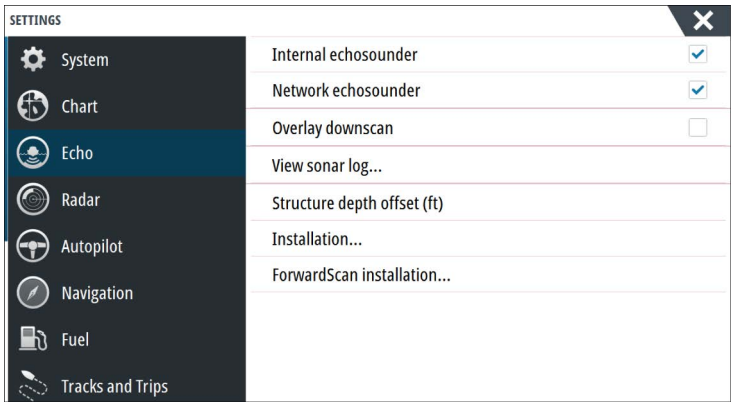
Fish symbols



Fish symbols and depth indication

→ ***Note:*** Not all fish symbols are actual fish.

Echosounder settings



Internal Echosounder

Select to make the internal Echosounder available for selection in the Echosounder menu. For more information about panel source selection, refer to the Operator manual.

When set to off, this option disables the internal Echosounder in the unit. It will not be listed as a Echosounder source for any unit on the network. Select this option on a unit which does not have a transducer connected.

Network Echosounder

You can share the Echosounder images from this unit with other units connected on the Ethernet network.

For more information about how to setup Echosounder, refer to the separate NSS evo3 Installation manual.

Overlay downscan

When a DownScan source is connected to your system, you can overlay DownScan images on the regular Echosounder image.

When activated, the Echosounder menu expands to include basic DownScan options.

View Echosounder log

Used to view Echosounder recordings. The log file is displayed as a paused image, and you control the scrolling and display from the menu.

You can use the cursor on the image, measure distance, and set view options as on a live Echosounder image. If more than one channel was recorded in the selected Echosounder file, you can select which channel to display.

You exit the view function by selecting the **X** in the upper right corner.

Structure depth offset

Setting for Structure transducers.

All transducers measure water depth from the transducer to the bottom. As a result, water depth readings do not account for the distance from the transducer to the lowest point of the boat in the water or from the transducer to the water surface.

To show the depth from the lowest point of the boat to the bottom, do the following. Before setting the Structure offset, measure the distance from the structure transducer to the lowest point of the boat in the water. If, for example, the distance is 0.3 m (1 ft), it will be input as (minus) - 0.3 m (-1 ft).

To show the depth from the water surface to the bottom, do the following. Before setting the Structure offset, measure the distance from the structure transducer to the water surface. If, for example, the distance is 0.3 m (1 ft), it will be input as (plus) 0.3 m (1 ft).

A setting of 0 (zero) causes the depth displayed to be the distance from the transducer to the bottom.

Installation

Used for defining Echosounder sources available for selection in the Source menu option. For information about defining sources, refer to the separate NSS evo3 Installation manual. For information about Source selection, refer to *"Source"* on page 77.

ForwardScan Installation

Used for ForwardScan installation and setup. Refer to the *"ForwardScan setup"* on page 92.

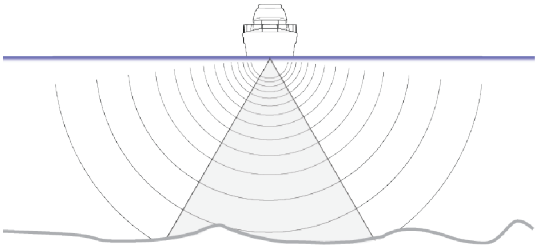
11 StructureScan

StructureScan uses high frequencies to provide a high resolution, picture-like image of the seabed.

The unit has built-in StructureScan.

→ ***Note:*** You must have a StructureScan HD, TotalScan or StructureScan 3D transducer installed to use StructureScan features.

→ ***Note:*** Connect StructureScan transducers to the Sonar2 port only.

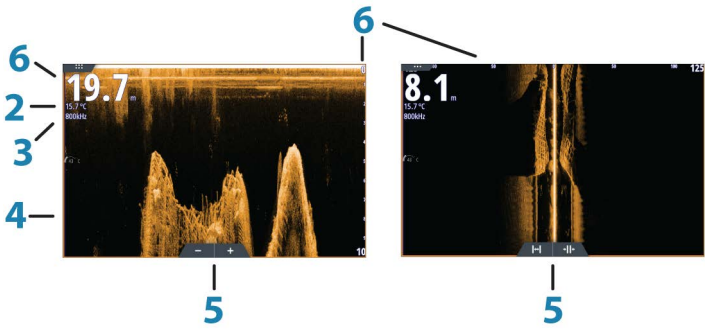


The StructureScan image

The view

The StructureScan panel can be set up as a DownScan image, or showing left/right side scanning.

The DownScan image can also be added as an overlay to the traditional Echosounder image.



1 Depth

→ ***Note:*** The depth reading depends on the **Structure depth offset** setting, refer to *"Structure depth offset"* on page 81

2 Temperature

3 Frequency

4 Bottom

5 Zoom (downscan) / Range (sidescan) icons

6 Range scale

Zooming the StructureScan image

You can zoom a StructureScan image by:

- turning the rotary knob when the cursor is not active
- using the panel zoom icons
- by pinching or spreading on the screen

Zoom level is shown on the upper left side of the panel.

Using the cursor on the StructureScan panel

By default, the cursor is not shown on the StructureScan image.

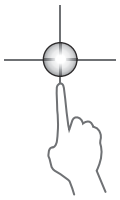
When you position the cursor on a DownScan image, the screen pauses, the cursor information window and the history bar are activated. On a DownScan image, the depth is shown at cursor position.

When you position the cursor on a SideScan image, the screen pauses, and the cursor information window is activated. On a SideScan image, the left/right distance from the vessel to the cursor are shown at the cursor position.

GoTo cursor

You can navigate to a selected position on the image by positioning the cursor on the panel, then using the **Goto Cursor** option in the menu.

The cursor assist function



→ ***Note:*** The cursor assist function is available if it is enabled. Refer to *"Customizing the long press feature"* on page 19.

The cursor assist function allows for fine tuning and precision placement of the cursor without covering details with your finger.

Activate the cursor on the panel, then press and hold your finger on the screen to switch the cursor symbol to a selection circle, appearing above your finger.

Without removing your finger from the screen, drag the selection circle to the desired position.

When you remove your finger from the screen the cursor reverts to normal cursor operation.

Measuring distance

The cursor can be used to measure the distance between the position of two observations on the image.

1. Position the cursor on the point from where you want to measure the distance
2. Start the measuring function from the menu
3. Position the cursor on the second measuring point
   - A line is drawn between the measuring points, and the distance is listed in the Cursor Information panel
4. Continue selecting new measuring points if required

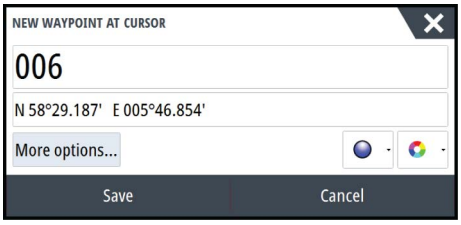
You can use the menu to re-position the start point and the end point as long as the measuring function is active.

When you select **Finish measuring** or press the **X** key, the image resumes to normal scrolling.

Saving waypoints

You can save a waypoint at a selected location by positioning the cursor on the panel, and then doing one of the following:

- Pressing the rotary knob
- Pressing the **Mark** key
- Using the new waypoint option in the menu

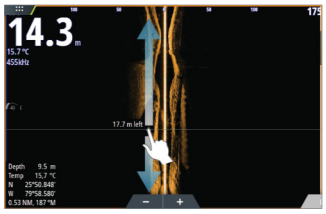


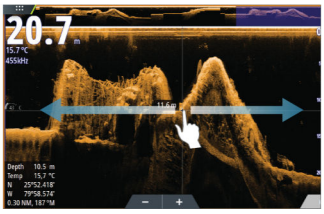
Viewing StructureScan history

Whenever the cursor is active on a StructureScan panel, the scroll bar is shown on the panel. The scroll bar shows the image you are currently viewing in relation to the total StructureScan image history stored. Depending on the view selected, the scroll bar is on the far right side (SideScan) or at the top of the screen (DownScan).

You can pan the image history by dragging up/down (SideScan) or left/right (DownScan).

To resume normal StructureScan scrolling, press **Clear cursor**.





Setting up the StructureScan image

Range

The range setting determines the water depth and SideScan range that is visible on the screen.

Auto range

When the range is set to Auto the system automatically sets the range depending on the water depth.

Preset range levels

You can select between several preset range levels.

Custom range

This option allows you to manually set both upper and lower range limits.

StructureScan frequencies

StructureScan supports two frequencies. 455 kHz provides ideal range and image quality in most situations, while 800kHz is used to provide higher detail in shallow water.

Contrast

Determines the brightness ratio between light and dark areas of the screen.

To adjust the contrast setting:

1. Select the contrast icon or activate the contrast option in the menu to display the color adjustment bar
2. Drag the bar or use the rotary knob to set the value.

Palettes

You can select between several display palettes optimized for a variety of fishing conditions.

View

You can set up the StructureScan page as a DownScan image, left only, right only, or left/right side scanning.

Pausing the StructureScan image

You can pause the StructureScan image, allowing you to examine the structures and other images in more depth and detail.

This function is useful when you need to position a waypoint exactly on the StructureScan image, and if you are using the cursor to measure a distance between 2 elements on the image.

Advanced StructureScan settings

TVG

Wave action and boat wakes can cause onscreen clutter near the surface. The TVG (Time Variable Gain) option reduces surface clutter by decreasing the sensitivity of the receiver near the surface.

→ ***Note:*** For optimal image return and clarity in most conditions, the default value is set to 3, the maximum (range is 0-3).

Flipping the Structure image left/right

If required, the left/right SideScanning images can be flipped to match the direction of the transducer installation.

Range Lines

Range lines can be added to the image to make it easier to estimate depth (Downscan) and distance (SideScan).

Recording StructureScan data

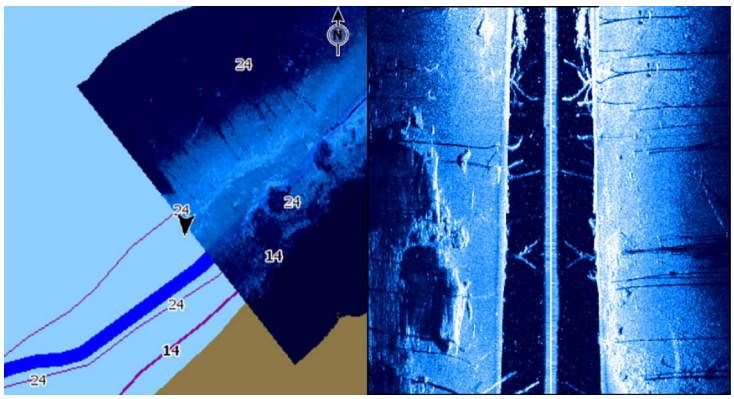
You can record StructureScan data and save the file internally in the NSS evo3 unit, or onto memory card as described in *"Start Recording echosounder data"* on page 78.

12 StructureMap

The StructureMap feature overlays SideScan images from a StructureScan source on the map. This makes it easier to visualize the underwater environment in relation to your position, and aids in interpreting SideScan images.

The StructureMap image

The example below shows a chart panel with Structure overlay, combined with a traditional SideScan panel.



You move around in the chart as usual when you have a Structure overlay:

- zoom the chart and the scanned image by turning the rotary knob, by using the zoom icons, or by pinching or spreading on the screen
- move the chart to view the scanned image by dragging it in the desired direction

Pressing the **X** key or selecting the **Clear cursor** option removes the cursor from the panel, and the chart center is positioned at the vessel.

Activating Structure overlay

1. Turn on Structure overlay from the chart menu
   - The chart menu is increased to show Structure options
   - Structure data starts to appear on the chart screen as soon as Structure overlay is enabled
2. Select Structure source
   - Live data is default

→ ***Note:*** Structure overlay can also be activated by selecting a saved StructureMap file in the files browser.

StructureMap sources

Two sources can be used to overlay Structure logs on the charts, but only one can be viewed at a time:

- Live data - Used when StructureScan data is available on the system.
- Saved files - These are recorded StructureScan (*.sl2) data that are converted to StructureMap (*.smf) format. Saved *.smf files can be used even if no StructureScan sources are connected.

Live source

When live data is selected, the SideScan imaging history is displayed as a trail behind the vessel icon. The length of this trail varies depending on available memory in the unit and range settings. As the memory fills up, the oldest data is automatically deleted as new data is added. When increasing the search range, the ping speed of the StructureScan transducer is reduced, but the width and the length of the image history is increased.

→ ***Note:*** Live mode does not save any data. If the unit is turned off, all recent data is lost.

Saved files

When Saved files are selected, the StructureMap file is overlaid on the map based on position information in the file.

If the chart scale is large, the StructureMap area is indicated with a boundary box until the scale is large enough to show Structure details.

Saved mode is used to review and examine StructureMap files, and to position the vessel on specific points of interest on a previous scanned area.

➔ ***Note:*** When saved files are used as the source, all StructureMap files found on the memory card and in the system's internal memory are displayed. If there is more than one StructureMap of the same area, the images overlap and clutter the chart. If several logs of the same area are required, the maps should be put on separate memory cards.

StructureMap tips

- To get a picture of taller structures (a wreck, etc.) — do not drive over it, instead, steer the boat so the structure is on the left or right side of your vessel.
- Do not use Autorange when using StructureScan. Set your structure range to a significantly greater level (two-to-three times) than the water depth to ensure a complete scan and to maximize conversion accuracy.
- Do not overlap history trails when conducting a side-by-side scan of an area.

Recording StructureScan data

StructureScan data can be recorded from a chart panel with Structure overlay enabled.

StructureScan recordings can also be started from a StructureScan panel.

When StructureScan data is being recorded, there is a flashing red symbol and a message appears periodically at the bottom of the screen.

➔ ***Note:*** The message includes information about file size. Keep the size of your logs to 100MB or less to allow for faster file conversion.

The recording is stopped by re-selecting the record function.

Converting StructureScan data to StructureMap format

A StructureScan log file (.sl2) is converted to StructureMap format (.smf) after recording from the recording dialog, or from the files browser.

You can create standard or high resolution files. High resolution .smf files capture more detail, but take longer to convert and are larger than standard resolution files.

To save disc space it is recommended to remove the StructureScan (.sl2) files after conversion.

Using StructureMap with mapping cards

StructureMap allows you to maintain full chart capability and can be used with embedded cartography as well as Navionics, Insight and other third-party charting cards compatible with the system.

When using StructureMap with mapping cards, copy the StructureMap (.smf) files to the unit's internal memory. We recommend keeping copies of StructureMap files on external mapping cards.

Structure options

You adjust the StructureMap settings from the Structure options menu. The menu is available when Structure overlay is enabled.

Not all options are available when saved StructureMap files are used as the source. Unavailable options are greyed.

Range

Sets the search range.

Transparency

Sets the opaqueness of the Structure overlay. With minimum transparency settings, the chart details are almost hidden by the StructureMap overlay.

Palette

Selects Structure palette.

Contrast

Determines the brightness ratio between light and dark areas of the screen.

Water column

Shows/hides the water column in Live mode.

If turned OFF schools of bait fish might not be seen on the SideScan image.

If turned ON the accuracy of the SideScan image on the map might be affected by the water depth.

Frequency

Sets the transducer frequency used by the unit. 800 kHz offers the best resolution, while 455 kHz has greater depth and range coverage.

Noise rejection

Signal interference from bilge pumps, engine vibration and air bubbles can clutter the sonar screen. The noise rejection option filters the signal interference and reduces on-screen clutter.

Clear live history

Clears existing live history data from the screen and begins showing only the most current data.

Record data

Records StructureScan data.

Source

Selects StructureMap source.

13 ForwardScan

ForwardScan sonar is a navigational aid that helps you monitor the underwater environment in front of your vessel while carrying out slow speed maneuvers.

To use the ForwardScan feature you must have a ForwardScan transducer mounted on your vessel. For installation instructions, refer to the ForwardScan transducer installation manual.

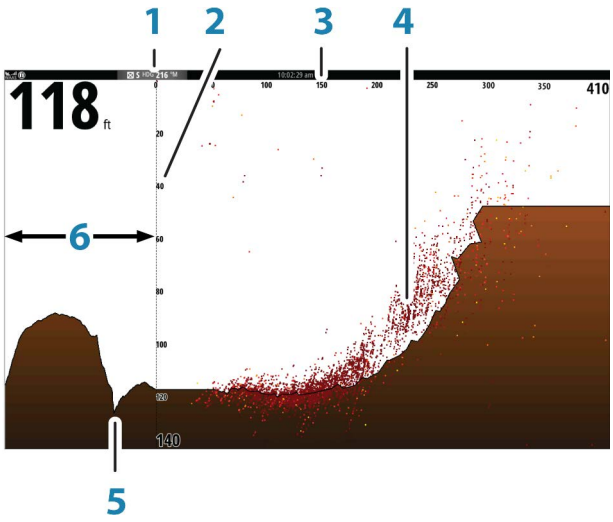
The ForwardScan transducer can be connected to a SonarHub and shared over the Ethernet network. You can also connect the ForwardScan transducer to the Sonar2 port on your NSS evo3 unit, leaving the Sonar1 port available for a CHIRP transducer.

→ ***Note:*** When a ForwardScan transducer connected to the NSS evo3 is in use. Transducers connected to Sonar1 port will be paused.

⚠ Warning: Do not rely on this equipment as your principle source of navigation or hazard detection.

⚠ Warning: Do not use this equipment to gauge depth or other conditions for swimming or diving.

The ForwardScan image



1 Transducer location shown as the origin on the page

2 Depth range scale and vessel position

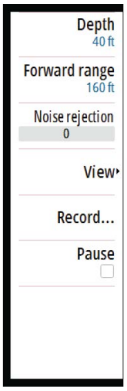
3 Forward range scale

4 Point data

5 Bottom

6 Depth history

Setting up the ForwardScan image



Depth

Controls depth range. Depth range is set to auto mode by default.

Forward range

Controls the forward looking search range. Maximum Forward range is 91 meters (300 feet).

Noise Rejection

Filters out signal interference and reduces on-screen clutter.

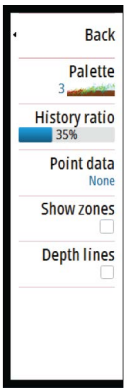
Record

Records ForwardScan sonar logs.

Pause

Pauses forward-looking Echosounder transmissions.

ForwardScan view options



Palette

Several display palettes are available for a variety of water conditions.

History ratio

Controls how much Echosounder history is shown behind the boat. The higher the ratio, the more history will be shown.

Point data

By default, ForwardScan only shows the bottom. Select the Point data menu option to specify to view no sonar data points, all sonar data points, or only points (Objects) in the water column.

Show zones

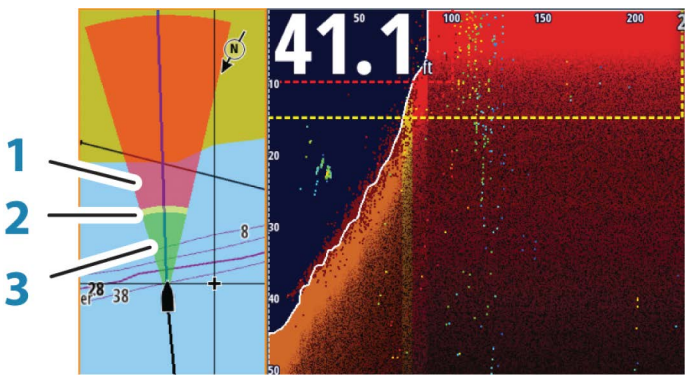
Displays warning zones (yellow) and critical zones (red) on the screen. Refer to *"Critical forward range and Critical depth"* on page 92.

Depth lines

Displays lines on the screen that make it easier to quickly estimate depth and the underwater objects.

Heading extension

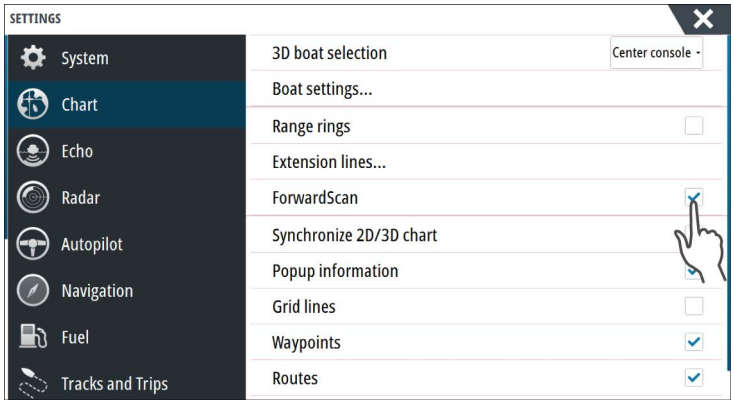
You can use the heading extension to monitor ForwardScan on the chart panel. Heading extension colors are based on the ForwardScan alarm values.



ForwardScan extension

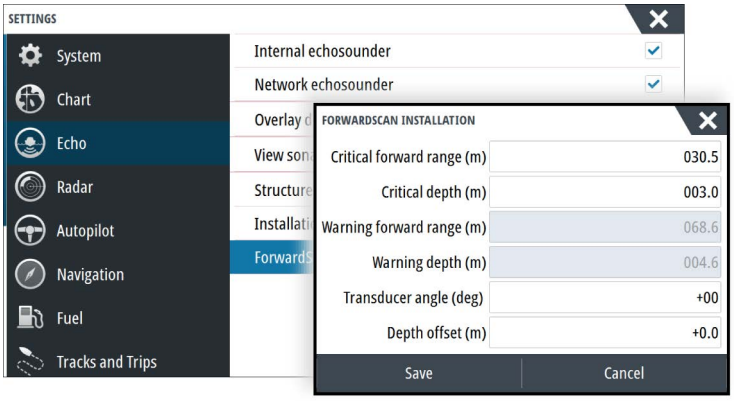
1. Red - Critical
2. Yellow - Warning
3. Green - Safe

Select ForwardScan in the Chart Settings dialog to view the ForwardScan heading extension on the chart panel.



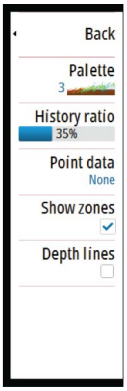
ForwardScan setup

Specify the setup in the **ForwardScan installation** dialog.

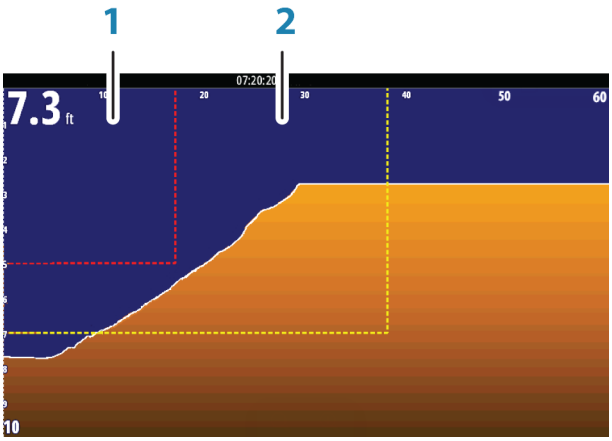


Critical forward range and Critical depth

Critical Forward Range and Critical Depth are user-selected thresholds that define a critical zone forward of your vessel.



If you travel into water shallow enough to cross into the critical zone, the Critical Zone alarm is activated. You can display the critical warning zones by activating the **Show zones** menu option.



ForwardScan image with Show zones active

1 Critical zone

2 Warning zone

Warning Forward Range and Warning Depth values are based on the selected Critical Forward Range and Critical Depth values.

➔ ***Note:*** To receive Critical Zone alerts, enable ForwardScan alarm in the Alarm settings dialog. For more information about enabling alarms, refer to Alarms.

Transducer angle

We recommend installing the transducer vertical to the waterline. In cases where that is not possible, the Transducer Angle setting helps offset the difference between the transducer angle and the waterline.

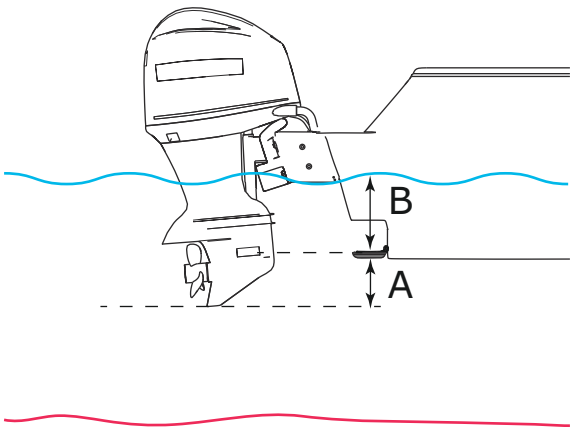
The angle can be adjusted from 0 (vertical) to 20 degrees.

⚠ Warning: Adjustments to the transducer angle value should be done with caution. Large variations in the transducer angle value can distort depth data, increasing the risk of striking underwater obstructions.

Depth offset

All transducers measure water depth from the transducer to the bottom. As a result, water depth readings do not account for the distance from the transducer to the lowest point of the boat (for example; bottom of the keel, rudder, or skeg) in the water or from the transducer to the water surface.

Before setting the offset, measure the distance from the transducer to the lowest point of the boat in the water or from the transducer to the water surface.



A Lowest point of vessel offset: Set the distance from the transducer to the lowest point of the boat in the water - this should be set as a negative value. For example, - 0.3 m (-1 ft).

B Depth below surface (waterline) offset: Set the distance from the transducer to the surface - this should be set as a positive value. For example, +0.5 m (+1.77 ft).

For depth below transducer, set the offset to 0.

14 Wireless connection

GoFree wireless connectivity gives you the ability to:

- Use a wireless device to remotely view (smartphone and tablet) and control the system (tablet only).
- Access the GoFree Shop.
- Upload your Echosounder logs to create custom maps at Insight Genesis.
- Download software updates
- Connect to third party applications

→ ***Note:*** Maps, charts, software updates, and other data files can be large. Your data provider may charge you based on the amount of data you transfer. If you are unsure contact the service provider for information.

The unit includes Built-in wireless functionality for connecting to the internet and wireless devices such as smartphones and tablets.

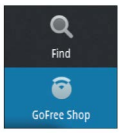
Initial configuration and setup of the built-in wireless functionality is described in your system's Installation Manual.

Connect and disconnect from a wireless hotspot

To connect to a wireless hotspot, select the Wireless option in the System Controls dialog and then select Not Connected. This opens the Wireless Devices dialog. Use this dialog to select the desired hotspot, enter the login information and then select Connect. Connecting to a wireless hotspot changes the wireless mode to **Client mode**. In this mode, you can access the GoFree Shop.

To disconnect from a wireless hotspot, select the Wireless option in the System Controls dialog, then select Connected *hotspot_name*, and then Disconnect. This changes the wireless mode to **Access point mode**. In this mode, you can connect a wireless device so that Apps such as GoFree Link can access the vessel's navigation information.

GoFree Shop



The wireless must be connected to an external wireless hotspot in order to access the GoFree Shop.

At the GoFree Shop you can browse, purchase and download compatible content for your system including navigation charts and Insight Genesis Maps. When you log on, the system automatically gives you a notification if a new software version is available for your system. If an update is available, you can download it to a card slot or defer the download until later. If you defer the download until later, the notification is available in the About dialog accessible from the System Settings.

GoFree Link

The wireless functionality lets you use a wireless device to remotely view (smartphone and tablet) and control the system (tablet only). The system is viewed and controlled from the wireless device by the GoFree Link Apps downloaded from their relevant Application store. When remote control is accepted, the active page is mirrored to the wireless device.

→ ***Note:*** To use smartphones and tablets to view and control the system, wireless functionality must be disconnected from the wireless hotspot (in **Access point mode**).

→ ***Note:*** For safety reasons, Autopilot and CZone functions cannot be controlled from a wireless device.

Connecting a tablet

Install the GoFree App on the tablet before following this procedure.

1. Set the internal wireless to **Access Point** mode. To do this, select the **Wireless devices** page in the Wireless settings dialog and then select the Internal wireless. Next, select the **Mode** option and then select **Internal Access Point**.
2. Select a device on the **Wireless devices** page to view its network key.
3. Navigate to the wireless network connection page on the tablet, and find the unit or GoFree wireless *xxxx* network. If more than one is in range, review the **Wireless devices** page on the unit to confirm which wireless device is connected to the unit.
4. Enter the Network Key in the tablet to connect to the network.
5. Open the GoFree application - the unit should be automatically detected. The name displayed will be either the default, or that assigned in the Device Name setting. If the unit does not appear, follow the on screen instructions to manually find the device.
6. Select the graphic icon of the unit. The unit displays a prompt similar to the following:

7. Select **Yes** for one-time connection, or **Always** if device is to be remembered for regular connection. This setting can be changed later if required.

→ ***Note:*** The internal wireless module only supports GoFree connection to itself. Other units connected on the network are not visible.

Connecting a smartphone

Install the GoFree App on the smartphone before following this procedure.

1. Set the internal wireless to **Access Point** mode. To do this, select the **Wireless devices** page in the Wireless settings dialog and then select the unit's Internal Wireless. Next, select the **Mode** option and then select **Internal Access Point**.
2. Select a device on the **Wireless devices** page to view its Network Key.
3. Navigate to the wireless network connection page on the smartphone, and find the unit or GoFree wireless *xxxx* network. If more than one is in range, review the **Wireless devices** page from the unit's Wireless settings dialog to confirm which wireless device is connected to the unit.
4. Enter the Network Key in the smartphone to connect to the network.
5. Open the GoFree application on the smartphone, the unit should be automatically detected. The name displayed will be either the default, or that assigned in the Device Name setting. If the unit does not appear, follow the on screen instructions to manually find the device.

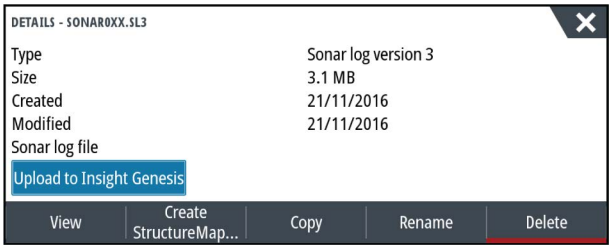
The MFD's display is shown on the smartphone. To change the MFD's display on the smartphone, use the MFD to change the display on the MFD. The display change on the MFD is reflected on the smartphone.

Uploading log files to Insight Genesis

To upload a recorded Echosounder log file to Insight Genesis, select the file you want to upload from the Files panel and select the upload to Insight Genesis option.

→ ***Note:*** You must be connected to a wireless hotspot to upload recorded log files to Insight Genesis.

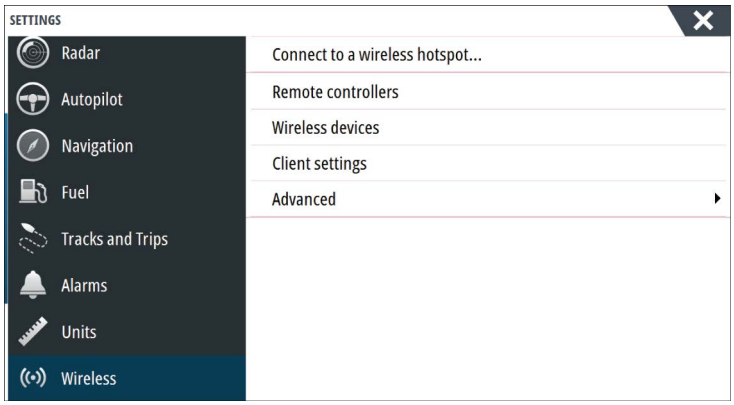
→ ***Note:*** Recorded log files can also be uploaded to Insight Genesis if you have specified **Upload to Insight Genesis** in the Record Echo dialog. For more information, refer to *"Start Recording log data"* on page 78.



Wireless settings

Provides configuration and setup options for the wireless functionality.

For more information, refer to the NSS evo3 Installation Manual.



Connect to a wireless hotspot

Displays the Wireless device dialog that you can use to connect the wireless functionality to a wireless hotspot.

Remote controllers

When a wireless device (smart phone or tablet) is connected, it should appear in the Remote controllers list. Selecting **Always allow** means the device can automatically connect without needing a password each time. This menu also allows you to disconnect devices that no longer require access.

Wireless devices

This dialog shows the internal wireless and any connected WIFI-1 devices, as well as their IP and channel number. Selecting the internal wireless or a WIFI-1 device provides additional detail.

To view and change internal wireless detail values (Network Name (SSID), Network Key, or Channel) the internal wireless must be in **Access Point** (Internal Wifi) mode. To select a network (hotspot) to connect to, the internal wireless must be in **Client Mode**. Use the Mode option to change modes.

Client settings

Displays information about the wireless hotspot your unit is connected to or the last one your unit was connected to. You can select the hotspot in the dialog to set it as a hotspot you want to always connect to when in range or you can select to delete it.

Advanced

Initiates the Iperf and DHCP Probe tools that help in fault-finding and setting up the wireless network.

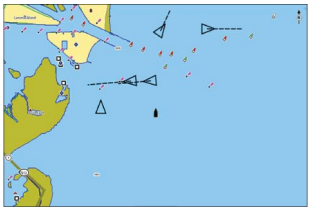
→ ***Note:*** Iperf and DHCP Probe are tools provided for diagnostic purposes by users familiar with network terminology and configuration. Navico is not the original developer of these tools, and does not provide support related to their use.

15 AIS

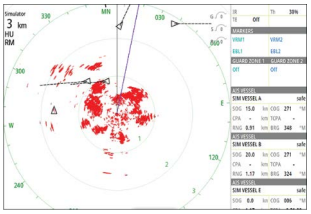
If a compatible AIS (Automatic Identification System) source is connected to the system, then any targets detected by these devices can be displayed and tracked. You can also see messages and position for DSC transmitting devices within range.

AIS targets can be displayed as overlay on radar and chart images, making this feature an important tool for safe travelling and collision avoidance.

You can set alarms to notify you if an AIS target gets too close or if the target is lost.



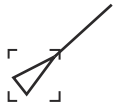
AIS vessels on a chart panel



AIS vessels on a radar panel

AIS target symbols

The system uses the AIS target symbols shown below:

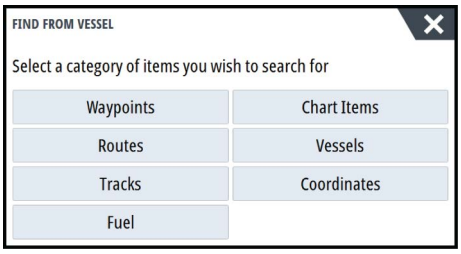
	Sleeping AIS target (not moving or at anchor).
	Moving and safe AIS target with course extension line.
	Dangerous AIS target, illustrated with bold line. A target is defined as dangerous based on the CPA and TCPA settings. Refer to *"Defining dangerous vessels"* on page 102.
	Lost AIS target. When no signals have been received within a time limit, a target is defined as lost. The target symbol represents the last valid position of the target before the reception of data was lost.
	Selected AIS target, activated by selecting a target symbol. The target returns to the default target symbol when the cursor is removed from the symbol.
	AIS SART (AIS Search And Rescue Transmitter).

Viewing information about AIS targets

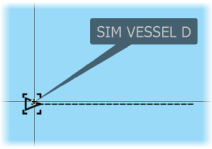
Searching for AIS items

You can search for AIS targets by using the **Find** option in the Tools panel.

From a chart panel you can search for AIS targets by using the **Find** option in the menu. If the cursor is active, the system searches for vessels around the cursor position. Without an active cursor, the system searches for vessels around your vessel's position.



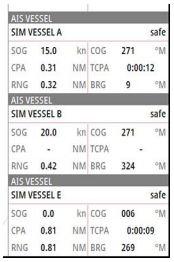
Viewing information about single AIS targets



When you select an AIS icon on the chart or radar panel the symbol changes to Selected target symbol, and the vessel's name is displayed.

You can display detailed information for a target by selecting the AIS pop-up, or from the menu when the target is selected.

AIS information on radar panels



The radar data bar includes information on up to 3 AIS targets.

The targets are listed with the closest target on top, and are color coded to indicate target status.

Calling an AIS vessel

If the system includes a VHF radio supporting DSC (Digital Select Calling) calls over NMEA 2000, you can initiate a DSC call to other vessels from the NSS evo3.

The call option is available in the **AIS Vessel Details** dialog, and in the **Vessel** status dialog activated from the **Tools** panel.

From the **Call** dialog you can change channel or cancel the call. The **Call** dialog is closed when the connection is established.

AIS SART

When an AIS SART (Search and Rescue beacon) is activated, it starts transmitting its position and identification data. This data is received by your AIS device.

If your AIS receiver is not compliant with AIS SART, it interprets the received AIS SART data as a signal from a standard AIS transmitter. An icon is positioned on the chart, but this icon is an AIS vessel icon.

If your AIS receiver is compliant with AIS SART, the following takes place when AIS SART data is received:

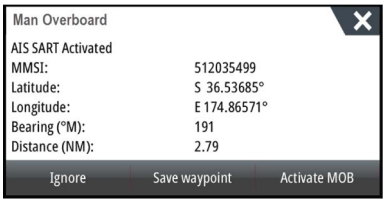
- An AIS SART icon is located on the chart in the position received from the AIS SART
- An alarm message is displayed

If you have enabled the siren, the alarm message is followed by an audible alarm.

➔ ***Note:*** The icon is green if the received AIS SART data is a test and not an active message.

AIS SART alarm message

When data is received from an AIS SART, an alarm message is displayed. This message includes the AIS SART's unique MMSI number, and its position, distance, and bearing from your vessel.



You have the following options:

- Ignore the alarm
  - The alarm is muted and the message closed. The alarm does not reappear

➔ ***Note:*** If you ignore the alarm, the AIS SART icon remains visible on your chart, and the AIS SART remains in the Vessels list.

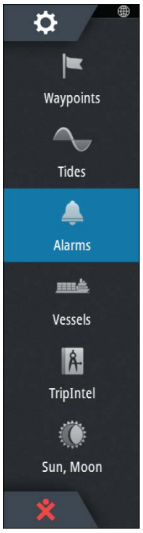
- Save the waypoint
  - The waypoint is saved to your waypoint list. This waypoint name is prefixed with MOB AIS SART - followed by the unique MMSI number of the SART. For example, MOB AIS SART - 12345678.
- Activate the MOB function
  - The display switches to a zoomed chart panel, centered on the AIS SART position
  - The system creates an active route to the AIS SART position

➔ ***Note:*** If the MOB function is already active, this will be terminated and replaced by the new route towards the AIS SART position!

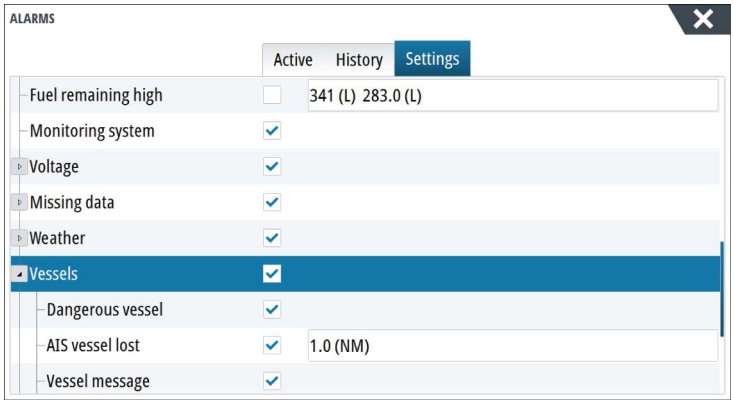
➔ ***Note:*** If the AIS stops receiving the AIS SART message, the AIS SART remains in the Vessels list for 10 minutes after it receives the last signal.

If you select the AIS SART icon on the chart panel, then you can see the AIS MOB details.

Vessel alarms



You can define several alarms to alert you if a target shows up within predefined range limits, or if a previously identified target is lost.



Dangerous vessel

Controls whether an alarm will be activated when a vessel comes closer than the distance for CPA within the time limit for TCPA. Refer to *"Defining dangerous vessels"* on page 102.

AIS vessel lost

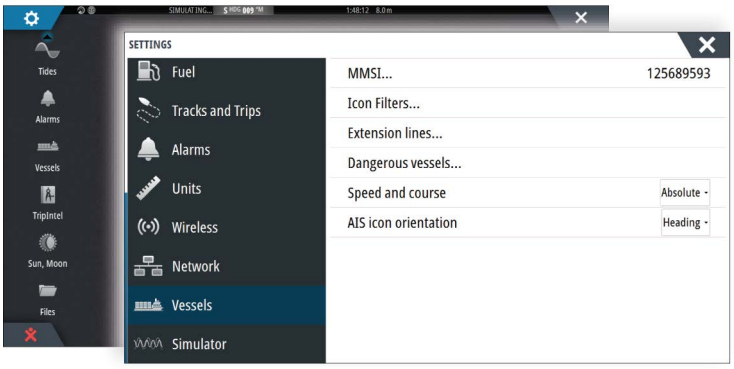
Sets the range for lost vessels. If a vessel is lost within the set range, an alarm occurs.

→ ***Note:*** The check box controls whether the alarm pop-up box is displayed and if the siren goes on. The CPA and TCPA define when a vessel is dangerous regardless of the enabled or disabled state.

Vessel message

Controls whether an alarm will be activated when a message is received from an AIS target.

Vessel settings



Your vessel's MMSI number

You need to have your own MMSI (Maritime Mobile Service Identity) number entered in the system to receive addressed messages from AIS and DSC vessels.

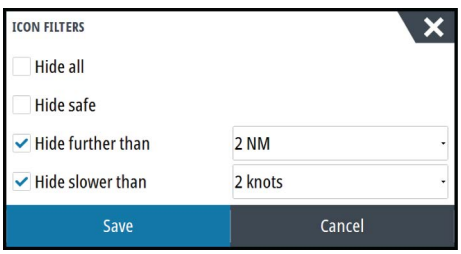
It is also important to have the MMSI number entered to avoid seeing your own vessel as an AIS target on the chart.

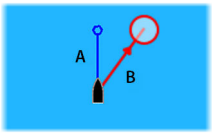
→ ***Note:*** The Vessel message option in the alarm settings must be toggled on for any MMSI message to be displayed.

Icon filters

By default, all targets are shown on the panel if an AIS device is connected to the system.

You can select not to show any targets, or to filter the icons based on security settings, distance, and vessel speed.



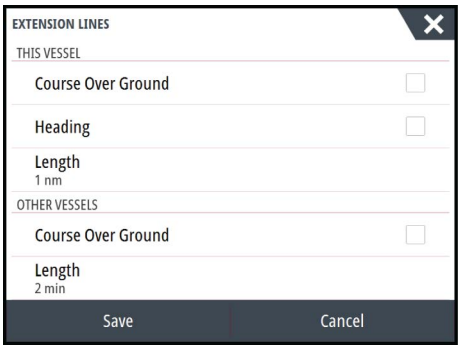


Extension lines

The length of the extension lines for your vessel and for other vessels can be set by the user.

- A: Heading
- B: Course Over Ground (COG)

The length of the extension lines is either set as a fixed distance, or to indicate the distance the vessel will move in the selected time period. If no options are turned on for **This vessel** then no extension lines are shown for your vessel.

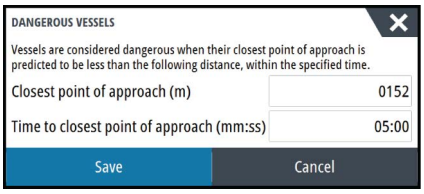


Your own vessel heading information is read from the active heading sensor, and COG information is received from the active GPS.

For other vessels COG data is included in the message received from the AIS system.

Defining dangerous vessels

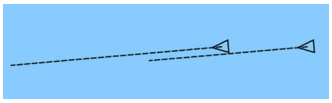
You can define an invisible guard zone around your vessel. When a target comes within the set limits, the symbol changes to the Dangerous target symbol. An alarm is triggered if activated in the Alarm settings panel.



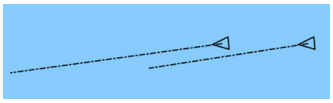
Speed and course indication

The extension line can be used to indicate speed and course for targets, either as absolute (true) motion in the chart or relative to your vessel.

A different line style is used on the extension lines to indicate motion, as shown below.



AIS vessels shown with Absolute motion



AIS vessels shown with Relative motion

AIS icon orientation

Sets the orientation of the AIS icon, either based on heading or COG information.

16 Instrument panels

The Instruments panels consist of multiple gauges - analog, digital and bar - that can be customized to display selected data. The Instruments panel displays data on dashboards, and you can define up to ten dashboards within the Instruments panel.

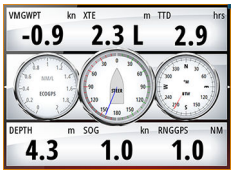
➔ ***Note:*** To include fuel/engine information, engine and tank information has to be configured from the Settings panel.

Dashboards

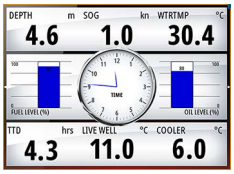
A set of dashboard styles are predefined to display vessel, navigation, and angler information.

You switch between the panel's dashboards by selecting the left and right arrow buttons on the panel. You can also select the dashboard from the menu.

Vessel dashboard



Navigation dashboard



Angler dashboard

➔ ***Note:*** Additional dashboards can be activated from the menu if other systems (e.g. CZone) are present on the network.

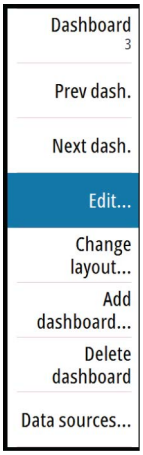
Customizing the Instruments panel

You can customize the Instruments panel by changing the data for each of the gauges in the dashboard, by changing the dashboard layout, and by adding new dashboards. You can also set limits for analog gauges.

All edit options are available from the Instruments panel menu.

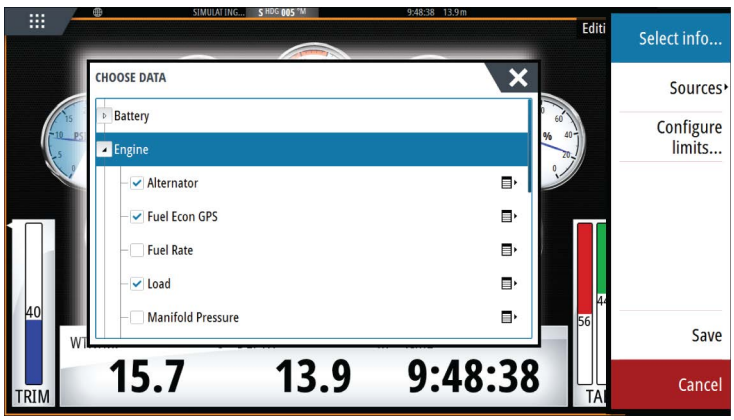
Available editing options depend on which data sources are connected to your system.

Edit a dashboard



Activate the dashboard you want to edit, then either press and hold on the gauge you want to change and select the information to be displayed or do the following:

1. Activate the menu
2. Select the edit option
3. Select the gauge you want to change. Selected gauge is indicated with a colored background
4. Select information to be displayed, configure limits, and eventually change the source for the information
5. Save your changes by selecting the save option in the menu



17 Audio

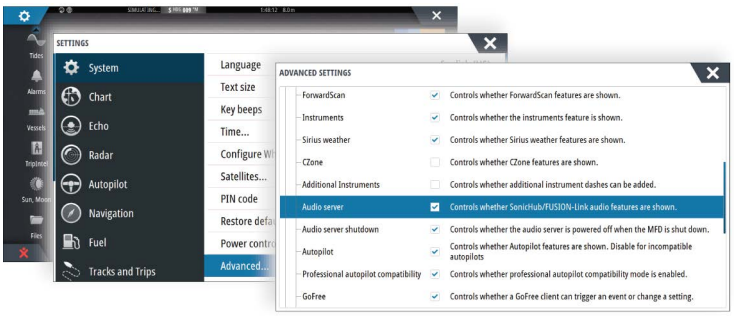
If a SonicHub server, a FUSION marine entertainment system, or NMEA 2000 audio system is connected to the NMEA 2000 network, you can use the NSS evo3 to control and customize the audio system on your vessel.

When connected to a WM-3 Satellite module with an active subscription, you can include SiriusXM products on your system. You can also connect a SiriusXM radio to a FUSION system. Sirius audio and weather service covers inland U.S. waters and coastal areas into the Atlantic and Pacific oceans, Gulf of Mexico, and the Caribbean Sea. The SiriusXM products received vary depending on your selected subscription package. For more information refer to www.siriusXM.com.

Before you can start using your audio equipment, it must be installed according to the NSS evo3 Installation manual and to the documentation included with the audio device.

Enabling audio

A compatible audio device connected to the NMEA 2000 network should automatically be identified by the system. If not, enable the feature from the **Advanced Settings** dialog.

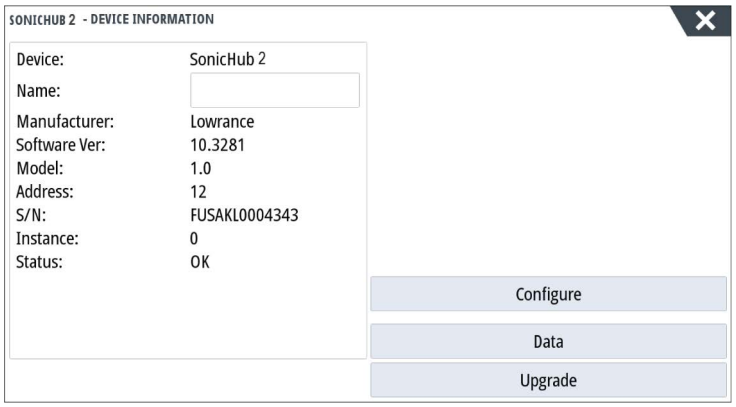


SonicHub 2

A SonicHub 2 connected to the NMEA 2000 network is supported.

SonicHub 2 Device Information

Open the Network Settings dialog and select the SonicHub 2 device in the Device list. This opens the SonicHub 2 Device Information dialog.



Configure

Select to configure the device.

Upgrade

Updates the device software.

➔ ***Note:*** A USB memory stick with the software upgrade must be plugged into the device. Periodic software updates may be available from the product website. Detailed instructions for how to install the software are included with the upgrade files.

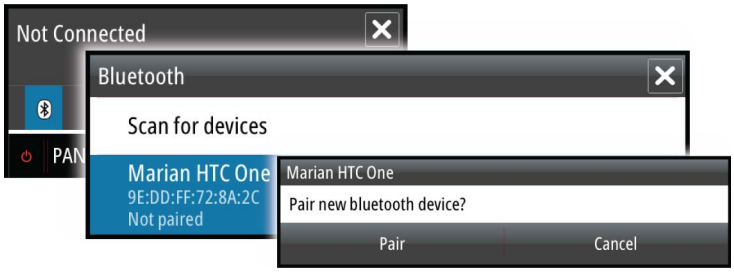
Factory Reset

Resets the device to factory defaults.

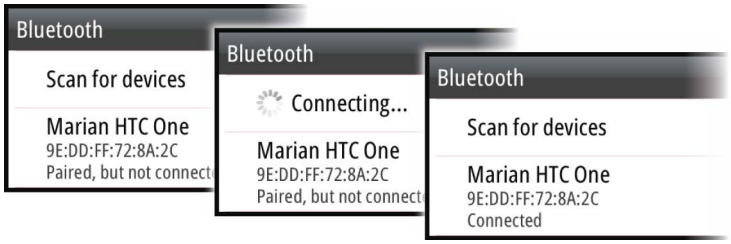
SonicHub 2 is Bluetooth enabled

The SonicHub 2 is a Bluetooth enabled device. You can use the SonicHub 2's built-in Bluetooth wireless to connect it to Bluetooth enabled audio devices.

To pair the SonicHub 2 to a Bluetooth enabled device select the Bluetooth devices icon in the **Controls** menu. Choose the Bluetooth device you want to pair to from the list of available devices and then select Pair.



The SonicHub 2 connects to the paired device.



Connecting and disconnecting paired devices

The SonicHub 2 automatically connects to a device when you pair them. You can pair it to several devices but only one device can be connected at a time.

You can manually disconnect and connect the SonicHub 2 to paired devices.

To disconnect a paired device, select the paired device in the device list and then select **Disconnect**.

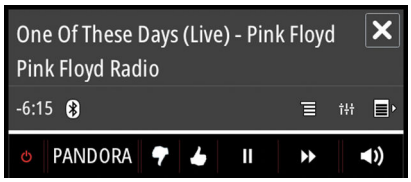
To connect to a paired device, select the paired device in the device list and then select **Connect**.

Pandora

The SonicHub 2 supports streaming music from Pandora from an Android device (over Bluetooth) or IOS device (over USB and Bluetooth).

➔ ***Note:*** You must be in a valid location to use Pandora. Refer to the Pandora website for more information.

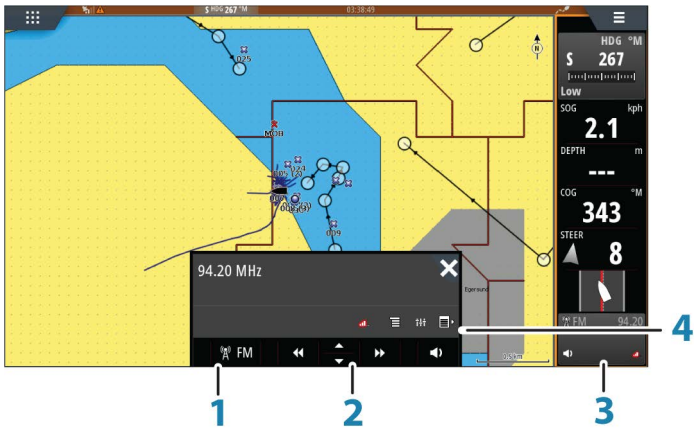
Use menu controls to run Pandora on the smart device.



The Audio panel

You activate the audio panel by activating the audio tile in the Instrument bar.

The control buttons, tools and options vary from one audio source to another as described later in this chapter.



1. Audio source
2. Audio control buttons
3. Audio tile
4. Audio tools

Audio control buttons

Icon	Tuner	VHF	DVD	Playback
iPod	Select to display the list of available sources			
	Select to select previous/next frequency Press and hold to tune in a channel		Select to rewind/play fast forward	Select to select previous/next track
	Select to select next/previous favorite channel		N/A	N/A
	N/A	N/A	Select to start	
	N/A	N/A	Select to pause playback	
	Select to display the volume slider			

Audio tools

Icon	Tuner	VHF	Playback
	Signal strength	N/A	N/A
	N/A	N/A	Select to toggle on/off repeat function. The icon is colored when the function is active.
	N/A	N/A	Select to toggle on/off shuffle mode. The icon is colored when the function is active.
	Select to display menus used for setting up zones and master control		
	Select to display the favorite stations for the tuner	Select to display the favorite channels for the VHF	Select to display the native menu for active source
	Select to display optional settings for active source		

Setting up the audio system

The speakers

Speaker zones

The NSS evo3 can be set up to control different audio zones. The number of zones depends on the audio server connected to your system.

You can adjust balance, volume and volume limit settings individually for each zone. Adjustments to the bass and tremble settings will alter all zones.

Master volume control

By default the volume for all speaker zones are adjusted when you adjust the volume. You can define which zones will be altered when you increase/decrease the volume.

Selecting tuner region

Before playing FM or AM radio, and using a VHF radio, you must select the appropriate region for your location.

Detaching Sirius from the AUX source

If a Sirius radio is connected to the FUSION radio/server, the AUX source is automatically attached to the Sirius feed. **Sirius** then appears in the source list when the FUSION server is active.

To use the AUX source for a different device, the Sirius must be detached from the AUX source.

→ ***Note:*** To use SiriusXM, an optional SiriusXM tuner must be connected to the FUSION server.

Operating the audio system

1. Select the Audio tile in the Instrument bar to activate the Audio overlay
2. Select the options icon and then select the audio server

3. Select the source icon and then select the audio source
   - Number of sources depends on the active audio server
4. Use the panel buttons to control your audio system

For an overview of audio control buttons and tools, refer to *"Audio control buttons"* on page 106 and *"Audio Tools"* on page 107.

For available options, refer to the documentation following your audio equipment.

Favorite channels

When a tuner or VHF channel is tuned in, you can add the channel to your favorite list. The favorite channels can be viewed, selected and deleted from within the Favorite list.

You page through favorite channels by using the up/down audio panel buttons.

Sirius radio (North America only)

Channels list
The channels list displays all available Sirius channels, whether or not you have a subscription for the channel.

Favorites list
You can create a list of your favorite Sirius channels from within the channels list. You cannot add unsubscribed channels.

Locking channels
You can lock selected Sirius channels from being broadcasted. A 4-digit-code must be entered to lock channels and the same code entered to unlock the channels.

18 Weather

The system includes weather functionality that allows the user to view forecast data overlaid on the chart. This helps gaining a clear understanding of the weather conditions that are likely to appear.

The system supports weather data in GRIB format, available for download from various weather service suppliers.

The system also supports weather data from SIRIUS Marine Weather Service. This service is available only in North America.

Wind barbs

The rotation of the wind barbs indicate the relative wind direction, with the tail showing the direction the wind is coming from. In the graphics below, the wind comes from the northwest.

Wind speed is indicated by a combination of small and large barbs at the end of the wind tail.

	Zero knots / Indeterminate wind direction
	Small barb = 5 knots
	Large barb = 10 knots
	Arrow barb = 50 knots

If a combination of 5 and 10 knot barbs are shown on a tail, then add them together to give you the total wind speed. The example below shows 3 x large barb + 1 x small barb = 35 knots, and 60 knots indicated with 1 x arrow barb + 1 x large barb.

Wind speed: 35 knots

Wind speed: 60 knots

Showing weather details

If pop-up is enabled, you can select a weather icon to display the identity of the observation. If you select the pop-up, detailed information about the observation is displayed. You can also display the detailed information from the menu when the weather icon is selected.

GRIB weather

A GRIB file contains forecast information for a set number of days. It is possible to animate the weather data, which shows how weather systems are developing.

Importing GRIB data

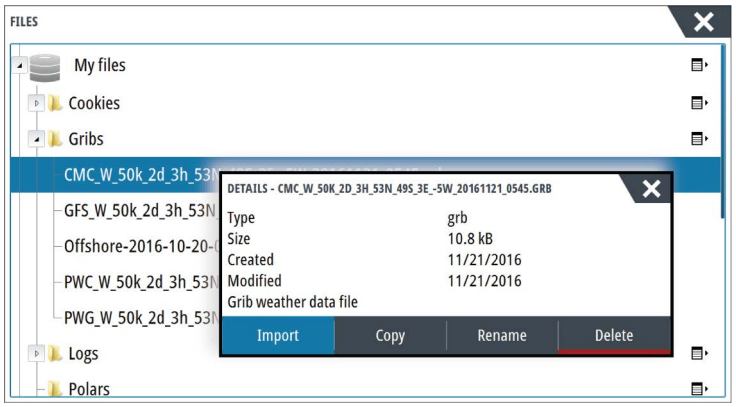
GRIB data imported into memory can be displayed as chart overlay. Refer to *"Displaying GRIB weather as overlay"* on page 110. The file can be imported from any location that can be seen in the file manager.

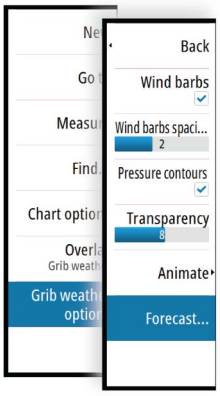
→ ***Note:*** GRIB data that is imported overwrites the GRIB data in memory.

You can import the weather file using the File manager from the Tools panel or the Forecast menu option on the Chart panel:

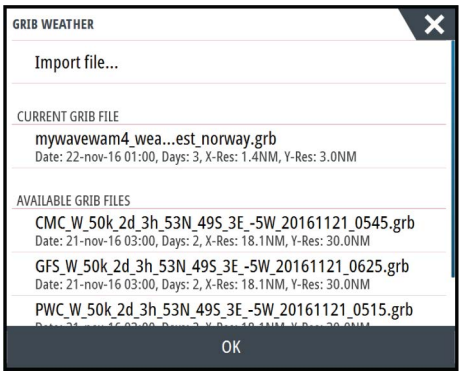
- When you select a GRIB file with the File manager, the import option is available. Use it to import a GRIB file into memory.

Select the GRIB file to import the data.





- Selecting the Forecast menu option on the Chart panel displays the GRIB weather dialog. Use the import file option in this dialog to open the File manager and import a GRIB file into memory.
  Using this dialog you can also select an available GRIB file. Selecting an available GRIB file is the same as importing the file into memory. Available GRIB files are files downloaded from a weather service supplier to the Gribs directory (in the Files manager).



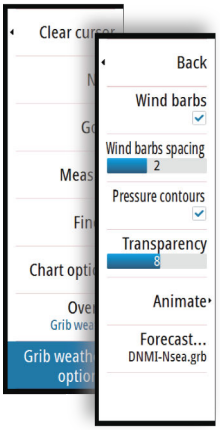
Displaying GRIB weather as overlay

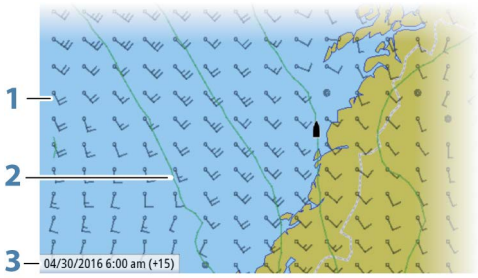
Imported GRIB weather data can be displayed as an overlay on your chart panel.

When the GRIB weather overlay is selected, the chart menu increases to show GRIB weather options. From this menu you can select which weather symbols you want to display, set the distance between the barbs, and adjust the opaqueness of the weather symbols.

From this menu you can also animate the weather forecast. Refer to *"Animating GRIB weather forecast"* on page 111.

The Forecast menu option displays the GRIB file currently in memory and overlaid on the chart. Select the Forecast menu option to import a new GRIB file into memory. Importing a new file overwrites the GRIB data in memory.





1 Wind barbs

2 Pressure contours

3 GRIB information window

GRIB information window

The GRIB information window shows the date and time for the GRIB weather forecast, and the selected forecast time in brackets. A negative value in the brackets indicates historic weather data.

If you select a position on the chart, the information window expands to include weather details for the selected position.

Animating GRIB weather forecast

The GRIB data contains forecast information for a set number of days. It is possible to animate the weather data and to show the predicted forecast for a specific time and date. The time scales vary depending on the file you are using.

The time shift is shown in brackets in the GRIB information window. The time is relative to the current time as provided by a GPS device connected to the system.

Select time and animation speed from the menu.

SiriusXM weather

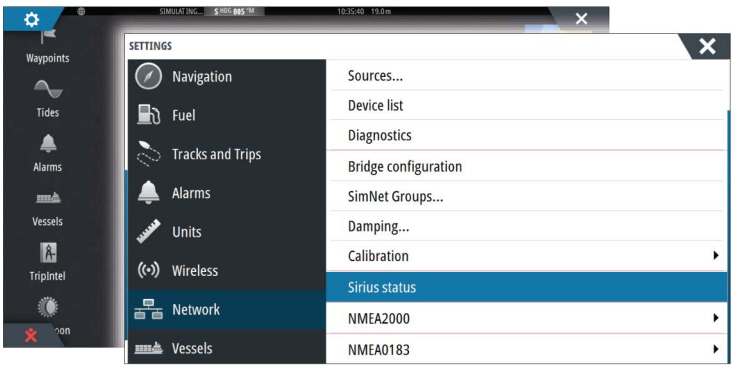
When connected to a Navico Weather module, you can subscribe and include Sirius audio and Sirius Marine Weather Service on your system (North America only).

Depending on your selected subscription package, Sirius audio and weather service covers a variety of North American inland waters and coastal areas. For more information refer to www.siriusxm.com/marineweather

Sirius status panel

When the weather module is connected to the system, you get access to the Sirius status panel.

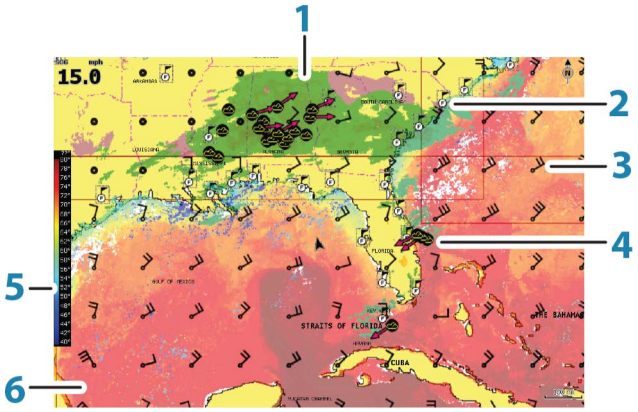
The status panel shows signal strength is indicated as 1/3 (weak), 2/3 (good) or 3/3 (preferred). It also includes antenna status, service level, and the electronic serial number for the weather module.



Sirius weather display

Sirius weather can be displayed as an overlay on your chart panel.

When weather overlay is selected, the chart menu increases to show the available weather options.



1 Precipitation color shading

2 City forecast icon

3 Wind barb

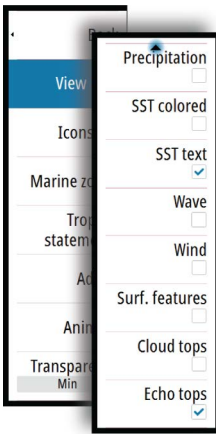
4 Storm icon

5 SST color bar

6 SST color shading

Use the Sirius weather option menu to select which weather symbology that should be displayed and how they should appear on the chart panel.

Sirius view options



Precipitation

Shades of color are used to show precipitation type and intensity. The darkest color indicates the highest intensity.

Rain	From light green (light rain) - yellow - orange - to dark red (heavy rain)
Snow	Blue
Mixed	Pink

Sea Surface Temperature (SST)

You can show the sea surface temperature as color shading or as text.

When color coding is selected, the SST color bar is shown on the left side of the display.

You define how the color codes are used to identify sea surface temperature. See *"Adjusting color codes"* on page 114.

Wave indication

Colors are used to indicate forecasted wave height. The highest waves are dark red, while the lowest are blue.

You can define how the color codes are used to identify the wave height. Refer to *"Adjusting color codes"* on page 114.

Surface features

Turns surface features on/off. Surface features include fronts, isobars, and pressure points. Surface features cannot be shown at the same time as Wind.

Cloud tops

Turn Cloud tops on/off. Cloud tops indicate the height of the top of the clouds. The color palette used is grey with darker greys indicating lower clouds. Cloud tops cannot be shown at the same time as Precipitation or Echo Tops.

➔ ***Note:*** This feature is only available for certain SiriusXM subscriptions.

Echo tops

Turns Echo tops on/off. Echo tops indicate the tops of storms. The color palette used is the same as for Precipitation. Echo tops cannot be shown at the same time as Precipitation or Cloud Tops.

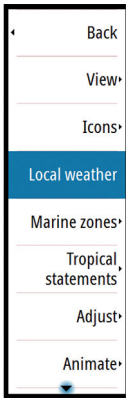
➔ ***Note:*** This feature is only available for certain SiriusXM subscriptions.

Weather icons

Several weather icons are available to show current or predicted weather conditions. You can select an icon to display detailed weather information.

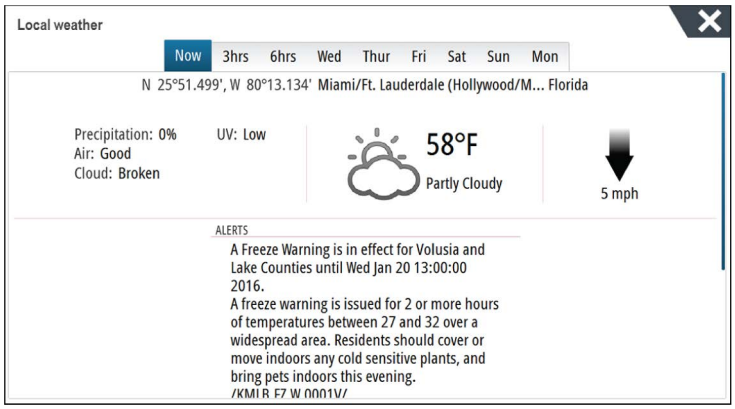
	City forecast
	Surface observation
	Tropical storm tracking; past (grey) - present (red) - future (yellow)
	Hurricane (category 1-5) tracking; past (grey) - present (red) - future (yellow)
	Tropical disturbance/depression tracking; past (grey) - present (red) - future (yellow)
	Storm attributes
	Lightning
	Watch box location and warning
	Marine zone location

Local weather



Select the Local weather menu option to display the Local weather dialog. This dialog shows weather forecast and alerts for the area.

Select a time-slot tab to see the forecast for it.



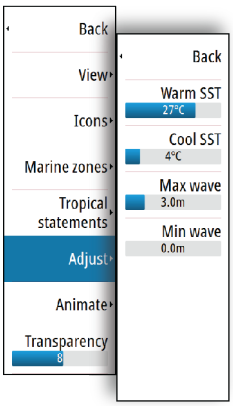
Marine zones

Depending on your selected subscription, SiriusXM services includes access to weather reports for U.S. and Canadian Marine Zones, with the exception of the high seas zones.

You can select a marine zone on a chart and view its forecast. You can also select a marine zone as your current zone of interest and you will be notified of any weather warnings in that zone.

Tropical statements

You can read tropical statements including information about tropical weather conditions. These statements are available for the entire Atlantic and the Eastern Pacific.



Adjusting color codes

You can define the sea surface temperature range and wave height color coding.

The temperature above warm and below cool values is displayed as progressively darker red and darker blue.

Waves higher than the maximum value are indicated with progressively darker red. Waves lower than the minimum value are not color coded.

Animating Sirius weather graphics

The NSS evo3 records the weather information you have turned on, and this information can be used to animate past or future weather conditions. The amount of information available in the system depends on the amount of weather activity; the more complex it is, the less time that is available for animation.

You can animate the past or the future, depending on which weather view you have turned on:

- With precipitation overlay, you can animate for the past and only assume weather conditions in the immediate future.
- With colored wave height overlay, you can animate the future (the predictions).

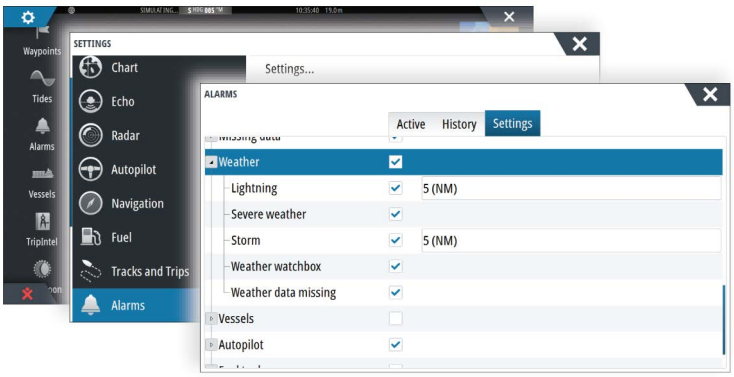
When activated, the time for the current graphic animation is displayed in the lower left corner of the chart panel.

Weather alarms

You can setup lightning or storm alarms to occur when the conditions are within a certain range of your vessel.

You can also set up an alarm as a severe weather forecast alarm issued for your chosen marine zone.

A watchbox is defined by the National Weather Service. When the alarm for watchbox is turned on, an alarm occurs when your vessel is entering or inside a watchbox.



19 Video

The video function allows you to view videos or camera sources on your system.

→ ***Note:*** The video images are not shared from the Ethernet network. You can only view the video on the unit connected to the video source.

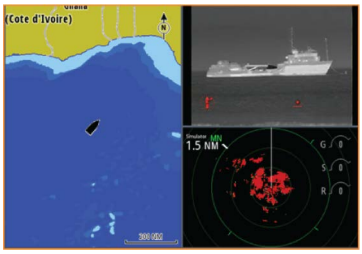
If a FLIR M-series camera is available on the Ethernet network, you can display the video and control the camera from the system.

For information about how to connect the camera, see the separate NSS evo3 Installation manual.

The Video panel

A video panel can be set up as a single panel, or as one of the panels on a multiple panel page.

The video image is proportionally scaled to fit into the video panel. Areas not covered by the image are colored black.



Setting up the video panel

Video source

NSS evo3 supports two video input channels. You can select to view one channel only, or to cycle the image between available video cameras.

The cycle period can be set from 5 to 120 seconds.

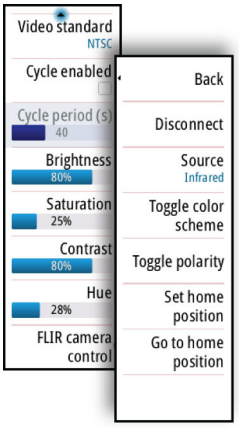
Video standard

NSS evo3 supports NTSC and PAL video. Check the local video standard or the standard of your cameras.

Adjusting the video image

You can optimize the video display by adjusting the video image settings. The settings are adjusted individually for each video source. Default for all settings: 50%.

FLIR camera control



When the connection is established to a FLIR camera, the menu changes to include access to FLIR camera controls.

→ ***Note:*** You can take over camera control from any NSS evo3 connected to the Ethernet network.

Establishing connection with the FLIR video camera

When a video panel is active, the NSS evo3 automatically recognizes a FLIR camera if it is available on the network.

→ ***Note:*** When there is a DHCP server present on the Ethernet network, the FLIR camera needs to be configured and set to have a Static IP Address before the connection can be established. For instructions on how to configure your specific FLIR camera model, refer to FLIR documentation.

→ ***Note:*** Only one FLIR camera can be connected to the Ethernet network.

When you activate a video panel, the system starts searching the network for a FLIR camera.

Lost connections are indicated by a panel key. Select this key to reestablish the connection.

When the connection is established the menu changes to include access to FLIR camera control.

➔ ***Note:*** You can take over camera control from any NSS evo3 unit connected to the Ethernet network.

Panning and tilting the FLIR camera

When the connection to the FLIR camera is established, pan and tilt panel buttons appear on the video panel. The left and right arrow buttons control the camera's pan. The up and down arrow buttons tilt the camera.

Select one of the arrow buttons on the panel to control the camera. The camera continues to move for as long as you press the button.

Zooming the FLIR video image

You zoom the video image by using the zoom panel buttons.

There are two zoom options available, depending upon your selected FLIR camera source option:

- **Digital zoom**
  Only available when the camera is in Infrared mode. In this mode, the zoom is represented in levels (0, 2 and 4 times zoom). Each press on a zoom button increments or decrements the zoom level.
- **Optical zoom**
  Available in daylight mode. In this mode, the camera continues to zoom for as long as you press a zoom panel button.

The FLIR camera source options

The FLIR camera includes both daylight and infrared video sources.

When the infrared source is selected, the following options are available:

- **Toggle color scheme**
  Cycles through FLIR's video output color scheme. Each of these schemes maps a different color to a different temperature.
- **Toggle polarity**
  Inverts the color scheme. For example, instead of: White = Hot and Black = Cold, it becomes Black = Hot and White = Cold.

The FLIR camera's home position

You can set the current pan and tilt position as the camera's home position.

You can later quickly return to this camera position.

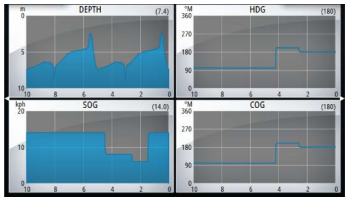
20 Time plots

The NSS evo3 can present data history in different plots. The plots can be displayed in full page, or combined with other panels.

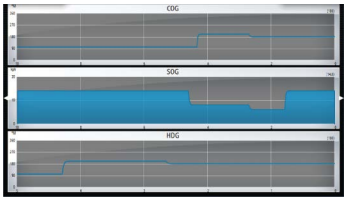
The Time plot panel

The Time plot panel consists of two predefined layouts. You switch between the layouts by selecting the left and right panel arrows. You can also select the layout from the menu.

You can select which data to present on a time plot panel, and you can define the time range for each plot.



Layout 1



Layout 2

Missing data

If the data is unavailable, the relevant plot turns into a dashed line and flattens out at the point the data was lost. When the data becomes available again, a dashed line joins up the two points showing an average trend line bridging the missing data.

Selecting data

Each data field can be changed to show the preferred data type and the time range.

1. Select the edit option from the menu
2. Activate the field you want to edit
3. Change the information type and eventually the range
4. Save your changes

The data available for the Time plots are by default the sources used by the system. If more than one data source is available for a data type you can select to show alternative data source in the Time plot. You change the data type by using the data source option in the menu.

21 Alarms

Alarm system

The system continuously checks for dangerous situations and system faults while the system is running. When an alarm situation occurs, an alarm message pops up on the screen.

An alarm icon is displayed in the status bar, and the status bar pulses the color of the alarm.

If you have enabled the siren, the alarm message is followed by an audible alarm, and the switch for external alarm becomes active.

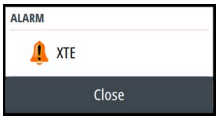
The alarm is recorded in the alarm listing so that you can see the details and take the appropriate corrective action.

Type of messages

The messages are classified according to how the reported situation affects your vessel. The following color codes are used:

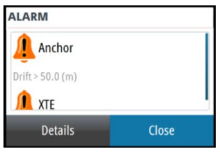
Color	Importance
Red	Critical
Orange	Important
Yellow	Standard
Blue	Warning
Green	Light warning

Single alarms



A single alarm is displayed with the name of the alarm as the title, and with details for the alarm.

Multiple alarms



If more than one alarm is activated simultaneously, then the alarm message displays a list of up to 3 alarms. The alarms are listed in the order they occur with the alarm activated first at the top. The remaining alarms are available in the Alarms dialog.

Acknowledging a message

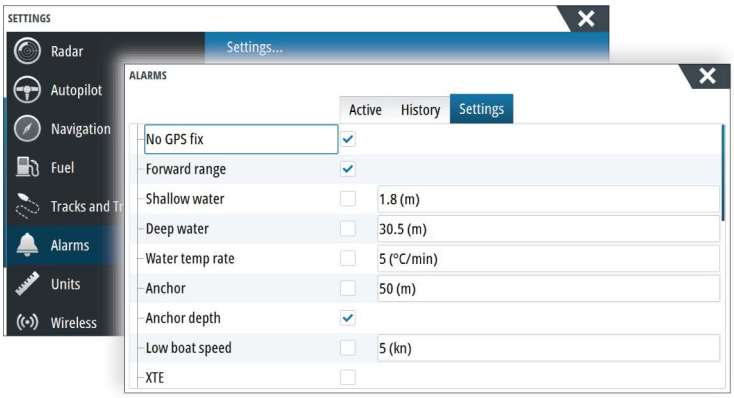
The following options are available in the alarm dialog for acknowledging a message:

- **Close**
  Sets the alarm state to acknowledged, meaning that you are aware of the alarm condition. The siren / buzzer stops and the alarm dialog is removed.
  However, the alarm remains active in the alarm listing until the reason for the alarm has been removed.
- **Disable**
  Disables the current alarm setting. The alarm does not show again unless you turn it back on in the Alarms dialog.

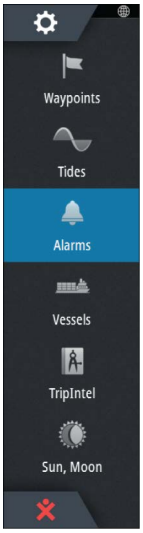
There is no time-out on the alarm message or siren. They remain until you acknowledge the alarm or until the reason for the alarm is removed.

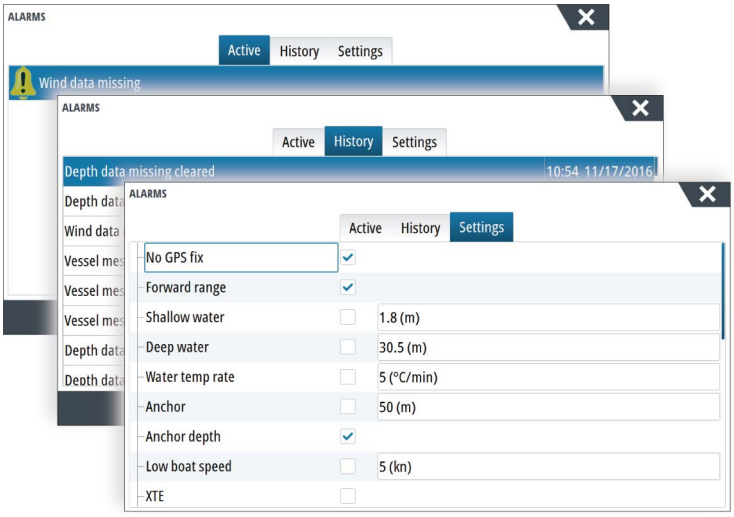
Alarms dialog

All alarms are setup in the Alarms Settings dialog.



The alarm dialogs can also be activated from the Tools panel. The alarm dialogs include information about active alarms and alarm history.





22 Tools

By default, the Tools panel includes icons used for accessing options and tools that are not specific to any panel.

When external equipment is integrated to the unit, new icons might be added to the Tools panel. These icons are used for accessing the external equipment's features.

Waypoints

List of waypoints, routes, and tracks with details.

Select the waypoint, route, or track you wish to edit or delete.

Tides

Displays tide information for the tide station nearest to your vessel.

Select the arrow panel buttons to change the date, or select the date field to access the calendar function.

Available tide stations can be selected from the menu.

Alarms

Active alarms
List of active alarms.

Alarm history
List of all alarms with time stamp.

Alarm settings
List of all available alarm options in the system, with current settings.

Vessels

Status listing
List of all AIS, MARPA, and DSC vessels with available information.

Message listing
List of all messages received from other AIS vessels with time stamp.

TripIntel

Provides trip management functionality and trip information. For more information, refer to *"TripIntel"* on page 46.

Sun, Moon

Displays sunrise, sunset, moonrise and moonset for a position based on entered date and the position's latitude/longitude.

Files

File management system, used to browse the contents of the unit's internal memory and inserted SD card.

Viewing files

Select a file in the Files panel and then the view file option in the **Details** dialog.

Copying files to a card in the card reader

You can copy screen captures and logs to a card in the card reader. You can also export System Settings, Waypoints, Routes, and Tracks to a card. Exporting files is covered in the section *"Maintenance"* on page 124.

Find

Search function for chart items (waypoints, routes, tracks, etc.).

GoFree Shop

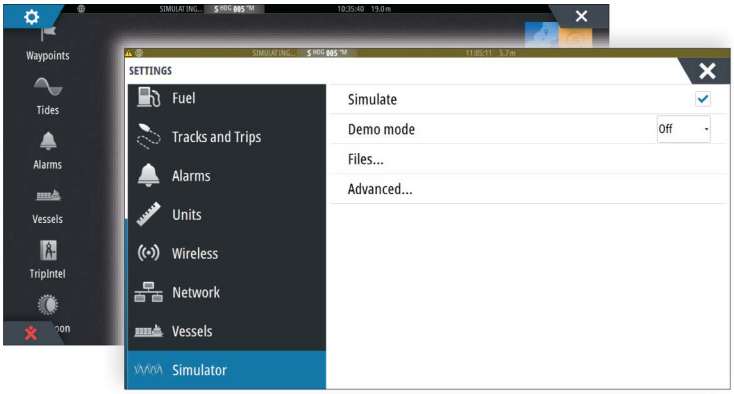
→ ***Note:*** The built-in wireless functionality must be connected to an external wireless hotspot in order to access the GoFree Shop. Refer to *"Connect and disconnect from a wireless hotspot"* on page 95.

Opens the GoFree Shop web site. At the GoFree Shop you can browse, purchase, and download compatible charts for your system. You can also upload your Echosounder logs to be shared on Social Map charts. When you log on, the system automatically gives you a notification if a new software version is available for your system. If an update is available, you can download it to a card slot or defer the download until later.

23 Simulator

The simulation feature lets you see how the unit works in a stationary position and without being connected to other devices.

The status bar indicates if the simulator is toggled on.



Demo mode

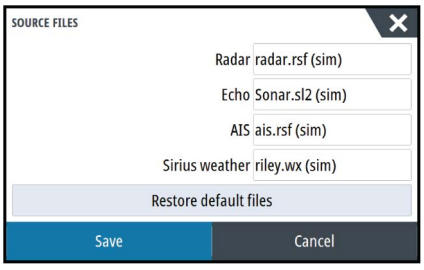
In this mode the unit automatically runs through the main features of the product; it changes pages automatically, adjusts settings, opens menus, etc.

If you tap on a touchscreen or press a key when demo mode is running, the demonstration pauses. After a time-out period, demo mode resumes and any changed settings are restored to default.

→ ***Note:*** Demo mode is designed for retail/showroom demonstrations.

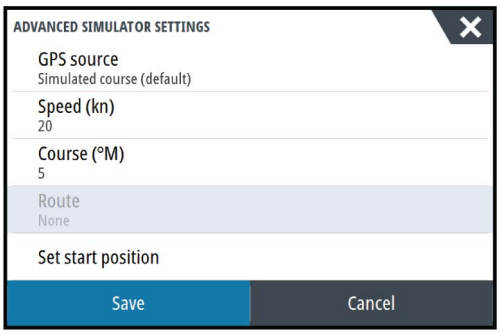
Simulator source files

You can select which data files are used by the simulator. A set of source files is included in your system, and you can import files by using a card inserted into the card reader. You can also use your own recorded log data files in the simulator.



Advanced simulator settings

The Advanced simulator settings allows for manually controlling the simulator.



GPS source

Selects where the GPS data is generated from.

Speed, Course and Route

Used for manually entering values when GPS source is set to Simulated course or Simulated route. Otherwise, GPS data including speed and course come from the selected source file.

Set start position

Moves your vessel to the current cursor position.

→ ***Note:*** This option is only available when the GPS source is set to Simulated course.

24 Maintenance

Preventive maintenance

The unit does not contain any field serviceable components. Therefore, the operator is required to perform only a very limited amount of preventative maintenance.

It is recommended that you always fit the supplied protective sun cover when the unit is not in use.

Cleaning the display unit

A proper cleaning cloth should be used to clean the screen, where possible. Use plenty of water to dissolve and take away salt remains. Crystalized salt may scratch the coating if using a damp cloth. Apply minimal pressure to the screen.

Where marks on the screen cannot be removed by the cloth alone, use a 50/50 mixture of warm water and isopropyl alcohol to clean the screen. Avoid any contact with solvents (acetone, mineral turpentine, etc.), or ammonia based cleaning products, as they may damage the anti-glare layer or plastic bezel.

To prevent UV damage to the plastic bezel, it is recommended that the sun cover be fitted when the unit is not in use for an extended period.

Cleaning the media port door

Clean the media port door regularly to avoid salt crystallization on the surface, causing water to leak into the card slot.

Checking the keys

Make sure that no keys are stuck in the down position. If one is stuck, wiggle the key to free it back to normal.

Checking the connectors

The connectors should be checked by visual inspection only.

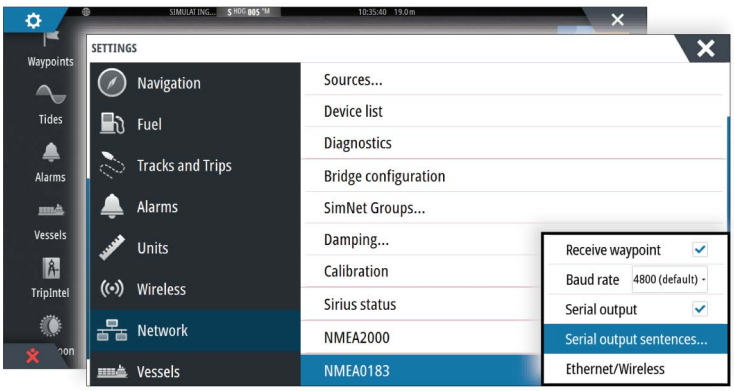
Push the connector plugs into the connector. If the connector plugs are equipped with a lock, ensure that it is in the correct position.

NMEA Data logging

All serial output sentences sent over the NMEA TCP connection are logged to an internal file. You can export and review this file for service and fault finding purposes.

The maximum file size is predefined. If you have added several other files to the system (file recordings, music, pictures, PDF files), this may reduce the allowed file size for the log file.

The system logs as much data as possible within the file size limitation, and then it starts overwriting the oldest data.



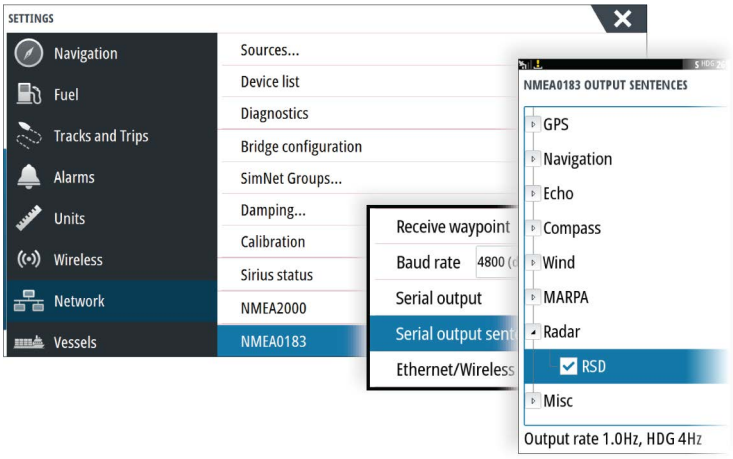
Exporting the log file

The log file can be exported from the files dialog.

When you select the Log database you are prompted to select a destination folder and filename. Once accepted, the log file is written to the chosen location.

RSD sentence output

The output of RSD NMEA 0183 message can be enabled (default off) to provide cursor position information to an external device. The cursor position information may be used by devices such as thermal cameras with pan-tilt ability, and external radar displays.



→ ***Note:*** The sentence format (dictated by NMEA 0183) was not written to take in to consideration dual radar systems, and therefore does not transmit identification information to distinguish between sources. When two radar PPIs are shown on the screen at the same time, only the first (left hand) radar provides RSD information. **RSD** is shown on the radar PPI to indicate this feature is enabled.

Software upgrades

The latest software is available for download from our website, www.simrad-yachting.com.

Before initiating an update to the unit itself, be sure to back up any potentially valuable user data. Refer to *"Backing up your system data"* on page 126.

The system or the Network analyzer and service assistant can advise software updates are available.

Network analyzer and service assistant

The system has a built-in service assistant that creates a report of the devices installed on the NMEA 2000 and Ethernet network such as the software versions, serial numbers, and information from the settings file to assist in technical support enquiries.

To use the analyzer, open the About page of the System settings dialog and select Support. Two options are displayed:

Create report

Analyzes your network and prompts you for information required for support and creates the report with information automatically gathered from the network. You can add screenshots and log files that will be attached to the report. There is a 20MB limit for the report attachments. You can save the report to a memory card and email it to support or upload it directly if you have an internet connection. If you call technical support first, you can enter an incident number to assist with tracking.

Check system for updates

Analyzes your network and checks if updates are available for compatible devices.

→ ***Note:*** Connect your unit to the internet to check for the latest available software versions. The software versions will be up to date as of the last time you updated your unit or connected to the internet.

Update software

→ ***Note:*** Remove any mapping cards from your unit and install a memory card with sufficient storage before downloading software updates or creating and saving reports to the memory card.

→ ***Note:*** Do not turn off the MFD or device until the update is completed or you are prompted to restart the unit or device being updated.

1. If your MFD is connected to the Internet, you can download the software update from the **Updates Dialog** into a memory card. You can also download the software update from www.simrad-yachting.com to a memory card inserted in a smart device or PC connected to the internet.
2. Insert the card containing the software updates in your MFD.
3. Select the item to be updated in the **Updates Dialog** and follow the prompts.

As you respond to the prompts the update occurs. Prompts may request that you restart the device to complete the update. You can restart devices to complete the update later at a more convenient time.

Backing up your system data

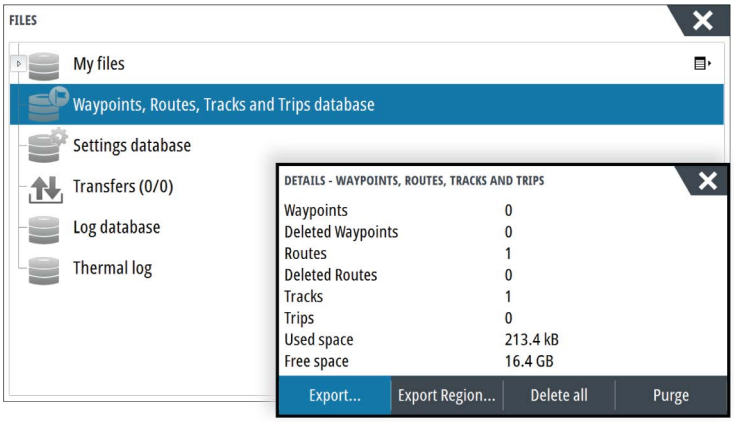
Waypoints, Routes, and Tracks that you create are filed in your system. It is recommended to regularly copy these files and your system settings files as part of your back-up routine. The files can be copied to a card inserted in the card reader.

There are no export file format options for the system settings file. The following output formats are available for exporting Waypoints, Routes, and Tracks files:

- **User Data File version 5**
  This is used to import and export waypoints and routes with a standardized universally unique identifier (UUID), which is very reliable and easy to use. The data includes such information as the time and date when a route was created.
- **User Data File version 4**
  This is best used when transferring data from one system to another, since it contains all the extra bits of information these systems store about items.
- **User Data file version 3 (w/depth)**
  Should be used when transferring user data from one system to a legacy product (Lowrance LMS, LCX)
- **User data file version 2 (no depth)**
  Can be used when transferring user data from one system to a legacy product (Lowrance LMS, LCX)
- **GPX (GPS Exchange, no depth)**
  This is the format most used on the web that shares among most GPS systems in the world. Use this format if you are taking data to a competitor's unit.
- **Northstar.dat (no Tracks)**
  Used to transfer data to a legacy Northstar device.

Export all Waypoints, Routes and Tracks

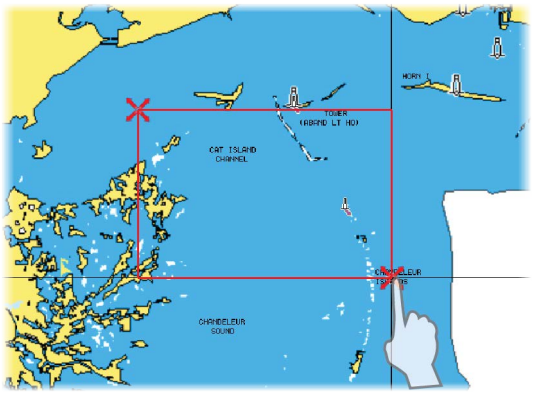
Use the export option if you want to backup all Waypoints, Routes, Tracks and Trips on your system.



Export region

The export region option allows you to select the area from where you want to export data.

1. Select Export region
2. Drag the boundary box to define the desired region



3. Select the export option from the menu
4. Select the appropriate file format
5. Select the serial port field to start the export

Purging Waypoints, Routes and Tracks

Deleted Waypoints, Routes and Tracks are stored in the display unit's memory until the data is purged. This is necessary to allow user data to be synchronized across multiple units on an Ethernet network. If you have numerous deleted, unpurged Waypoints, purging may improve the performance of your system.

➔ ***Note:*** When user data is purged from the memory, it cannot be recovered.

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988-113541-001

SIMRAD

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NSS evo3

Installation Manual

ENGLISH

www.simrad-yachting.com

Preface

Disclaimer

As Navico is continuously improving this product, we retain the right to make changes to the product at any time which may not be reflected in this version of the manual. Please contact your nearest distributor if you require any further assistance.

It is the owner's sole responsibility to install and use the equipment in a manner that will not cause accidents, personal injury or property damage. The user of this product is solely responsible for observing safe boating practices.

NAVICO HOLDING AS AND ITS SUBSIDIARIES, BRANCHES AND AFFILIATES DISCLAIM ALL LIABILITY FOR ANY USE OF THIS PRODUCT IN A WAY THAT MAY CAUSE ACCIDENTS, DAMAGE OR THAT MAY VIOLATE THE LAW.

Governing Language: This statement, any instruction manuals, user guides and other information relating to the product (Documentation) may be translated to, or has been translated from, another language (Translation). In the event of any conflict between any Translation of the Documentation, the English language version of the Documentation will be the official version of the Documentation.

This manual represents the product as at the time of printing. Navico Holding AS and its subsidiaries, branches and affiliates reserve the right to make changes to specifications without notice.

Copyright

Warranty

The warranty card is supplied as a separate document.

In case of any queries, refer to the brand website of your unit or system: www.simrad-yachting.com.

Compliance statements

This equipment complies with:

- CE under 2014/53/EU Directive
- The requirements of level 2 devices of the Radio communications (Electromagnetic Compatibility) standard 2008
- Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The relevant Declaration of conformity is available in the product's section at the following website: www.simrad-yachting.com.

Industry Canada

IC RSS-GEN, Sec 7.1.3 Warning Statement- (Required for license exempt devices)

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie

Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Warning

The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that of the receiver
- Consult the dealer or an experienced technician for help

Internet usage

Some features in this product use an internet connection to perform data downloads and uploads. Internet usage via a connected mobile/cell phone internet connection or a pay-per-MB type internet connection may require large data usage. Your service provider may charge you based on the amount of data you transfer. If you are unsure, contact your service provider to confirm rates and restrictions.

Countries of intended use in the EU

AT - Austria
BE - Belgium
BG - Bulgaria
CY - Cyprus
CZ - Czech Republic
DK - Denmark
EE - Estonia
FI - Finland
FR - France
DE - Germany
GR - Greece
HU - Hungary
IS - Iceland
IE - Ireland
IT - Italy
LV - Latvia
LI - Liechtenstein
LT - Lithuania
LU - Luxembourg
MT - Malta
NL - Netherlands
NO - Norway
PL - Poland
PT - Portugal
RO - Romania
SK - Slovak Republic
SI - Slovenia
ES - Spain
SE - Sweden
CH - Switzerland
TR - Turkey
UK - United Kingdom

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Navico product references

This manual refers to the following Navico products:

- Broadband Sounder™ (Broadband Sounder)
- DownScan Overlay™ (Overlay)
- GoFree™ (GoFree)
- Halo™ Pulse Compression Radar (Halo Radar)
- INSIGHT GENESIS® (Insight Genesis)
- StructureScan® (StructureScan)

About this manual

This manual is a reference guide for installing NSS evo3 units.

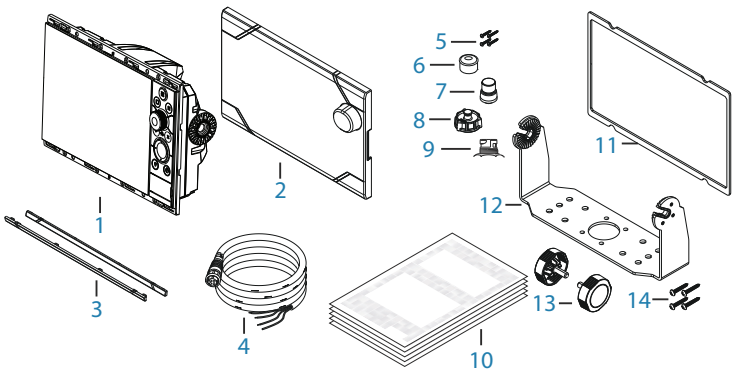
Important text that requires special attention from the reader is emphasized as follows:

➔ ***Note:*** Used to draw the reader's attention to a comment or some important information.

⚠ Warning: Used when it is necessary to warn personnel that they should proceed carefully to prevent risk of injury and/or damage to equipment/ personnel.

Contents

1 Check the contents



1	Display unit
2	Sun cover
3	Bezel trim
4	Power cable
5	Self tapping pozi screws, 4Gx1/2" (x4 for 7", x8 for 9"/12", & x12 for 16" units)
6	Dust caps, different sizes for NMEA 2000 (x1), Ethernet (x1 for 7"/9", x2 for 12"/16") and Sonar (x2) connectors
7	Dust cap for HDMI connector (12" and 16" only)
8	Dust cap for Video/NMEA 0183 connector
9	Dust cap for USB (16" only)
10	Document pack
11	Foam gasket (self adhesive)
12	U-bracket
13	Bracket knobs
14	Self tapping pozi screws for bracket, 14G x 1"

2

Overview

The unit has a built-in CHIRP/Broadband, StructureScan and ForwardScan Echosounder.

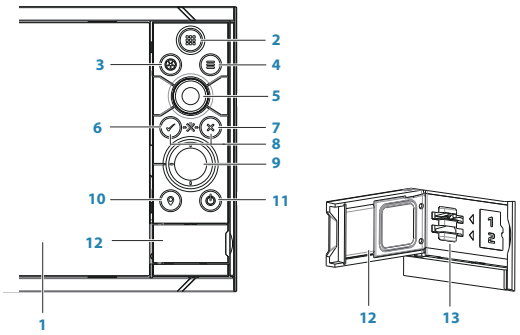
The unit can network over NMEA 2000, and Ethernet allows access to data as well as control of numerous optional devices that can provide Echosounder, radar, audio entertainment, weather and digital switching.

The unit has a built-in high speed GPS receiver (10Hz) and supports Insight charts from Navico including Insight Genesis. The system also supports charts from Navionics and C-MAP as well as content created by a variety of third party mapping providers in the AT5 format. For a full selection of available charts, visit www.gofreemarine.com, www.c-map.com or www.navionics.com.

The unit may be mounted to the vessel with the supplied mounting bracket, or panel mounted.

The unit can operate on 12 V or 24 V systems.

Front controls



1 **Touch screen**

2 **Pages/Home** - press to open the Home page for page selection and setup options

3 **WheelKey** - user configurable key, refer to *"Configuring the WheelKey"* on page 24.
Default without an autopilot connected to the system:
- Short press: toggles between panels on split screen
- Long press: maximizes active panel on split screen

Default with an autopilot connected to the system:
- Short press: opens the autopilot controller and puts the autopilot in standby mode
- Long press: toggles between panels on split screen

4 **Menu key** - press to display the active panel's menu

5 **Rotary knob** - turn to zoom or scroll the menu, press to select an option

6 **Enter key** - press to select an option or to save settings

7 **Exit key** - press to exit a dialog, return to previous menu level, and clear the cursor from the panel

8 **MOB** - press simultaneously the **Enter** and **Exit** keys to create a MOB at the vessel's position

9 **Arrow keys** - press to activate the cursor or to move the cursor
Menu operation: press to navigate through menu items and to adjust a value

10 **Mark key** - press to place waypoint at vessel position or at cursor position when cursor is active

11 **Power key** - press and hold to turn the unit ON/OFF
Press once to display the System Controls dialog, additional presses to toggle through three default dimming levels

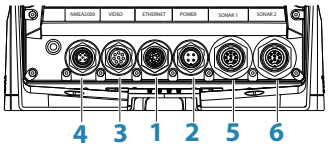
12 **Card reader door**

13 **Dual card reader slots**

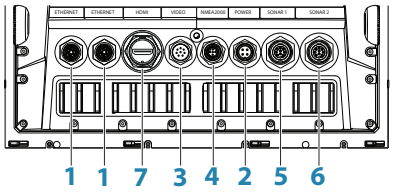
Rear connections

All units

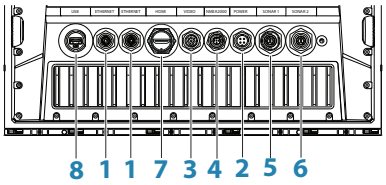
7" and 9" units



12" units



16" units



1 **Ethernet** - connection to high bandwidth network modules

2 **Power** - 12 V or 24 V DC supply input

3 **Video** - input for video sources such as cameras, and NMEA 0183 port

4 **NMEA 2000** - dynamic data

5 **Sonar 1** - single channel CHIRP, 50/200 kHz conventional or HDI transducer

6 **Sonar 2** - singel channel CHIRP, 50/200 kHz conventional, TotalScan, StructureScan or ForwardScan transducer

7 **HDMI** - video output for external monitor

8 **USB** - mouse, keyboard or mass storage

Card reader

Used for inserting a microSD memory card. The memory card can be used for detailed chart data, software updates, transfer of user data, and system backup.

→ ***Note:*** Do not download, transfer or copy files to a chart card. Doing so can damage chart information on the chart card.

The card reader door should always be securely shut immediately after inserting or removing a card, in order to prevent possible water ingress.

3 Installation

Mounting location

Choose the mounting locations carefully before you drill or cut.

For overall width and height requirements, refer to *"Dimensional drawings"* on page 51.

Do not mount any part where it can be used as a hand hold, where it might be submerged, or where it will interfere with the operation, launching, or retrieving of the boat.

The unit should be mounted so that the operator can easily use the controls and clearly see the screen.

The unit has a high-contrast screen and is viewable in direct sunlight, but for best results install the unit out of direct sunlight. The chosen location should have minimal glare from windows or bright objects.

Consider the optimum viewing angle when determining installation, refer to *"Viewing angle"* on page 12.

The mounting location may affect the internal GPS receiver. Test the unit in its intended location to ensure satisfactory reception. An external GPS source can be added to overcome poor reception areas.

Check that it is possible to route cables to the intended mounting location.

Leave sufficient clearance to connect all relevant cables.

Before cutting a hole in a panel, make sure that there are no hidden electrical wires or other parts behind the panel.

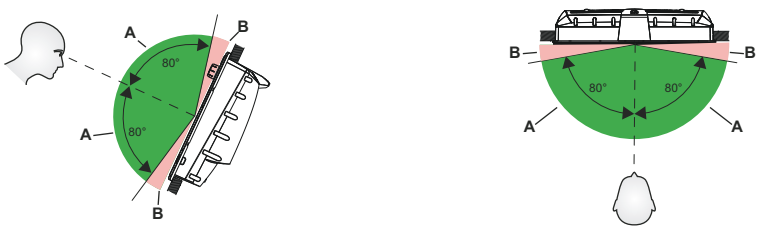
Ensure that any holes cut are in a safe position and will not weaken the boat's structure. If in doubt, consult a qualified boat builder, or marine electronics installer.

→ ***Note:*** Where flush mounted, the enclosure should be dry and well ventilated. In small enclosures, it may be required to fit forced cooling.

⚠ Warning: Inadequate ventilation and subsequent overheating of the unit may cause unreliable operation and reduced service life. Exposing the unit to conditions that exceeds the specifications could invalidate your warranty. – refer to *"Technical specifications"* on page 49.

Viewing angle

The viewing angle influences the viewability of the monitor. The recommended viewing angles relative to perpendicular are shown in the illustrations below.



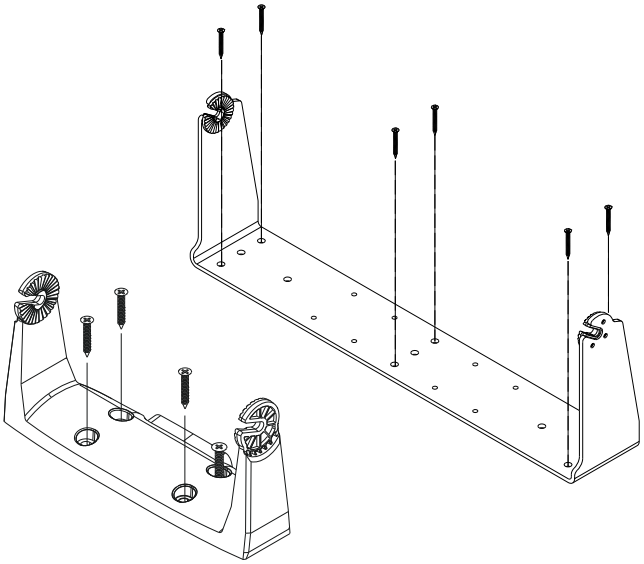
A Optimum viewing angle

B Poor viewing angle or obstructed view

Bracket mounting

U-bracket mounting

1. Place the bracket in the desired mounting location. Ensure that the chosen location has enough height to accommodate the unit fitted in the bracket, and allows tilting of the unit. Also adequate space is required on both sides to allow tightening and loosening of the knobs.
2. Mark the screw locations using the bracket as a template, and drill pilot holes. Use fasteners suited to the mounting surface material. If the material is too thin for self-tappers, reinforce it, or mount the bracket with machine screws and large washers. Use only 304 or 316 stainless steel fasteners.
3. Screw down the bracket.



4. Mount the unit to the bracket using the knobs. Hand tighten only. The ratchet teeth in the bracket and unit ensure a positive grip and prevent the unit from changing from the desired angle.

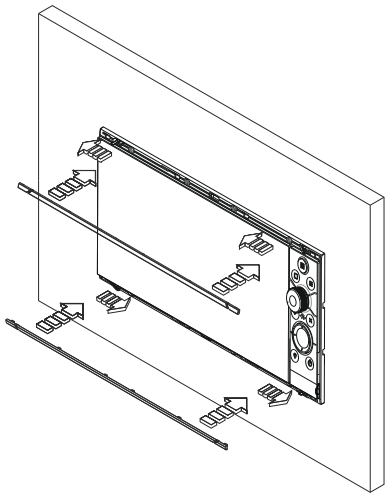
Flush mounting

Use the separate Mouting template to flush mount the unit.

→ ***Note:*** Remember to attach the foam gasket (self adhesive) to rear of unit before flush mounting.

Bezel Fitment and Removal

When fitting bezels, ensure hook tabs on back of each bezel recess in to opposing slots on screen frame. Once flush with front surface of screen, slide top bezel to the left, and bottom bezel to the right to lock in to place.



The bezel trim have been designed to be very low profile, and therefore fully conceal the locking tabs that keep them from being accidentally disengaged from the mounting flange.

To release the locking tab, gently lever the centre of the bezel trim away from the mounting flange. To remove the cover, simultaneously slide it sideways; to the right for the top bezel, and to the left for the bottom bezel.

Transducer mounting location

Transducer location selection and installation are two of the most critical steps in sonar installation. To function properly the transducer must be in the water at all times, and in a location that has a smooth flow of water when the boat is moving.

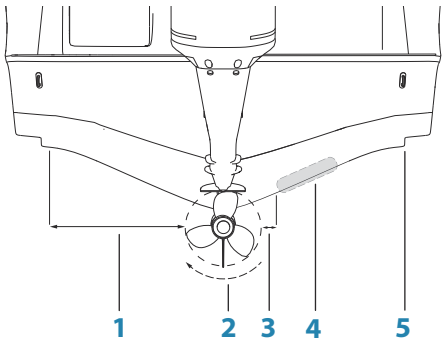
Research

Before starting the installation of the transducer, check the following:

- Find out if the boat builder has a recommended installation location
- Establish the direction of rotation of the propeller(s)
- With the boat traveling at cruising speed, watch the water flow behind the boat to find the area with the smoothest flow (least bubbles)

Select a transducer location

The primary aim is to stay clear of propeller and hull generated turbulence, while mounting the transducer as close to the center of the vessel as possible.



1 **Avoid mounting within 1 m (3.3') to port (left) of propeller**

2 **Conventional clockwise propeller rotation**

3 **Avoid mounting within 7.5 cm (3") to starboard of propeller**

4 **Best mounting location - undisturbed water flow**

5 **Planing strake - avoid mounting behind here**

→ ***Note:*** Reverse the distance guides (1 & 3) from propeller where engine is of counterclockwise configuration.

→ ***Note:*** Vessels with strakes or ribs on the hull can create large amounts of turbulence at higher speeds. A good transducer location on these types of boats is between the ribs closest to the engine.

→ ***Note:*** If the transducer is not placed in a smooth flow of water, interference caused by bubbles and turbulence may show onscreen in the form of random lines or dots. The unit could also lose bottom signal when the boat is on plane.

→ ***Note:*** Trim tabs vary in the amount of turbulence they create as they are adjusted, stay clear of these.

Transducer installation

For transducer installation information, refer to separate installation instructions included with the transducer.

4 Wiring

Guidelines

Don't:

- make sharp bends in the cables
- run cables in a way that allows water to flow down into the connectors
- run the data cables adjacent to radar, transmitter, or large/high current carrying cables or high frequency signal cables.
- run cables so they interfere with mechanical systems
- run cables over sharp edges or burrs

Do this:

- make drip and service loops
- use cable-tie on all cables to keep them secure
- solder/crimp and insulate all wiring connections if extending or shortening the cables. Extending cables should be done with suitable crimp connectors or solder and heat shrink. Keep joins as high as possible to minimize possibility of water immersion.
- leave room adjacent to connectors to ease plugging and unplugging of cables

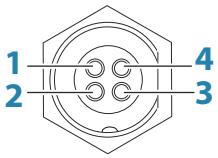
⚠ Warning: Before starting the installation, be sure to turn electrical power off. If power is left on or turned on during the installation, fire, electrical shock, or other serious injury may occur. Be sure that the voltage of the power supply is compatible with the unit.

⚠ Warning: The positive supply wire (red) should always be connected to (+) DC with the supplied fuse or a circuit breaker (closest available to fuse rating).

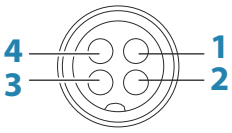
Power connection

The unit is designed to be powered by a 12 or 24 V DC system. It is protected against reverse polarity, under voltage and over voltage (for a limited duration).

A fuse should be fitted to the positive supply; 3 A for the 7" and 9" units, and 5 A for the 12" and 16" units.



Unit socket (male)



Cable plug (female)

Key	Purpose	Color
1	DC negative	Black
2	External alarm	Blue
3	Power control	Yellow
4	+12/24 V DC	Red

Power Control connection

→ ***Note:*** If the control unit is set to Power Slave, the unit cannot be powered down using its own power key. Presseing and holding this key will set the unit to standby. Refer to *"Power Control"* on page 24.

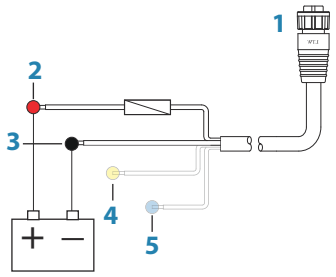
The yellow Power Control wire in the power cable can either be an input that will turn on the unit when power is applied, or an output that turns on other devices when the unit is powered on. It can be configured at the installation stage to control the power state of displays and compatible devices. When commissioning the system, the unit can be set to be a Power Control Slave or Power Control Master.

Power Control configuration options of the unit are:

- Unit turns on when power key pressed: Yellow wire not connected.
- Unit turns on when power source is turned on: Common red and yellow wires.
- Unit turns on with power key, as well as other compatible devices such as Broadband Radar: Yellow wires connected together (Power Control Bus). (Set one or more displays to be a Power Control Master.)

Power Control unconnected

Device will turn on and off when the power button on the front of the unit is pressed. Leave the yellow Power Control wire disconnected and tape or heat-shrink the end to prevent shorting.

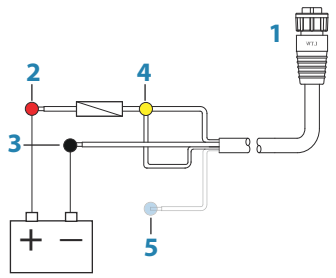


1 Power cable connector to unit
2 Positive wire (red)
3 Ground wire (black)
4 Power control wire (yellow)
5 Alarm wire (blue)

Power Control to supply positive (auto on)

Device will turn on immediately when power is applied. Common the yellow wire with the red wire after the fuse.

→ ***Note:*** The unit cannot be powered down by power button, but can be put in to standby mode. (The screen backlight turns off.)

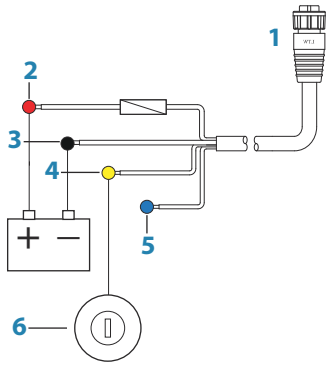


1 Power cable connector to unit
2 Positive wire (red)
3 Ground wire (black)
4 Power control wire (yellow)
5 Alarm wire (blue)

Power Control to ignition

Device will turn on once ignition is turned on to start engines. Connect the yellow wire to the accessories output of the engine key switch.

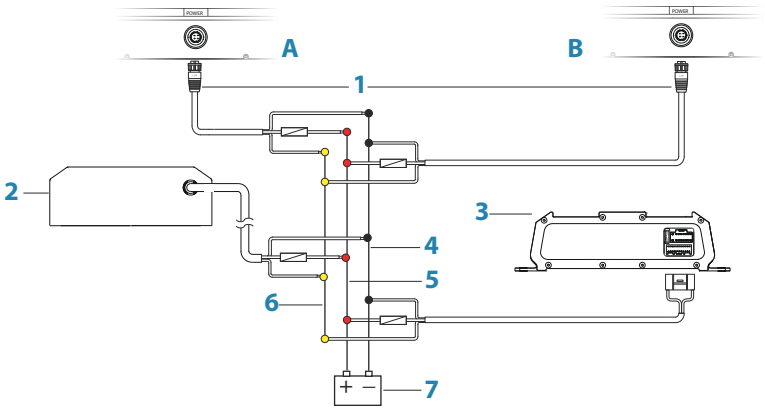
→ ***Note:*** Engine start batteries and house batteries should have a common ground connection.



1 Power cable connector to unit
2 Positive wire (red)
3 Ground wire (black)
4 Power control wire (yellow)
5 Alarm wire (blue)
6 Ignition switch

Power Control master/slave bus

Turning on the 'master' device turns on connected 'slave' devices.



A Power connection to unit on the left
B Power connection to unit on the right
1 Power cable connectors to units
2 Radar interface box
3 Audio entertainment device (e.g. SonicHub2)
4 Ground wire (black)
5 Positive wire (red)
6 Power control wire (yellow)

7 DC power supply

If the unit on the left (A) is turned on using the power button and is set as the Power Control Master, it will output voltage on the Power Control bus to power on the other unit on the right (B), the Radar Interface, and the SonicHub.

If the unit on the right (B) is set to Power Control Slave, it cannot be powered down using its own power button, but can be set to standby.

If the unit on the left (A) is set to Power Control Master and is off, the unit on the right (B) can be turned on using its own power button, but does not turn on any other devices.

To turn on all network devices from either the unit on the left (A) or the unit on the right (B), both devices can be configured as Power Control Masters.

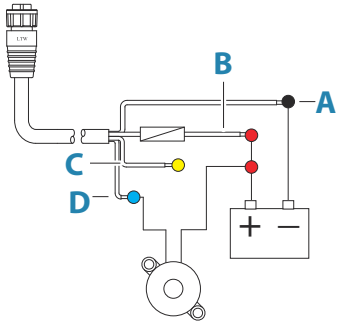
➔ ***Note:*** If a unit has its power state controlled by another device (or ignition switch), it cannot be totally powered down. It can however enter a standby state to save power.

External alarm

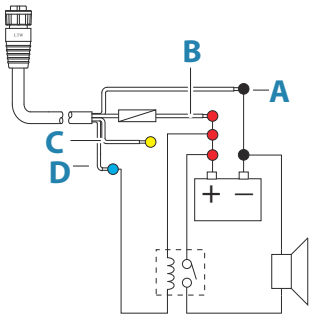
The external alarm can be a small piezo buzzer connected directly, or a horn siren connected through a relay.

Alarms are configured globally in the system. That is, they can be configured on any one networked multifunction device or instrument, and be seen, heard, and acknowledged from all devices. Individual devices can also be configured to not sound their internal buzzer, but still display the alarm information. For information about configuring alarms, refer to the Alarms section in the Operator Manual.

For sirens that draw more than 1 Amp, use a relay.



Buzzer



Siren

A Negative power wire (black)

B Positive power wire (red)

C Power control wire (yellow)

D Alarm wire (blue)

Connect an external monitor

The 12" and 16" units incorporate HDMI technology and have a HDMI output which can be connected to an external monitor to replicate the display at a remote location. The image is shown on the external monitor at the units own native resolution, so the external monitor should support the same resolution or be able to scale.

If a monitor of different resolution is connected, a dialog is displayed at power up which allows you to **Force HDMI** output to the closest resolution it can output. This may not may provide an optimal image on the monitor. The unit will need to restart to apply the change.

➔ ***Note:*** An HDMI cable with a water tight HDMI connector should be used to connect to the unit in exposed installations.

➔ ***Note:*** While the HDMI standard does not state maximum cable length, signal may be compromised on long runs. Only use Navico or other high quality HDMI certified cables.

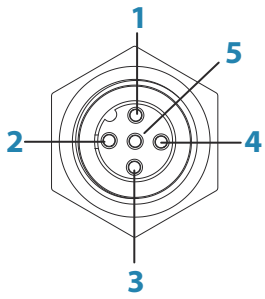
3rd party cables should be tested before installation. On runs over 10m it may be required to add an HDMI amplifier or use HDMI-CAT6 adaptors.

➔ ***Note:*** Some HDMI TV displays may apply over-scan, which will in effect crop the image possibly causing loss of important content. Check the display manual for an option to disable over-scan or adjust scaling

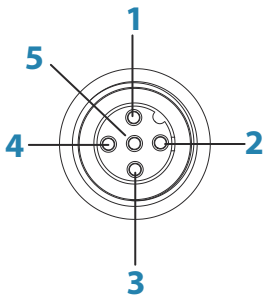
NMEA 2000 backbone

NMEA 2000 device connection

The NMEA 2000 data port allows the receiving and sharing of a multitude of data from various sources.



Unit socket (male)



Cable plug (female)

Key	Purpose	Color
1	Shield	Drain
2	NET-S (+12 V DC)	Red
3	NET-C (DC negative)	Black
4	NET-H	White
5	NET-L	Blue

Essential network information

The standardized physical cables/connectors for NMEA 2000 are Micro-C and Mini-C, directly derived from the automation industries **DeviceNET - Micro-C** being the more commonly used size.

- While most Navico products use Micro-C cabling and connectors, some products still use proprietary SimNet connectors, which are easily made compatible with adaptor cables.
- A network consists of a linear backbone from which drop-cables connect to NMEA 2000 compliant devices.
- A single drop cable has a maximum length of 6 m (20 ft). The total length of all drop cables combined should not exceed 78 m (256 ft).
- A NMEA 2000 network, using Micro-C cabling, has a maximum cable length of 100 m (328 ft), between any two points.
- A NMEA 2000 network needs to have a terminator at each end of the backbone. A terminator can be one of the following:
  - A terminator blank plug.
  - A wind transducer (where the mast cable is one end of the backbone).

Planning and installing a network backbone

The backbone needs to run between the locations of all products to be installed - typically in a bow to stern layout - and be no further than 6 m from a device to be connected.

Choose from the following components to make up the backbone:

- Micro-C cables: 0.6 m (2 ft), 1.8 m (6 ft), 4.5 m (15 ft), and 7.6 m (25 ft) cables.
- T-connector or 4-way connector. Used to connect a drop cable to the backbone.
- Micro-C power cable. Connect to the backbone at a position that is central to the network load using a T-connector or 4-way connector.

Power the network

The network requires its own 12 V DC power supply protected by a 5 amp fuse or breaker.

For vessels fitted with 24 V systems, use a DC-DC converter to supply 12 V.

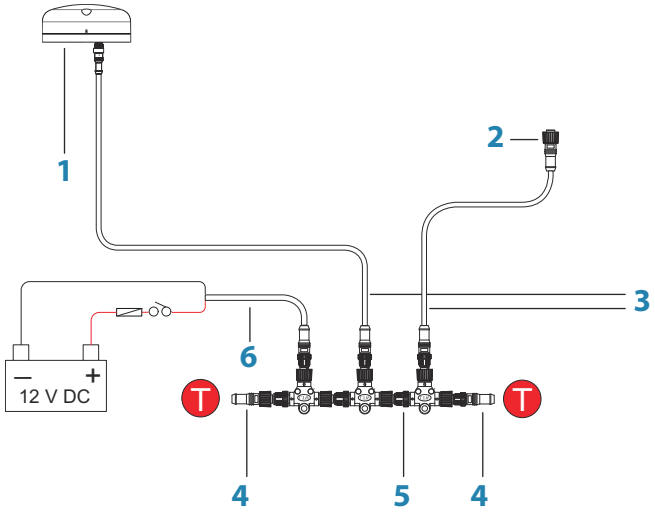
Connect power at any location in the backbone for smaller systems.

For larger systems introduce power at a central point in the backbone to ***balance*** the voltage drop of the network.

➔ ***Note:*** If joining to an existing NMEA 2000 network that already has its own power supply, do not make another power connection elsewhere in the network, and ensure the existing network is not powered by 24 V DC.

➔ ***Note:*** Do not connect the NMEA 2000 power cable to the same terminals as the engine start batteries, autopilot computer, bow thruster or other high current devices.

The following drawing demonstrates a typical small network. The backbone is made up of directly interconnected T-connectors.



1 NMEA 2000 device

2 Connector to unit

3 Drop-cable, should not exceed 6 m (20 ft)

4 Terminators

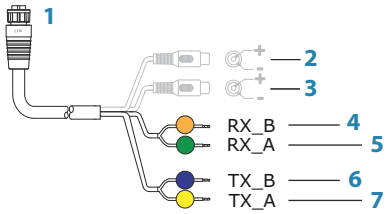
5 Backbone

6 Power cable

NMEA 0183 device connection

The unit has a NMEA 0183 serial port, providing both an input and an output. The port uses the NMEA 0183 (serial balanced) standard, and can be configured in the software for different baud rates up to 38,400 baud.

➔ ***Note:*** The connector for NMEA 0183 is labelled VIDEO on rear of unit, as the cable is dual purpose and carries both composite video and NMEA 0183 (on seperate wires)



1 Connector to unit
2 Camera input 1 - red cable
3 Camera input 2 - green cable
4 NMEA 0183 RX_B (orange)
5 NMEA 0183 RX_A (green)
6 NMEA 0183 TX_B (blue)
7 NMEA 0183 TX_A (yellow)

Talkers and Listeners

Do not connect multiple devices outputting data (Talkers) on to any serial input (RX) of the unit. The RS422 protocol is not intended for this type of connection, and data will be corrupted if more than one device transmits simultaneously. The output (TX) however may drive multiple receivers (Listeners). The number of receivers is finite, and depends on the receiving hardware. Typically three devices is possible.

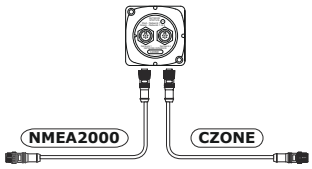
CZone connection to NMEA 2000

When interfacing to CZone network it is recommended to use a BEP Network interface bridge to join the two network backbones together.

The CZone / NMEA 2000 Network interface bridge isolates the power of the two networks, but allows data to be freely shared between both sides.

The Interface Bridge can also be used for expansion of the NMEA 2000 network, when the maximum node limit (node = any device connected to network) for the network has been reached or the maximum cable length of 150 m will be exceeded. Once an Interface Bridge has been fitted, a further 40 nodes and additional cable length can be added.

The Network Interface is available from your BEP dealer. For more information please refer to the BEP web site www.bepmarine.com.



Transducer connection

The unit has internal CHIRP, Broadband, StructureScan, TotalScan and ForwardScan sonar.

There are two 9-pin transducer connectors on the rear of the unit. Traditional 50/200 Khz, CHIRP and HDI transducers can be connected to Sonar1 (Blue nut) or Sonar2 (black nut). TotalScan, StructureScan and ForwardScan must be connected to Sonar2. For connector location, refer to the embossed labeling on the back of the unit or the section *"Rear connections"* on page 10.

→ ***Note:*** The connector attached to the transducer cable is keyed, and can only be inserted in one orientation. Once inserted, turn locking collar to secure.

➔ ***Note:*** A 7-pin transducer cable can be connected to a 9-pin port using a 7-pin to 9-pin adaptor cable. However, if the transducer has a paddle wheel speed sensor, the water-speed data will not be displayed on the unit.

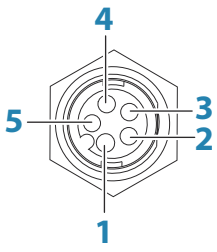
➔ ***Note:*** For transducer installation information, refer to separate installation instructions included with the transducer.

Ethernet connector

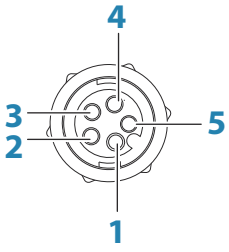
The unit is equipped with an Ethernet port, which allows connecting the unit to your network using the 5 pin Ethernet connector.

➔ ***Note:*** The 7" and 9" units have one Ethernet port, where as the 12" and 16" have two.

Connection of network devices, such as radar, sonar, and other multifunction displays, can be made directly to the Ethernet port, or via a network expansion device to the Ethernet port.



Unit socket (female)

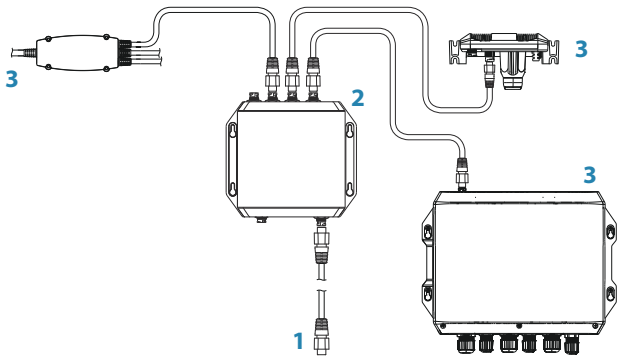


Cable plug (male)

Key	Purpose	Color
1	Transmit positive TX+	Blue/White
2	Transmit negative TX-	Blue
3	Receive positive RX+	Orange/White
4	Receive negative RX-	Orange
5	Shield	Bare

Ethernet expansion device

Connection of network devices can be made via an Ethernet expansion device. Additional expansion devices can be added to provide the required number of ports.



1 Ethernet connector to unit

2 Ethernet expansion device

3 Network devices

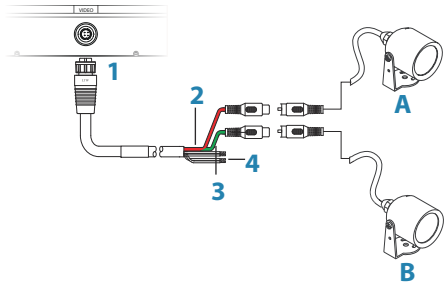
Video in

The unit can be connected to two composite video sources, and display video images on its display.

The video input cable is fitted with female RCA plugs - the camera cables should be terminated with male RCA cables to suit.

➔ ***Note:*** The video images will not be shared with another unit via the network. It is only possible to view video on the unit connected to the video source.

➔ ***Note:*** Both NTSC and PAL formats are supported.



1 Cable connector to Video port on unit

2 Camera A input (red cable)

3 Camera B input (green cable)

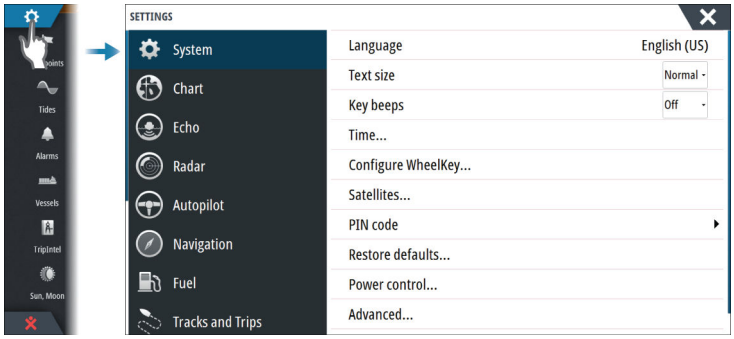
4 NMEA 0183 cables

5

Software Setup

This unit requires some initial configuration before use, in order to get the most out of the product. The following sections focus on settings that typically do not require change once configured. User preference settings and operation are covered in the Operator Manual.

Pressing the Home key or selecting the Home button opens the Home page. Select the Settings icon in the top left corner of the Home page to open the Settings dialog and access items that require configuration. You can also press the Power key once to display the Systems Controls dialog and select the Settings icon from there.



First time startup

When the unit is started for the first time, or after a factory default, the unit displays a setup wizard. Respond to the setup wizard prompts to select some fundamental setup options.

You can perform further setup using the system settings option and later change settings made with the setup wizard.

Configuring the WheelKey

You can define what happens with a short or long press of the WheelKey on the front of the unit.

To configure the Wheel key, select **Configure WheelKey** on the System Setting dialog.

Select the **Short press** option or **Long press** option in the WHEELKEY CONFIGURATION dialog and then an option from the list displayed.

Time and Date

System

Configure time settings to suit vessel location, along with time and date formats.

Power Control

System

Determines unit response to signal applied to the yellow wire of the power cable.

Set to 'Slave' if the yellow wire is connected to ignition or to a stand-alone switch that applies 12 V/24 V. Set to Master to make this device turn on other devices when powered up.

→ ***Note:*** The System Controls panel does not display the Power Off option and you cannot use the power key to power off the unit when the unit is configured as slave. To power down the unit, the master device must be powered down, or system power removed.

Data source selection

Network

→ ***Note:*** If NMEA 0183 is used, complete the NMEA 0183 setup prior to doing source selection. Refer to *"NMEA 0183 setup"* on page 39.

Data sources provide live data to the system.

The data may originate from modules internal to the unit (for example internal GPS or sonar), or external modules connected to the NMEA 2000 or via NMEA 0183 if available on the unit.

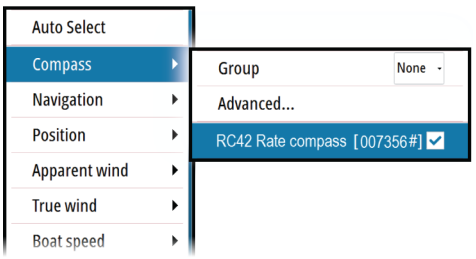
When a device is connected to more than one source providing the same data, the user can choose the preferred source. Before commencing with source selection make sure all external devices and the NMEA 2000 backbone are connected and are turned on.

Auto Select

The Auto Select option looks for all sources connected to the device. If more than one source is available for each data type, selection is made from an internal priority list. This option is suitable for the majority of installations.

Manual source selection

Manual selection is generally only required where there is more than one source for the same data, and the automatically selected source is not the one desired.



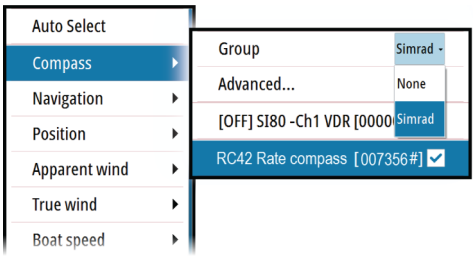
Group source selection

Multifunction displays, autopilot controllers, and instruments have the ability to:

- Use data sources (for example position, wind direction, and so on) that all other products on the network use, or alternatively use a data source independently from other units.
- Globally change all displays over to a different source from any display. (This only includes products set to Group mode.)

→ ***Note:*** In order to enable group selection, the display must be set to Simrad group.

Devices with the Group set to None can be set to use different sources to those of the rest of the network devices.



Advanced source selection

This allows the most flexible and precise manual control over which devices provide data. Some data sources, such as those for fuel level, or engine RPM, can only be changed from the Advanced menu. Occasionally Auto Select may not assign the desired source, which may be corrected using the Advanced Source Selection. An example of this is where twin installations with NMEA 2000 compliant engines are not programmed with unique instance numbers. This means that the auto select feature cannot determine which engine is fitted on the port and which is fitted on the starboard side.

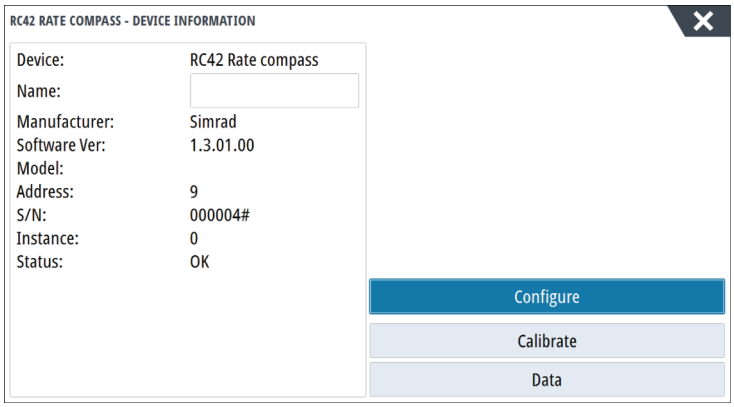
→ ***Note:*** The **Advanced** option is visible in multiple places - the bottom of the **Sources** list, and under each source category (for example, Compass). The latter shows a filtered list that only relates to devices that output data relevant to the category.

Device list

Network

The Device list shows the devices that provide data. This may include a module inside the unit, or any external NMEA 2000 device.

Selecting a device in this list will bring up additional details and actions:



All devices allow allocation of an instance number in the **Configure** option. Set unique instance numbers on any identical devices on the network to allow for the unit to distinguish between them. The **Data** option shows all data being output by the device.

Some devices will show additional option(s) specific to the device - the RC42 illustrated above has a **Calibration** option, to allow easy setup of this device.

→ ***Note:*** Setting the instance number on a 3rd party product is typically not possible.

SimNet Groups

Network

The SimNet Group function is used to control parameter settings, either globally or in groups of units. The function is used on larger vessels where several SimNet units are connected to the network. By assigning several units to the same group, a parameter update on one unit will have the same effect on the rest of the group members.

Display (backlighting), **Units** (metric or imperial units of measure), **Damping** (to dynamic data), and **Alarms** can be grouped either in **Simrad** group, or groups **1** through to **6**. If any of the settings require discrete control, set it to **none**.

Diagnostics

Network

The NMEA 2000 tab on the diagnostics page can provide information useful for identifying an issue with the network.

→ ***Note:*** The following information may not always indicate an issue that can be simply resolved with minor adjustment to network layout or connected devices and their activity on the network. However, Rx and Tx errors are most likely indicating issues with the physical network, which may be resolved by correcting termination, reducing backbone or drop lengths, or reducing the number of network nodes (devices).

Bus state

Simply indicates whether the bus is powered, but not necessarily connected to any data sources. However, if bus shows as **off**, but power is present along with an increasing error count, it is possible that termination or cable topology is incorrect.

Rx Overflows

The unit received too many messages for its buffer before the application could read them.

Rx Overruns

The unit contained too many messages for its buffer before the driver could read them.

Rx/Tx Errors

These two numbers increase when there are error messages, and decrease when messages are received successfully. These (unlike the other values) are not a cumulative count. Under normal operation these should be at 0. Values around 96 upwards indicate a heavily error prone network. If these numbers go too high for a given device, it will automatically drop off the bus.

Fast Packet Errors

Cumulative counter of any fast packet error. This could be a missed frame, or a frame out of sequence etc. NMEA 2000 PGNs are made of up to 32 frames. The entire message will be discarded when a frame is missed.

→ ***Note:*** Rx and Tx Errors often indicate an issue with the physical network, which may be resolved by correcting termination, reducing backbone or drop lengths, or reducing the number of network nodes (devices).

Damping

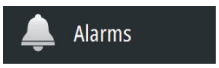
If data appears erratic or too sensitive, damping may be applied to make the information appear more stable. With damping set to off, the data is presented in raw form with no damping applied.

Calibration

An offset (positive or negative) can be applied to correct inaccuracies in boat speed, sea temp, air temp, barometric pressure, and depth sourced from NMEA 2000.

→ ***Note:*** Any calibrations made here will ONLY be applied locally to this unit. Other devices on the network will not have these offsets applied.

External Alarm Setup



The **Siren Enabled** option must be set in order for the unit to drive the buzzer when an alarm condition arises. Its setting also determines the operation of the external alarm output.

Echosounder setup

Make general settings from the Echosounder Settings dialog. Define Echosounder sources in the Installation dialog.

You can select which source is displayed in the Echosounder panel. You can also display two different sources simultaneously, using a split panel configuration. All menu controls for each panel are independent.

The source can be the internal Echosounder, another MFD on the Ethernet network, or a Echosounder module.

Internal Echosounder

Select to make the internal Echosounder available for selection in the Echosounder menu. For more information about panel source selection, refer to the Operator manual.

When set to off, this option disables the internal Echosounder in the unit. It will not be listed as a Echosounder source for any unit on the network. Select this option on a unit which does not have a transducer connected.

Network Echosounder

Enabling Network Echosounder allows the display to use other compatible Echosounder sources on the Ethernet network as well as sharing it's own Echosounder with other devices.

Structure depth offset

Setting for Structure transducers.

All transducers measure water depth from the transducer to the bottom. As a result, water depth readings do not account for the distance from the transducer to the lowest point of the boat in the water or from the transducer to the water surface.

To show the depth from the lowest point of the boat to the bottom, do the following. Before setting the Structure offset, measure the distance from the structure transducer to the lowest point of the boat in the water. If, for example, the distance is 0.3 m (1 ft), it will be input as (minus) - 0.3 m (-1 ft).

To show the depth from the water surface to the bottom, do the following. Before setting the Structure offset, measure the distance from the structure transducer to the water surface. If, for example, the distance is 0.3 m (1 ft), it will be input as (plus) 0.3 m (1 ft).

A setting of 0 (zero) causes the depth displayed to be the distance from the transducer to the bottom.

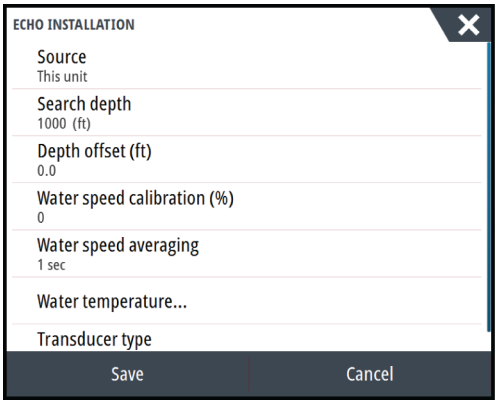
Overlay downscan

When a DownScan source is connected to your system, you can overlay DownScan images on the regular Echosounder image.

When activated, the Echosounder menu expands to include basic DownScan options.

Echosounder installation

Use this dialog to setup and configure available Echosounder sources.



Source

Select this option to display a list of Echosounder sources available for setup. The settings you make in the rest of the dialog pertain to the source selected. The sources setup in this dialog are available for selecting to display in the image in the Echosounder panel.

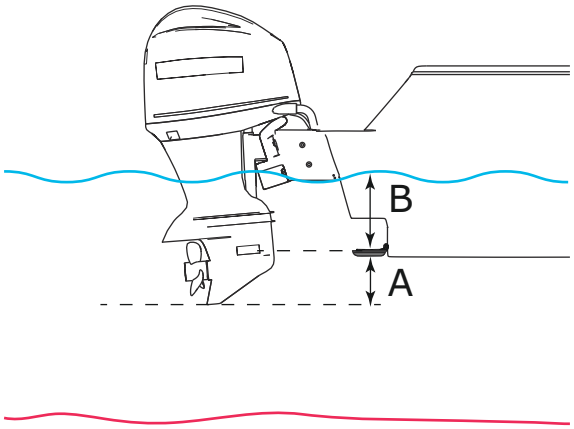
Search depth

Noise may cause the echosounder to search for unrealistic depths. By setting the search depth manually the system displays echoes received from objects within the set depth range.

Depth offset

All transducers measure water depth from the transducer to the bottom. As a result, water depth readings do not account for the distance from the transducer to the lowest point of the boat (for example; bottom of the keel, rudder, or skeg) in the water or from the transducer to the water surface.

Before setting the offset, measure the distance from the transducer to the lowest point of the boat in the water or from the transducer to the water surface.



A Lowest point of vessel offset: Set the distance from the transducer to the lowest point of the boat in the water - this should be set as a negative value. For example, - 0.3 m (-1 ft).

B Depth below surface (waterline) offset: Set the distance from the transducer to the surface - this should be set as a positive value. For example, +0.5 m (+1.77 ft).

For depth below transducer, set the offset to 0.

Echosounder software version

For external sounder modules, the software version is displayed in the header of the Echo Installation dialogue. For upgrade software information, refer to *"Software updates and data backup"* on page 43.

Water speed calibration

Water speed calibration is used to adjust the speed value from the paddle wheel to match the actual boat speed through the water. Actual speed can be determined from GPS speed over ground (SOG) or by timing the boat over a known distance. Water speed calibration should be performed in calm conditions, with minimal wind and current movement.

Increase this value above 100 % if the paddle wheel is under reading, and decrease this value if it is over reading. For example, if the average water speed reads 8.5 knots (9.8 MPH) and SOG records 10 knots (11.5 MPH) the calibration value needs to be increased to 117 %. To calculate the adjustment, divide the SOG by the paddlewheel speed, and multiply the product by 100.

Calibration range: 50-200 %. Default is 100 %.

Water speed averaging

Averages water speed by measuring your speed at a selected interval of time. Water speed intervals range from one to thirty seconds. For example if you select five seconds, your displayed water speed will be based on averaging over 5 seconds of sampling.

Calibration range: 1-30 seconds. Default is 1 second.

Water temperature calibration

Temperature calibration is used to adjust the water temperature value from the sonar transducer to match the data from another temperature sensor. It may be required to correct for localized influences to the measured temperature.

Calibration range: -9.9° - +9.9°. Default is 0°.

➔ ***Note:*** Water temperature calibration only appears if the transducer is temperature capable. Check transducer type selection if this option should be available.

Transducer type

Transducer type is used for selecting the transducer model connected to the sonar module. The transducer selected will determine what frequencies the user can select during sonar operation. In some transducers with built-in temperature sensors, the temperature reading

may be inaccurate or not available at all if the wrong transducer is selected. Transducer temperature sensors are one of two impedances - 5k or 10k. Where both options are given for the same model transducer, refer to paperwork supplied with transducer to determine impedance.

ForwardScan installation

Available when the ForwardScan feature is turned on. For installation and setup information, refer to the separate ForwardScan documentation.

StructureScan

System

This feature is automatically enabled when a TotalScan transducer is plugged in before the unit has been powered on.

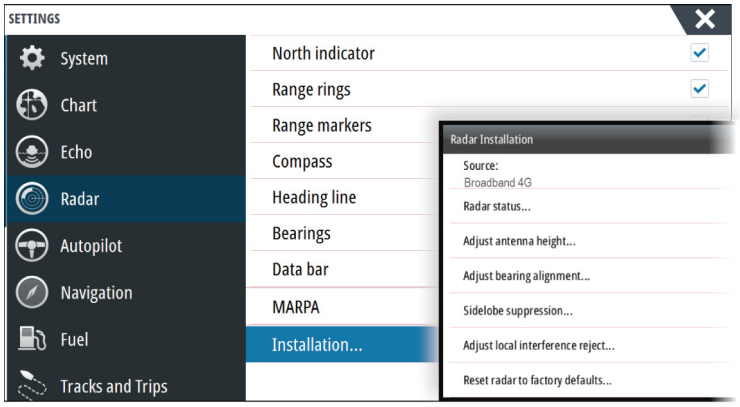
You should set the **Structure depth offset** for the structure transducer. This settings is in the Echosounder Settings dialog.

Radar setup

Radar

Use the Radar Installation dialog to setup the radar.

→ ***Note:*** The installation can vary depending on the radar. Follow the installation and setup instructions supplied with the radar.

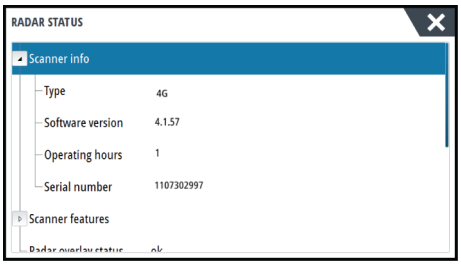


Radar source

In a system with more than one radar, the correct device to configure can be selected from this menu.

→ ***Note:*** Radars that support dual radar mode are represented twice in the source list, with an A and B suffix.

Radar status



Scanner type

Identifies the model of scanner connected to the network.

Software version

Check to make sure you have the latest software. Check the latest software version available at: www.simrad-yachting.com.

Serial Number

This number should be recorded for support and insurance purposes.

MARPA status

The MARPA status can identify if a heading sensor is on the network and that the radar is receiving heading information essential for MARPA calculations.

Reset device ID

Should a radar be connected to the network that has been connected to a dual radar network in the past, it might not be detected by the system because it might have an invalid Device ID. With the radar connected and powered up, select the Reset Device ID button to resolve this problem.

→ ***Note:*** This procedure must be performed with only one radar on the network, and only applies where a network combines an older MFD with other MFDs.

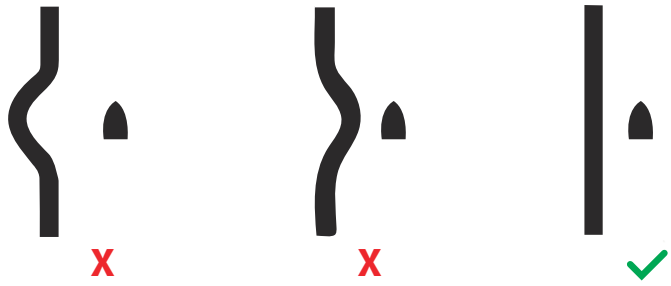
Adjust range offset

(Pulse Radar only)

The radar sweep should commence at your vessel (a radar range of zero). You may need to adjust the radar range offset to achieve this. If this is set incorrectly, a large dark circle in the center of the sweep might occur. You might notice straight objects such as straight sea walls or piers having curves or an indentation. Objects close to your vessel may appear "pulled in" or "pushed out".

Adjust the range offset as below when the vessel is about 45 to 90 m (50 to 100 yards) from a straight-walled jetty or similar feature that produces a straight line echo on the display.

- Point the boat towards the jetty
- Adjust the gain setting until a reasonably good image of the jetty echo is displayed



Adjust antenna height

Set the radar scanner height relative to the water surface. The Radar uses this value to calculate the correct STC settings.

Adjust bearing alignment

This is to align the heading marker on the screen with the center line of the vessel. This will compensate for any slight misalignment of the scanner during installation. Any inaccuracy will be evident when using MARPA or chart overlay.

Point the boat to be perpendicular to the very end of a breakwater or peninsula. Adjust the bearing alignment setting, so that the heading marker and land mass intersect.

Sidelobe suppression

Occasionally false target returns can occur adjacent to strong target returns such as large ships or container ports. This occurs because not all of the transmitted radar energy can be

focused into a single beam by the radar antenna, a small amount energy is transmitted in other directions. This energy is referred to as sidelobe energy and occurs in all radar systems. The returns caused by sidelobes tend to appear as arcs.

➔ ***Note:*** This control should only be adjusted by experienced radar users. Target loss in harbor environments may occur if this control is not adjusted correctly.

When the radar is mounted where there are metallic objects near the radar, sidelobe energy increases because the beam focus is degraded. The increased sidelobe returns can be eliminated using the Sidelobe Suppression control.

By default, this control is set to Auto and normally should not need to be adjusted. However, if there is significant metallic clutter around the radar, sidelobe suppression may need to be increased. The control should be adjusted as follows:

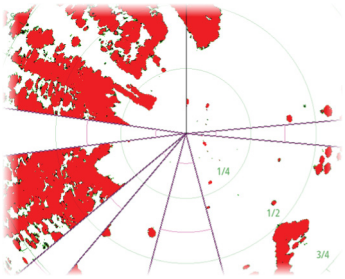
1. Set Radar range to between 1/2 nm to 1 nm and Sidelobe Suppression to Auto
2. Take the vessel to a location where sidelobe returns are likely to be seen. Typically, this would be near a large ship, container port, or metal bridge.
3. Traverse the area until the strongest sidelobe returns are seen.
4. Change Auto sidelobe suppression to OFF then select and adjust the sidelobe suppression control until the sidelobe returns are just eliminated. You may need to monitor 5-10 radar sweeps to be sure they have been eliminated.
5. Traverse the area again and readjust if sidelobes returns still occur.
6. Exit the dialog.

Radar sector blanking (Halo radar only)

Radar installed in close proximity to a mast or structure could cause unwanted reflections or interference to appear on the radar image. Use the sector blanking feature to stop the radar from transmitting on up to four sectors in the image. The blanking occurs on the main radar PPI and on the radar overlay on a chart.

➔ ***Note:*** Sectors are setup relative to the heading line of the radar. The bearing of the sector is measured from the center line of the sector.

➔ ***Note:*** Sector blanking should be applied very carefully to avoid reducing the radar's usefulness in identifying valid and potentially dangerous targets.



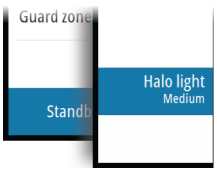
Main radar PPI

Radar overlay on a chart

Adjust open array park angle (Halo Radar only)

The park angle is the final resting position of the antenna relative to the heading line of the radar when the radar is set to standby. The antenna will stop rotating at the desired offset.

Halo light



Controls the levels of the Halo Radar pedestal blue accent lighting. There are four levels possible for the lighting. The accent lighting can only be adjusted when the radar is in standby mode.

➔ ***Note:*** The blue accent pedestal lighting might not be approved for use in your boating location. Check your local boating regulations before turning the blue accent lights ON.

Adjust local interference reject

Interference from some onboard sources can interfere with the Broadband radar. One symptom of this could be a large target on the screen that remains in the same relative bearing even if the vessel changes direction.

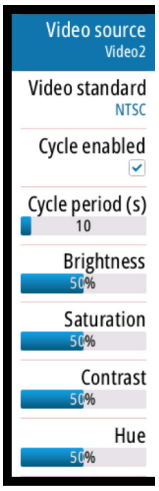
Choose from Local interference rejection LOW, MED or HIGH. Default is LOW.

Restore radar to factory defaults

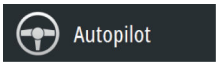
This option can be used to revert all user adjustments.

Video In configuration

Open the menu on the video panel to set up video.
Enable PAL or NTSC depending on the video output standard of the selected camera.
You can optimize the video display by adjusting the video image settings (brightness, saturation, etc.).
The settings are applied individually for each video source.
Mirror image may be applied where the camera is providing a rear view, and the user wishes to see objects as they would appear in a vehicle rear view mirror, i.e., on the same side as they actually are.



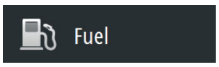
Autopilot setup



For setup and commissioning of autopilot computers, refer to the documentation included with the autopilot computer.

→ ***Note:*** The WheelKey can be used as a STBY key when configured for autopilot control. To configure the WheelKey, refer to *"Configuring the WheelKey"* on page 24.

Fuel setup



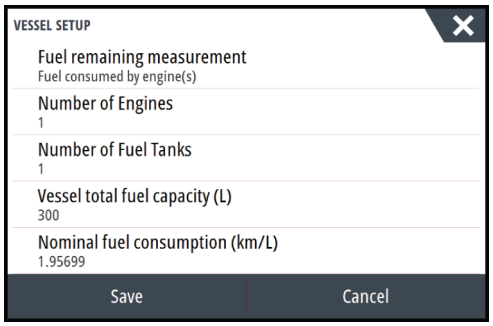
The fuel utility monitors a vessel's fuel consumption. This information is totaled to indicate trip and seasonal fuel usage, and is used to calculate fuel economy for display on instrument pages and the data bar.

To use the utility, a Navico Fuel Flow sensor, or a NMEA 2000 engine adaptor cable/gateway with Navico Fuel Data Storage device must be fitted to the vessel. Neither the Navico Fuel Flow sensor, nor the Suzuki engine interface require the use of a separate Fuel Storage device. Refer to the engine manufacturer or dealer for information on whether or not your engine provides a data output, and what adaptor is available to connect to NMEA 2000.

Once the physical connection is made, ensure source selection is completed. Multiple engine installations using Fuel Flow sensors, or Fuel Data Storage devices, require setup of related engine location in the Device list. For general source selection information, refer to *"Data source selection"* on page 24.

Vessel setup

The Vessel setup dialog must be used to select the number of engines, the number of tanks and vessel's total fuel capacity across all tanks.



Fuel remaining measurement

The Fuel remaining measurement can be determined from fuel used by engine(s), or fuel level from tank sensors. Nominal fuel consumption is required to set the scale on the fuel economy gauge. This value should be determined from experience, over time. Alternatively the boat builder or designer may be able to give an approximate value to use.

➔ ***Note:*** Fuel remaining measurement taken from level sensors while underway can get inaccurate readings due to vessel movement.

➔ ***Note:*** Nominal fuel consumption setting should be determined taking into account typical vessel loads. That is, filled fuel and water tanks, stowed tender, supplies, etc.

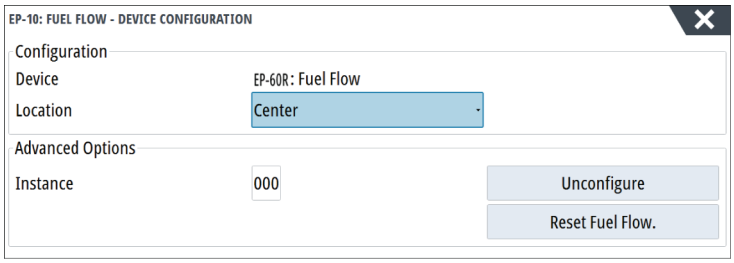
Fuel flow configuration

Network

After the number of engines is set, it is required to set which fuel flow sensor is connected to which engine. Under **Device list** on the Network page, view the Device Configuration dialog for each sensor, and set the **Location** to match the engine the device is connected to.

Unconfigure - defaults the device which clears all user settings.

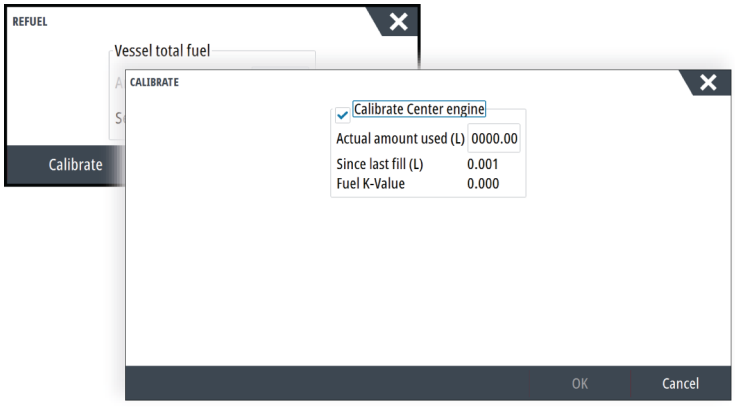
Reset Fuel Flow - restores only the Fuel K-Value setting, if set in Calibrate. Only Navico devices can be reset.



Calibrate

Fuel

Calibration may be required to accurately match measured flow with actual fuel flow. Access calibration from the **Refuel** dialog. Calibration is only possible on Navico's Fuel Flow sensor.



1. Start with a full tank and run the engine as it would normally be operated.
2. After at least several liters (a few gallons) have been used, the tank should be fully refilled, and the **Set to full** option selected.
3. Select the **Calibrate** option.
4. Set the **actual amount used** based on amount of fuel added to the tank.
5. Select **OK** to save settings. The **Fuel K-Value** should now show a new value.

→ ***Note:*** To calibrate multiple engines repeat the steps above, one engine at a time. Alternatively, run all engines simultaneously, and divide the ***Actual amount used*** by the number of engines. This assumes reasonably even fuel consumption on all engines.

→ ***Note:*** The **Calibrate** option is only available when **Set to full** is selected, and a Fuel Flow is connected and set up as a source.

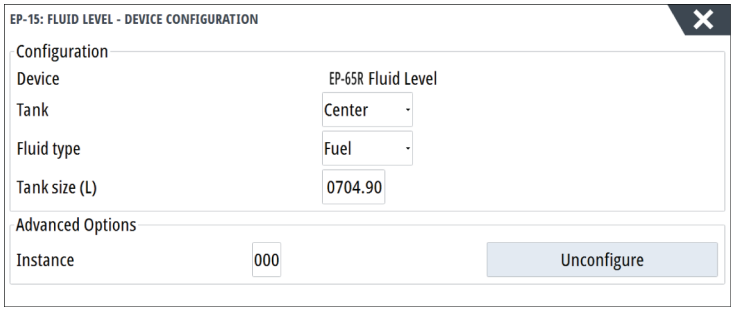
→ ***Note:*** A maximum of 8 engines is supported using Fuel Flow sensors.

Fuel Level

With the use of a Navico Fluid Level device connected to a suitable tank level sensor, it is possible to measure the amount of fuel remaining in any equipped tank. The number of tanks must be set in Vessel Setup dialog, initiated from the Fuel setting options page, to allow discrete tank assignment of the Fluid Level devices.

Network

Select **Device list** on the Network page, and view the Device Configuration dialog for each sensor, and set the Tank location, Fluid type, and Tank size.



For setting up the Instrument bar or a gauge on the Instrument page with Fluid Level device data, refer to the Operator Manual.

→ ***Note:*** A maximum of 5 tanks is supported using Fluid Level devices.

→ ***Note:*** Tank data that is output by a compatible engine gateway can also be displayed, however tank configuration for such a data source is not possible from this unit.

CZone setup

In order to communicate with the CZone modules connected to the network, the NSS evo3 must be assigned a unique CZone Display Dipswitch setting.

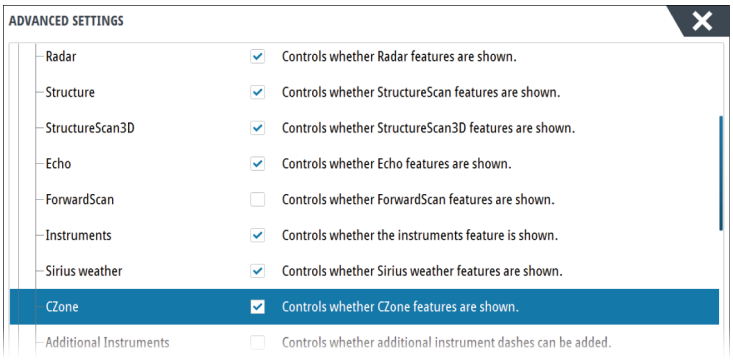
The functionality of the CZone system is determined by the CZone Config File (.zcf), which is stored on all CZone modules and the NSS evo3. The file is created using the CZone Configuration Tool, a specialized PC application available from BEP Marine Ltd, and associated CZone distributors.

The NSS evo3 system provides a means to load the Config file, as well as apply updates to module firmware, removing the need to take a laptop computer aboard the vessel.

Enabling CZone functionality

System

If the CZone device(s) are not automatically detected, it is possible to manually enable CZone.



CZone

Assigning the dipswitch setting

Every product capable of controlling and viewing CZone devices must be assigned a virtual dipswitch setting. This setting is unique for each device. Typically it is set after the configuration file already exists on the CZone system, but it may also be set in advance. To do so, access the CZone menu on the Settings page.

When the configuration is already available on the network, it will immediately commence uploading to the NSS evo3 once the dipswitch is set. Allow this to complete, without interruption.

Setting CZone to display at startup

With this option selected, the CZone control page is shown first, every time the NSS evo3 is powered up.

CZone backlight control

Enabling this causes the NSS evo3 to synchronize its backlight setting with that of any CZone Display Interfaces set up to share backlight settings.

→ ***Note:*** CZone Config also needs to have the NSS evo3 set as a controller.

Import and backup a configuration file

The files page may be used to import CZone configuration files, or export a copy to a memory card in the card reader. Importing overwrites the existing file on the NSS evo3 and all connected CZone devices.

For further information, see *"Backing up and Importing user data"* on page 44.

Wireless setup

Wireless

The unit includes built-in wireless functionality that lets you:

- Use a wireless device to remotely view (smartphone and tablet) and control the system (tablet only). Wireless devices use the GoFree app downloaded from their relevant application store.
- Access the GoFree Shop.
- Upload your logs to create custom maps at Insight Genesis.
- Download software updates
- Connect to third party applications

Connecting a tablet

Install the GoFree App on the tablet before following this procedure.

1. Set the internal wireless to **Access Point** mode. To do this, select the **Wireless devices** page in the Wireless settings dialog and then select the Internal wireless. Next, select the **Mode** option and then select **Internal Access Point**.
2. Select a device on the **Wireless devices** page to view its network key.
3. Navigate to the wireless network connection page on the tablet, and find the unit or GoFree wireless *xxxx* network. If more than one is in range, review the **Wireless devices** page on the unit to confirm which wireless device is connected to the unit.
4. Enter the Network Key in the tablet to connect to the network.

5. Open the GoFree application - the unit should be automatically detected. The name displayed will be either the default, or that assigned in the Device Name setting. If the unit does not appear, follow the on screen instructions to manually find the device.
6. Select the graphic icon of the unit. The unit displays a prompt similar to the following:

7. Select **Yes** for one-time connection, or **Always** if device is to be remembered for regular connection. This setting can be changed later if required.

→ ***Note:*** The internal wireless module only supports GoFree connection to itself. Other units connected on the network are not visible.

Connecting a smartphone

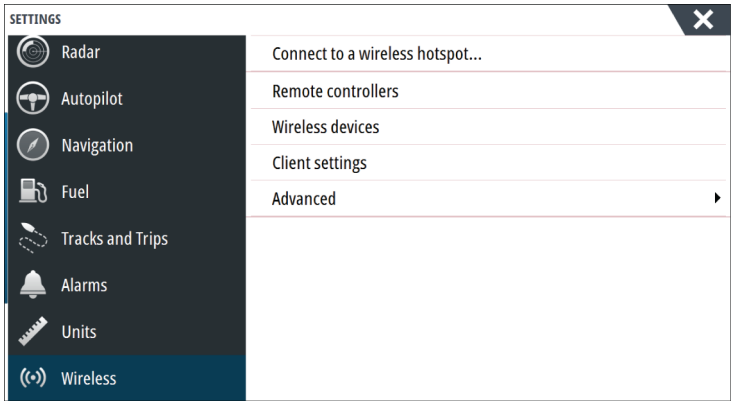
Install the GoFree App on the smartphone before following this procedure.

1. Set the internal wireless to **Access Point** mode. To do this, select the **Wireless devices** page in the Wireless settings dialog and then select the unit's Internal Wireless. Next, select the **Mode** option and then select **Internal Access Point**.
2. Select a device on the **Wireless devices** page to view its Network Key.
3. Navigate to the wireless network connection page on the smartphone, and find the unit or GoFree wireless *xxxx* network. If more than one is in range, review the **Wireless devices** page from the unit's Wireless settings dialog to confirm which wireless device is connected to the unit.
4. Enter the Network Key in the smartphone to connect to the network.
5. Open the GoFree application on the smartphone, the unit should be automatically detected. The name displayed will be either the default, or that assigned in the Device Name setting. If the unit does not appear, follow the on screen instructions to manually find the device.

The MFD's display is shown on the smartphone. To change the MFD's display on the smartphone, use the MFD to change the display on the MFD. The display change on the MFD is reflected on the smartphone.

Wireless settings

Provides configuration and setup options for the wireless functionality.



Remote controllers

When a wireless device is connected, it should appear in the **Remote controllers** list.

Selecting **Always allow** means the device can automatically connect without needing a password each time. This menu also allows disconnection of devices that no longer require access.

Wireless devices

This dialog shows the internal wireless and any connected WIFI-1 devices, as well as their IP and channel number. Selecting the internal wireless or a WIFI-1 device provides additional detail.

To view and change internal wireless detail values (Network Name (SSID), Network Key, or Channel) the internal wireless must be in **Access Point** (Internal Wifi) mode. To select a network (hotspot) to connect to, the internal wireless must be in **Client Mode**. Use the Mode option to change modes.

Mode

Displays if the internal wireless is set to **Access Point** (Internal Wifi) mode or **Client Mode**. Select it to change the wireless between **Access Point** mode and **Client Mode**.

If the internal wireless is set to **Access Point** (Internal Wifi) mode, smartphones and tablets can access the unit to view and control (tablet only) it. Also when set to **Access Point** (Internal Wifi) mode you can view and change the internal wireless details. **Client Mode** allows the unit internet access via a wireless hotspot.

When veiwing this menu for a WIFI-1 set to **Access Point** mode, it's also possible to switch between **Primary** and **Secondary** access point modes so two WIFI-1 devices can exist on the network at the same time.

Only one WIFI-1 may operate as **Primary**, which determines that the device is acting as DHCP server. Only one DHCP server may exist on a network at a time.

To use two WIFI-1s as access points simultaneously the unit must initially be connected to only one unit. Once this unit is set to secondary, a second module may be turned on/ connected, and will automatically default to primary.

→ ***Note:*** In a network with only one WIFI-1 and one or more internal wireless modules, the WIFI-1 should be left in **Primary** mode. The internal modules do not act as a DHCP server.

Hardware

Provides firmware version info, and MAC address details.

Networks

Only visible if the internal wireless is in **Client Mode** when the device is selected. Shows a list of all networks (hotspots) available for connection. Select the name of the desired network to enter its network key and connect to it.

Network Name (SSID)

Displays the name of the internal wireless network.

Only visible if the internal wireless is set to **Access Point** (Internal Wifi) mode when the device is selected. You can select it and change the internal wireless network to any name you want for easy identification.

Network Key

Required by the smartphone or tablet to connect to the internal wireless network.

Only visible if the internal wireless is set to **Access Point** (Internal Wifi) mode when the device is selected. You can select it and change it to increase network security. The key must be at least 8 characters.

Channel

Only visible if the internal wireless is set to **Access Point** (Internal Wifi) mode when the device is selected. Select it to change the Channel setting to overcome potential interference to the internal wireless by another RF device transmitting in the same frequency band.

Restore defaults

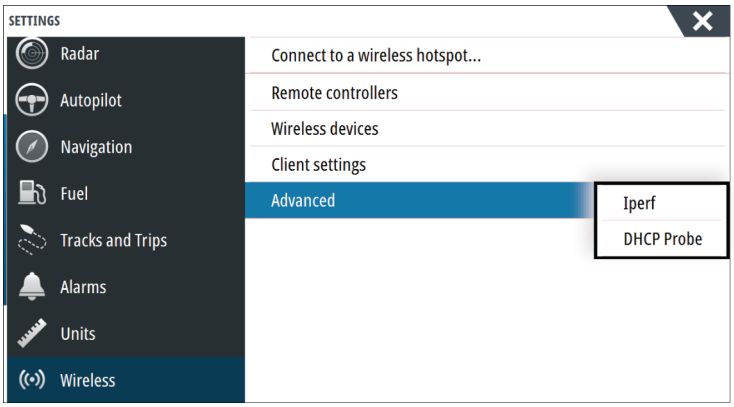
Deletes all user made changes, and restores the wireless to factory settings.

Client settings

Opens the Wireless Client Settings dialogue, which shows networks previously connected to, regardless of whether they are currently visible or not. Allows deletion of a network from the list, and toggling of Automatic connection setting.

Advanced

Tools are available within the software to assist in fault-finding and setting up the wireless network.



Iperf

Iperf is a commonly used network performance tool. It is provided for testing wireless network performance around the vessel so weak spots or problem areas can be identified. The application must be installed on and run from a tablet device.

The NSS evo3 must be running Iperf server before initiating the test from the tablet. On exiting the page, Iperf automatically stops running.

DHCP Probe

The wireless module contains a DHCP server that allocates IP addresses for all the MFDs, and Echosounder in a network. If integrating with other devices, such as a 3G modem or satellite phone, other devices in the network may also be acting as DHCP servers. To make it easy to find all DHCP servers on a network, dhcp_probe may be run from the NSS evo3. Only one DHCP device may be operational on the same network at a time. If a second device is found, turn off its DHCP feature if possible. Refer to the device's own instructions for further assistance.

→ ***Note:*** Iperf and DHCP Probe are tools provided for diagnostic purposes by users familiar with network terminology and configuration. Navico is not the original developer of these tools, and cannot provide support related to their use.

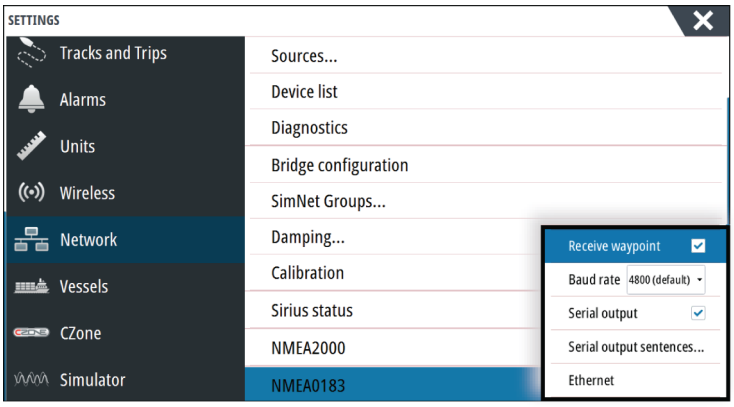
Simultaneous Client and Access Point operation

If it is desirable to have the MFD accessible to a tablet while also having internet access for GoFree store and Insight Genesis, it is necessary to use two wireless units - one must be in Client mode, the other in Access Point mode. This can be a combination of internal wireless and an external WIFI-1, or two external WIF-1 units. Two external WIFI-1 units will offer the advantage of providing both features to all MFDs on the network (where applicable).visible or not.

NMEA 0183 setup

Network

The NMEA 0183 port must be set to suit the speed of connected devices, and can be configured to output only the sentences required by listening devices.



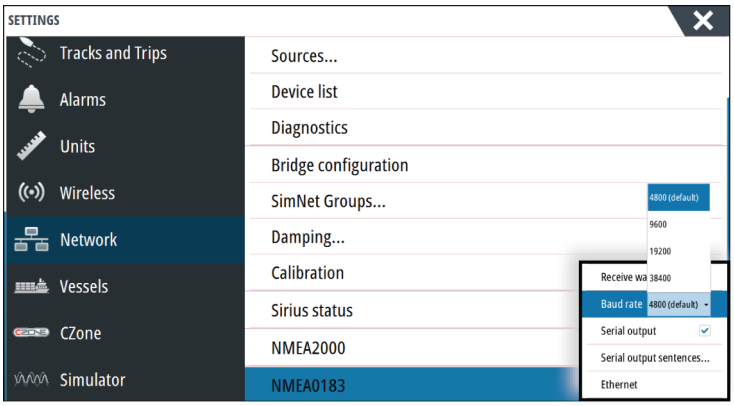
Receive waypoint

Select this option to allow a device capable of creating and exporting waypoints via NMEA 0183 to transfer directly to this unit.

Baud rate

This should be set to correspond with devices connected to the NMEA 0183 input and output. The input and output (Tx, Rx) use the same baud rate setting.

→ ***Note:*** AIS transponders typically operate at NMEA 0183-HS (high speed), and will require the baud rate to be set to 38,400.



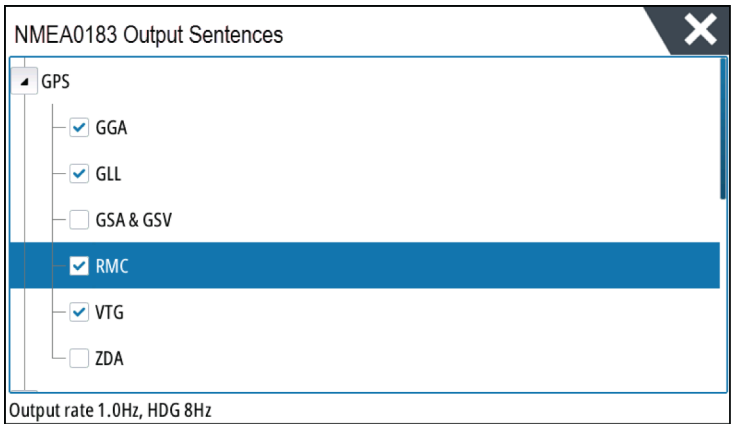
Serial Output

Selection determines whether the data is output via Tx lines, and will enable editing of the output sentences list.

Serial Output Sentences

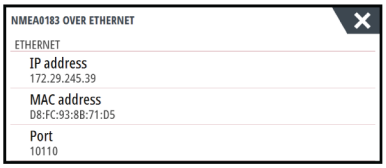
This list allows control over which sentences need to be transmitted to other devices from the NMEA 0183 port. Due to the limited bandwidth of NMEA 0183 it is desirable to only enable the data that is required. The less sentences that are selected, the higher the output rate of the enabled sentences.

Commonly used sentences are enabled by default.



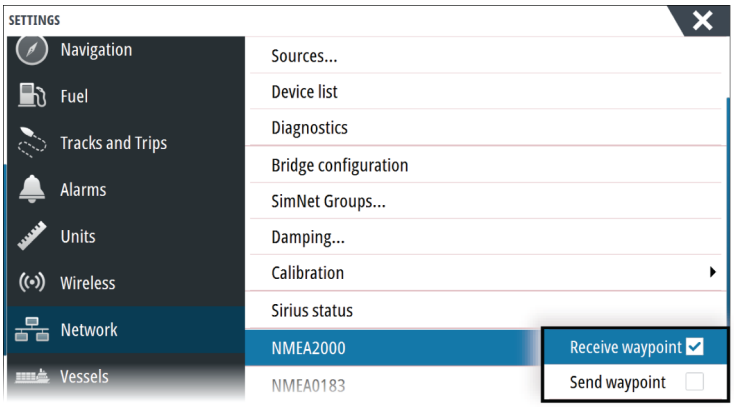
NMEA 0183 over Ethernet

NMEA 0183 data stream is also output over ethernet, which is made available to tablet devices and PCs, via the internal wireless. The ethernet dialogue provides IP and port data typically required for configuring the application on the third party device.



→ ***Note:*** Other MFDs cannot decode this information back to NMEA 0183, to use the data as a source. To share data a physical NMEA 2000 or NMEA 0183 connection is still required.

NMEA 2000 setup



Receive waypoint

Select this option to allow another device capable of creating and exporting waypoints via NMEA 2000 to transfer directly to this unit.

Send waypoint

Select this option to allow this unit to send waypoints to another device via NMEA 2000.

Ethernet setup

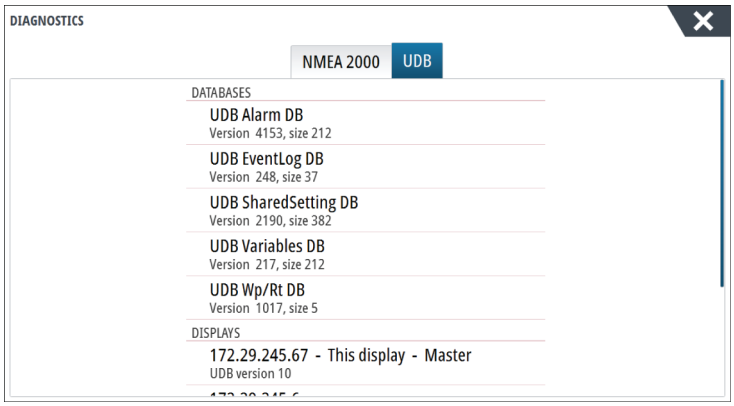
No special setup is required for establishing an ethernet network, it is all *plug-and-play*. An optional ethernet expansion device connected between the unit and another network

module (e.g. 4G radar) will automatically start working, and relay data between the two devices.

Diagnostics

Network

The UDB (User Data Base) tab on the diagnostics page, provides information on Ethernet activity, as shown below.



The **Reset Display List** option can be used to refresh the list of connected displays and their UDB version.

Databases

The upper table gives an account of the various automatically synchronised databases that ensure units are all using the same user settings and data. Each unit stores the database locally, so that all information is available if the device is run in standalone.

Databases can become unsynchronised when one or more displays in a multi display network are not powered up while other displays are being operated. Creation of waypoints, routes, tracks, and altering global settings all affect databases.

When the check-box **Dirty** is selected, the unit has identified that its database is older than that of another device on the network. The check-box should clear within seconds of both devices being powered up, and the databases synchronising. If it does not clear, it is recommended that all devices are power cycled.

IP address

The lower table shows the IP address of the display being viewed (top of list), the Master display (with **This display** next to it), and any other displays in a multiple display network.

The function of the Master is invisible to the end user - It manages database synchronization, however this task automatically shifts to another display if the current master is shut down.

The IP address list only refreshes after all devices on the network have been powered down - a single device that is shutdown on the network will not be removed from the table shown on other devices. When powering up a system that has been completely shutdown, a network connectivity issue can be identified if a display does not show any other IP addresses than its own.

The **UDB version** is dependant on the software version installed on the display. It will never change on its own, unlike the **Version** of the Databases on the upper table. It is preferable to have all UDB versions the same. This can usually be achieved by loading the latest software on to your display - refer to *"Software upgrades"* on page 43.

Module network light

The network LED on network expansion devices can be useful for determining if the network is fundamentally operational. No light indicates no connection. A rapidly blinking green LED means the network module is communicating with another device.

FLIR camera setup

The FLIR M-series cameras are plug and play when used in conjuction with the WIFI-1 acting as a DHCP host. For setup on networks not utilizing a DHCP host, refer to the website www.simrad-yachting.com, or contact technical support.

Mercury®

If the unit is on the same NMEA 2000 network as a Mercury VesselView® 4, 7, 403, 502, 702, 703, or Link, a host of Mercury® specific features are automatically unlocked on the unit. When the features are enabled, the display may prompt the user for some basic configuration information. Refer to the VesselView® manual or engine supplier for further information.

Suzuki Marine®

If the unit is on the same NMEA 2000 network as a Suzuki C10 color gauge, a dedicated Suzuki instrument panel is unlocked and automatically enabled. Data source selection is done the same way as for any regular NMEA 2000 sources.

Software updates and data backup

From time to time we release software updates to our existing products. Updates are created for a variety of reasons; to add or improve features, to add support for new external devices, or to fix software bugs.

Updates can be found on the website: www.simrad-yachting.com

When the unit is connected to the internet, a pop-up can appear advising that a software update is available and encourages you to download the update.

The unit may be used to apply software updates to itself, and to supported network devices, with files read off a memory card inserted in the card reader.

Before initiating an update to the unit itself, be sure to back up any potentially valuable user data.

Network analyzer and service assistant

The system has a built-in service assistant that creates a report of the devices installed on the NMEA 2000 and Ethernet network such as the software versions, serial numbers, and information from the settings file to assist in technical support enquiries.

To use the analyzer, open the About page of the System settings dialog and select Support. Two options are displayed:

Create report

Analyzes your network and prompts you for information required for support and creates the report with information automatically gathered from the network. You can add screenshots and log files that will be attached to the report. There is a 20MB limit for the report attachments. You can save the report to a memory card and email it to support or upload it directly if you have an internet connection. If you call technical support first, you can enter an incident number to assist with tracking.

Check system for updates

Analyzes your network and checks if updates are available for compatible devices.

→ ***Note:*** Connect your unit to the internet to check for the latest available software versions. The software versions will be up to date as of the last time you updated your unit or connected to the internet.

Software upgrades

The update file must be loaded to the root directory of the memory card.

The update may be initiated at boot up: insert the memory card into the card reader before turning the unit on, boot the unit, and follow the on-screen instructions.

Alternatively, in the Files menu, locate the update file on the memory card inserted in the card reader and select **Upgrade**, followed by **This Display**. Accept the prompt to reboot

the unit, and wait a few moments as the unit restarts. Do not remove the memory card or repower the unit until the process is completed (this typically takes no more than a couple of minutes).

NMEA 2000 device upgrades

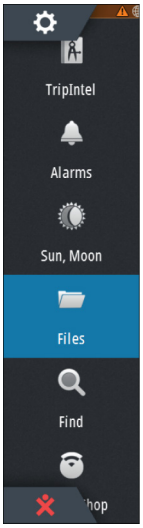
The update file must be loaded to the root directory of a memory card inserted in the card reader.

1. Select the Files toolbar option and select the update file under Memory card.
2. Select the Upgrade option presented when the file is highlighted. A list should appear displaying any compatible devices the update file applies to. In most cases this will be a single device.

→ ***Note:*** If no device is shown, check that the device to be updated has power, and run any outstanding updates for the unit first.

3. Select the device and initiate the upgrade. Do not interrupt the upgrade process.

Backing up and Importing user data



There are two files that can be backed up that relate to user changes made to the system:

- Waypoints, Routes, and Tracks database.
- Settings database (includes preferences such as unit settings, custom pages, and CZone configuration files).

Insert a memory card into the unit's card reader as a storage location for backup data.

Waypoints, Routes, and Tracks database backup

You can export all Waypoints, Routes, and Tracks, or export only those contained within a specific region.

If Export Region is selected, the chart page will be displayed, centered on vessel location. Using the touch screen, adjust the red boundary box to outline the area to be exported. The export option offers different file formats to save as:

- **User data file version 5**: Use with current units (NSO evo2/3, NSS evo2/3, NSS, NSO, NSE, Zeus, Zeus Touch, HDS Gen2, HDS Gen2 Touch, HDS Gen3, HDS Carbon, GO XSE units, Vulcan units, and ELITE Ti units). Offers most detail.
- **User data file version 4**: Use with current units (NSO evo2/3, NSS evo2/3, NSS, NSO, NSE, Zeus, Zeus Touch, HDS Gen2, HDS Gen2 Touch, HDS Gen3, HDS Carbon, GO XSE units, Vulcan units, and ELITE Ti units).
- **User data file version 3 (with depth)**: Use with legacy GPS chartplotters.
- **User data file version 2 (no depth)**: Use with legacy GPS chartplotters.
- **GPX (GPS Exchange, no depth)**: Use with some other manufacturers' GPS products, and PC applications.

After you select the file type, select Export and destination memory card. The receiving GPS/PC typically needs to be set to allow import of Waypoints.

Settings database export

Select **Setting database** to export the Settings database, or export CZone configuration (CZone installation dependent). Choose the desired option and select the memory card destination.

Importing a database

Later, if the unit has been restored to factory defaults or user data is accidentally deleted, return to the files page, select the backed up file, and then **Import**. View file details for creation date.

6 Accessories

The most up-to-date accessories list is available at: www.simrad-yachting.com

NSS evo3 accessories

Part number	Description
000-00129-001	NSS EVO3 & ZEUS3 - VIDEO/NMEA 0183 CABLE
000-13748-001	NSS EVO3 & ZEUS3 CHART CARD DOOR
000-13740-001	NSS7 EVO3 SUN COVER
000-13741-001	NSS9 EVO3 SUN COVER
000-13742-001	NSS12 EVO3 SUN COVER
000-13743-001	NSS16 EVO3 SUN COVER
000-13749-001	NSS7 EVO3 & ZEUS3 – 7 EDGE BEZELS
000-13750-001	NSS9 EVO3 & ZEUS3 – 9 EDGE BEZELS
000-13751-001	NSS12 EVO3 & ZEUS3 – 12 EDGE BEZELS
000-13752-001	NSS16 EVO3 & ZEUS3 – 16 EDGE BEZELS
000-13753-001	NSS7 EVO3 & ZEUS3 - 7 DASH MOUNT KIT
000-13754-001	NSS9 EVO3 & ZEUS3 - 9 DASH MOUNT KIT
000-13755-001	NSS12 EVO3 & ZEUS3 - 12 DASH MOUNT KIT
000-13756-001	NSS16 EVO3 & ZEUS3 - 16 DASH MOUNT KIT
000-13757-001	NSS7 EVO3 & ZEUS3 - 7 MOUNTING BRACKET
000-13758-001	NSS9 EVO3 & ZEUS3 - 9 MOUNTING BRACKET
000-13759-001	NSS12 EVO3 & ZEUS3-12 MOUNTING BRACKET
000-13760-001	NSS16 EVO3 & ZEUS3-16 MOUNTING BRACKET

7 Supported data

NMEA 2000 compliant PGN List

NMEA 2000 PGN (receive)

59392	ISO Acknowledgement
59904	ISO Request
60928	ISO Address Claim
126208	ISO Command Group Function
126992	System Time
126996	Product Info
127237	Heading/Track Control
127245	Rudder
127250	Vessel Heading
127251	Rate of Turn
127257	Attitude
127258	Magnetic Variation
127488	Engine Parameters, Rapid Update
127489	Engine Parameters, Dynamic
127493	Transmission Parameters, Dynamic
127503	AC input status
127504	AC Output Status
127505	Fluid Level
127506	DC Detailed Status
127507	Charger Status
127508	Battery Status
127509	Inverter Status
128259	Speed, Water referenced
128267	Water Depth
128275	Distance Log
129025	Position, Rapid Update
129026	COG & SOG, Rapid Update
129029	GNSS Position Data
129033	Time & Date
129038	AIS Class A Position Report
129039	AIS Class B Position Report
129040	AIS Class B Extended Position Report
129041	AIS aids to Navigation
129283	Cross Track Error
129284	Navigation Data
129539	GNSS DOPs
129540	AIS Class B Extended Position Report
129794	AIS aids to Navigation
129801	Cross Track Error
129283	Cross Track Error

129284	Navigation Data
129539	GNSS DOPs
129540	GNSS Sats in View
129794	AIS Class A Static and Voyage Related Data
129801	AIS Addressed Safety Related Message
129802	AIS Safety Related Broadcast Message
129808	DSC Call Information
129809	AIS Class B "CS" Static Data Report, Part A
129810	AIS Class B "CS" Static Data Report, Part B
130074	Route and WP Service - WP List - WP Name & Position
130306	Wind Data
130310	Environmental Parameters
130311	Environmental Parameters
130312	Temperature
130313	Humidity
130314	Actual Pressure
130576	Small Craft Status
130577	Direction Data

NMEA 2000 PGN (transmit)

126208	ISO Command Group Function
126992	System Time
126996	Product Info
127237	Heading/Track Control
127250	Vessel Heading
127258	Magnetic Variation
128259	Speed, Water referenced
128267	Water Depth
128275	Distance Log
129025	Position, Rapid Update
129026	COG & SOG, Rapid Update
129029	GNSS Position Data
129283	Cross Track Error
129284	Navigation Data
129285	Route/Waypoint Data
129539	GNSS DOPs
129540	GNSS Sats in View
130074	Route and WP Service - WP List - WP Name & Position
130306	Wind Data
130310	Environmental Parameters
130311	Environmental Parameters
130312	Temperature
130577	Direction Data

NMEA 0183 supported sentences

TX / RX - GPS

Receive	GGA	GLL	GSA	GSV	VTG	ZDA	
Transmit	GGA	GLL	GSA	GSV	VTG	ZDA	GLC

TX / RX - Navigation

Receive	RMC				
Transmit	AAM	APB	BOD	BWC	BWR

Receive					
Transmit	RMC	RMB	XTE	XDR	

TX / RX - Sonar

Receive	DBT	DPT	MTW	VLW	VHM
Transmit	DBT	DPT	MTW	VLW	VHM

TX / RX - Compass

Receive	HDG	HDT	HDM
Transmit	HDG		

TX / RX - Wind

Receive	MWV	MWD
Transmit	MWV	MWD

TX / RX - AIS / DSC

Receive	DSC	DSE	VDM

→ ***Note:*** AIS sentences are not bridged to or from NMEA 2000.

TX / RX - MARPA

Transmit	TLL	TTM

→ ***Note:*** These are only output sentences.

8 Technical specifications

→ ***Note:*** The most up-to-date specifications list is available at: www.simrad-yachting.com

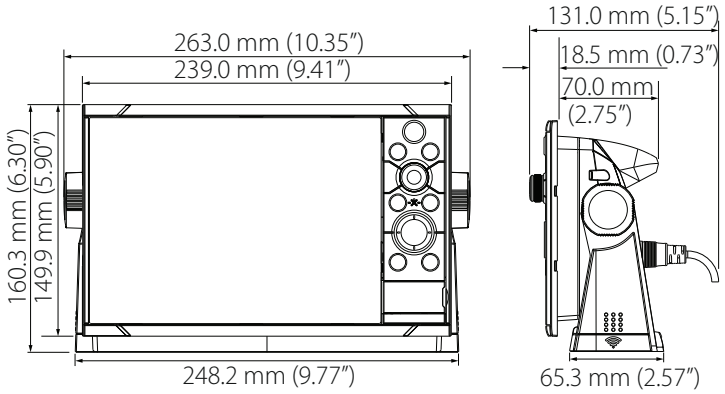
Technical specifications

Approvals	
Compliance	FCC, Industry Canada, Radio Equipment Directive, ACMA, RSM
Display	
Resolution	
7" unit	1024 x 600
9" unit	1280 x 720
12" unit	1280 x 800
16" unit	1920 x 1080
Type	High Visibility SolarMax HD® IPS optically bonded TFT
Brightness	1200 nits
Touch screen	Full touch screen (multi-touch)
Viewing angles in degrees *(typical value @ contrast ratio = 10)*	80° top/bottom, 80° left/right
Electrical	
Supply voltage	12/24 V DC (10 - 31.2 V DC min - max)
Power consumption - Max	
7" unit	20 W +- 4 W
9" unit	23 W +- 4 W
12" unit	30 W +- 5 W
16" unit	45 W +- 5 W
Recommended fuse rating	
7" unit	3 A
9" unit	3 A
12" unit	5 A
16" unit	5 A
Environmental	
Operating temperature range	-15°C to +55°C (5°F to 131°F)
Storage temperature	-20°C to +60°C (4°F to 140°F)
Waterproof rating	IPX 6 and 7
Humidity	IEC 60945 Damp heat 66°C (150°F) @ 95% relative (48 hr)
Shock and vibration	100 000 cycles of 20 G
GPS	10Hz high speed update. WASS, MSAS, EGNOS, GLONASS
Interface/Connectivity	
Ethernet	
7" unit	1 Port
9" unit	1 Port
12" unit	2 Ports

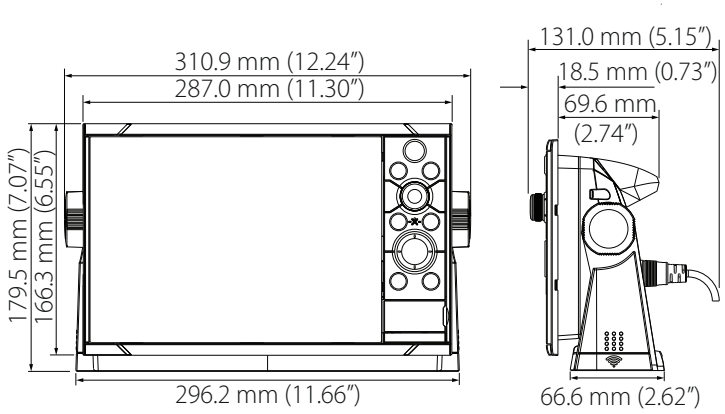
16" unit	2 Ports
NMEA 2000	Micro-C (1)
NMEA 0183	1 input/output. 4800, 9600, 19200, 38400 baud - via optional adaptor cable
Video input	2 x Composite video RCA - via optional adaptor cable
Data card slot	2x microSD
Wireless	Internal 802.11b/g/n
Bluetooth	Internal
Physical	
Dimensions (W x H x D)	Refer to *"Dimensional drawings"* on page 51
Weight (display only)	
7" unit	1.1 kg (2.42 lbs.)
9" unit	1.41 kg (3.11 lbs.)
12" unit	3.1 kg (6.83lbs.)
16" unit	4.65 kg (10.25lbs.)
Compass Safe Distance - Metric, imperial	50 cm
Mounting type	Bracket (Supplied) or panel mount
Autopilot	
Manouveres / Turn patterns	U-turn, Spiral-turn, C-turn, Zig-zag, Square-turn, Lazy S-turn, Depth contour tracking
Steering modes	Auto, Nav., No Drift, Follow up, Non-follow up, Turn patterns, Standby, *Wind, *Wind Nav. (*Boat type set to Sail)
Sonar	
Sonar frequency	40-250kHz 455-800kHz
Sonar output power	1kW RMS
Warranty Period	3 Years

9 Dimensional drawings

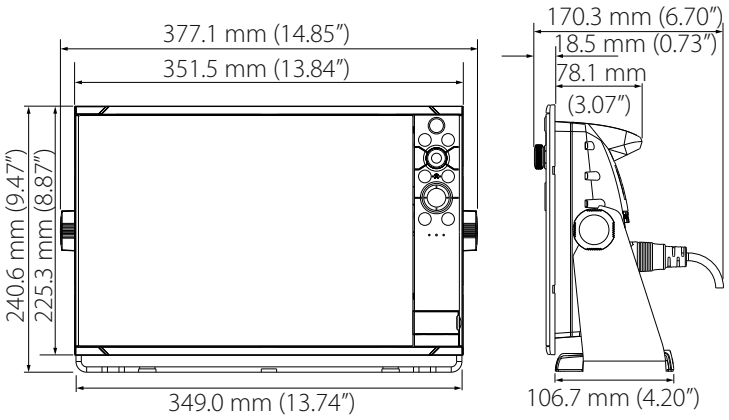
7" Unit dimensions



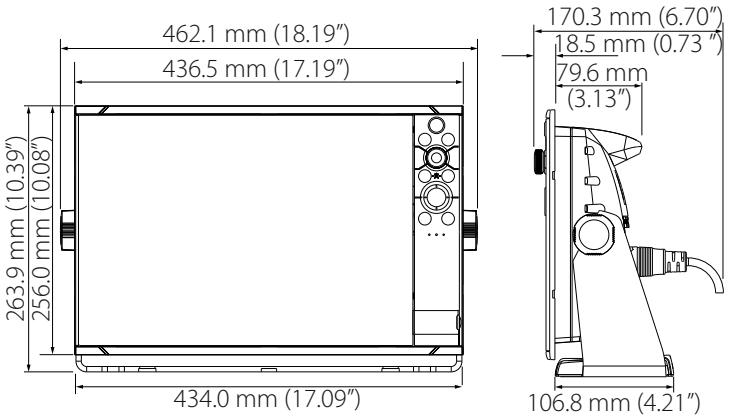
9" Unit dimensions



12" Unit dimensions



16" Unit dimensions



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LOWRANCE

Broadband Radar™

Reinventing Radar

ESSENTIAL GUIDE

www.bandg.com

www.simrad-yachting.com

www.lowrance.com

Broadband Radar™

Reinventing Radar

The most significant radar breakthrough since 1940

Crystal clear imagery

Miss none of your immediate surroundings. Fantastic for tight manoeuvres in marinas or in conditions of limited visibility.

InstantOn™

Solid-state technology produces an immediate, accurate on-screen image.

Low power consumption

Broadband Radar™ requires very little power: ideal for all types and size of recreational boat.

Extremely low emissions

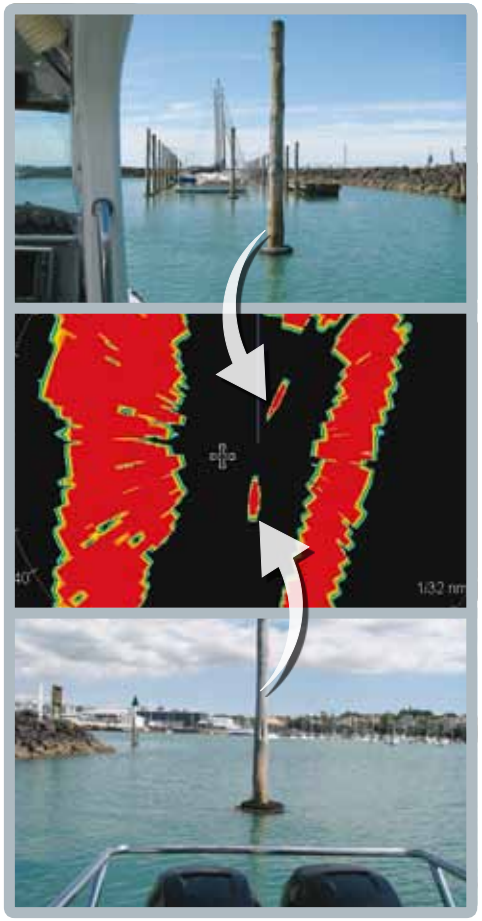
This safest of all radar, it can be mounted anywhere! Broadband Radar™ has fewer emissions than a mobile phone

Quick installation

No reason to open the dome, no tune or zero mile adjustment, and best of all – no radar-licensed technician required.

Automatic clarity

Proven Auto Harbour and Offshore modes completely optimise the radar image – even on our shortest range of 200 feet. Just steer.



www.lowrance.com | www.bandg.com | www.simrad-yachting.com

Leaders in Marine Electronics

The world's leading marine leisure electronics brands: Lowrance, Simrad Yachting and B&G are proud to develop and manufacture the full range of navigation and communications equipment for use by boaters in the leisure and coastal commercial sectors.

As research-driven organisations, these leading marine electronics brands maintain centres of technological excellence around the world, including development facilities for GPS and echo-sounder products in the USA, autosteering in Norway, instrumentation in the UK and radar in New Zealand. The development of Broadband Radar is an excellent example of the long-term approach that Lowrance, Simrad Yachting and B&G take to ensure that they remain at the forefront of marine electronics.

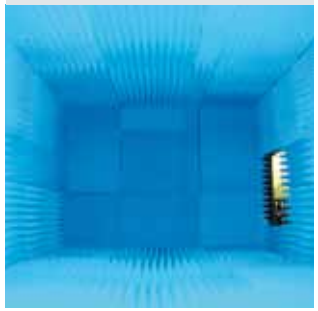
Over seven years of R&D and the application of substantial funding, including a grant from the New Zealand government, went into achieving these revolutionary advances in marine navigation. The enthusiastic response to the introduction of the Broadband Radar family of products from the worldwide boating community demonstrates the benefits of investing time and resources in seeking radical new solutions to the challenges of the marine environment.

Yachtsmen, anglers and professional mariners can expect to see a steady flow of similarly exciting new products from the three brands in the coming years. With a commitment to ever-enhanced performance, ease of operability and seamless systems integration,they will continue to set the pace in innovation for the marine electronics industry for the foreseeable future.

"Over Seven years of R&D went in to achieving these revolutionary advances in marine navigation"

Broadband Radar Engineers in New Zealand

Pyramidal foam inside an anechoic chamber to eliminate internal signal reflections when testing Broadband Radar



The Broadband family of Radomes have undergone demanding waterproof testing

How does it work?

Broadband Radar™ compared to conventional pulse radar

Conventional pulse radar uses a magnetron to generate a pulsed microwave signal that is transmitted from the rotating radar antenna. This "bang" of microwave energy is reflected off targets that it hits and returns to the radar, the time it takes determines the range and bearing.

This type of radar transmission is, in layman's terms like shouting loudly in one direction and then listening to see if you hear an echo, turning your position and then repeating the process.

Broadband Radar uses a different type of technology, allowing the radar to send out a continuous radar signal. The continuous signal has a changing tone or frequency (at a much lower power than a pulse radar) and the Broadband Radar constantly listens for the change in that signal. This is more like you whispering a tune continuously and listening at the same time for the echo. This is made possible by using two antennas, one which whispers and one that listens.

The change in the tone of the transmitted radar signal (or in our example the notes of the tune) determines the time taken for the signal to reach the target and return. This time determines the range and the bearing.

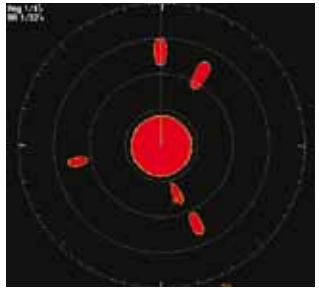
Broadband Radar simultaneously receives as it transmits, unlike a pulse radar that pulses loudly then has to switch the internal circuits from transmit to receive. This causes all pulse radars to have an unavoidable "main bang" which appears in the centre of the screen as a sunburst. This covers up any close targets, reducing the effectiveness of the pulse radar at short range.

Many types of pulse radar "blank" this main bang artificially this also hides any short-range targets which blinds the radar to close by targets.

With Broadband Radar only sending out a "whisper" the main bang is just not there, so there is no sunburst in the centre of the screen and no need for main bang suppression. The benefit of this is that close targets are not lost or hidden, with the radar able to show targets right up to the bow of the boat. This short-range performance is exclusive to Broadband Radar.

Conventional radar emits a pulse, and this pulse varies in length depending on the range. This pulse length determines the ability of the radar to distinguish between close targets on a similar bearing. Usually this can be around 80ft at short ranges and up to 500ft at longer ranges. Broadband Radar, using a continuously transmitted signal, is able to see targets as close as 6ft from the dome on the shortest scale and separate targets 30ft apart in range on the scales used for navigation.

This short-range performance is also enhanced with the minimum range scales now going beyond the conventional 1/8th of a nm range down to just 200ft with three additional scales. With Broadband 4G™ Radar including an additional 36nm long range scale, there are 18 range scales now available.



An example of Main Bang interference on a 4kw radar screen

The dual microwave stripline arrays inside of the antenna dome allow continuous transmission and reception, unlike conventional radar that only has one antenna used for both.

The outcome of this whisper technology is, better short range detection, better visibility of close in targets and better target range resolution in comparison to conventional radar.

The better target range resolution also helps in reducing sea clutter. This is due to the radar being able to detect different targets at small range difference, much more clearly than with pulse radar.

A continuous radar wave is much easier to filter for individual targets as the echoes returned are smaller.

Pulse radar sends several waves which tend to return a single large echo that can display as one target. Broadband Radar therefore provides a far clearer display and enables detection of smaller floats or buoys in the water.

"It's Magic"

Greg Konig, Sr.Vice-President for Navico's Product Line was asked at a Press lunch if he could explain how Broadband Radar works "in Layman's terms". Konig obviously did not want to launch into a lengthy discourse over salad and sandwiches. "In Layman's terms" he said, pausing for effect "....it's magic!"

With help from Konig and other folks at Navico, we'll now try to explain how Broadband Radar works and how it differs from conventional Pulse Radar

Conventional or pulse radar is generated by a magnetron, which has been compared to a valve opening and closing to release pulses of energy.

In layman's terms: Imagine you are standing blindfolded near a house. You holler "hello!" and then listen to hear the echo. Let's assume you are changing direction like a rotating radome as you continue to call "hello!" and listen again. You holler, pause, listen; holler, pause, listen. Your sense of hearing is more finely tunes than most, and the echoes tell you that there is an irregular object nearby in a particular direction at a specific distance.

ELECTRONICS

RADAR LOVE

Broadband Radar is a marketing name for what engineers call frequency-modulated continuous-wave (FMCW) radar. The word "broadband" nowadays is associated with good computer connectivity; Navico justified use of this term because its radar emits signals along a broad range of frequencies. It does this without a magnetron, instead using two solid-state amplifiers: one to transmit waves at continuously increasing frequencies, the other to simultaneously receive their echoes.

Now, Mr. Layman, you are standing near the same house, not hollering. You are whispering, "do, re, me, fa, so, la, ti, do; do, re, me, fa, so, la, ti, do," etc. As you rotate and whisper, you listen for echoes, with an ear for nuance. You don't pause; you whisper and listen simultaneously. You clock the echo from each discreet note and use these streaming time-stamps to build a mental picture of a building with a tree in front of it, but not touching.

"You are able to match what you see on the screen to reality quicker that you ordinarily could. It also eliminates sea clutter and rain clutter about five times better than your traditional radar, and you don't have to tune the radar to get the signals to pop out from the noise" Konig said.

Excerpts from "Radar Love" in Passage Maker Magazine, courtesy of Peter Swanson

Advantages of Broadband Radar

Introducing a revolutionary radar system unlike anything else on the recreational boating market. Utilising solid-state technology, these breakthrough radar solutions provide superior target detection and separation, ease of operation, and a new level of navigational safety to a wide range of boats.

The exclusive technology and performance characteristics of Broadband Radar make them an ideal match for almost any vessel. Unparalleled resolution and discrimination make it an ideal complement to large radar systems on power and sailing yachts. User-friendly operation makes it an ideal primary radar for small to medium-sized vessels. Its small size, minimal power requirements and safer transmission energy levels open up the advantages of sophisticated radar to all boats.

Crystal clear image

The images displayed on the screen are incredibly clear and easy to understand due to the use of amazing FMCW (Frequency Modulated Continuous Wave) technology. The signal sent from the radar is simply a range of frequencies; hence the term Broadband. This signal is radiated from the rotating part of the antenna in much the same way as normal radar.

The real difference is in the way the radar looks out for the returned signal. Sending this signal out continuously and listening with a very sensitive receiver allows the radar to detect the change in frequency. From this change it is possible to calculate the range and bearing of the target. Broadband Radar has two antennas inside, one transmitting all the time and the other dedicated to receiving the radar signals.

This clear signal back is what provides such a crystal clear image on the radar display, making it very quick and easy to understand the radar picture. No complicated tuning or learning curve makes it easy to operate and understand.

Low power consumption

Using new solid state technology reduces the power consumption of the radar significantly over conventional radar. Perfect for use on recreational and Sail boats where battery reserves are limited.

Extremely low emissions

Unlike any other radar, Broadband Radar is completely huggable. In fact, the Broadband 4G™ Radar and Broadband 3G™ Radar emit one-fifth the emissions of a common mobile phone. No other radars are this safe! Broadband 3G Radar and Broadband 4G Radar transmit only 1/5th of one Watt, whereas pulse radar on a small boat emits a substantial 2000+ Watts. This enables the radar to be mounted in many more positions than conventional radar, which is ideal for small power boats where radar was previously not an option.

Typical Pulse Rader safe distance table

Power	Public Safe Distance
2kW	4.6ft (1.4m)
4kW	9.3ft (2.8m)

No need to worry about microwave radiation with the new Broadband Radar.

Instant On™

Broadband Radar provides instant radar transmission, ideal for on a sail boat where you may not wish to have the radar running continuously. Compare this to waiting 90 to 180 seconds as you may have to do with conventional pulse radar. Broadband Radar gives you the radar picture the moment you need it.

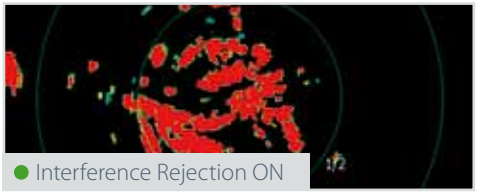
Automatic clarity

The Broadband 3G and 4G Radar operate mostly automatically, with user selectable auto modes. No need for special tuning of the radar at start up or to adjust the tune when changing range, all this is taken care of with the auto modes. In Harbour or inshore use the Auto Harbour mode, when offshore fishing, use the Auto Offshore mode. Broadband Radar takes care of all the fine-tuning automatically. In addition the Broadband 4G Radar has Direction Clutter Rejection that allows smaller targets to be seen in sea clutter like never before.

Interference rejection

Broadband Radar automatically tunes out interference that may come from other radars operating in the vicinity. Multiple levels of interference rejection remove all noise depending on whether you are in a busy commercial harbour , shipping lanes or just out fishing with another boat. The special IR software will remove other radar noise; yet still maintain a perfect radar picture around the boat. Simple to use and the results are impressive.

● Interference Rejection OFF



● Interference Rejection ON

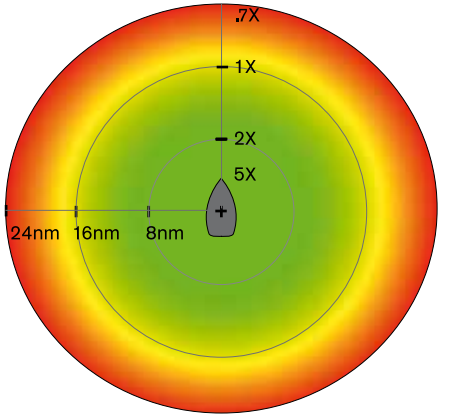
Range discrimination performance

Range discrimination is a measure of the radar's ability to distinguish closely spaced targets on the same bearing. FMCW technology provides unsurpassed performance for your maximum safety and precise navigation. At 16nm and less Broadband 3G Radar and Broadband 4G Radar have from 1 to 5 times more range discrimination capability to see smaller targets than conventional 2kW pulse radars. This greatly improves your situational awareness.

The below graph uniquely demonstrates range discrimination performance of Broadband 3G and 4G Radar Vs. pulse radar.

Range Discrimination Performance

Green = better than 2kW / 4kW **Red** = worse than 2kW/4kW



See the radar target return chart on Page 17 demonstrating typical Broadband Radar range performance.

All weather performance

In bad weather, when visibility is low, that is when you will want to rely on your radar.

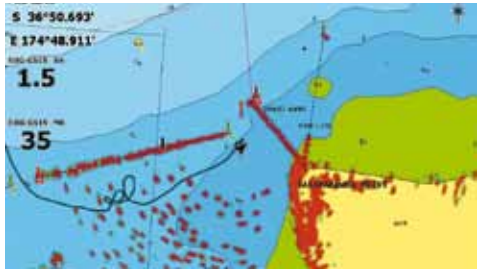
In a rain shower or snow the radar signal will penetrate and show you the radar picture you expect to see. The Rain Clutter feature on the radar reduces noise on the picture associated with rain, yet still provides you with a clean picture of the radar targets around you.

Advantages of Broadband Radar™

Close Range Performance

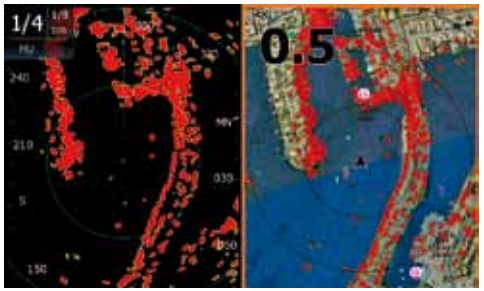
Enhance your situational awareness thanks to Broadband Radar with chart overlay. Radar Chart overlay is the perfect way to determine what are fixed targets and what could be moving targets such as ships.

Even at night or in fog or mist, by using Broadband 3G™ Radar and Broadband 4G™ Radar it is possible to vastly improve safe navigation in restricted conditions at close range.



The image above shows a boat safely navigating through a vessel mooring field at close range with Broadband 4G Radar

The same vessel mooring field as seen by eye is incredibly crowded and challenging to navigate through without the aid of radar



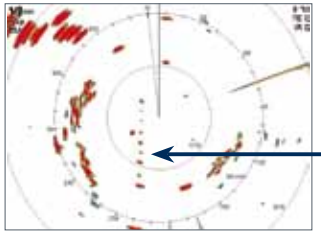
Exceptionally sharp target resolution is seen with Broadband 4G Radar in a busy Florida Harbour when using split screen radar with overlay mode.

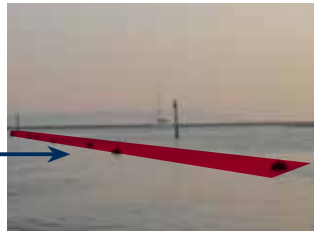
"A lot safer…"

At 200ft away from the boat on the port side are a series of very small channel marker floats, these are clearly visible, yet are made of plastic and are probably only 6 inches above the water.

The skipper of the boat who is used to this harbour says that at night being able to see these markers will make coming into this harbour a lot safer.

Channel markers are easily associated to visible surroundings ▼





See what you need to see, when you need to see it

Broadband 4G Radar clearly sees both inside and outside rows of poles ▼

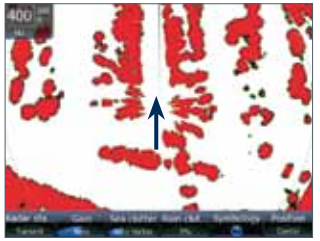
Only possible at this range as Broadband Radar has no main pulse suppression that a conventional radar suffers from. Possible to see targets close together and yet they are clearly shown as separate targets.

Broadband 3G Radar sees breakwater to port, with three mooring buoys close in ▼

The Broadband Radar is able to separate targets that are close together much clearer than a conventional radar, here we see the three buoys clearly visible close to the breakwater.

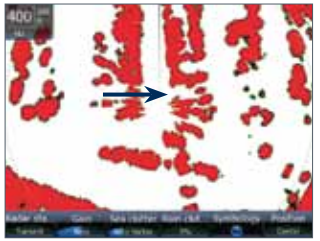
Left turn complete, moving along a row of boats ▼

In narrow harbours it is possible to use Broadband Radar to find your berth. Often harbours have confusing background lights that can make a night harbour entrance seem overwhelming. The radar at this scale makes it all very clear.



Vacant berths in a marina are easily identified ▼

At short ranges Broadband Radar shows up the individual yachts in their berths, ideal at night when visibility may be compromised. In this type of situation conventional radar would only show a merged target possibly obscured by the main pulse.



Images courtesy of James Turner

Broadband 4G™ Radar, What's New?

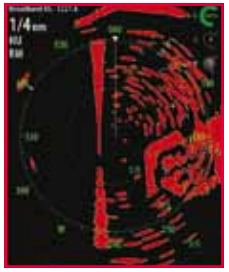
The Broadband 3G™ Radar followed in the footsteps of the award-winning BR24™ Broadband Radar and has two times higher RF energy transmitted at the antenna than the original BR24, resulting in a 30% increase in range.

The newest member of the Broadband Radar range, the Broadband 4G Radar continues in this tradition offering all the benefits of the Broadband 3G Radar, as well as some spectacular extra features .

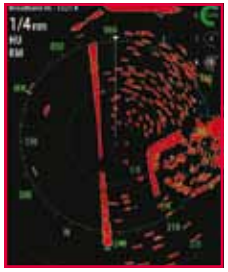
The Broadband 4G Radar has an impressive 50% improvement in range and target detection capability, with a new 36nm range and 18 range scales to accomodate the increased performance.

Broadband 4G is the first dome radar to employ Beamsharpening. This technology enables a new feature called Target Separation Control, which improves the Azimouth resolution, or effective antenna horizontal beam width, up to double the resolution of any 18-inch dome radar. This is the equivalent of a three and a half foot open array radar!

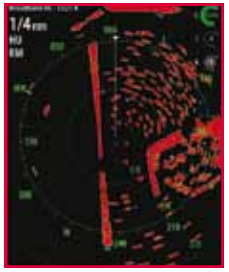
When paired with the Simrad NSE and NSO or B&G Zeus series, the Broadband 4G Radar is capable of high speed operation up to 48rpm. It also has a new Dual Range feature which allows unprecendented simultaneous working ranges, anywhere from 200ft up to 36nm - no other radar in the world can do this.



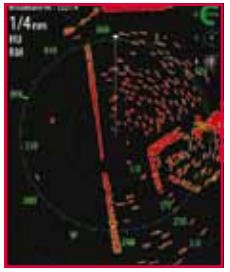
Target Separation Control OFF ~5.2˚



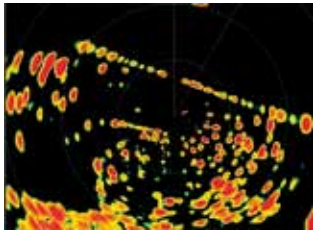
Target Separation Control LOW ~4.4˚



Target Separation Control MED ~3.5˚



Target Separation Control HIGH ~2.6˚



4kW pulse radar showing inferior target separation

Both Broadband 3G Radar and Broadband 4G Radar work with the entire range of Simrad Yachting, Lowrance and B&G award-winning multifunctional displays., these include the B&G Zeus, Simrad NSE, Simrad NSO, Simrad NSS and Lowrance HDS series.

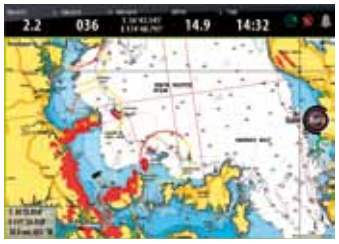
Broadband 4G™ Radar, What's New?

Improved Range Performance with Noise Rejection Control

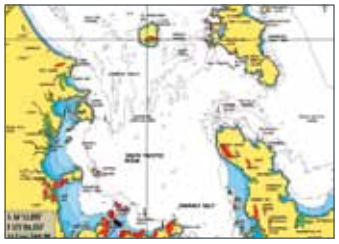
Broadband 4G Radar uses advanced levels of Digital Signal Processing to reduce the amount of noise picked up by the radome's surroundings. Users can choose the levels of Noise Rejection via an onscreen menu and decide between LOW or HIGH rejection to customise their views*.

Noise Rejection Control increases the Broadband 4G Radar range by up to 50% and also increases target detection sensitivity.

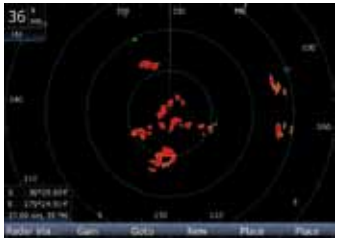
Little Barrier island clearly seen over 32nm away with Broadband 4G Radar



Broadband 4G Radar clearly detects the New Zealand Coromandel Peninsula .>29nm away with the B&G Zeus



Omaha Beach and Little Barrier island are seen at over 32nm away by Broadband 4G Radar



Broadband 4G Radar provides a 36nm usable display range as shown here on the Lowrance HDS

Broadband 3G™ Radar sees some of the Coromandel Peninsula at 23nm.

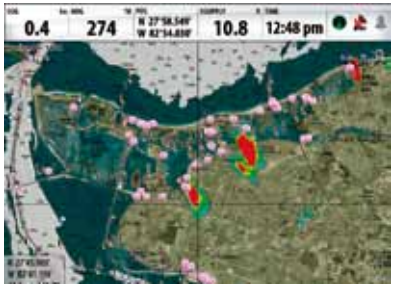
*Displays without Noise Rejection Control automatically default to High, in this case Target Separation will also be High

Broadband 4G™ Radar, What's New?

Weather Detection

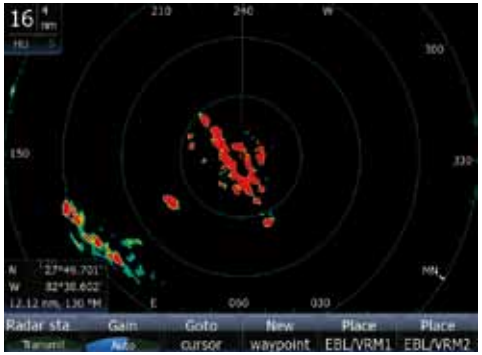
Broadband 4G™ Radar benefits from increased weather detection of around 10% when compared to Broadband 3G™ Radar. In on-water testing, Broadband Radar has detected strong rain cells in Florida, USA more than 17nm away.

A concentrated Summer Storm cell is seen over the coast

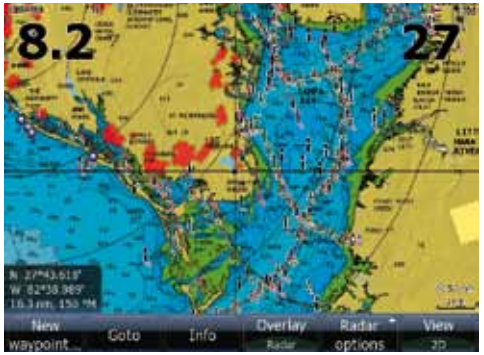


Broadband 4G Radar shows three individual rain cells inside the storm pictured on the left > 17nm away

Ballpark Distances Rain Pattern	Typical maximum range of Broadband 3G Radar in good propagation conditions*	Typical maximum range of Broadband 4G Radar in good propagation conditions*
Wide weather front with heavy rain	8-15nm	9-17nm
Dense rain cell 100mm/hr	7-13nm	8-15nm
Heavy shower 25mm/hr	2.5-5.5nm	3-6nm
Light Rain	1.3-2.6nm	1.5-3nm
*Distance data represents typical detection distance, not guaranteed		



When using Broadband 4G Radar, a powerful storm greater than 12nm away is displayed on a Lowrance HDS with multiple gradient colours

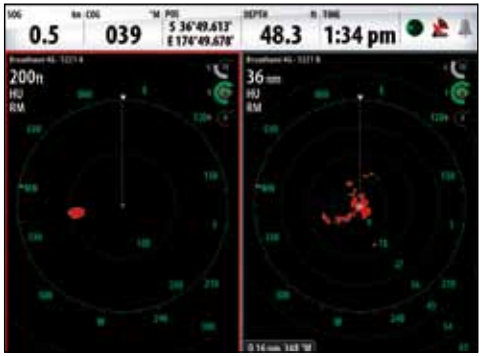


Broadband 4G Radar detects many separated cells inside a Florida rain storm overlaid on a chart greater than 16nm away

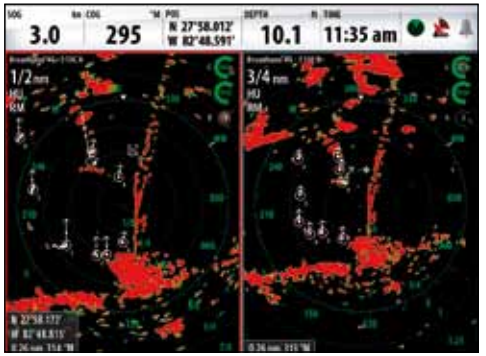
Broadband 4G™ Radar, what's new?

Dual Range with Advanced MARPA, High Speed

With compatible displays including the Simrad NSE, Simrad NSO and B&G Zeus series, Broadband 4G Radar is capable of simultaneous Dual Range operation from a single dome, allowing 10 MARPA targets on each side of a split screen. This allows unprecedented independent working ranges from 200ft right up to 36 nautical miles - no other recreational radar in the world can provide this scaling! Up to 48rpm high speed operation is available for single range operation at less than 1nm.



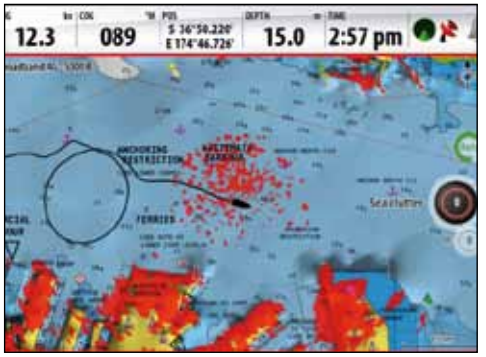
A Buoy is seen 86' away, while using the long 36nm simultaneously



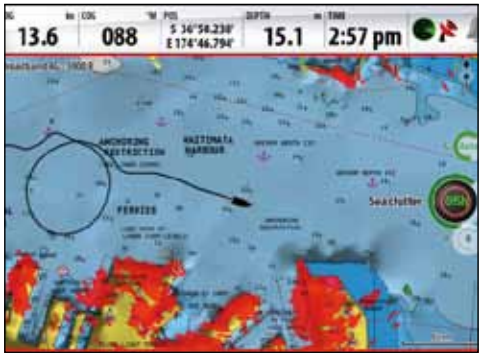
Broadband 4G Radar Dual Range mode tracks up to 10 MARPA targets on each side of the screen with independent controls, allowing 20 MARPA targets to be tracked in total.

Improved Sidelobe Clutter Rejection

Broadband 4G Radar has improved sidelobe clutter rejection for large targets, such as tankers and tall buildings on the coastline. In addition, directional sea clutter processing improves the ability to see smaller targets in heavy sea states.



Sea Clutter is set to OFF in a strong Sea State 3-4 to demonstrate sea clutter around the boat.

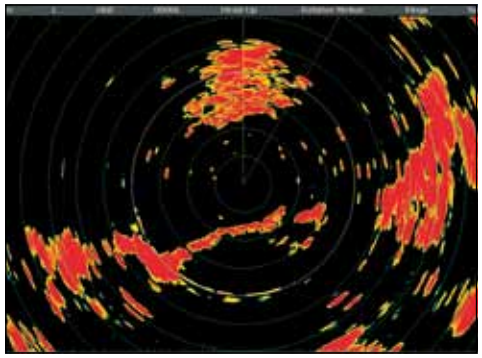


Automatic OFFSHORE mode totally eliminates sea clutter around boat while still seeing nearby targets.

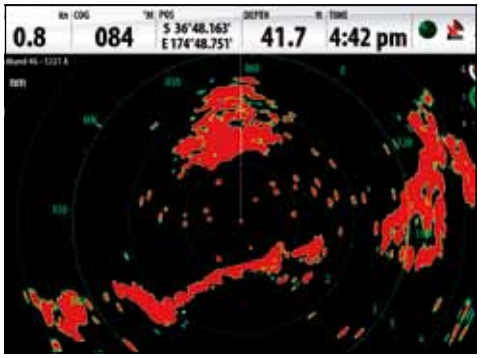
Broadband 4G™ Radar what's new?

Small Target Detection at 3nm Range

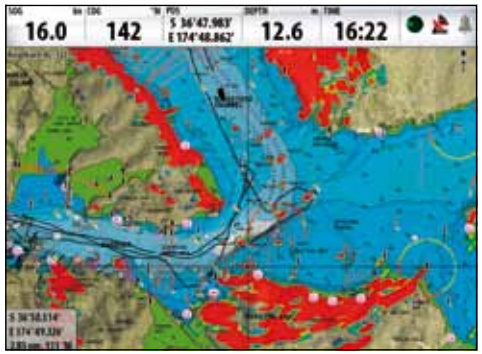
The 3nm range is especially important in the transition one from short to longer range radar performance. Broadband 4G™ Radar allows the clear detection of individual buoys, channel markers and coastline, while avoiding the sidelobe projections and target stretching that is common with pulse radar.



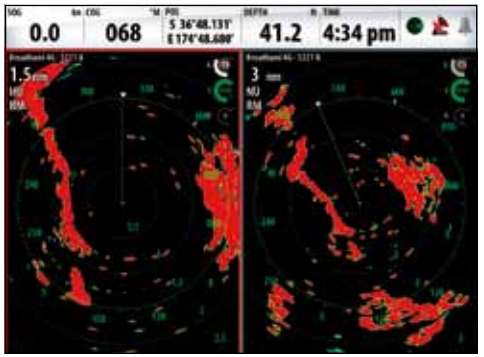
New Zealand Shipping channel at 3nm with 4kW Radar



New Zealand Shipping channel at 3nm with Broadband 4G™ Radar



New Zealand Shipping channel at 3nm with Broadband 4G™ Radar and chart overlay. Notice the crisp targets and markers.



Broadband 4G Radar showing shipping channel details with 1.5nm and 3nm split screen

Broadband 4G™ Radar what's new?

The Broadband 4G Radar offers extraordinary all-round performance, including exception clutter rejection, which dramatically increases situational awareness among novice and professional users alike.

Broadband 4G Radar compared to Broadband 3G Radar (right Image) when looking at Kayakers (above)

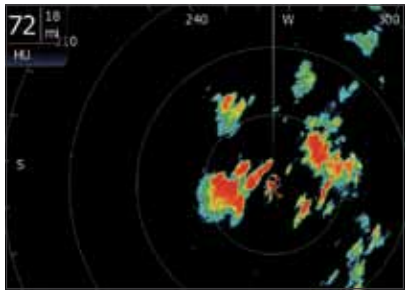
When to Use Pulse Radar vs Broadband Radar

Broadband 3G™ Radar and Broadband 4G™ Radar are ideal for

- Close range operation in tight quarters with an unmatched full screen radar scale of 200'
- Tall Coastline detection past 30nm with Broadband 4G Radar
- Weather detection greater than 15-17nm
- Precise navigation with high resolution target detection for collision avoidance situations up to 3nm
- Monitoring of both close and far ranges with Broadband 4G Radar
- Natural sea clutter rejection
- Directional sea clutter rejection with Broadband 4G Radar
- Easy installation with maximum RF emission safety
- Maximum safety and situational awareness

Pulse radar is ideal for

- Detailed visibility of storms and rain cells farther than 16-20nm away
- Seeing hard to detect sloping beaches and shorelines
- Triggering RACONS
- Cosmetic appearance of a turning open array



6kW HD Digital Open Array (Pulse) Radar on 72nm range with full colour storm cells

I can't see my friend's boat 6nm away. Why?

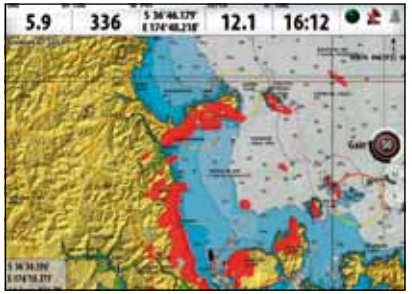
- Always be careful with distance and line of sight- all radars need to be higher to see farther, and the farther you look, the bigger and taller the object needs to be

TYPICAL RADAR TARGET RANGES

Scanner Height	Target ▼		
	Object at sea level	Small boat (2m high)	Big Launch (6m high)
6 feet	3.1 miles	6.3 miles	8.4 miles
9 feet	3.8 miles	7.0 miles	9.2miles
13 feet	4.4 miles	7.5 miles	9.8 miles

I can see coastline in the distance but my radar cannot see it. Why?

- This is true of all radars in some conditions due to the slope of the land, height of the coastline, vegetation, humidity and distance.
- Broadband Radar target detection ability decreases more rapidly than pulse radars as the radar range scale is increased while adequately seeing important larger targets far away. Broadband 3G Radar is good at seeing targets at distance, but Broadband 4G Radar is 50% better, with a working range up to 32nm and a useable display range of 36nm.



Broadband 4G Radar sees solid coastlines and three freighters in line approaching Auckland on this map overlay

When to Use Pulse Radar vs Broadband Radar

How far can I expect to see with Broadband Radar?

Ballpark Distances Typical Maximum range in good propagation conditions**	Target Height (ft)	Radar Horizon (nm)	Broadband 3G Range	Broadband 4G Range*
Marine Targets				
Large Power Station/ wind farm	300	21.3	18-25nm	25nm+
Long coastline with 100m high cliffs	300	21.3	13-25nm	19-25nm+
High density urban coastline	150	15.1	8-15nm	11-19nm+
Forest-covered coastline gently sloping to 250m	750	33.7	5-10nm	8-15nm
Low lying suburban coastline	150	15.1	5-10nm	8-15nm
Large container ship (ship dependent)	100	12.3	10-17nm	13-17nm+
Low lying coastline ,50m dense vegetation	100	12.3	4-8nm	6-11nm
small low lying island	50	8.7	2.5-5nm	4-7nm
Medium sized power boat	13	4.4	1.3-2.6nm	2-3.5nm
Channel markers with radar reflectors	10	3.9	1.3-2.6nm	2-3.5nm
Small power or sail boat	13	4.4	0.7-2nm	1-3nm
Small marker buoy	10	3.9	0.25-0.7nm	0.25-1nm
Kayak 300-800ft	6	3.0	300-800ft	300-800ft
Birds 160-500ft	100	12.3	160-500ft	160-500ft
Sandbars	1	5.7	0.2-0.6nm	0.3-0.9nm

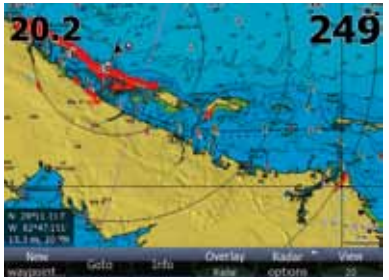
Ranges above with radome height of 13ft.
*Broadband 4G Radar - single range noise reduction = high
** Above data is typical target distances, not guaranteed

Can I improve maximum usable range by using manual controls?

- In some cases, yes, but introduces more noise in the image and not recommended for non-experienced radar users.

General Recommendations for selecting Broadband or Pulse Radars

- Broadband 3G Radar is the best value choice for the vast majority of radar applications and addresses the need for superior all weather navigation usage. Broadband 4G Radar is the best 18" dome radar available combining the best resolution for navigation and for offshore operation from 20-30nm
- Low emissions combined with the fact that "all collision incidents occur with objects less than 10' of the boat" - where radar visibility is now possible with Broadband Radar, makes you and your family safer in every way
- Pulse radars are for operators that regularly go further than 20nm offshore and need to keep tabs on distant storm cells and detect far away coastlines - in addition to seeing these objects on their chartplotter map. For these applications, HD digital open array radars are recommended



Broadband 4G Radar easily displays a small power plant more than 15 nm away on a Lowrance HDS

Is my display compatible?

Broadband 3G Radar and Broadband 4G Radar are compatible with many different modern Lowrance, SImrad and B&G displays. To see if yours is compatible, see below.

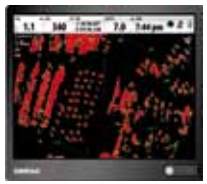
B&G www.bandg.com

B&G Zeus: 8-inch / 12-inch

SIMRAD www.simrad-yachting.com

Simrad NSS *Sport:*
7-inch
8-inch
12-inch

Simrad NSE *Expert:*
8-inch
12-inch



Simrad NSO *Offshore:*
15-inch
17-inch
19-inch

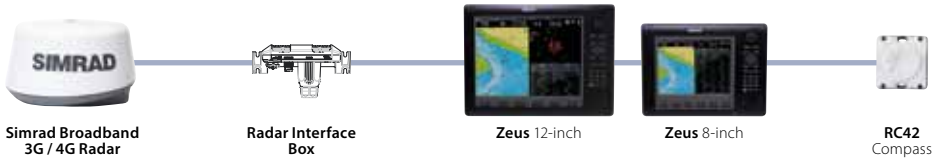
LOWRANCE www.lowrance.com

Note: Your display may require a software upgrade to be Broadband 3G and 4G Radar compatible. Available features may vary according to unit

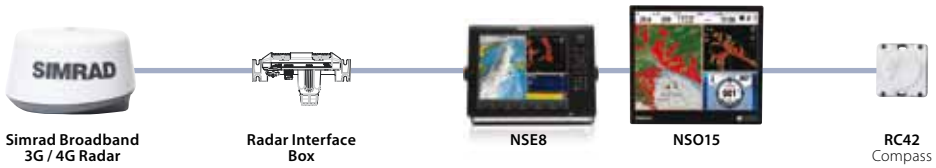
Lowrance HDS: 5-inch / 7-inch / 8-inch / 10-inch

Typical installation options

B&G Typical Installation (simplified diagram)



Simrad Typical Installation (simplified diagram)



Lowrance Typical Installation (simplified diagram)

What are the press saying?

"It's (Broadband Radar)
pretty close to a 10."

Peter Swanson, Passagemaker

"Broadband solid-state radar is a quantum jump in recreational marine radar."

Chuck Husik, Southern Boating

"After several hours of scoping target-rich Biscayne Bay, my impression (of the Broadband Radar) was a qualified "wow!"

Ben Ellison, Cruising World

"It's going to revolutionise the way people navigate basically"

Dave Barham, Boat Fishing Monthly

"Great screen clarity, it's really a game changer!"

John Burnham, Yachtworld.com/Boats.com

"There haven't really been any structural breakthroughs in radar in a long time. What we saw today would enable people to use the product, really effectively, in close quarters, better than any radar product than I'm aware of."

"This (Broadband Radar) gives people a reason to choose one radar product over another!"

Bruce Pelkey, Navigate-us

"The low power consumption makes it easier to run on a small boat with a two battery system."

*

"I like the fact that it's instant on and that you don't have a 90 second warm up period. Half the time when you want (conventional) radar, by the time the 90 second period is over, what you wanted to see is already gone."

*

"The detail that allows you to distinguish a guy's tender idling around a boat from your boat 50-feet away … that was pretty nice!"

*

Lenny Rudow, Marlin

"Broadband Radar is a major development in radar technology."

Chris Labozza, Nor'East Magazine

"(Broadband 3G Radar) offers excellent close quarters performance. Best On Test!"

David Pugh, PBO Magazine

"If I want to buy a new radar, I would choose this one"

Dieter Wanke, Skipper Magazine

"I would say the performance of this new radar technology is nothing short of remarkable"

RIB Magazine

"Being that inexperienced user, I found it very very easy to use"

Peter Nash, Boating Business Magazine

"It's so simple that everyone can just open it, switch it on and use it"

ars- Åke Redeén. Båtliv Magazine

"Compared to conventional radar, I found Broadband Radar amazingly clear for up close targets"

Toby Hodges, Yachting World Magazine

"I've run out of superlatives. Just buy one"

Simon Everett, Sports Boat & RIB Magazine

"Broadband marine radar is a game changer in the recreational marine market. "

Chuck Husik, Southern Boating

"It's early days, yet, but I'm convinced that we're in at the start of a revolution that could well mean the end of radar as we know it."

Tim Bartlett Technical Editor, Motor Boating

Broadband Radar™ was awarded the 2009 National Marine Manufacturers Association (NMMA) and Boating Writers International (BWI) Innovation Award

Broadband Radar wins Sail Magazine Freeman K. Pittman Award

Broadband Radar wins Motorboating Magazine's "Best of the year' award 2011

Broadband Radar wins NMEA Technology Award & Innovation Award 2009

Broadband Radar wins EDN Innovation Award for the "Best Application of RF Design"

Navico, Premier Way, Abbey Park, Romsey, Hampshire S051 9DH Tel: +44 (0) 1794 510010 www.navico.com

www.bandg.com

www.simrad-yachting.com

www.lowrance.com

LOWRANCE

SIMRAD

B&G

Broadband 3G™ Radar
Broadband 4G™ Radar
Installation Guide

ENGLISH

www.bandg.com
www.simrad-yachting.com
www.lowrance.com

Contents

Compliance

The Broadband 3G™ and 4G™ Radars comply with the following regulations:

- FCC Part 15.
- Industry Canada RSS-Gen.
- CE compliant with R&TTE directive.

For further compliance information please refer to our websites:

http://www.simrad-yachting.com/Products/Marine-Radars

http://www.lowrance.com/Products/Marine

http://www.bandg.com/Products

Industry Canada

IC: 4697A-3G4G

Operation is subject to the following two conditions:

(1) this device may not cause interference, and

(2) this device must accept any interference, including interference that may cause undesired operation of the device.

FCC Statement

FCC IDENTIFIER: RAY3G4G

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

➔ ***Note:*** This equipment has been tested and complies with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a normal installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. This device must accept any interference received, including interference that may cause undesired operation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an output on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced technician for help.

➔ ***Note:*** A shielded cable must be used when connecting a peripheral to the serial ports.

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Radar Transmit Emissions

➔ ***Note:*** Broadband 3G™ and 4G™ Radar are the second generation marine recreational radar from Navico that has Human Exposure Level RF Radiation of the Radar Transmitter outside the Radome well below the general public safety emission level of 1 mW/cm^2 . This means the radar can be mounted safely in locations impossible with other pulse radars.

➔ ***Note:*** If a pulse radar and Broadband Radar are mounted on the same vessel, do not transmit simultaneously as excessive interference is possible.

The Broadband Radar will not trigger X Band radar transponders, beacons, and SARTs due to the low output power and signal properties.

Disclaimer

As Navico is continuously improving this product, we retain the right to make changes to the product at any time which may not be reflected in this version of the manual. Please contact your nearest distributor if you require any further assistance.

It is the owner's sole responsibility to install and use the instrument and transducers in a manner that will not cause accidents, personal injury or property damage. The user of this product is solely responsible for observing safe boating practices.

NAVICO HOLDING AS. AND ITS SUBSIDIARIES, BRANCHES AND AFFILIATES DISCLAIM ALL LIABILITY FOR ANY USE OF THIS PRODUCT IN A WAY THAT MAY CAUSE ACCIDENTS, DAMAGE OR THAT MAY VIOLATE THE LAW.

Governing Language: This statement, any instruction manuals, user guides and other information relating to the product (Documentation) may be translated to, or has been translated from, another language (Translation). In the event of any conflict between any Translation of the Documentation, the English language version of the Documentation will be the official version of the Documentation.

This manual represents the product as at the time of printing. Navico Holding AS. and its subsidiaries, branches and affiliates reserve the right to make changes to specifications without notice.

Warranty

The warranty card is supplied as a separate document.

In case of any queries, refer to the brand web site of your display or system.

www.lowrance.com

www.simrad-yachting.com

www.BandG.com

1 Welcome

Congratulations on your purchase of the latest technology available in recreational marine radar. The special features designed into this radar are:

- "Revolutionary improvement in situational awareness" - provides unprecedented ability to distinguish hazards and other objects
- Radar is finally easy enough for casual users – identifies targets clearly with out complicated tuning adjustments
- Navigation with unparalleled resolution and clarity at close ranges, where traditional radar completely obscures targets
- "Start faster, go longer" - 100% solid state design – no powerful microwave transmitter required! – provides InstantOn™ power up capability and low power consumption
- Eliminate the 2-3 minute warm-up time typical of traditional radars
- Conserve power with a standby drain less than one tenth of the best existing radars – especially great for sailboats and smaller power boats
- No expensive magnetron replacement is ever required
- "Incredibly approachable" - practically imperceptible transmit emissions are extremely safe, allowing you to mount it anywhere
- Less than 1/5th the transmitted emissions of a mobile phone, can be safely mounted in proximity to passengers
- Compatible with a wide range of Navico multi-function displays and heading sensors

What is Broadband radar?

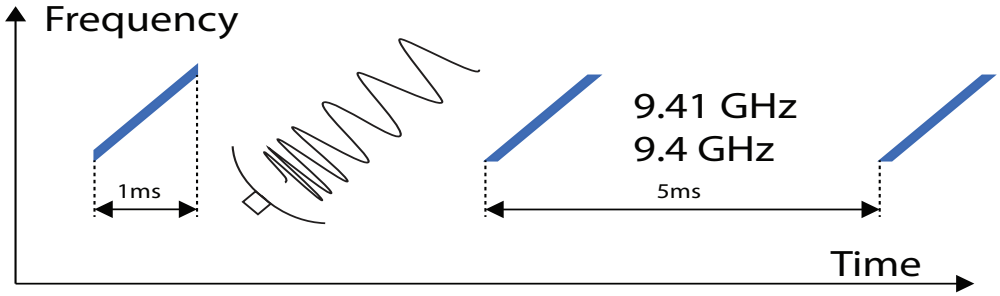
The Navico Broadband Radar uses FMCW (Frequency Modulated Continuous Wave) radar technology.

FMCW radar is different:

Firstly it is solid state – i.e. the transmitter is a semiconductor device, not based on magnetron technology. Secondly, it transmits a 1ms long signal of increasing frequency, rather than a short duration pulse. Thirdly, it measures the distance to a target not by timing the returned echoes, but by measuring the difference between the current transmitted frequency and echoed frequency. Hence FMCW – Frequency Modulated Continuous Wave.

The building up of the image over 360 degrees and the processing of the radar data is the same as for a magnetron radar.

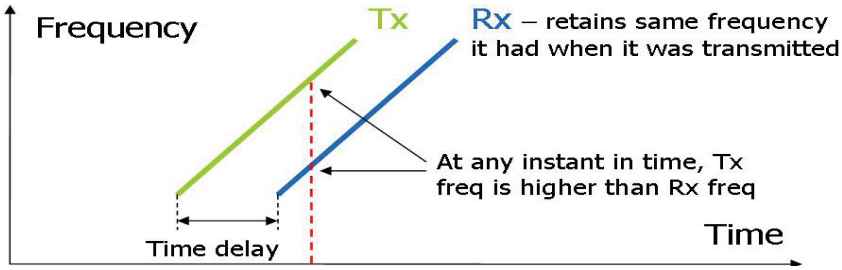
How does FMCW radar work?



FMCW = Frequency Modulated Continuous Wave

The scanner transmits a 'rising tone' (Tx wave) with linearly increasing frequency. The wave propagates out from the transmitter retaining the frequency it had when it was transmitted. If it reflects off an object, it will return to the receiver, still at the frequency it had when originally transmitted.

Meanwhile, the transmitter continues to output an increasing frequency.



The difference between both the currently transmitted and received frequencies, coupled with the known rate of frequency increase, allows a time of flight to be calculated, from which distance is calculated.

Additional benefits of FMCW radar are:

Safety

- low energy emissions. 1/5th of a mobile phone
- safe operation in anchorages and marinas
- instant power up. No warm up required

Short range performance

- broadband radar can see within a few meters of the boat, compared to pulse radars, which can not see closer than 30 meters
- higher resolution clearly separates individual vessels and objects
- Up to five times better sea and rain clutter performance

Low power

- suitable for small boats and yachts
- easier installation with lighter cabling and smaller connectors
- great for yachts on ocean passage

Instant power-up

- conventional radars take 2-3 minutes to warm up the magnetron: Safety – 2 minutes is a long time if you are concerned about collision.
- convenience – switch it on and use it.

Easy to use

- no constant adjusting required to obtain optimum performance
- no re-tuning between ranges. Means fast range change at all ranges

2

Radar system overview

The Broadband Radar is a state of the art navigation aid. It provides outstanding radar performance without the limitations of conventional pulse radars such as: dangerous high power microwaves, standby warm up time, 30 m blind spot (mainbang), high power consumption and large open arrays - which is what would be required to obtain the same image quality at shorter ranges.

The Broadband 3G™ radar has an effective range from 200 ft to 24 nm, whereas the Broadband 4G™ radar has an effective range from 200 ft to 36 nm (target dependent).

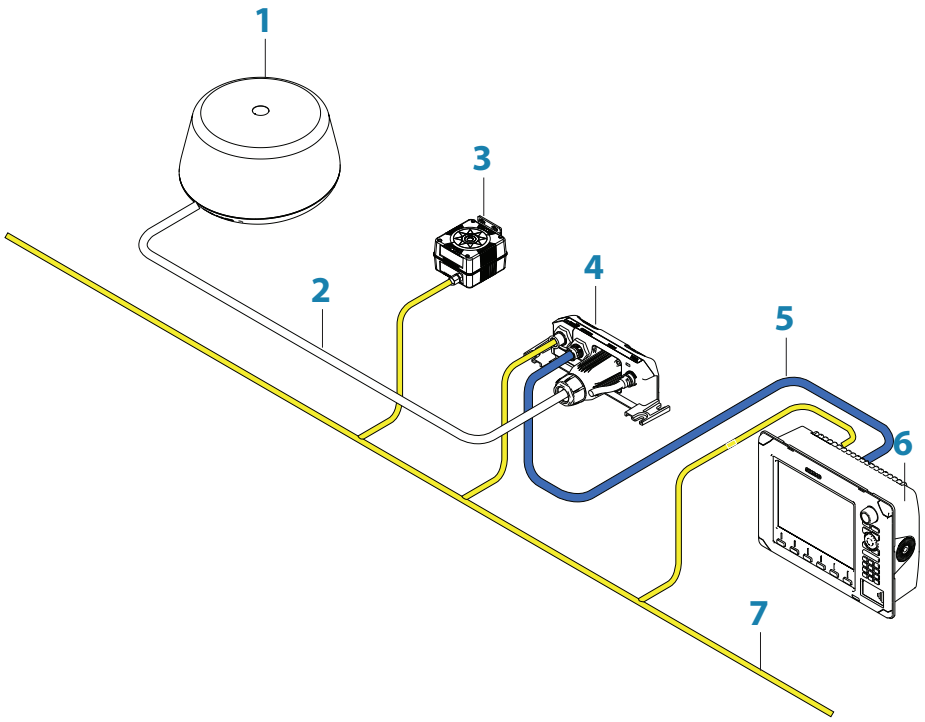
The operating power consumption for the 3G is 18 W, with a stand-by power consumption of 2 W. The 4G operates on 20W, and has a standby consumption of 2.9W.

The system consists of: radar scanner, an interface box (not included in Lowrance 3G USA model) and an interconnection cable. The scanner is housed in a dome of similar size to most 2 kW radars on the market.

The RI10 interface box is used to connect displays, power and heading information if MARPA or chart overlay are required (Heading sensor not included). The RI10 has a SimNet (Simrad NMEA 2000) connector for heading input. The RI10 is included in all 4G kits.

The RI11 interface box is used to connect to earlier NX series displays using a serial connection. A Y-cable may be used to add heading input for MARPA via NMEA0183.

The 3G kit may be ordered with either interface box, however the Lowrance USA model (000-10418-001) is not shipped with an RI10 or RI11 interface.



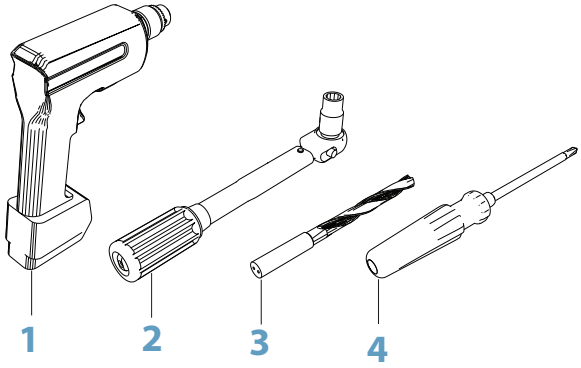
1. Broadband Radar
2. Radar interconnection cable
3. Option heading sensor required for MARPA and chart overlay (not included)
4. RI10 or RI11 Radar interface box (not included in the Lowrance 3G USA model)
5. Ethernet cable: shipped with 1.8 m (6 ft)
6. Display: Simrad NSO, NSE or NSS / B&G Zeus / Lowrance HDS
7. SimNet or NMEA2000 data network (not included)

3 Installation

→ ***Note:*** Follow these instructions carefully. Don't take any shortcuts!

- The Broadband Radar is factory sealed. It is not necessary to remove the cover.
- Removing the cover will void the factory warranty.

Tools Required



1. Drill
2. Torque wrench
3. Drill bit 9.5 mm (3/8")
4. Screw driver

Choose the scanner location

The radar's ability to detect targets greatly depends on the position of its scanner. The ideal location for the scanner is high above the vessel's keel line where there are no obstacles.

A higher installation position increases the radar ranging distance, but it also increases the minimum range around the vessel where targets cannot be detected.

When you're deciding on the location, consider the following:

The length of the interconnection cable supplied w your radar is usually sufficient. If you think you'll need a longer cable, consult your dealer before installation. Optional cable lengths are 10 m (33 ft), 20 m (65.5 ft) and 30 m (98 ft).

If you mount the scanner on a pedestal or base, ensure that rain and sea spray can drain away rapidly, and the breather hole in the base can operate .

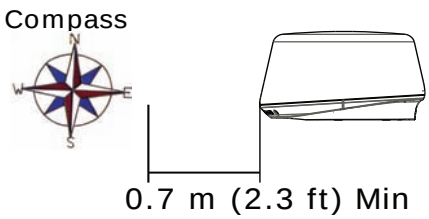
The scanner is usually installed parallel to the line of the keel.

DON'T DO THIS!

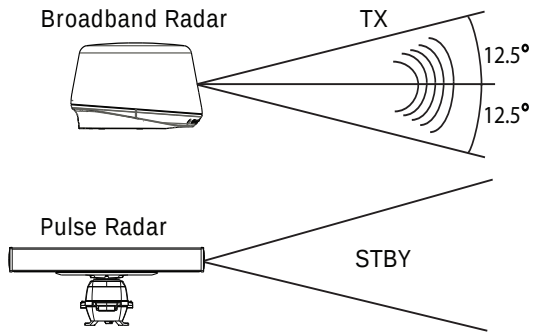
- DON'T install the scanner too high up (eg at the top of a mast), which may cause degradation of the radar picture over short ranges
- DON'T install the scanner close to lamps or exhaust outlets. The heat emissions may damage the dome. Soot and smoke will degrade the performance of the radar
- DON'T install the scanner close to the antennas of other equipment such as direction finders, VHF antennas, GPS equipment, as it may cause or be subject to interference
- DON'T install the scanner where a large obstruction (such as an exhaust stack) is at the same level as the beam, because the obstruction is likely to generate false echoes and/or shadow zones
- DON'T install the scanner where it will be subjected to strong vibrations because these vibrations could degrade the performance of the radar
- DON'T install the scanner such that boat electronics with switch mode power supplies (such as fish-finders and chart plotters) are in the beam of the antenna
- DON'T install the scanner directly on to a large flat roof area. Use a pedestal to elevate the scanner for radar beams to clear roof line (see "Considerations for direct roof mounting" on page 8)

Dual Radar installation - Broadband Radar and Pulse Radar installation:

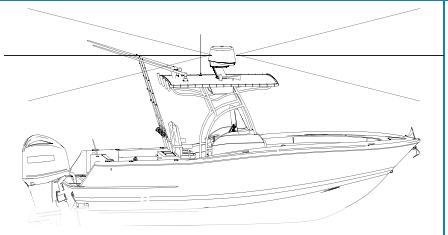
For dual radar installations, ensure Broadband Radar is not installed in the beam of the pulse radar at any time.



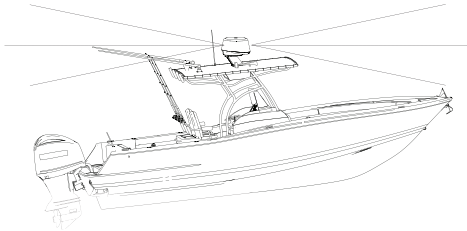
Minimum distance to install near the ships compass is 0.7 m (3.3 ft).



Do not install the Broadband Radar on the same beam plane as a conventional pulse radar. A pulse radar must be set to STBY or OFF any time the Broadband Radar is being operated.



If possible ensure that the location site provides the scanner with a clear view all round the vessel.

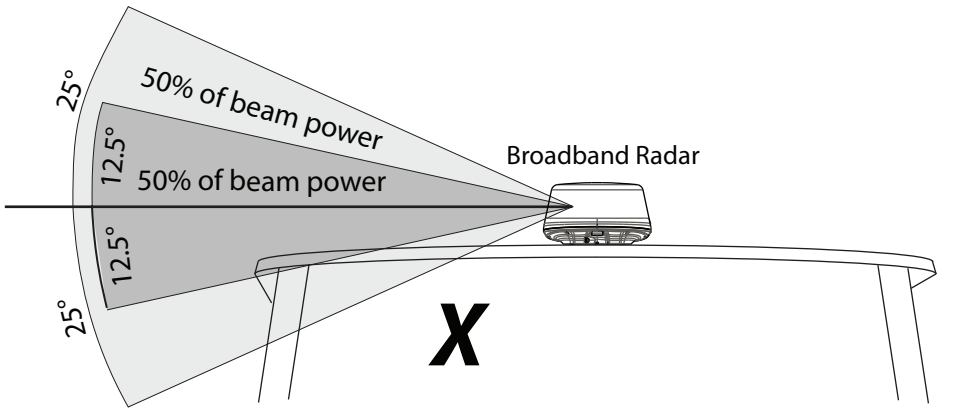


Installations on power boats that have a steep planing angle, it is recommended to tilt the scanner angle down at the front. (Beam angle is 12.5° either side of center).

Considerations for direct roof mounting

When deciding a suitable mounting location for the Broadband Radar, be aware that the vertical radar beam extends to 25° either side of horizontal. With 50% of the power projecting in a beam 12.5° off horizontal. If the radar beams cannot clear the roof line, this will decrease performance of the radar. Depending on the size of the hard top of the vessel, it is recommended not to mount directly on to the surface, instead elevate the scanner to allow the radar beams to clear the roof line. Below are guide lines on heights above the hard top.

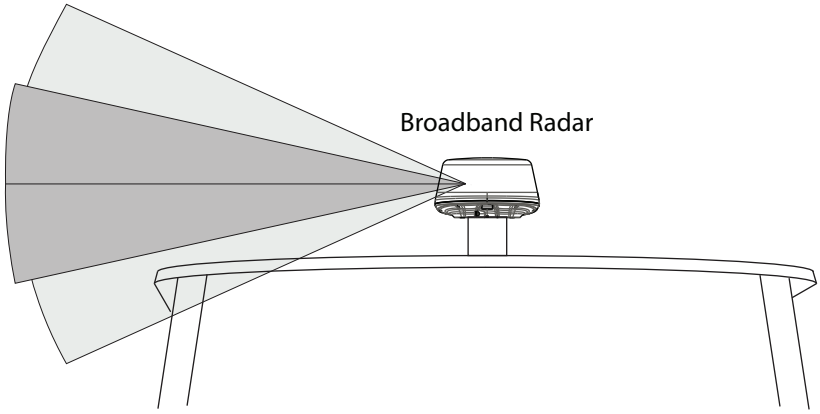
Possible performance loss



Above illustrates an installation with the Broadband Radar mounted directly on to a large hard top. This installation could suffer decreased performance as the radar energy is either reflected or absorbed by the hard top.

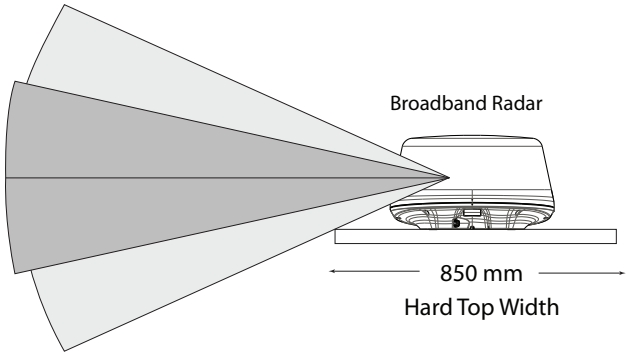
➔ ***Note:*** Where the mounting surface is constructed of any form of metal you must elevate the dome so that the beam has complete clearance, else performance will be severely impaired.

Better performance



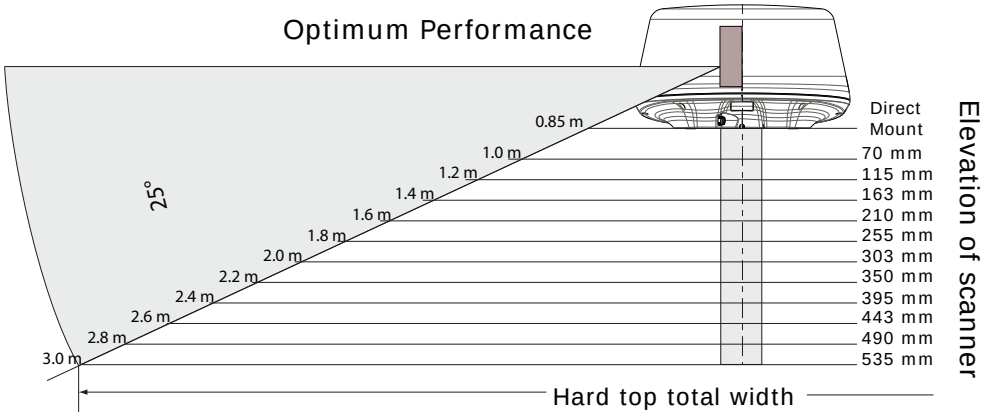
Above illustrates that raising the Broadband scanner off the hard top allowing most of the radar energy to clear the hard top.

Best performance

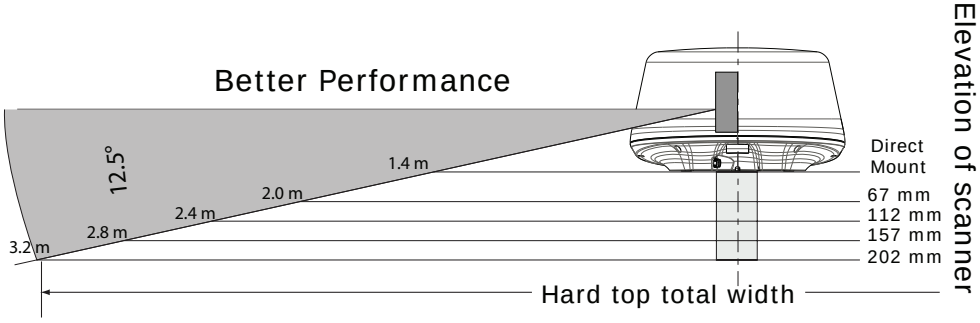


For best performance, the radar should be positioned to allow the beams to clear the superstructure of the boat.

Below is a guide to determine scanner height in relation to a vessels hard top overall width.



Every Increase of 400 mm of hard top width over 1.0 m wide: Increase height by 140 mm.



Every increase of 400 mm of hard top width over 2.0 m wide: Increase height by 45 mm.

Mounting the scanner

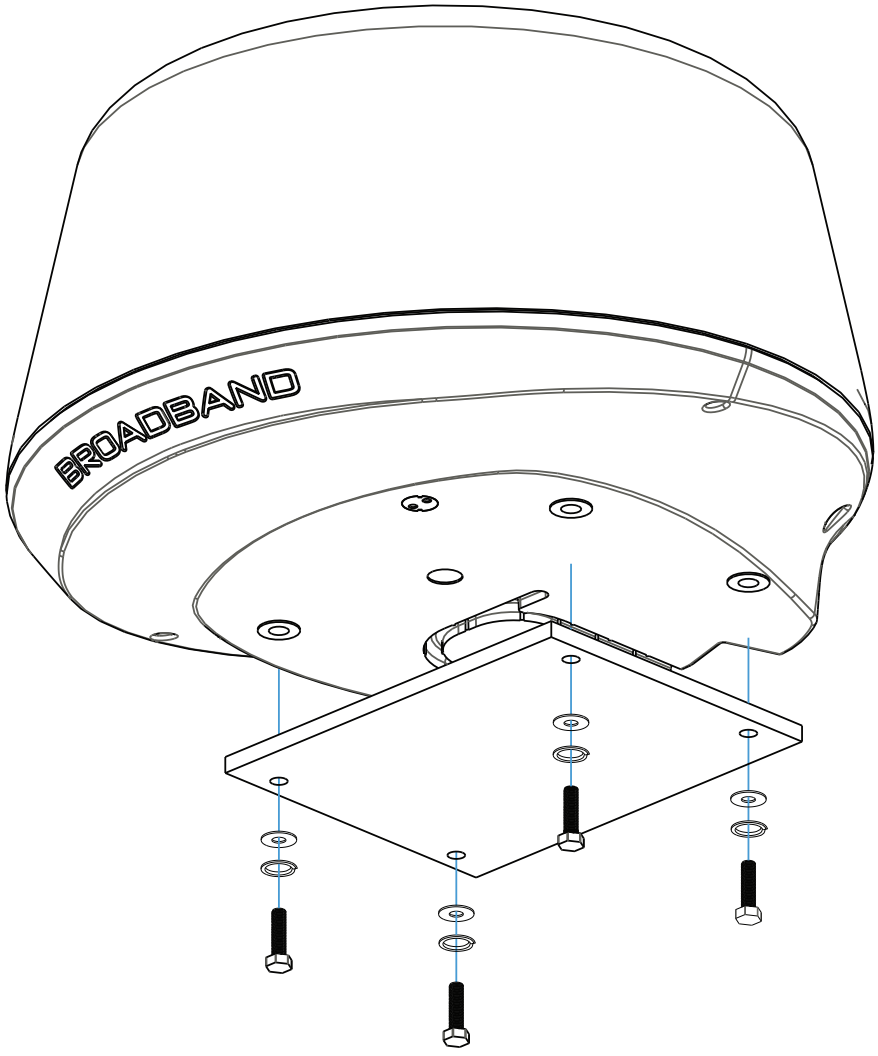
Use the supplied mounting template and tape it securely to the chosen location.

Before drilling, check that:

- you have oriented the mounting template correctly so that the front of the scanner unit will face the front of the vessel
- the thickness of chosen location is not more than 18 mm (0.7") thick. If the location is thicker, longer bolts than those supplied will be required
- the four bolts supplied are M8 x 30 mm. If you need to use longer bolts make sure they are marine grade stainless steel and allow for minimum of 8 mm (0.3") and maximum of 18 mm (0.7") of thread contact

1. Use a 9.5 mm (3/8") drill bit to drill the four holes where shown on the mounting template
2. Remove the mounting template
3. Connect the scanner interconnection cable (see "Connect interconnection cable to the scanner" on page 11)
4. Route the connection cable through the cable retention channel
6. Position the scanner carefully over the bolt holes so that they are aligned
7. Place a lock washer and a plain washer onto each bolt, as shown
8. Insert bolt into drill hole and locate into scanners threaded mounting holes and tighten securely

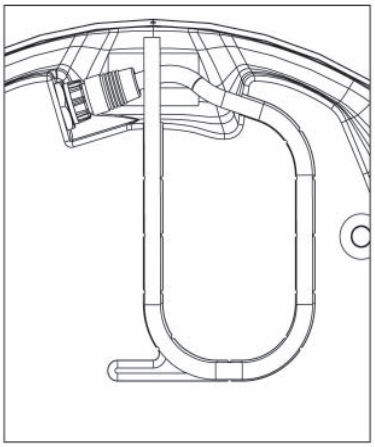
→ ***Note:*** The torque settings for the mounting bolts are 12 Nm – 18 Nm (8.9 lb ft – 13.3 lb ft)



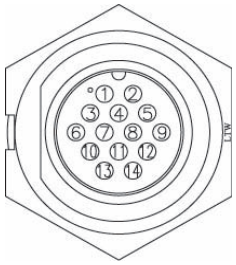
Connect interconnection cable to the scanner

The scanner interconnection cable connects the scanner to the RI10 interface box (or Lowrance HDS via and ethernet adapter cable - 3G U.S only). The cable connects to the scanner using a 14 pin connector.

- Protect the connectors when pulling cable through the boat and avoid putting strain on to the connectors
- The interconnection cable is 9 mm in diameter. A 14 mm hole will be required in order for the RJ45 connector to pass through (Interface box end) or 24 mm for the scanner end connector
- Run the interconnection cable between the scanner and the location of the radar interface box
- Insert cable connector on to the male 14 pin plug on the scanner
- Take care to align the connector correctly to avoid bending the pins. Secure the locking collar by rotating clockwise until it clicks
- Feed and secure the cable into the cable retention channel



Scanner Interconnection cable pin out



Scanner connector

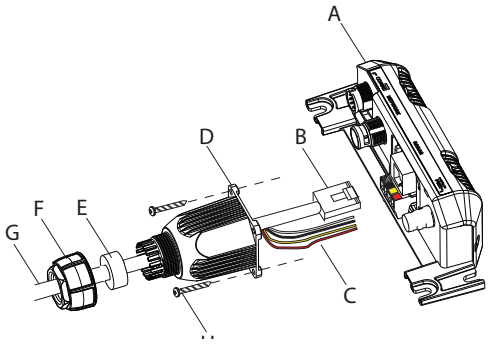
Cable connector

Diameter = 23 mm

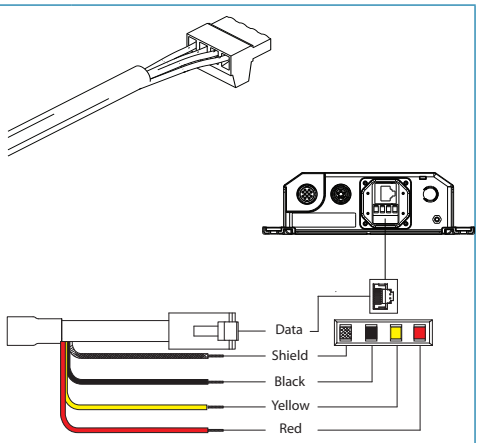
Pin-out	Wire color	RJ45
1	Black	Tinned wire
2	Red	Tinned wire
3	Yellow	Tinned wire
4	Drain	Tinned wire
5	N/A	N/A
6	Blue	RJ45 Pin 4
7	White / Blue	RJ45 Pin 5
8	White / Brown	RJ45 Pin 7
9	Brown	RJ45 Pin 8
10	White / Green	RJ45 Pin 3
11	N/A	N/A
12	White / Orange	RJ45 Pin 1
13	Green	RJ45 Pin 6
14	Orange	RJ45 Pin 2

Connect the interconnection cable to radar interface box

To connect interconnection cable to Lowrance HDS **(USA only)** (see "Lowrance: HDS USA (no MARPA)" on page 14)

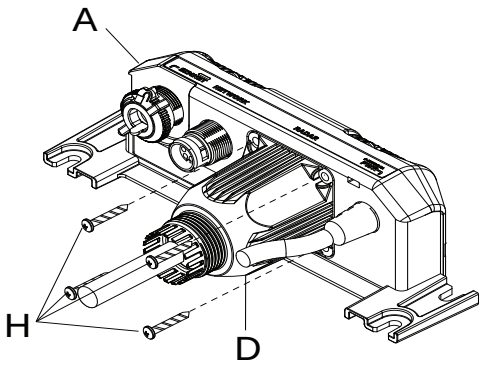


1. Slide (F), (E) and (D) over the RJ45 and data wires of the scanner interconnection cable (G)

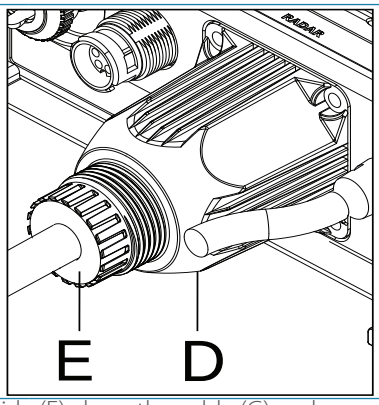


2. Connect data wires to the green terminal block (phoenix connector)

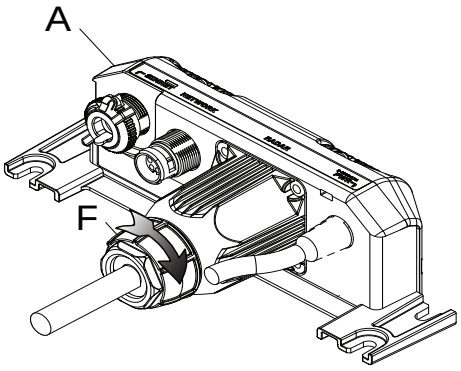
3. Connect RJ45 and phoenix connector to the radar interface box



4. Secure (D) to the radar interface box using the four supplied M3x12 black s/s screws (H)



5. Slide (E) along the cable (G) and press into the cable gland housing (D)



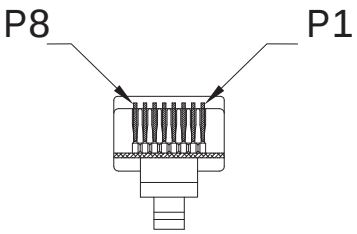
6. Rotate (F) clockwise to secure. Firmly tighten by hand only

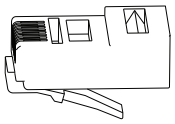
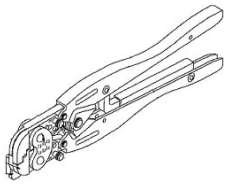
A	Radar interface box
B	Radar data connector RJ45
C	Power wires (see "Connect power" on page 18)
D	Cable gland housing
E	Gland washer
F	Lock nut
G	scanner interconnection cable
H	Screws x 4 M3x12 mm Phillips pan head

- To remove the scanner interconnection cable, follow the above procedure in reverse order
- To avoid damaging the connectors when removing the scanner interconnection cable, it is important to remove the cable gland washer before trying to remove the cable gland housing

Shortening the cable

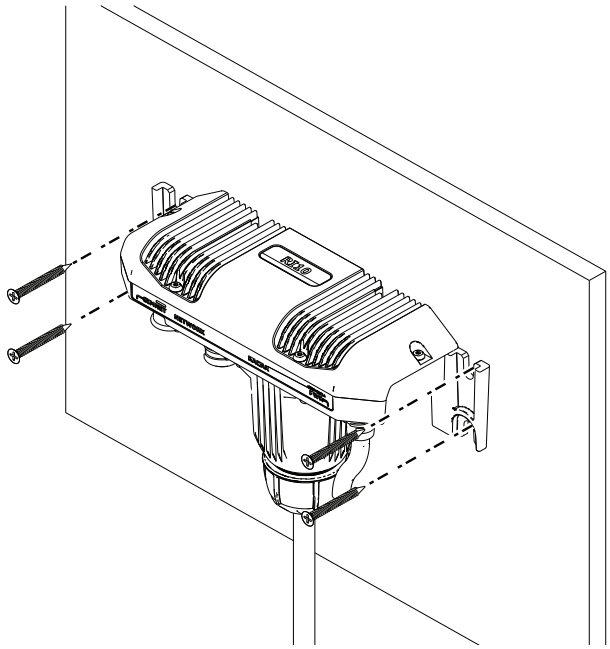
It is not recommended to shorten the cable, but if it is unavoidable, use the pin-out below to re-terminate the cable with a new RJ45 plug.

RJ45 Connector pinout		
	Pin	Color
	1	White/Orange
	2	Orange
	3	White/Green
	4	Blue
	5	White/Blue
	6	Green
	7	White/Brown
	8	Brown

Required to complete	
	
RJ45 Connector	RJ45 Crimping tool

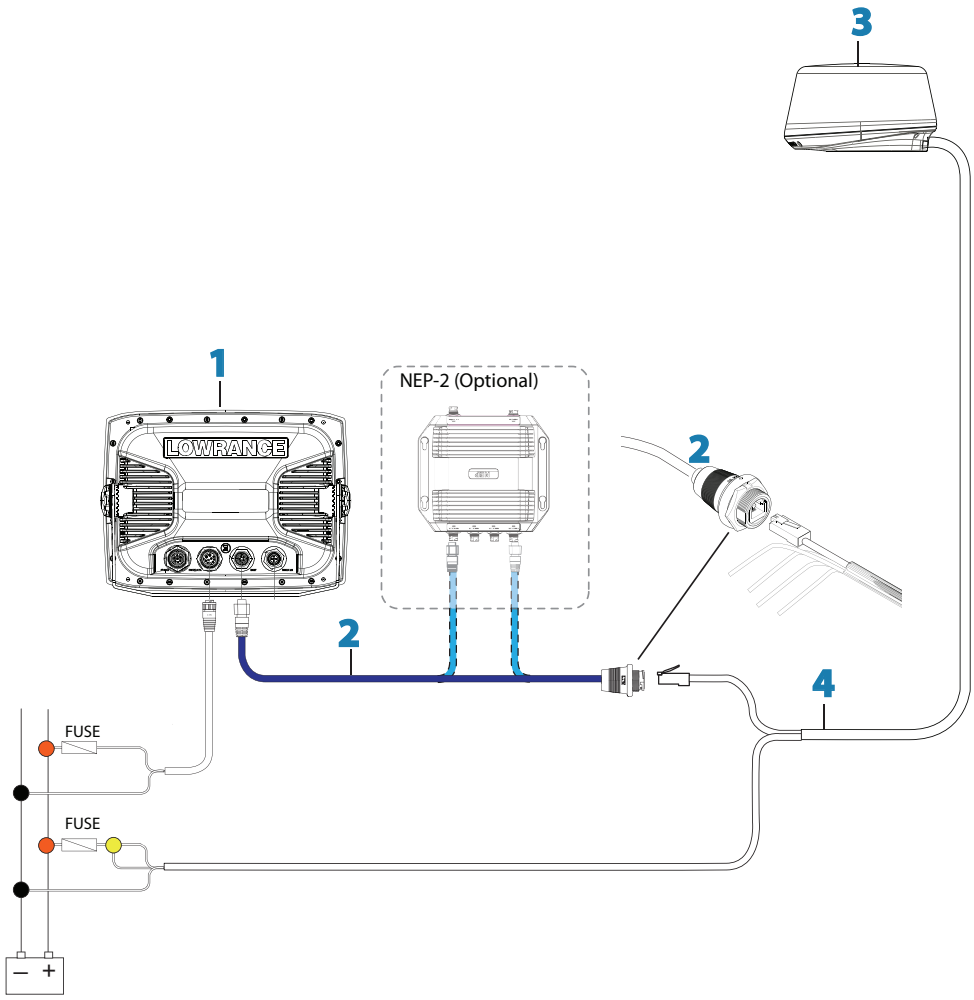
Mounting the radar interface box

- Install the radar interface box (where applicable) in a dry location away from spray, rain, drips and condensation
- The radar interface box must be located where it can be easily connected to the ship's power source, the scanner interconnection cable, SimNet/NMEA2000 and the display or display network
- Allow enough room for cables to form a drip loop
- Preferably mount the radar interface box on a vertical surface with cables exiting downwards
- Insert connectors. See "Connect the interconnection cable to radar interface box" on page 12
- Secure to the surface using the four mounting points and supplied 8G x 5/8 pozi s/s fasters



4 Connect the Broadband radar to your display

Lowrance: HDS USA (no MARPA)



1. Lowrance HDS
2. Ethernet adapter cable. 5 pin yellow male to RJ45 female 1.8 ft (6ft). Included in 3G™ kit 000-10418-001 (Lowrance USA only). Can connect directly to the HDS, or via a NEP-2 Ethernet switch, or using a free Ethernet port on a LSS-1 Structure Scan module (if applicable)

→ ***Note:*** Make sure this connection is made in a dry environment and is secured properly

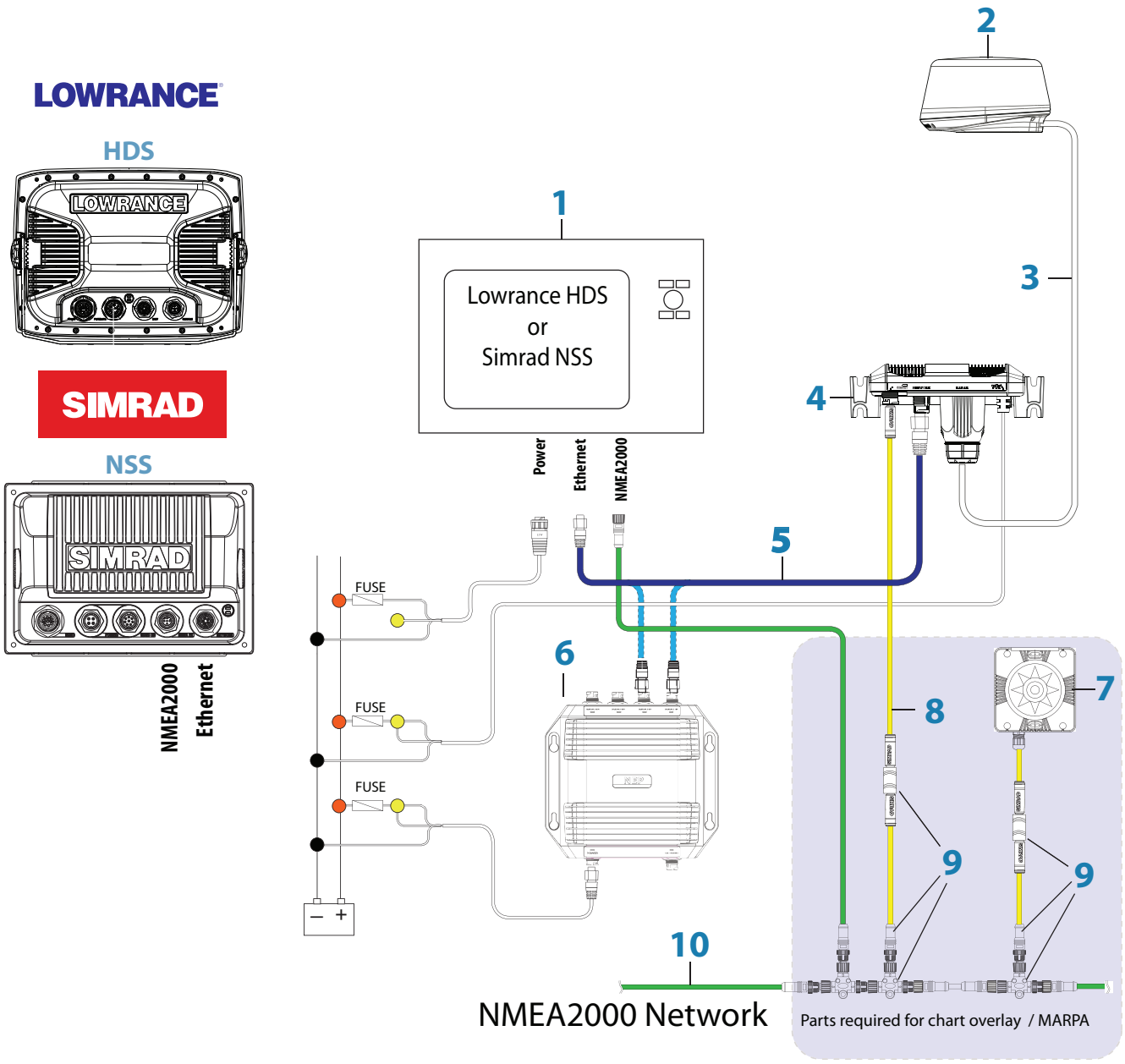
3. Broadband 3G™ Radar
4. Interconnection cable - ships with a 10 m (33 ft): Optional 20 m (65 ft) and 30 m (98 ft) available

→ ***Note:*** To add MARPA and / or chart overlay, you need to add an RI10 Interface Box and Heading Sensor (see next page)

→ ***Note:*** Broadband 4G™ radar may also be connected in this manner, but offers no advantage as they are all shipped with an RI10 interface box, which allows connection of a heading source to the radar

Lowrance: HDS outside USA or with MARPA / chart overlay
Simrad: NSS
(NMEA2000 network)

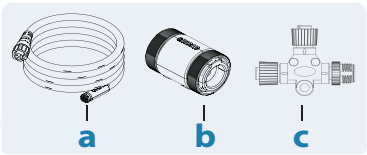
The 3G and 4G radar connects to the Lowrance HDS and Simrad NSS in the same manner



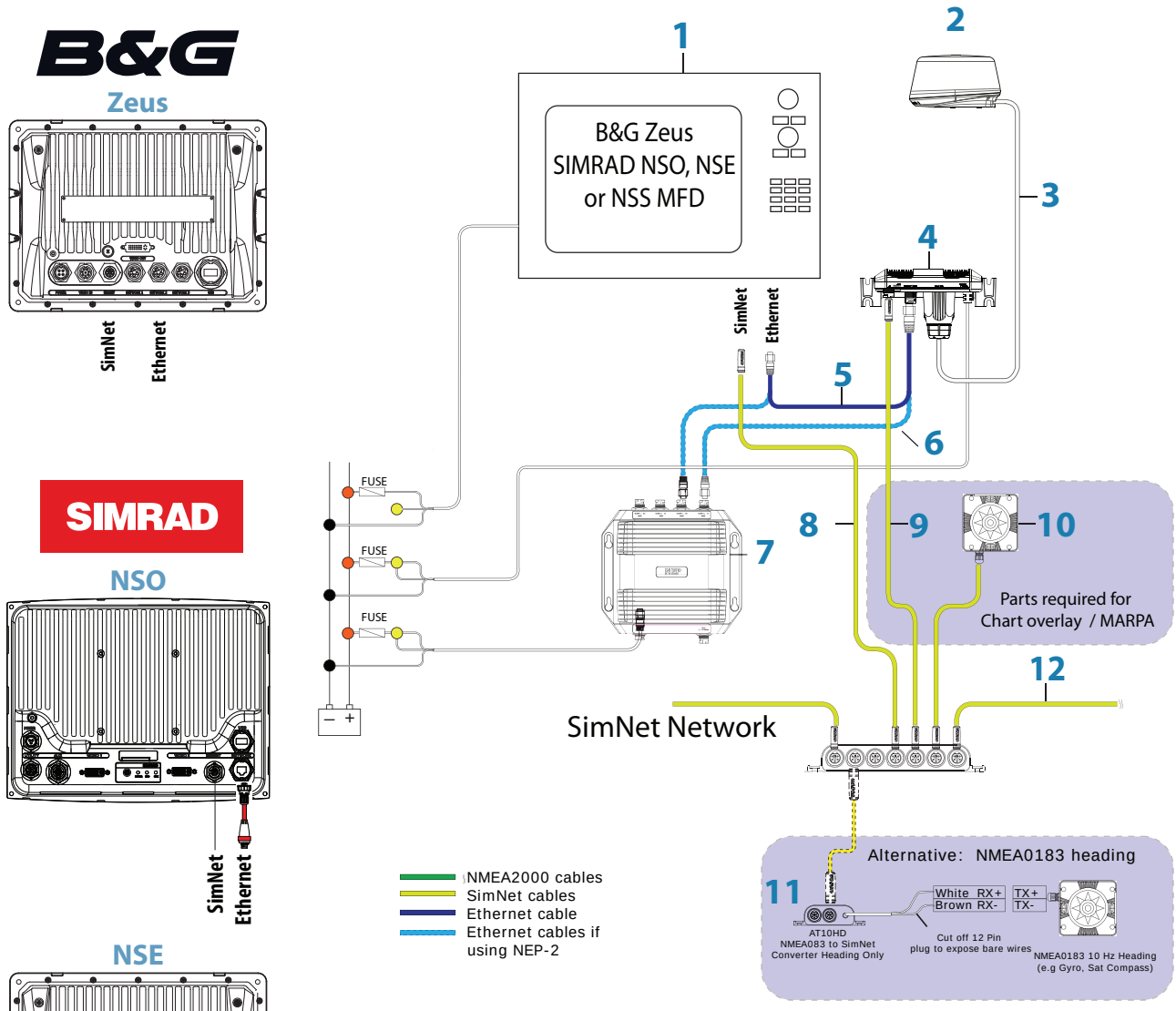
1. Lowrance HDS or Simrad NSS
2. Broadband 3G™ or 4G™ Radar
3. Interconnection cable (Lowrance 10 m (33 ft) Simrad 20 m (65.5 ft))
4. RI10 Radar interface box
5. Ethernet cable (1.8 m (6 ft)). The RI10 can connect either directly to a Multifunction display or via an Ethernet switch (NEP-2), or a free port on an LSS-1 Structure scan module. For cable options see "Ethernet cables" on page 28
6. NEP-2 Network Expansion Port. 5 Port Ethernet switch

The following Parts required for MARPA and / or chart overlay:

7. RC42 Heading Sensor
8. SimNet cable. For cable options see "SimNet cables" on page 28
9. SimNet - NMEA2000 adapter kit: a) SimNet -Micro-C cable 0.5 m (1.6 ft), b) SimNet joiner. c) NMEA2000 T-Connector



B&G: Zeus
Simrad: NSO, NSE and NSS
(SimNet network)

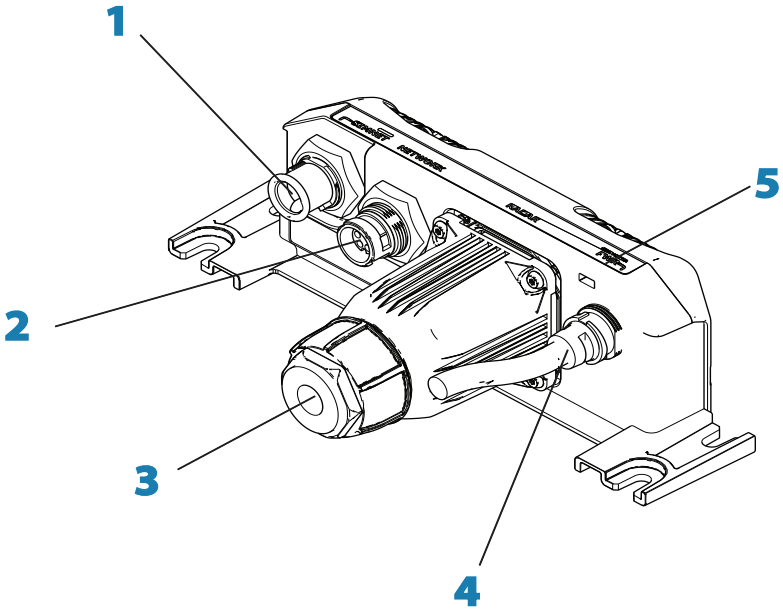


1. B&G Zeus or Simrad NSO / NSE / NSS
2. Broadband 3G™ or 4G™ Radar
3. Interconnection cable. Ships with a 20 m (65 ft) : Optional 10 m (33 ft) and 30 m (98 ft)
4. RI10 Radar interface box
5. Ethernet cable (1.8 m (6 ft)). The RI10 can be connected directly to the NETWORK port of the display/processor box, or via a Network Expansion Port (7). For cable options see "Ethernet cables" on page 28
6. Ethernet cables required to connect 3G™ / 4G™ via a NEP-2 (6)
7. Ethernet switch NEP-2

The following Parts required for MARPA and / or chart overlay:

8. For B&G Zeus, Simrad NSE, NSO . SimNet cable. (Not supplied)
   For SimRad NSS. SimNet to Micro-C cable (Not supplied) see "SimNet - NMEA2000 adapter cables" on page 28
9. SimNet drop cable. Allows display to receive heading information for chart overlay
10. RC42 Heading Sensor (22090195)
11. AT10HD. For installations with a NMEA0183 heading sensor
12. SimNet Network

5 RI10 Connections



1. Connects the RI10 to a SimNet or NMEA2000 network to allow heading and position information to be sent to the scanner for MARPA calculations
2. Main data network interface between the radar and the display (ethernet)
3. Provides data and power connection between the Broadband radar dome and the RI10.
4. Power cable (see "Connect power" on page 18)
5. Green LED indicates power is supplied to the RI10 and indicates SimNet state. A sequence of three rapid flashes indicates no SimNet connection was made at time of power up and a solid light means SimNet connection was lost after power up

➔ ***Note:*** Lowrance HDS units sold in the USA do not require an interface box and the scanner connects directly to the display or Ethernet switch. If chart overlay or MARPA are required for Lowrance HDS USA then an RI10 Interface box and heading sensor are required

Adding MARPA and / or Chart Overlay

To add MARPA and/or Chart overlay, it is essential to use a heading sensor with an output speed of 10 Hz. The Heading sensor needs to be a rate gyro stabilized compass or better

You can use a Heading Sensor with an NMEA 0183 or NMEA2000 output source

You must use a Radar Interface box to connect the heading data to the radar system - this is because MARPA calculations are done by the radar:

- If your heading source is NMEA0183, use an RI11 Interface box for NX installations, or an RI10 Interface box with an AT10HD converter for all other installations. The AT10HD converts NMEA0183 to SimNet / NMEA2000 (only heading information is converted)
- If your heading source is NMEA2000 or SIMNET use an RI10 Interface box.

6 Connect power

The Broadband Radar can operate on 12 or 24 V DC systems. The Broadband Radar requires +V DC to be applied on the yellow power on wire in order to operate. This can be achieved in one of three ways:

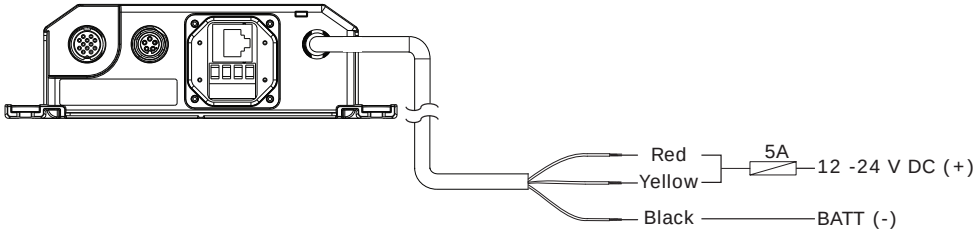
1. Common the red and yellow wire together, and connect to a fused switch. Radar will power on in standby when power is applied. When switch is off, radar will draw no power
2. Use ignition or install a switch that will provide power to the yellow wire. (It is recommended to use a 5 amp fuse or breaker). The radar will turn on when switch is activated. When the switch is off, the radar will draw minimal power (~1mA)
3. Connect the yellow wire to external wake up of suitable display such as NSE, NSO, or NSS. The radar will turn on when the display is turned on. The display must be set to 'Master' under Power Control. When the display is off, the radar will draw minimal power (~1mA)

Before connecting power to the system:

- ***make sure the scanner has been installed and is secured.***
- ***make sure the radar interconnection cable is connected to the radar.***
- ***if using the Radar Interface Box make sure all connections have been made to the display.***

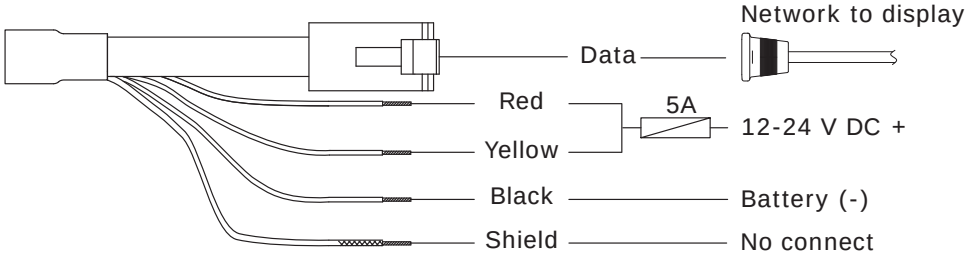
For systems using an RI10 radar interface box:

- Connect the red wire to power positive 12 or 24 V DC. Use a 5 amp fuse or breaker
- Connect the yellow wire to power source that will turn on the system (see above)
- Connect the black wire to power negative



For systems not using radar interface box (Lowrance 3G USA only):

- Connect the red wire to power positive 12 or 24 V DC. Use a 5 Amp fuse
- Connect the yellow wire to power source that will turn on the system (see above)
- Connect the black wire to power negative



7

Setup and Configuration

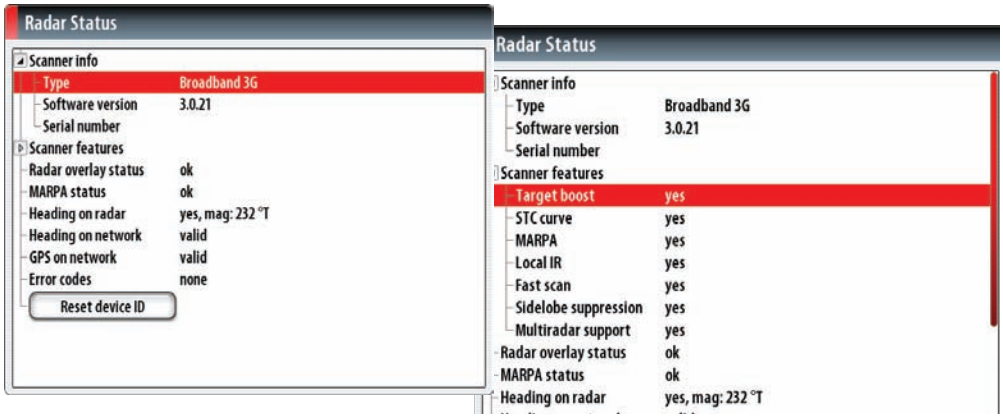
Setup and configuration of the Broadband radar has been simplified compared to traditional pulse radars. There is no zero range adjustment (time delay), no warm up time, and no burn in required.

The following sections cover the available adjustments. Note that the menu examples used are from the Simrad NSE. While these differ aesthetically from the Lowrance interface, the content is essentially the same.

Entering radar setup on your display

Enter radar installation by pressing MENU > SETTINGS > RADAR > INSTALLATION.

Radar Status



Software Version

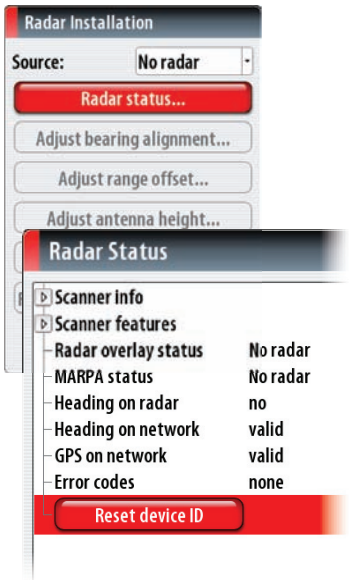
Check to make sure you have the latest software. Check website for the latest version.

Serial Number

Take a minute to write down the serial number of the radar.

MARPA Status

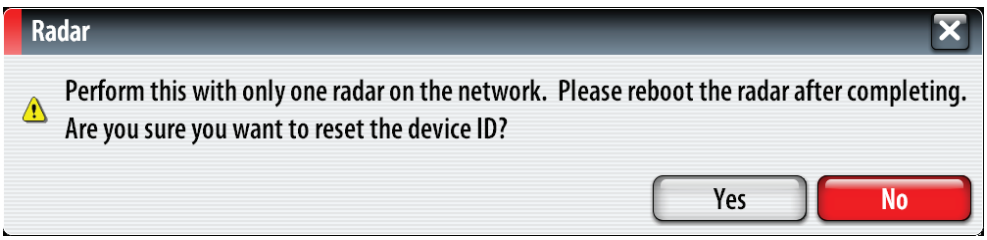
The MARPA status can identify if a heading sensor is on the network and that the radar is receiving heading information essential for MARPA calculations.



Reset Device ID

NSS and HDS displays only support one radar on the network. Should a radar be connected, that has been previously connected to a dual radar network in the past, it may not be detected by the display because it has an incorrect Device ID. To resolve this problem use the following procedure, which must be performed with only one radar on the network.

From the Radar Status page. Select "Reset device ID...." then follow the on screen prompts;



Adjust bearing alignment...

Adjust the heading marker. This is to align with the heading marker on the screen with the center line of the vessel, this will compensate for any slight misalignment of the scanner during installation. Any inaccuracy will be evident when using MARPA or chart overlay.

Point the boat to the end of a head land or peninsula. Adjust the bearing alignment so the heading line touches the end of the same head land or peninsula.

Adjust local interference reject...

Interference from some onboard sources can interfere with the Broadband radar. One symptom of this could be a large target on the screen that remains in the same relative bearing even if the vessel changes direction. Choose from Local interference rejection LOW, MED or HIGH. Default is LOW.

Adjust antenna height...

Set the radar scanner height. The Radar uses this value to optimize sea clutter performance.

→ ***Note:*** It is very important to get the antenna height configured correctly as this will affect the sea clutter function. Do not set the height to 0.

Sidelobe suppression...

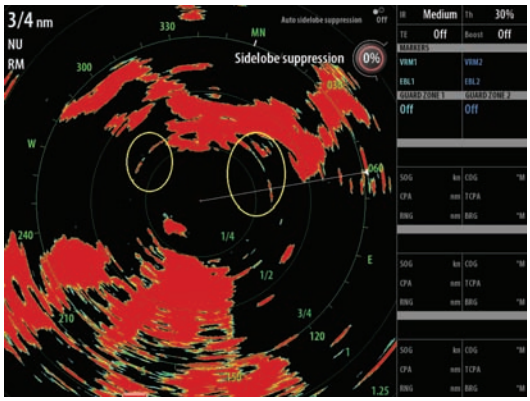
→ ***Note:*** This control should only be adjusted by experienced radar users. Target loss in harbour environments may occur if this control is not adjusted correctly.

Occasionally false target returns can occur adjacent to strong target returns such as large ships or container ports.

This occurs because not all of the transmitted radar energy can be focused into a single beam by the radar antenna, a small amount energy is transmitted in other directions.

This energy is referred to as sidelobe energy and occurs in all radar systems.

The returns caused by sidelobes tend to appear as arcs:



When the radar is mounted where there are metallic objects near the radar, sidelobe energy increases because the beam focus is degraded. The increased sidelobe returns can be eliminated using the Sidelobe Suppression control in the Radar installation menu.

By default this control is set to Auto, and normally should not need to be adjusted. However if there is significant metallic clutter around the radar, sidelobe suppression may need to be increased. The control should be adjusted as follows:

1. Set Radar range to between 1/2nm to 1nm and Sidelobe Suppression to Auto
2. Take the vessel to a location where sidelobe returns are likely to be seen. Typically this would be near a large ship, container port, or metal bridge
3. Traverse the area until the strongest sidelobe returns are seen
4. Change Auto sidelobe suppression to OFF then select and adjust the sidelobe suppression control until the sidelobe returns are just eliminated. You may need to monitor 5-10 radar sweeps to be sure they have been eliminated
5. Traverse the area again and readjust if sidelobes returns still occur
6. Exit the installation menu

To start the radar:

From the radar screen select the Transmit button.

RI10 heading source selection:

The RI10 receives heading via SimNet or NMEA2000 network and transmits this data to the radar, where MARPA processing is performed.

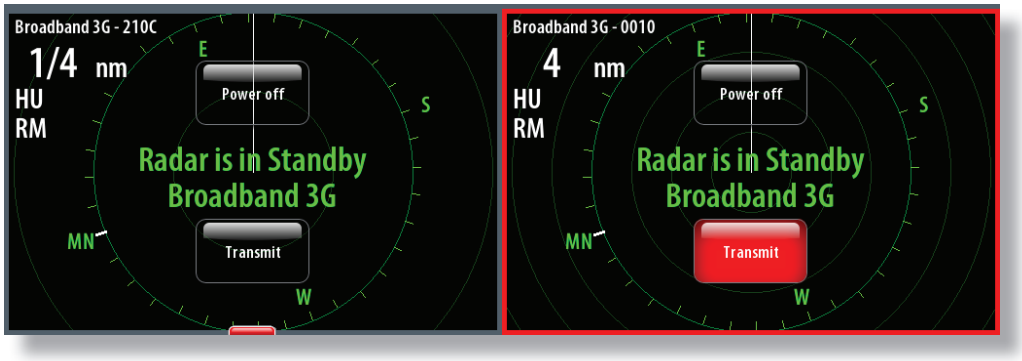
For Simrad installations with more than one SimNet heading source the RI10 will use the Simrad group source. The source used by the Simrad group can be viewed or changed via an NSx display in the Settings>Network>Sources… menu:

Dual Radar setup:

For B&G Zeus and Simrad NSO and NSE displays it is possible for two radars to be connected to the network and viewed simultaneously on one display. At time of installation radar source selection needs to be performed as described below.

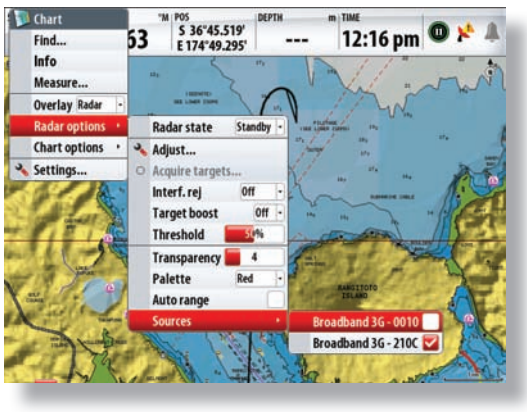
1. Power up the system including both radars
2. On any display, the first radar ever detected by the display will be used as the source for all chart and radar panels. This source will be used by default for every system power-up thereafter, until changed

The radar source is identified by radar type with a four digit number and is displayed in the top left corner of chart and radar panels:

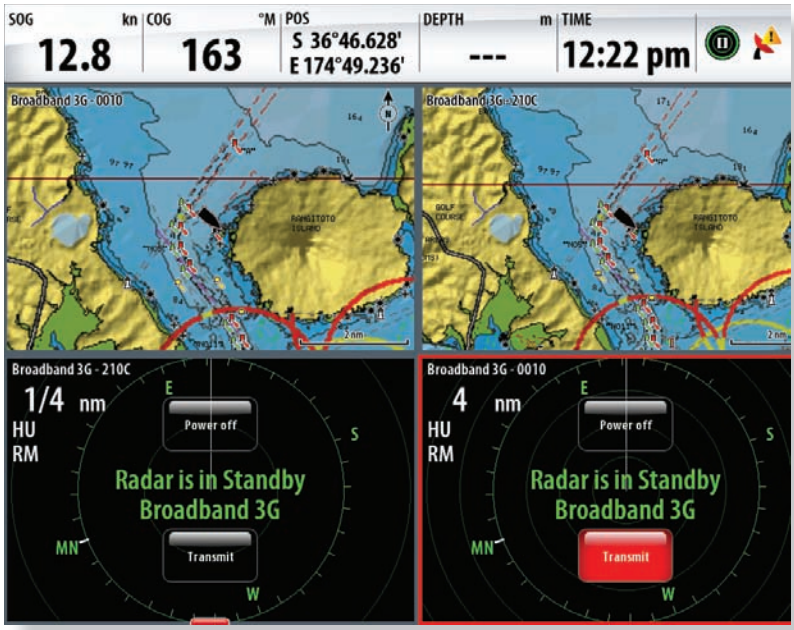


➔ ***Note:*** The four digit number is the last four digits of the radars serial number.

3. For a radar panel, the radar source can be changed in the Radar>Radar Options>Sources menu:
4. For a chart panel (with radar overlay on), the radar source can be changed in the Chart>Radar Options>Sources menu:



5. For pages with more than one radar or chart panel, it is possible to set up different radar sources for each panel



6. The radar source selection is not global, so will only apply to the display on which the source was selected. The radar source will need to be setup for each display on the network.

   Once the radar sources have been set up they will be retained for every system power-up until changed by the user

Dual Range setup (Broadband 4G™ Radar only):

With a Simrad NSE display connected to a Broadband 4G™ radar, it's possible to run the radar in dual range mode. This allows two radar panels to be veiwed simultaneously, operating at different ranges but with all image data supplied by one 4G scanner. Each displayed radar panel can track up to 10 MARPA targets - ability to acquire targets is range dependant.

Setup of Dual Range is identical to that used for Dual Radar setup, except that a 4G radar will show two instances in the sources list; an A channel and a B channel.

➔ ***Note:*** two 4G radars on the same system will show four radar sources (two A and B channels).

8 Maintenance

Clean the radome using soapy water and a soft cloth.

Avoid using abrasive cleaning products.

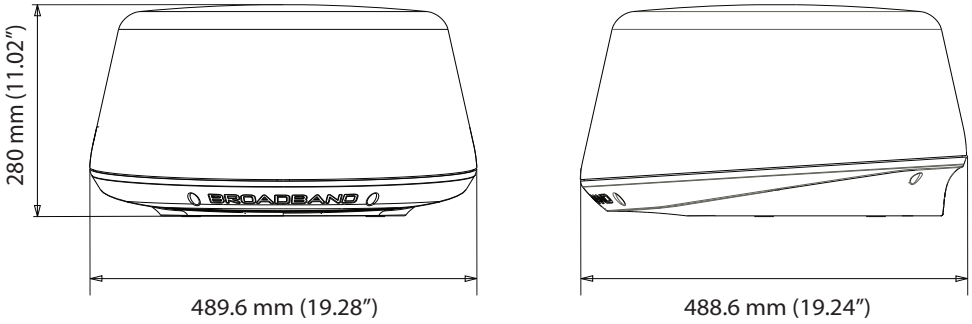
Do not use solvents such as gasoline, acetone, M.E.K etc. as this will damage the dome surface.

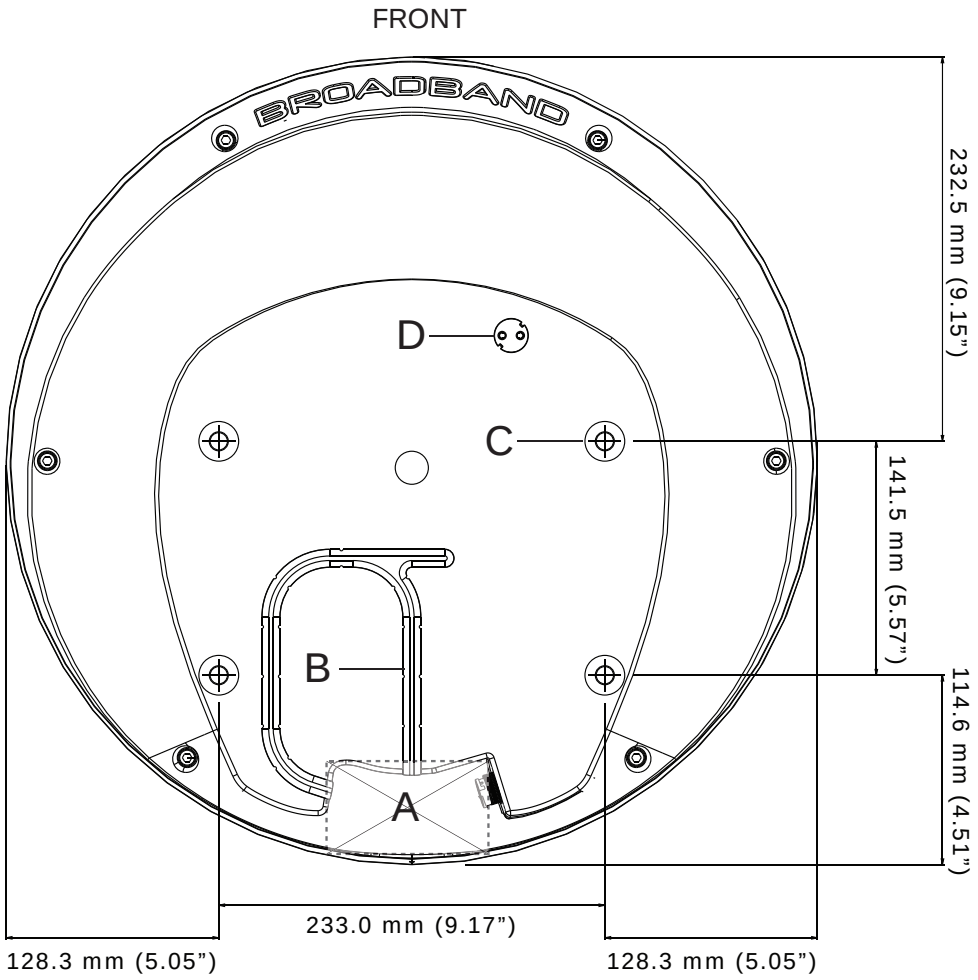
After years of use the drive belt may have to be replaced.

The transmitter in the Broadband Radar is solid state and will not require regular replacement as with an ordinary magnetron radar.

9 Dimension Drawings

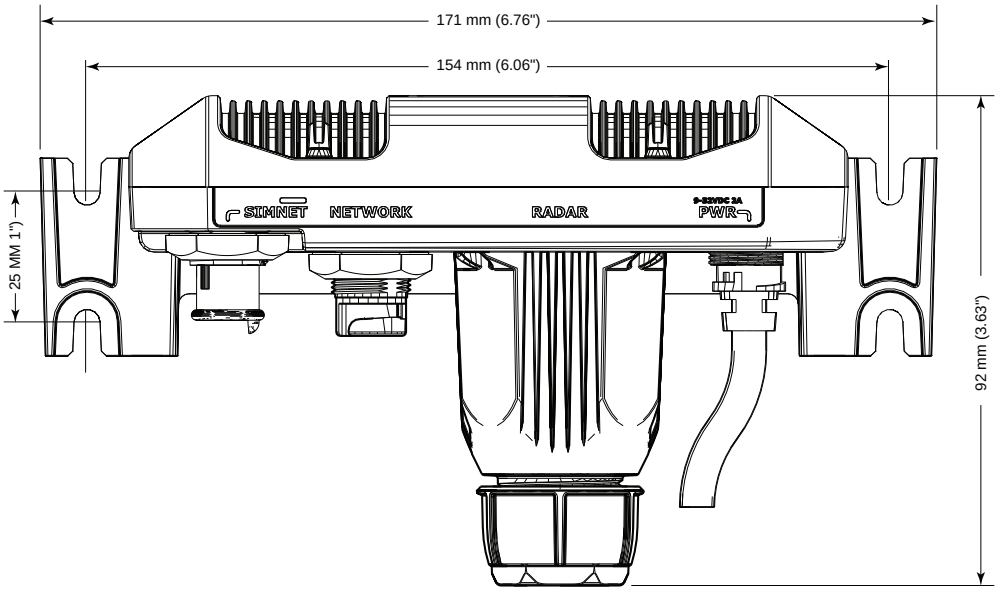
Scanner

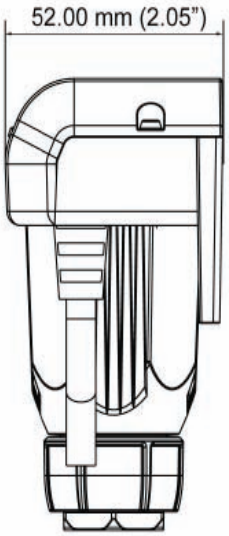




Key	Description
A	Cable entry area
B	Cable retention channel
C	Bolt holes x 4 M8 x 30 mm
D	Breather

Radar interface box





10 Specifications

Broadband 3G™ Radar

Characteristic	Technical Data
Compliance	CE, FCC (ID: RAY3G4G), IC: 4697A-3G4G
Environmental	IEC60945 : 2002 Operating Temperature: -25° to +55°C (-13° to +130°F) Relative humidity: +35° C (95° F), 95% RH Waterproof: IPX6
Relative wind velocity	51 m/sec (Max:100 Knots)
Power consumption (with 10m cable)	Operating: 18W (Typ.) @ 13.8Vdc Standby: 2W (Typ.) @ 13.8Vdc ~ 150mA
DC input (at end of radar cable)	9V to 31.2Vdc (12/24 Volt systems). Reverse polarity protection
Transmitter source (pre-heating time)	No magnetron – Instant On™
Outside dimensions	Height 280 mm x Diameter 489 mm (Height 11" x Diameter 19.3")
Scanner weight (no cable)	7.4 kg (16.31 lbs)
Radar and Antenna Parameters	
Radar ranges	50 m (200 ft) to 24 nm with 17 range settings (nm/sm/km)
Rotation (mode dependent)	24/36 rpm +/-10%
Transmitter frequency	X-band - 9.3 to 9.4 Ghz
Transmitter source (warm-up time)	No Magnetron – all solid state. Instant On™
Plane of polarization	Horizontal Polarization
Transmitter peak power output	165 mW (nominal at source)
Main bang dead zone & tuning	None – not a pulse radar
Sea and rain clutter	5 x less than a pulse radar
Sweep repetition frequency	200 Hz
Sweep time	1.3 ms+/- 10%
Sweep bandwidth	75 MHz max
Horizontal beam width (Tx and Rx antenna)	5.2°+/-10% (-3 dB width)
Vertical beam width (Tx and Rx antenna)	25°+/-20% (-3 dB width)
Side lobe level (Tx and Rx antenna)	Below -18 dB (within ±10°);Below -24 dB (outside ±10°)
Noise figure	Less than 6 dB
Coms/Cabling/Mounting	
Com protocol	High Speed Ethernet and Serial
Heading	NMEA0183 with RI11 interface box NMEA2000 / SimNet with RI10 interface box
Inter connecting cable length	Lowrance 10 m (33 ft) Simrad, B&G 20 m (65.6 ft)
Maximum inter connecting cable length	30 m (98.5 ft) – available as option
Bolts (4)	M8x30 - 304 stainless steel
Footprint	W233 mm (9.17") (port / starboard) x L141.5 mm (5.55") (matches Garmin GMR18HD / Raymarine RD218 footprint)

Compatible Displays		
Simrad:	Lowrance:	B&G:
NSO, NSE, NSS (all models)	HDS (all models)	Zeus (all models)

Broadband 4G™ Radar

Characteristic	Technical Data	
Compliance	CE, FCC (ID: RAY3G4G), IC: 4697A-3G4G	
Environmental	IEC60945 : 2002 Operating Temperature: -25° to +55°C (-13° to +130°F) Relative humidity: +35° C (95° F), 95% RH Waterproof: IPX6	
Relative wind velocity	51 m/sec (Max:100 Knots)	
Power consumption (with 10m cable)	Operating: 20W (Typ.) @ 13.8Vdc (21W in dual range mode) Standby: 2.9W (Typ.) @ 13.8Vdc ~ 170mA	
DC input (at end of radar cable)	9V to 31.2Vdc (12/24 Volt systems). Reverse polarity protection Minimum startup voltage 10.75Vdc	
Transmitter source (pre-heating time)	No magnetron – Instant On™	
Outside dimensions	Height 280 mm x Diameter 489 mm (Height 11" x Diameter 19.3")	
Scanner weight (no cable)	7.4 kg (16.31 lbs)	
Radar and Antenna Parameters		
Radar ranges	50 m (200 ft) to 66 km (36 nm) with 18 range settings (nm/sm/km)	
Rotation (mode dependent)	24/36/48 rpm +/-10% (mode and MFD dependant)	
Transmitter frequency	X-band - 9.3 to 9.4 Ghz	
Transmitter source (warm-up time)	No Magnetron – all solid state. Instant On™	
Plane of polarization	Horizontal Polarization	
Transmitter peak power output	165 mW (nominal - at antenna port)	
Main bang dead zone & tuning	None – not a pulse radar	
Sea and rain clutter	3-5 x less than a pulse radar	
Sweep repetition frequency	200 - 540 Hz (mode dependant)	
Sweep time	1.3 ms+/- 10%	
Sweep bandwidth	75 MHz max	
Horizontal beam width (Tx and Rx antenna)	5.2°+/-10% (-3 dB width)	
Target Seperation Control	OFF: 5.2°+/-10% (-3 dB width) LOW: ~4.4°+/-10% (-3 dB width) MED: ~3.2°+/-10% (-3 dB width) HIGH: ~2.6°+/-10% (-3 dB width)	
Vertical beam width (Tx and Rx antenna)	25°+/-20% (-3 dB width)	
Side lobe level (Tx and Rx antenna)	Below -18 dB (within ±10°);Below -24 dB (outside ±10°)	
Noise figure	Less than 6 dB	
Coms/Cabling/Mounting		
Com protocol	High Speed Ethernet	
Heading	NMEA2000 / SimNet with RI10 interface box	
Inter connecting cable length	Lowrance 10 m (33 ft) Simrad, B&G 20 m (65.6 ft)	
Maximum inter connecting cable length	30 m (98.5 ft) – available as option	
Bolts (4)	M8x30 - 304 stainless steel	
Footprint	W233 mm (9.17") (port / starboard) x L141.5 mm (5.55") (matches Garmin GMR18HD / Raymarine RD218 footprint)	
Compatible Displays		
Simrad:	Lowrance:	B&G:
NSO, NSE, NSS* (all models)	HDS* (all models)	Zeus (all models)

➔ ***Note:*** *NSS and HDS do not support full range of 4G features.

Navico Broadband radar part numbers

Broadband radar scanner part numbers			
Model	Part Number	Description	Length
		Scanner	
3G™	000-10416-001	Broadband 3G™ Radar	
4G™	000-10417-001	Broadband 4G™ Radar	
		Interface boxes	
RI10	AA010189	Broadband radar SimNet interface box	
RI11	AA010204	Broadband radar serial interface box	
		Scanner cables	
	AA010211	Broadband scanner interconnection cable	10 m (33 ft)
	AA010212	Broadband scanner interconnection cable	20 m (65.6 ft)
	AA010213	Broadband scanner interconnection cable	30 m (98.5 ft)
		Ethernet cables	
	000-00127-56	Adapter cable: yellow Ethernet male to RJ45 female (Supplied with Lowrance USA SKU)	2 m (6.5 ft)
	000-00127-28	Ethernet cable	0.6 m (2 ft)
	000-0127-51	Ethernet cable	1.8 m (6 ft)
	000-0127-29	Ethernet cable	4.5 m (15 ft)
	000-0127-30	Ethernet cable	7.7 m (25 ft)
	000-0127-37	Ethernet cable	15.2 m (50 ft)
		SimNet cables	
	24005829	SimNet cable	0.3 m (1 ft)
	24005837	SimNet cable	2 m (6.6 ft)
	24005845	SimNet cable	5 m (16 ft)
	24005852	SimNet cable note: For simNet backbone only	10 m (33 ft)
		SimNet - NMEA2000 adapter cables	
	24006413	Micro-C female to SimNet	4 m (13 ft)
	24006199	SimNet to Micro-C (female) cable that connects a NMEA 2000® product to SimNet	0.5 m (1.6 ft)
	24005729	SimNet to Micro-C (male) cable that connects a SimNet product to a NMEA 2000® network	0.5 m (1.6 ft)
		NMEA - SimNet Converters	
AT10	24005936	AT10 NMEA0183 / SimNet converter	
AT10HD	24006694	AT10HD NMEA0183 / SimNet converter. 10 Hz heading data only	

11 RF exposure compliance certificate

TIMCO ENGINEERING, Inc.
849 NW State Road 45
Newberry FL 32669
352-472-5500 F: 352-472-2030
info@timcoengr.com
www.timco.cc

REPORT

Compliance to RF exposure requirements

APPLICANT	NAVICO AUCKLAND LTD
ADDRESS	3-5 OMEGA STREET, BUILDING A ALBANY 0632 AUCKLAND NEW ZEALAND
TEL	011-64-9-925-4500
FCC ID	RAY3G4G
MODEL NUMBER	3G or 4G
PRODUCT DESCRIPTION	FMCW RADAR SCANNER
DATE SAMPLE RECEIVED	January/14/2011
DATE TESTED	January/15/2011
TESTED BY	Nam Nguyen
APPROVED BY	Mario de Aranzeta
TIMCO REPORT NO.	RF EXPOSURE REPORT
TEST RESULTS	☒ PASS ☐ FAIL

Description of Test Article

Operating Frequencies	9300 to 9500 MHz
DUT Power Source	☐ 120 Vac/50/60 Hz
	☐ 240 Vac 50/60 Hz
	☒ DC Power 12Vdc
	☐ Battery Operated Exclusively
Test Item	☐ Prototype
	☒ Pre-Production
	☐ Production
Type of Equipment	☐ Fixed
	☒ Mobile
	☐ Portable
Power Output	0.165 Watts Peak (nominal)

General Remarks

Summary

The device under test does:

☒ fulfill the requirements as identified in this test report
☐ not fulfill the requirements as identified in this test report

This equipment has been tested in accordance with the standards identified in the referenced test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

I attest that the necessary measurements were made by me or under my supervision, at TIMCO ENGINEERING, INC. located at 849 N.W. State Road 45, Newberry, Florida 32669 USA.

All Timco instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025: 2005 requirements.

Timco Engineering Inc.
849 NW State Road 45
Newberry, Fl 32669

Authorized Signatory Name and Title: Mario de Aranzeta, Compliance Engineer

Authorized Signature:

ACCREDITED

Testing Certificate #0955-1

988-10113-003

LOWRANCE

SIMRAD

B&G

www.bandg.com
www.simrad-yachting.com
www.lowrance.com

LOWRANCE SIMRAD B&G

Addendum for compatible Navico MFD's that support the following Broadband 4G™ Radar features:

- Dual Radar
- Dual Range
- 4G Radar Controls
  - Target Separation
  - Noise Rejection
  - Fast Scan
- Directional Clutter Rejection
- Reset Device ID
- 4G Compatibility Chart

☞ *The MFD screenshot examples used in this addendum is based on the SIMRAD NSE Multi-Function Display. The actual screen layout in your compatible MFD may vary in layout or color pallet, but essentially the controls and sequences are the same.*

Part no. 988-10224-001

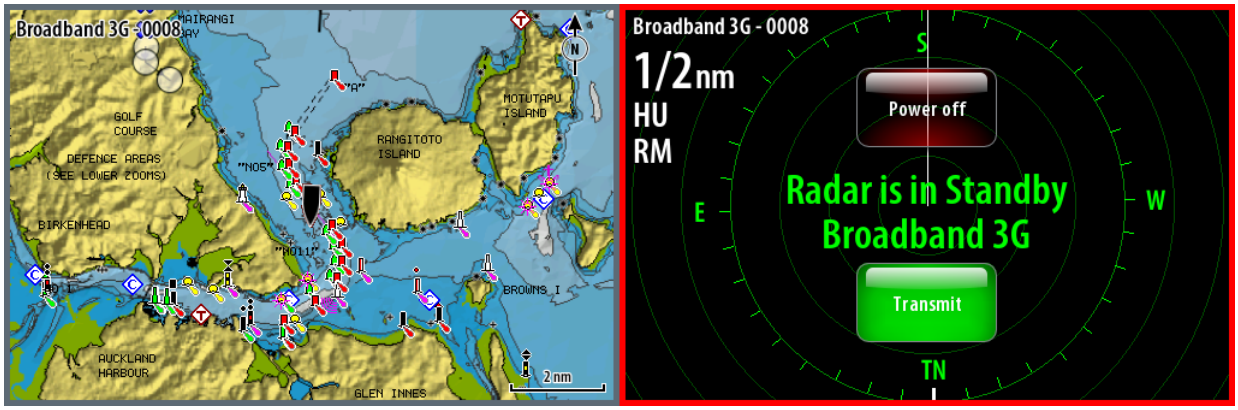
Dual Radar

With dual radar capability, it is possible for two radar sources to be displayed simultaneously. Connect either two Broadband Radars or two Pulse Radars or one of each and see both radar images at the same time.

Interference will be seen on the Broadband Radar on most ranges when a pulse radar and a Broadband Radar are transmitting at the same time on the same boat. It is Navico's recommendation to only transmit on one radar at a time e.g. Broadband Radar for typical navigational usage or pulse radar to locate weather cells, defined coastlines at a distance and to trigger Racons.

Initial setup:

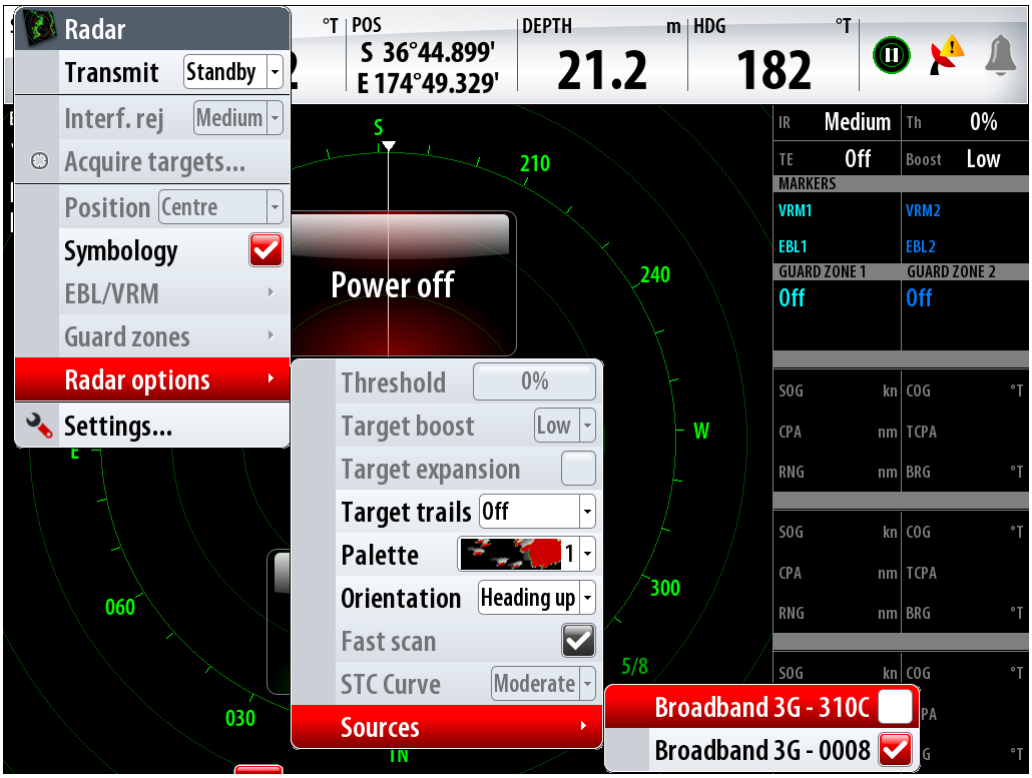
1. Power up the system including both radars.
2. On any display, the first radar detected by the display will be used as the source for all chart and radar panels. This source will be used by default for every system power-up thereafter, until changed.



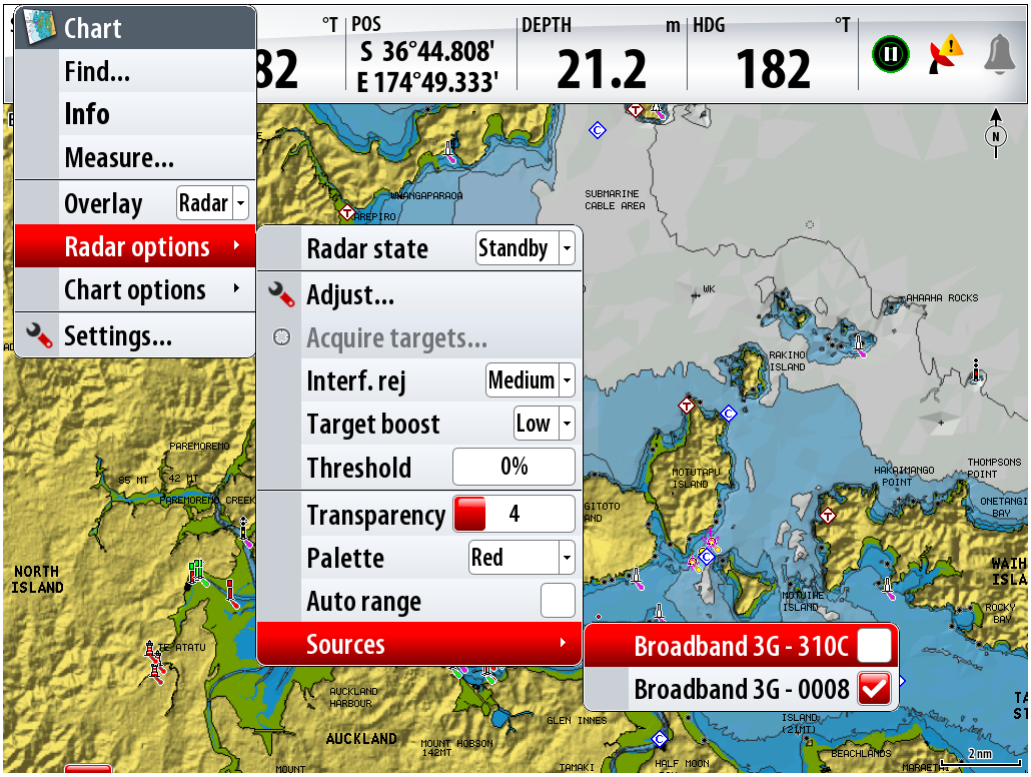
The radar source is identified by radar type with a four-digit number and is displayed in the top left corner of chart and radar panels.

The four-digit number is the last four digits of the radars serial number.

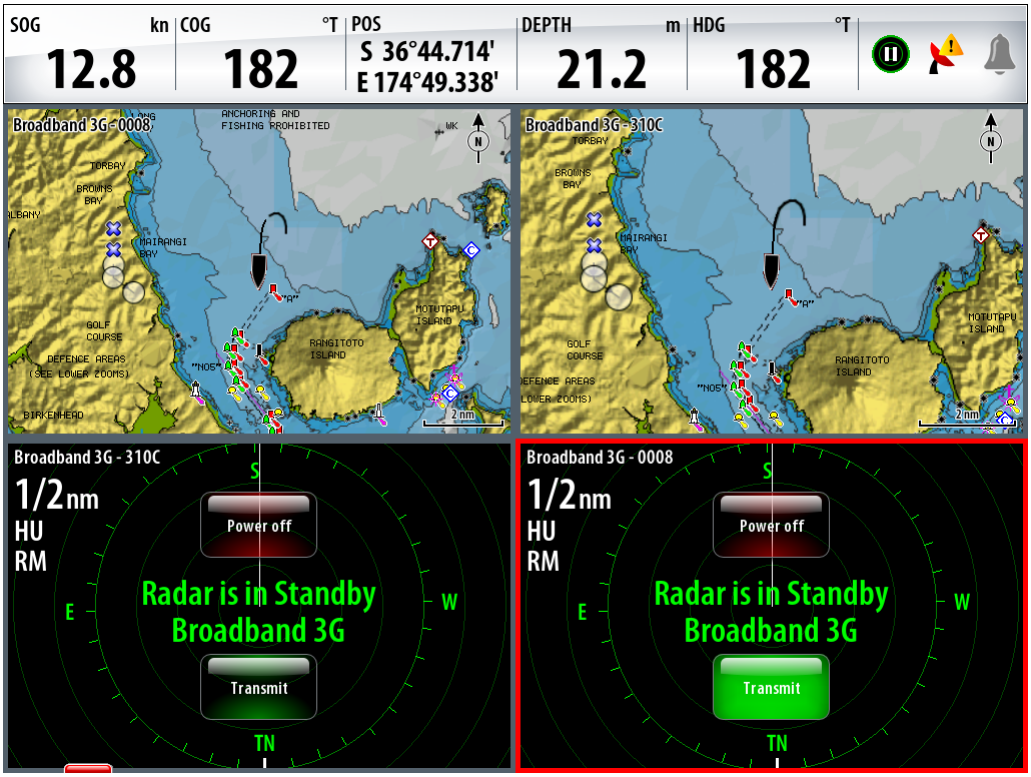
3. For a radar panel, the radar source can be changed in the menu as shown below:



4. For a chart panel (with radar overlay on), the radar source can be changed in the menu as shown below:



5. For pages with more than one radar or chart panel, it is possible to set up different radar sources for each panel:



6. The radar source selection is not global, so it will only apply to the display on which the source was selected. The radar source will need to be set up for each display on the network.

   Once the radar sources have been set up, they will be retained for every system power-up until changed by the user

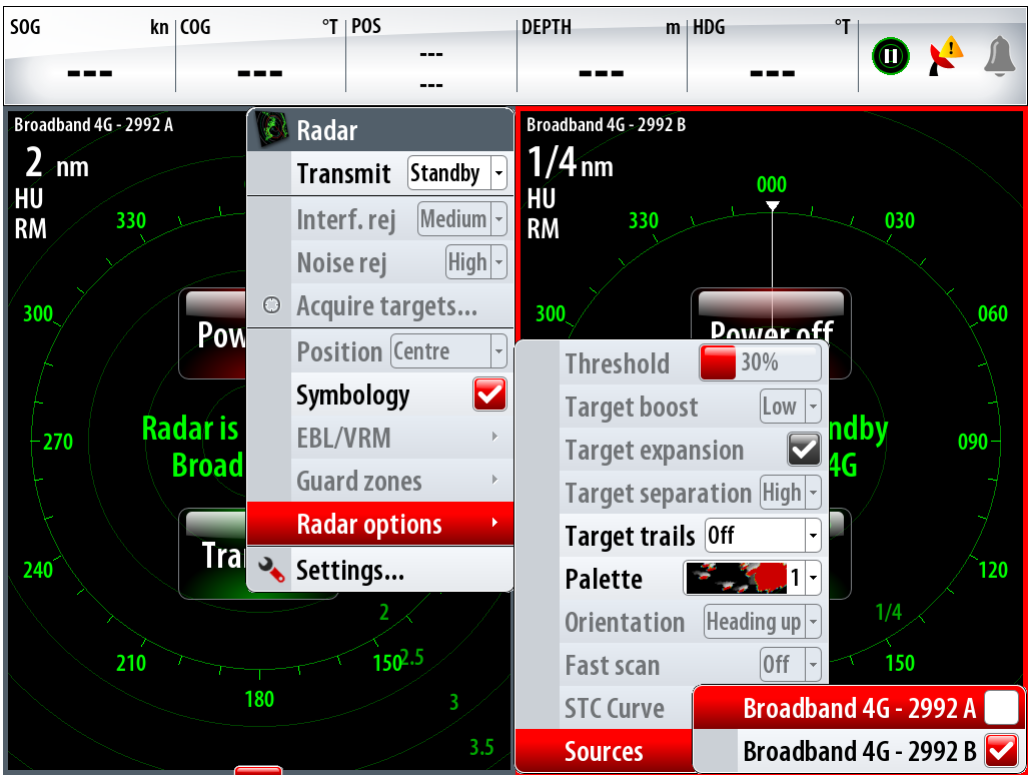
7. To view or change items in the installation menu for a particular radar source, the radar source must first be selected, as shown below:

Dual Range

When connected to a Broadband 4G™ Radar, it is possible to run the radar in Dual Range mode. The 4G radar will appear in the radar sources menu as two virtual radar sources A and B. Range and radar controls for each virtual radar source are fully independent* and the source can be selected for a particular chart or radar panel in the same manner as dual radar described in the previous section.

MARPA is fully independent and up to 10 targets may be tracked for each virtual radar source.

Up to two independent Guard Zones may also be defined for each virtual radar source.



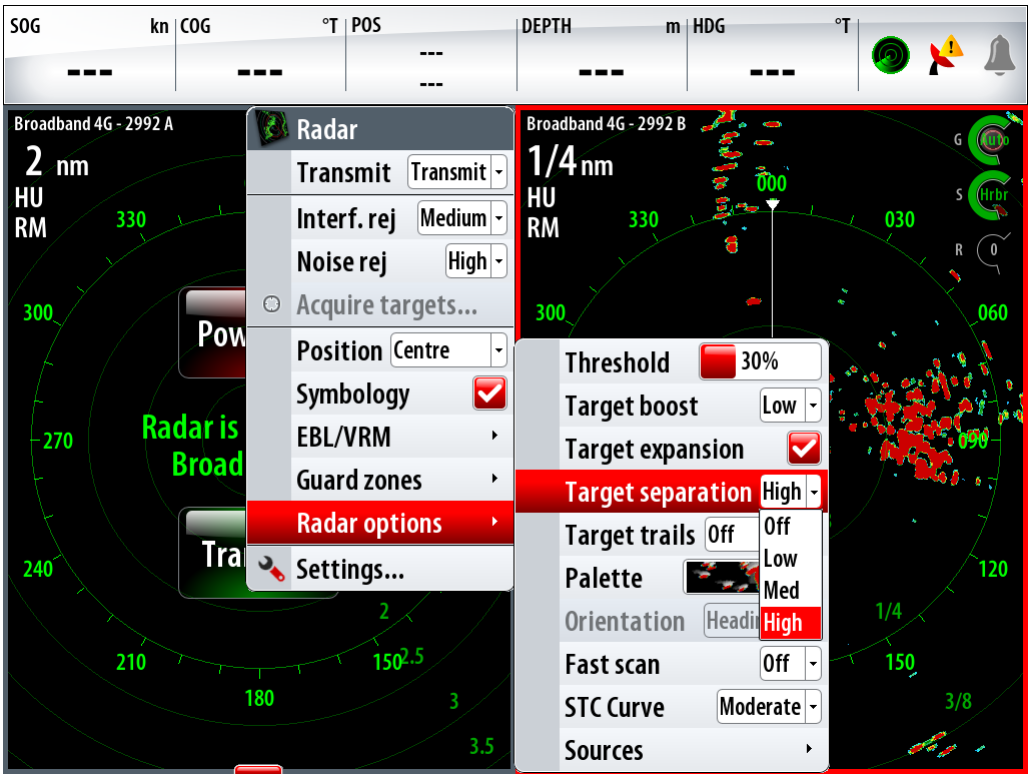
*Some controls that are related to physical properties of the radar itself are not independent of source. These are Fast Scan, Antenna Height and Bearing alignment.

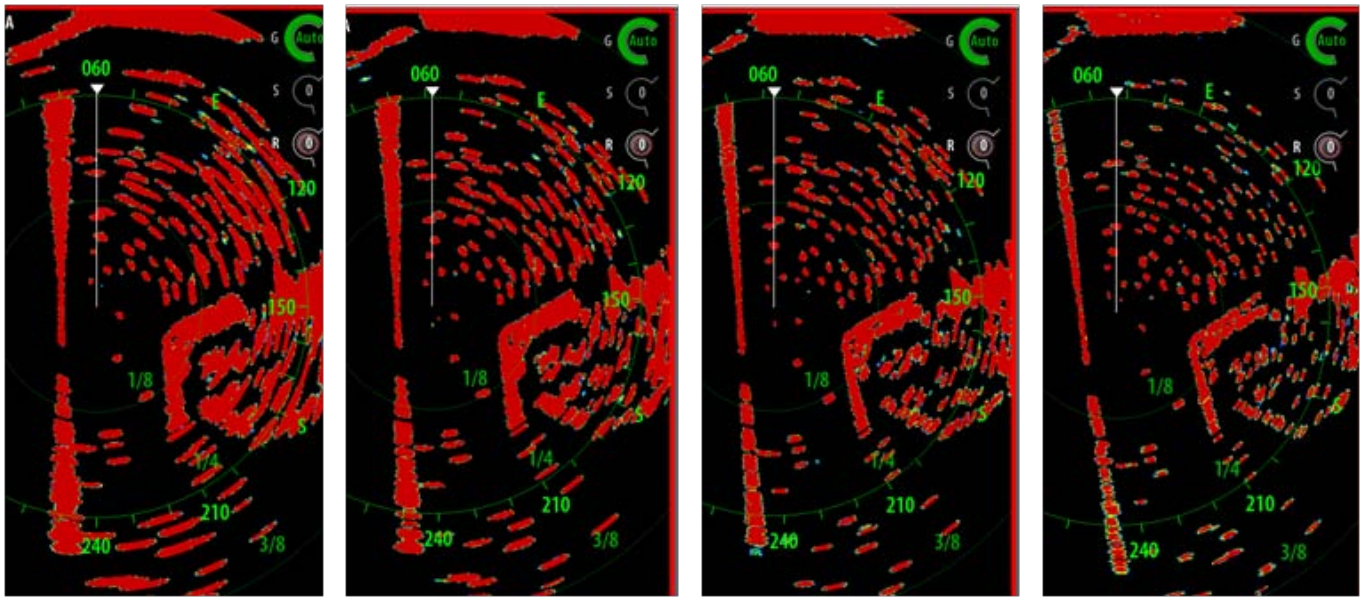
4G Radar Controls

Broadband 4G™ Radar has several controls not found on any other Navico radar:

Target Separation

The Target Separation control allows you to control the target discrimination of the radar as illustrated below:





Off **Low** **Med** **High**

Noise Rejection

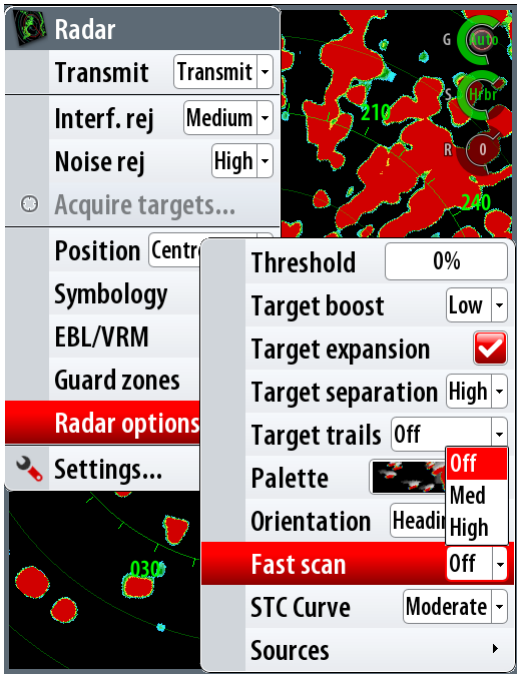
The Noise Rejection control sets the amount of noise filtering applied by the radar. Target sensitivity is increased at longer ranges when this control is set to Low or High, but does cause some loss of target discrimination.

Tip: To get maximum range performance from 4G, transmit on one range only, set Noise Reject control to High and threshold as low as possible. The default is 30% for less clutter on the screen. If OFF is selected for NSE, NSO and Zeus, the range performance is about equal to our 3G radar. In some areas where extreme high interference may exist, try OFF for best radar image.

Fast Scan

The Fast Scan control sets the rotation speed of the radar scanner. For Broadband 4G™ Radar there are Off/Medium/High (24/36/48 rpm nominal) settings. However, Fast Scan speed will be limited in certain modes of operation:

- In Dual Range mode, speed is limited to 24 rpm
- With Noise Rejection set to Low or High, for ranges 1 nm or greater, speed is limited to 21 rpm.



Directional Clutter Rejection

This mode automatically works when GAIN = AUTO and SEA = HARBOR or OFFSHORE. The purpose is to allow smaller vessels to be seen in the leeward direction of the sea clutter. The GAIN of the radar receiver is increased dynamically during the sweep, in the leeward direction, for increased target sensitivity in heavier sea states.

When GAIN or SEA = MANUAL, the Directional Clutter Rejection mode will be OFF (non-directional).

In addition, CALM, MODERATE or ROUGH STC Curve settings are available in the Radar options menu to better optimize the radar image to your liking.

Reset Device ID

It is not necessary to reset the radar device ID for dual radar operation. This feature is provided to enable displays that do not support dual radar to view a particular radar source. This operation must be performed with only the radar intended for Device ID reset connected to the network.

The Reset Device ID button is located in the Radar Status window in the Radar Installation menu. After the reset is performed, power cycle the radar and reconnect any other radars. The reset radar will now be visible on Navico displays that do not support dual radar.

4G Compatibility Chart

Broadband 4G™ Radar	LOWRANCE	SIMRAD			B&G
	HDS	**NSE**	**NSO**	**NSS**	**ZEUS**
Beam Sharpening	✓	✓	✓	✓	✓
→ Target Separation control	Fixed: 2.6°	5.2° to 2.6°	5.2° to 2.6°	Fixed: 2.6°	5.2° to 2.6°
Range - 50% more range than 3G and 2x over BR24	✓	✓	✓	✓	✓
→ Noise Rejection control	Fixed: High	Off, Low, High	Off, Low, High	Fixed: High	Off, Low, High
Maximum Range Scale - 36 nm, in 18 range settings	✓	✓	✓	✓	✓
Dual Range Operation	x	✓	✓	x	✓
Maximum Rotation Speed (Less than 1 nm)	36 RPM	48 RPM	48 RPM	36 RPM	48 RPM
Advanced Directional Clutter Rejection	✓	✓	✓	✓	✓
Advanced Sidelobe Rejection	✓	✓	✓	✓	✓
Best-In-Class Range Resolution	✓	✓	✓	✓	✓