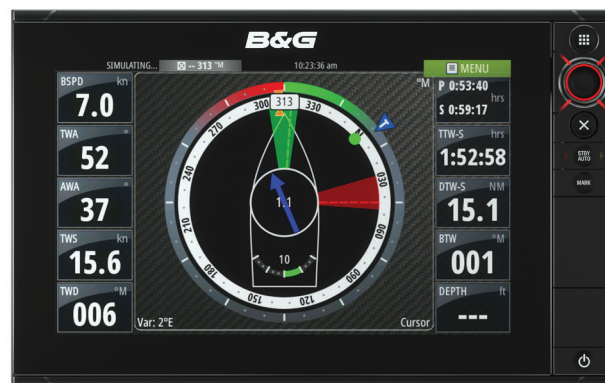# Zeus²
Operator Manual

ENGLISH

bandg.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)
- DownScan Imaging™ (DownScan)
- DownScan Overlay™ (Overlay)
- ForwardScan™ (ForwardScan)
- GoFree™ (GoFree)
- INSIGHT GENESIS® (Insight Genesis)
- SonicHub® (SonicHub)
- StructureMap™ (StructureMap)
- StructureScan® (StructureScan)
- StructureScan® HD (StructureScan HD)

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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.bandg.com.

Regulatory statements

This equipment is intended for use in international waters as well as coastal sea areas administered by the USA, and countries of the E.U. and E.E.A.

This equipment complies with:

- CE under R&TTE directive 1999/5/EC
- 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 Zeus^2 section on the following website: www.bandg.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. Please confirm data rates and restrictions with your service provider.

About this manual

This manual is a reference guide for operating the Zeus^2. It assumes that all equipment is installed and configured, and that the system is ready to use.

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 4.0. The manual is continually updated to match new software releases. The latest available manual version can be downloaded from www.bandg.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.bandg.com.

The manuals can be read from a card inserted in the card reader or copied to the unit's internal memory.
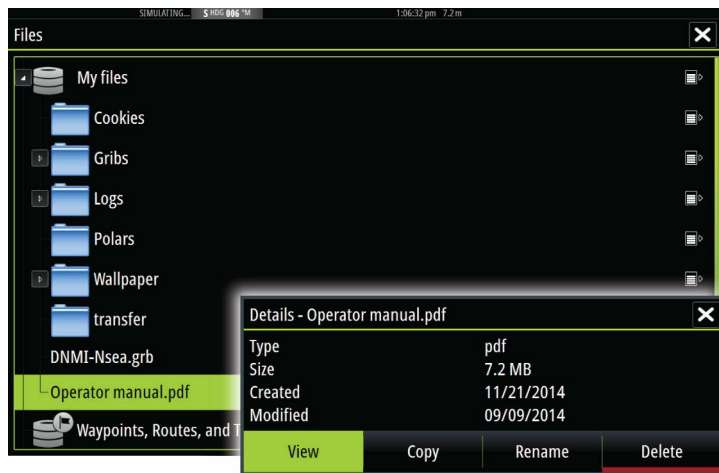
Use the menu options or the keys and on-screen buttons to maneuver in the PDF file as described below:

- 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 128.

Contents

Contents | Zeus2 Operator Manual

1

Introduction

The front panel and keys

1   Touch screen

2   Power key
Press once to display the System controls dialog.
Repeat short presses to cycle the backlight brightness.
Press and hold to turn the unit ON/OFF.

3   Rotary knob
Rotate to scroll through menu items, then press to confirm a selection.
Rotate to adjust a value.
Rotate to zoom a zoomable panel.

4   STBY / AUTO key
With the autopilot in any automatic mode: Press to set the autopilot to Standby mode.
With the autopilot in Standby mode: Press to display the autopilot mode selection pop-up.

5   Home key
Press once to activate the Home page. Repeat short presses to cycle the favorite buttons.
Press and hold to display the Favorite panel as an overlay on active page. Repeat short presses to cycle the favorite buttons.

6   X key
Press once to exit a dialog, to return to previous menu level and to remove the cursor from the panel.

7   MARK key
With cursor active on the panel: Press to immediately save a waypoint at cursor position.
With no active cursor: Press to immediately save a waypoint at vessel position.
Press and hold to display the Plot menu used for saving new waypoints, routes and tracks.

8   Card reader door

9   Micro-SD Card readers

➔   *Note:* The MARK key is not available on 7" units.

The Home page

The **Home** page is accessed from any operation by a short press on the **Home** key.
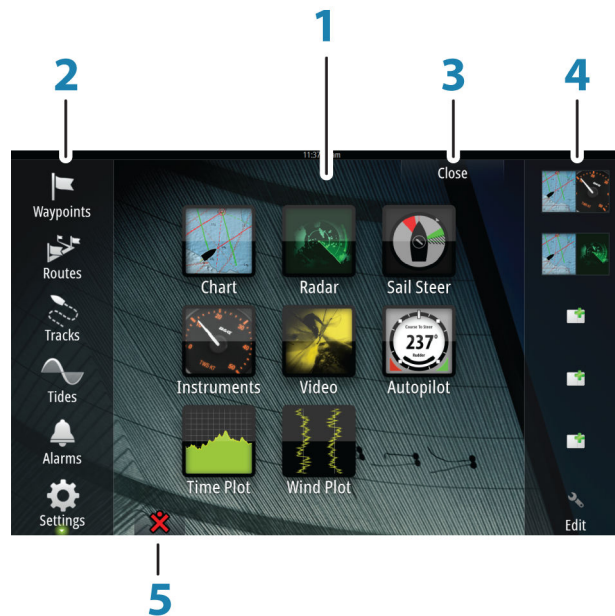
1. **Applications**
   Select a button to display the application as a full page panel.
   Press and hold a button to display pre-configured split page options for the application.

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

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

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

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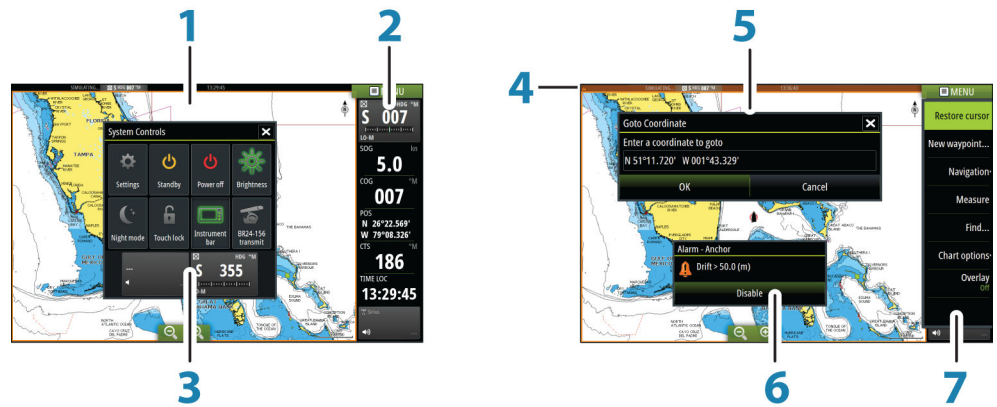
Each application connected to the system is presented on panels. The application can be presented as a full page, or in combination with other panels in a multiple panel page.

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

1 **Application panel**

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

3 **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.

4 **Status bar**

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

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

7 **Menu**
Panel specific menu.
Display the menu by selecting the **MENU** panel button.

Split pages

You can have several panels on one page depending on screen size:
- 7" units: 2 panels
- 9" and 12": 4 panels

2 panels page
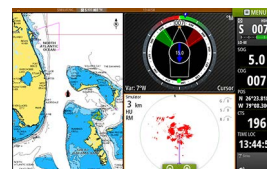
3 panels page

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.
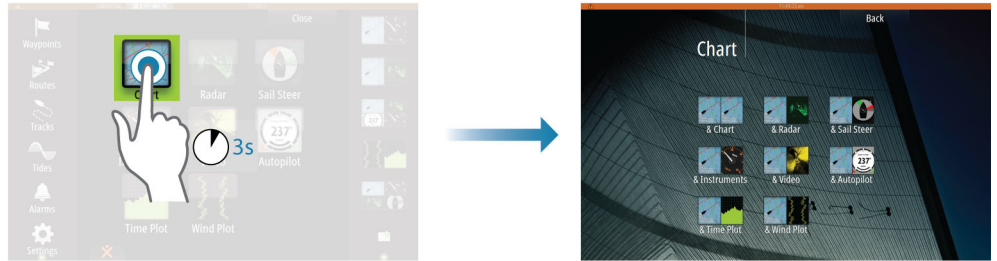
Favorite pages

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 21.

Integration of 3rd party devices

Several 3rd party devices can be connected to the Zeus². 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.

FUSION-Link integration

FUSION-Link devices connected to the NMEA 2000 network can be controlled from the Zeus² 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 camera is available on the Ethernet network, you can display the video and control the camera from the Zeus².

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

Refer to *"Video"* on page 119 for more information.

BEP CZone integration

The Zeus² 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 Zeus² 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.

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.

H5000 integration

The unit integrates with B&G's H5000 Instrument and Autopilot system.

The H5000 icon will be available in the **Tools** panel on the **Home** page when an H5000 system is available on the network.

Separate documentation is provided with the H5000 system. Refer to this documentation for how to install and configure the H5000 system.

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.bandg.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.

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.

System Controls			
⚙️ Settings	⏻ Standby	⏻ Power off	🔆 Brightness
🌙 Night mode	🔓 Touch lock	📟 Instrument bar	

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 on and off by pressing and holding the **Power** key. You can also turn the unit off from 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.
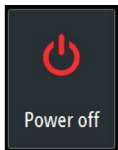
First time startup

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.

Switch from Standby mode to normal operation by a short press on the **Power** key.
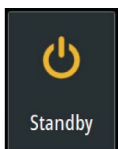
Display illumination

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.

If a ZM monitor is plugged into the HDMI output port on a 12" unit, an additional icon will be added to the **System Controls** dialog. Select this icon to control the brightness of the external monitor.

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!
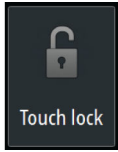
Locking the touchscreen

Touch lock

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.

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
x1	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
3s	Press and hold: • On any panel with a cursor to activate the cursor assist feature • 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.
	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.

You can make the menu slide away by tapping the screen outside the menu area, or by pressing the **MENU** button. When you re-press the **MENU** button, the menu opens in the same status it had before it closed.

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.

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.
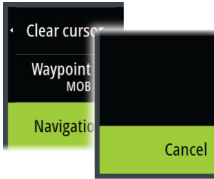
Cancel navigation to MOB

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.

To view files, refer to

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.
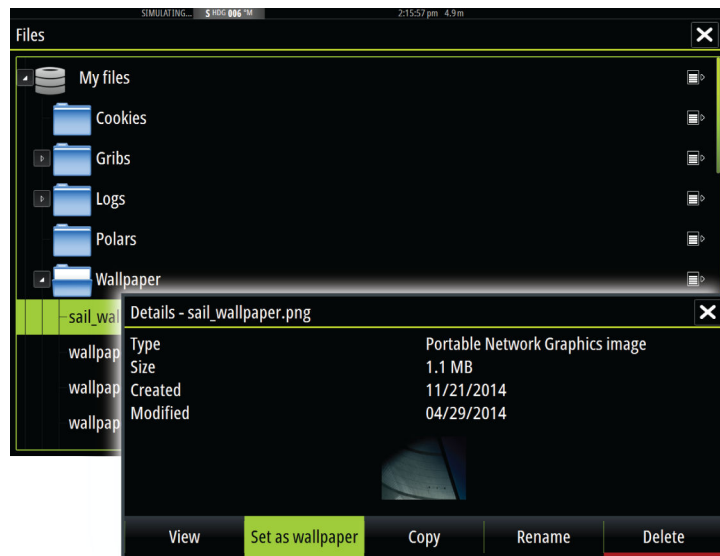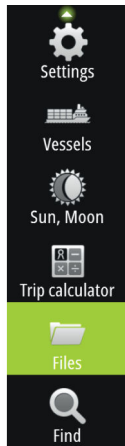
Adjusting panel size

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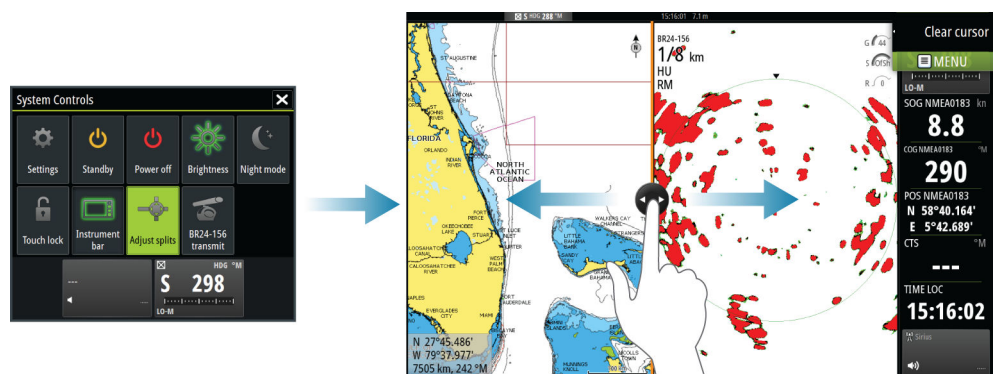
The changes are saved to the active favorite or split page.

Password protection

You can set a PIN code to prevent unauthorized access to your system settings. 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.
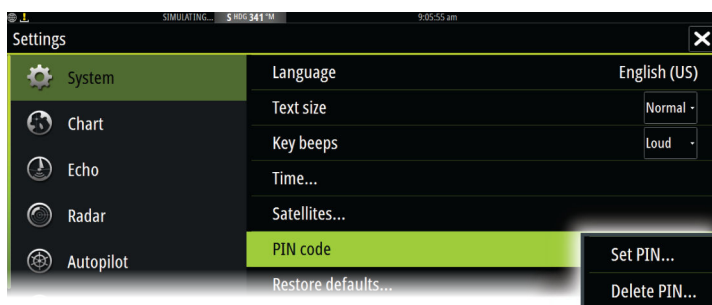
Adding new favorite pages

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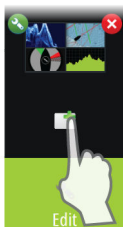
The system displays the new favorite page, and the new page is included in the list of favorite pages on the **Home** page.
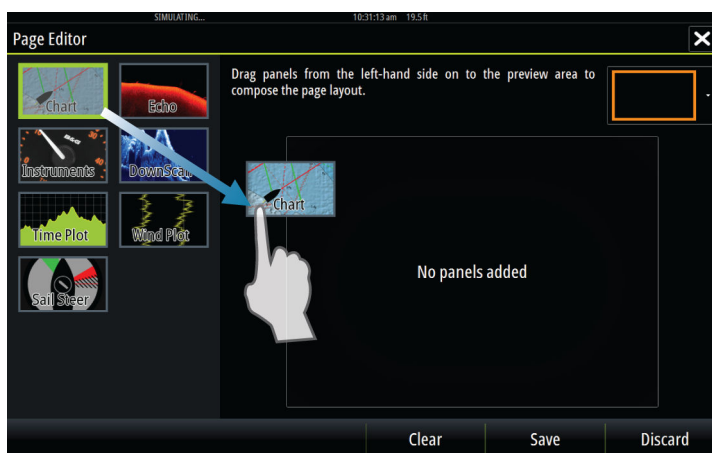
Edit favorite pages

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.

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.

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

→ **Note:** You can configure Bar 1 for the active page or for all pages except those that have a local configuration. Bar 2 can only be configured for the active page.
5. Select **Menu** and then **Finish editing** to save your changes.

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. You can overlay a radar image, a StructureScan image or weather information.

The Chart panel
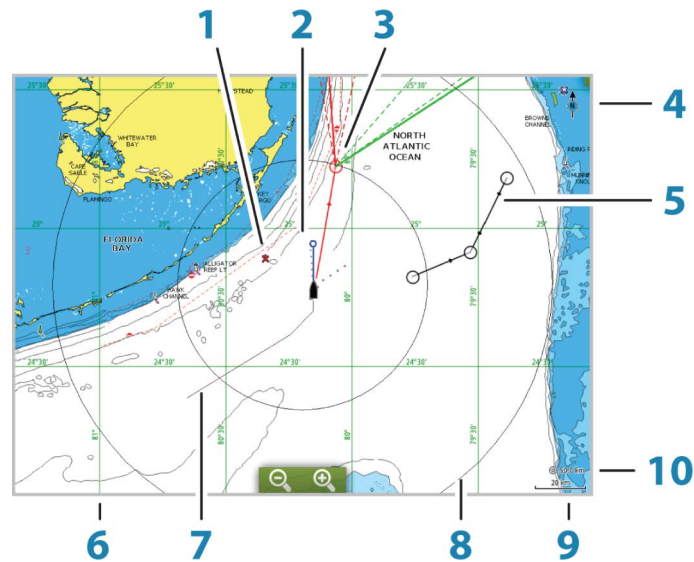
1	MOB (Man Over Board) mark
2	Vessel with extension line (extension line is optional)
3	Waypoint with Laylines*
4	North indicator
5	Route*
6	Grid lines*
7	Track*
8	Range rings*
9	Chart range scale
10	Range rings interval (only displayed when Range rings are turned on)

* 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 Jeppesen 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 gofreeshop.com, c-map.jeppesen.com, or 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.
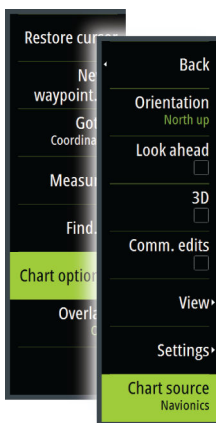
Selecting chart type

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.
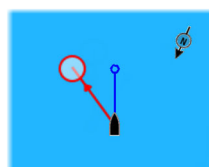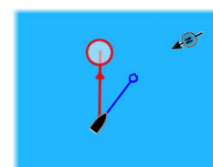
North up	Heading up	Course up

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
Rotates the chart in the direction of the next waypoint when navigating a route or navigating to a waypoint. If not navigating the heading up orientation is used until navigation is started.

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 Jeppesen 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.
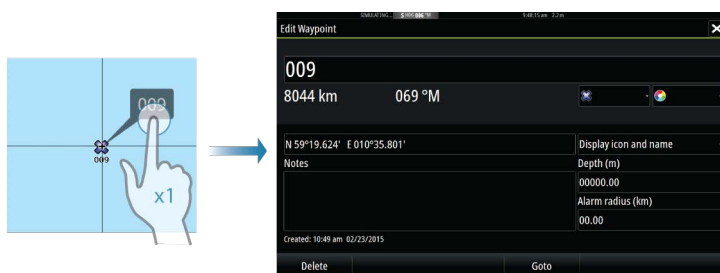
Using the cursor on the chart panel

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

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 <u>from</u> the grey icon <u>to</u> 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

You can save a waypoint at a selected location by positioning the cursor on the panel, and then selecting the new waypoint option in the menu.

New Waypoint at Cursor	✕
028	
N 59°28.248' E 010°29.509'	
More options...	✕ ▾ 🎨 ▾
Save	Cancel
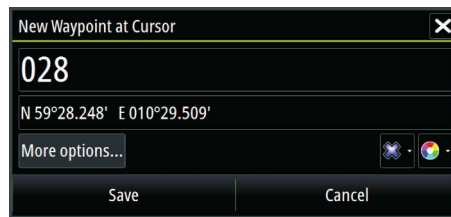
In the Chart and Nav panels, you can save a waypoint at the vessel position, when the cursor is not active, by selecting the new waypoint option in the menu.

If your unit has a **MARK** key, you can press this key to immediately save a waypoint. If the cursor is active, the waypoint is saved at the cursor position. If the cursor is not active, the waypoint is saved at your vessel's position.

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 38.

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.

Find from vessel	✕
Select a category of items you wish to search for	
Waypoints	Chart Items
Routes	Vessels
Tracks	Coordinates
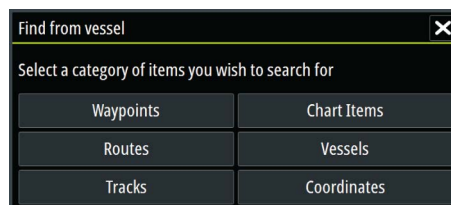
→ **Note:** You must have a SIRIUS data package subscription to search for fueling stations and an AIS receiver connected to search for vessels.

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 24.

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 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.

➔ **Note:** You can overlay the SailSteer image on the Chart. For more information, refer to *"SailSteer overlay"* on page 48.

Insight charts

Insight specific chart options

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

Chart imagery style
The charts can be displayed in three imagery styles.
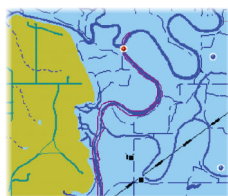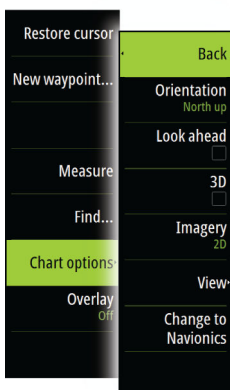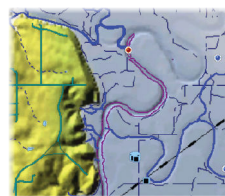
| 2D mapping style | Shaded relief | No contours |
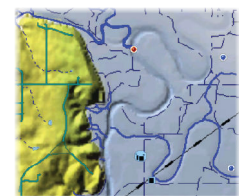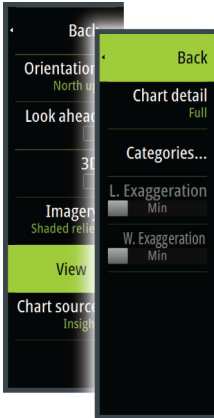
Insight view options

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 chart categories

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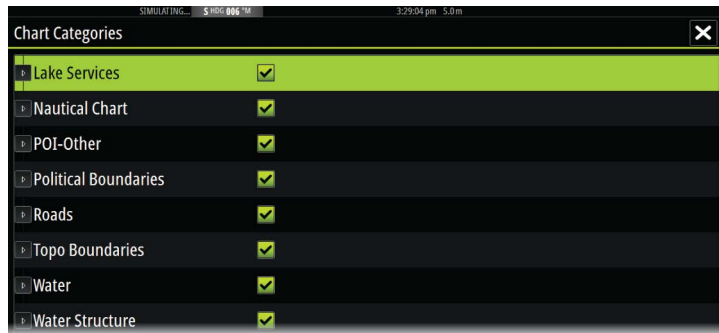
Land Exaggeration and Water Exaggeration

Graphical settings 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.

Navionics charts

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.
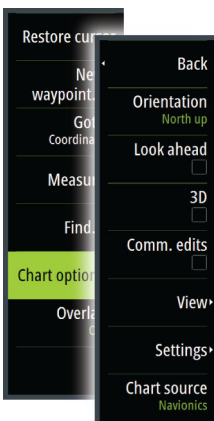
Navionics view options

Chart shading
Shading adds terrain information to the chart.
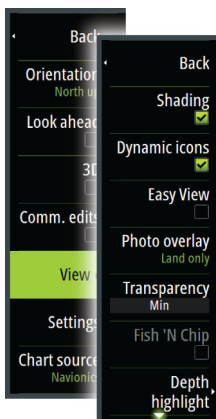
Navionics dynamic tide and current icons
Shows tides and currents with a gauge and an arrow instead of the diamond icons used for static tides and current information.

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.
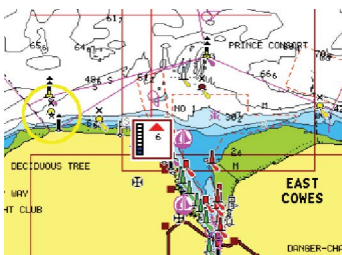
Dynamic tide information
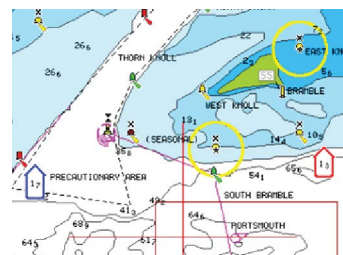
Dynamic current information

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
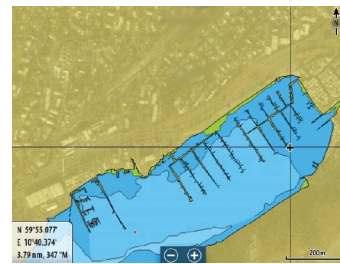
Maximum transparency

Navionics Fish N' Chip

The system supports Navionics Fish N' Chip (U.S. only) chart feature.

For more information, see www.navionics.com.

Depth highlight 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.
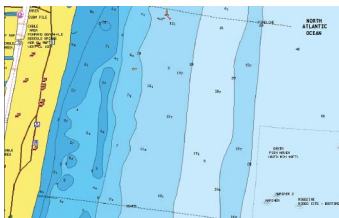
No Depth highlight range
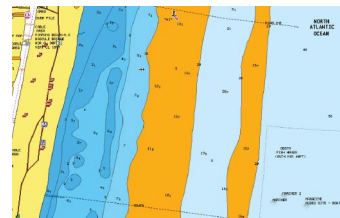
Depth highlight range: 6 m - 12 m

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).
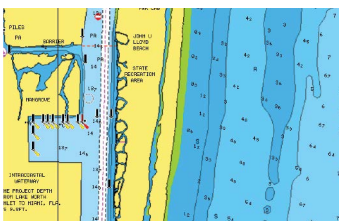
No shallow water highlighted
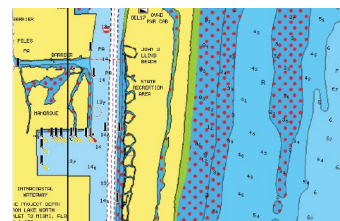
Shallow water highlight: 0 m - 3 m

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.

Jeppesen charts

All possible menu options for Jeppesen charts are described below. The Jeppesen features and menu options can vary depending on the Jeppesen charts you use.

Jeppesen tides and currents

The system can display Jeppesen 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.
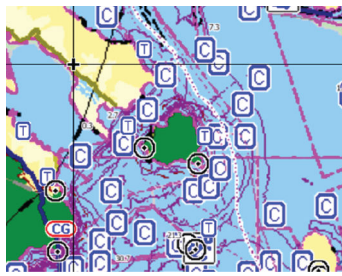
Static Current and Tide icons
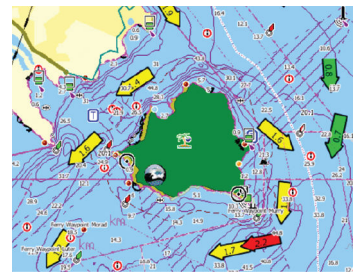
Dynamic Current icons

Jeppesen 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.
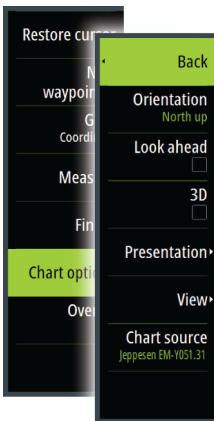
Shaded relief
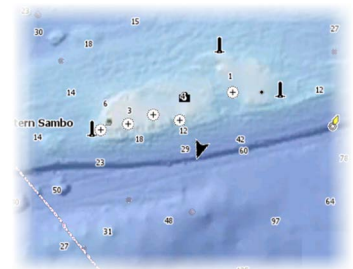
No contours
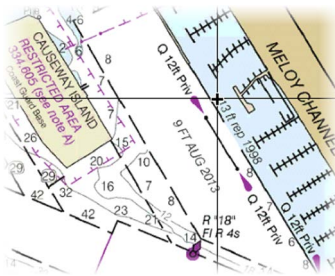
Raster imagery
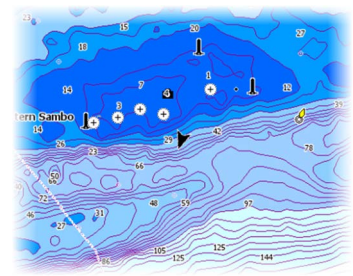
High resolution bathymetry
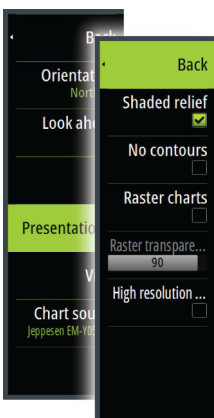
Shaded relief

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.
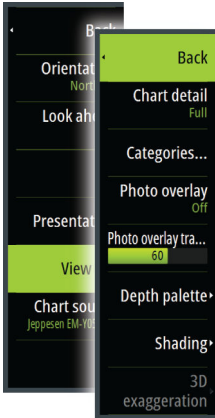
Jeppesen view options

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.

Jeppesen chart categories

Jeppesen 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

Jeppesen 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.
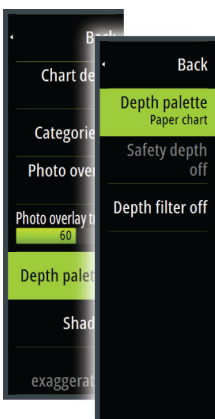
Shading

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

➔ **Note:** Composition and Vegetation shading are not applicable to Jeppesen 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.
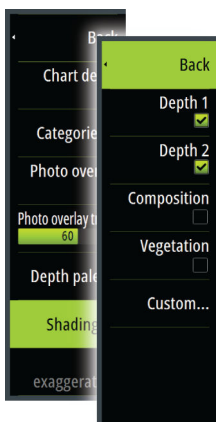
3D exaggeration

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.

Chart settings

Settings and display options made in the Chart settings page are common for all chart panels.
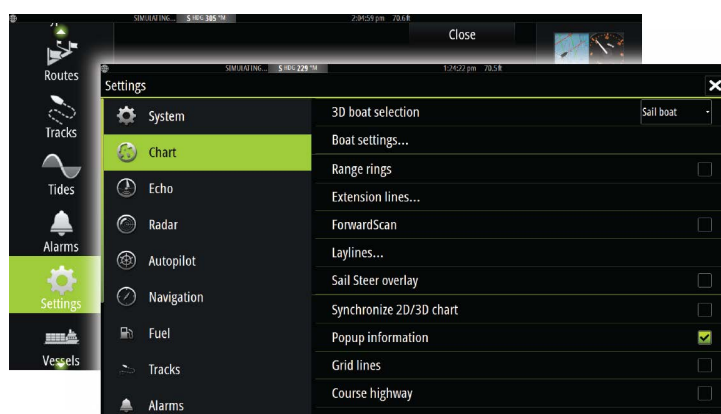
3D boat selection

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 the autorouting and easy routing features.

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.
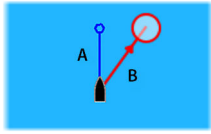
Extension lines

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.
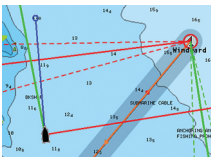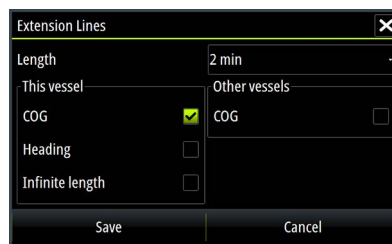
Laylines

Configures the options for laylines on the chart and on the SailSteer panels.

The image shows laylines from mark/waypoint with limits.
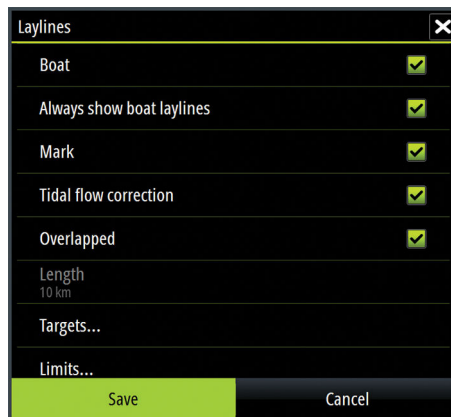
Boat
Displays laylines from boat, indicating the target course.

Always show boat laylines
Displays boat laylines.

Mark
Displays laylines from mark/waypoint, indicating the target course to sail to reach the mark/waypoint.

Tidal flow correction
Calculates the tidal effect of the boat based on COG, and applies this information to the laylines.

Overlapped
Extends the laylines beyond the tack/gybe intersection.

Length
Sets the length of the laylines

Targets
Defines the target for a given TWS (True Wind Speed). The targets can be read from an H5000 CPU Polar table, live measurements, manually entered upwind and downwind angles, or from the targets table.
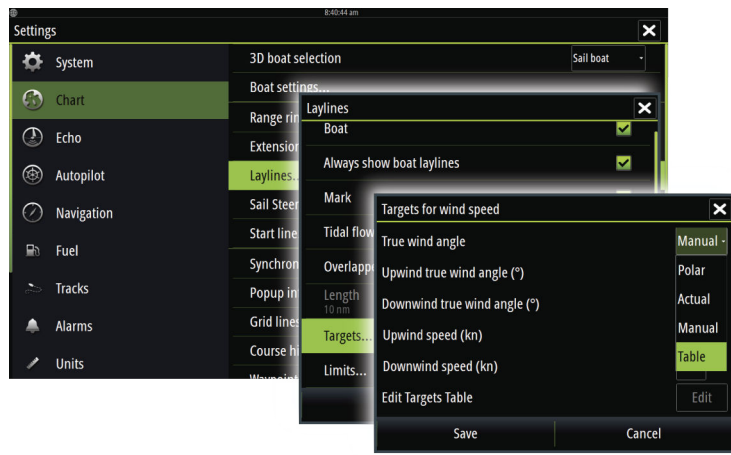
- Laylines targets table
  Edit the targets table to specify Upwind True Wind Angle (TWA), Upwind Boat Speed (BS), Downwind TWA, and Downwind BS values for different true wind speeds. Accurate table information gives the system a better basis for creating target laylines.
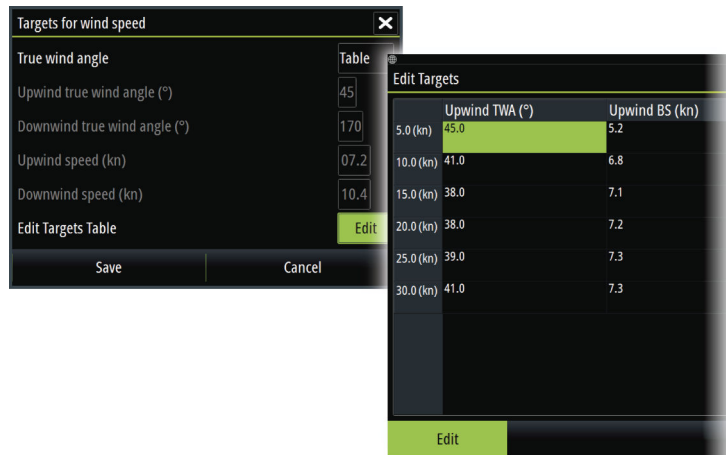
Limits
Sets the maximum tack/gybe time period to either side of the laylines. When turned on the limits are indicated with a dotted line on the chart and on the SailSteer panel.

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.

SailSteer overlay

Turns on/off viewing of SailSteer image overlay on the chart. Refer to *"SailSteer overlay"* on page 48.

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.

Course highway

Adds a graphic presentation of cross track error (XTE) limits to the route. For setting the XTE limit, see *"XTE limit"* on page 45.

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

You can save a waypoint at a selected location by positioning the cursor on the panel, and then selecting the new waypoint option in the menu.
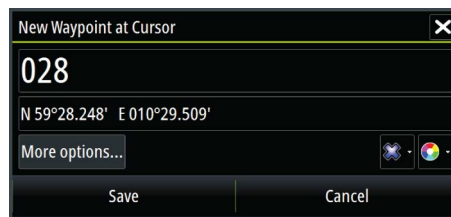
In the Chart and Nav panels, you can save a waypoint at the vessel position, when the cursor is not active, by selecting the new waypoint option in the menu.

If your unit has a **MARK** key, you can press this key to immediately save a waypoint. If the cursor is active, the waypoint is saved at the cursor position. If the cursor is not active, the waypoint is saved at your vessel's position.

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.
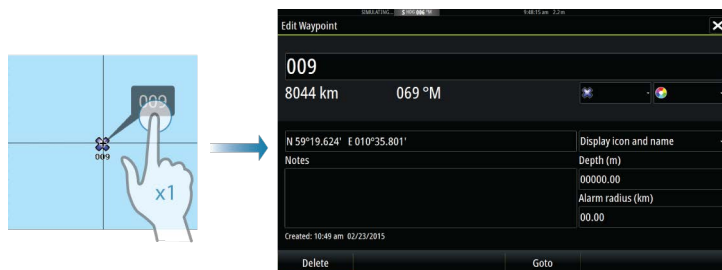
Delete a waypoint

You can delete a waypoint from the **Edit Waypoint** dialog or by selecting the **Delete** menu option when the waypoint is activated.

You can also delete waypoints from the Waypoints tool on the **Home** page.

You can delete MOB waypoints the same way.

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 122.
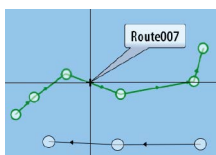
Routes

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 Zeus[2] software version 4.0 includes support for Navionics Autorouting and Jeppesen Easy Routing. This feature automatically suggest 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.

Delete a route

You can delete a route by selecting the **Delete** menu option when the route is activated. You can also delete routes from the Routes tool on the **Home** page.

Autorouting and Easy Routing

The 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 or Easy Routing capabilities. Autorouting or Easy Routing 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 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 Autorouting or Easy Routing menu option is not available. Compatible cartography includes Jeppesen CMAP MAX-N+,

Navionics+ and Navionics Platinum. For a full selection of available charts please visit insightstore.navico.com, c-map.jeppesen.com or navionics.com.

1. Position at least two routepoints on a new route, or open an existing route for editing.
2. Select **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.

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
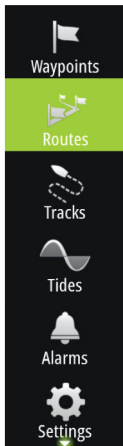
Creating routes using existing waypoints

You can create a new route by combining existing waypoints from the **Routes** dialog. The dialog is activated by using the **Routes** tool on the **Home** page.
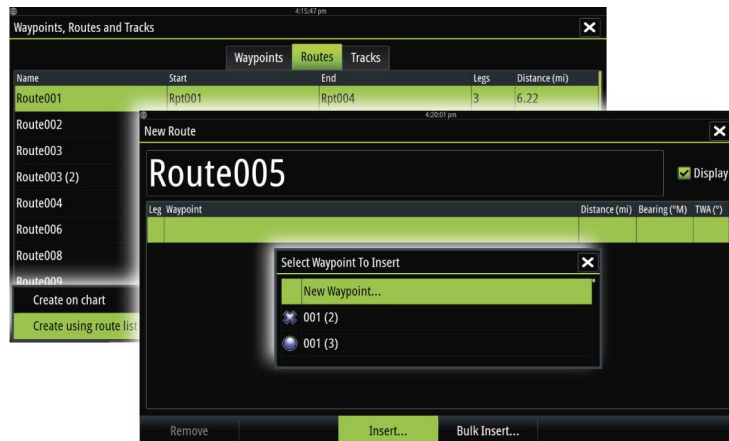
Routes - bulk insert waypoints

Use the bulk insert option to enter a list of waypoints separated by commas (for example 21,22,23,24) to create a new route or add multiple waypoints to an existing route.

1. Make a note of the waypoints you want to bulk enter. You do not have to enter the full waypoint ID, just enough of it to distinguish it.
2. Select Routes on the Tool panel
3. Select the New button and then select the Create using route list option. Alternatively, scroll down the list of existing routes and select New Route.
4. Select the first row in the New route dialog, so that it is highlighted
5. Select the Bulk Insert button
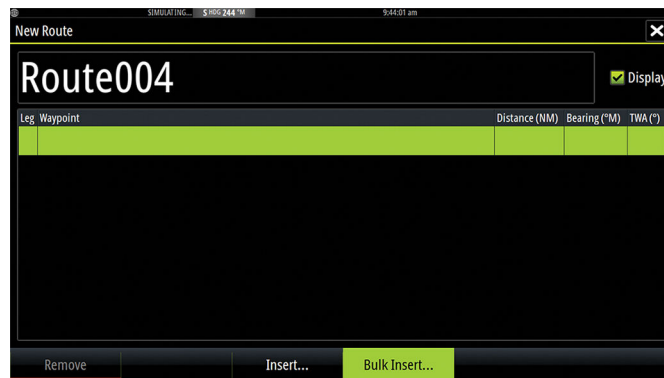
6. Enter a list of waypoints separated by commas (for example 21,22,23,24)
7. Select Enter. If the system finds more than one waypoint that has similar IDs, it will choose one and advise you which one it has chosen. If the system does not find a waypoint with a similar ID to what you entered, then a dialog opens and informs you of the items it did not find.
8. (Optional) Give the route a name by selecting the system given name and use the virtual keyboard to enter the name.
9. Select save.

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.

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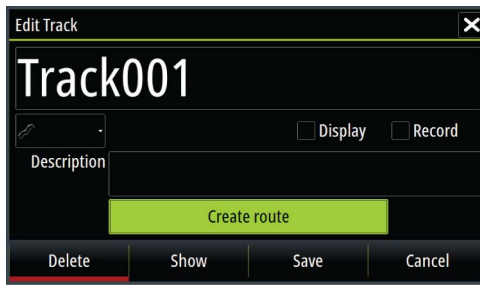
The Edit Route dialog

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 **Routes** tool on the **Home** page.

When adding routepoints, you can insert bulk waypoints, refer to *"Routes - bulk insert waypoints"* on page 41.
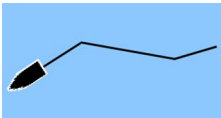
Tracks

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 track from the **Tracks** dialog, activated by using the **Tracks** 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.

You can select to position track points based on time settings, distance, or by letting the system position a waypoint automatically when a course change is registered.

➔ *Note:* The Tracks option must also be turned ON in the chart settings to be visible.
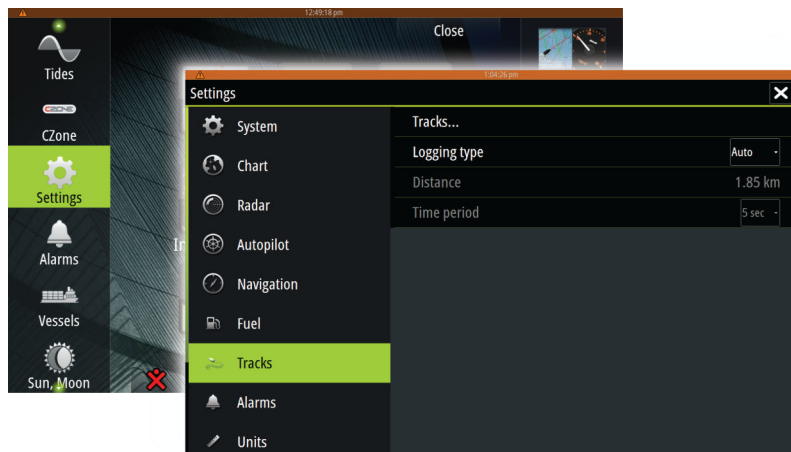
Waypoints, Routes, and Tracks dialogs

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

The dialogs are accessed from the **Tools panel** on the **Home** page.
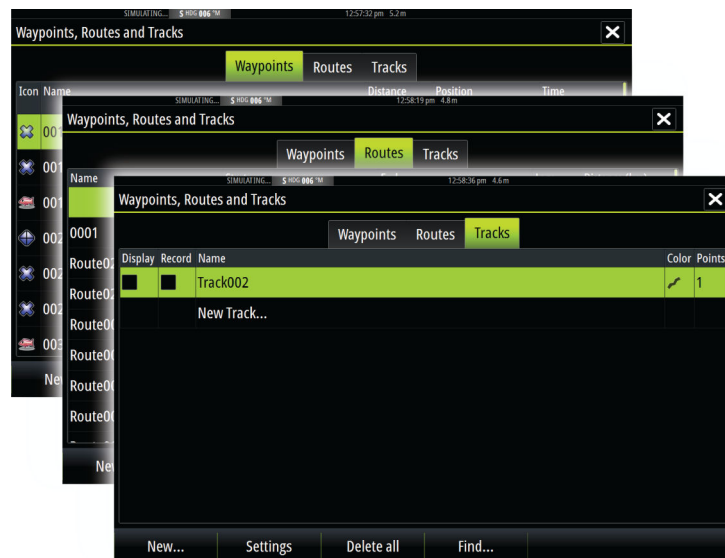
6

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 38.

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 **Route** tool from the **Home** page
- Selecting the route details from the menu
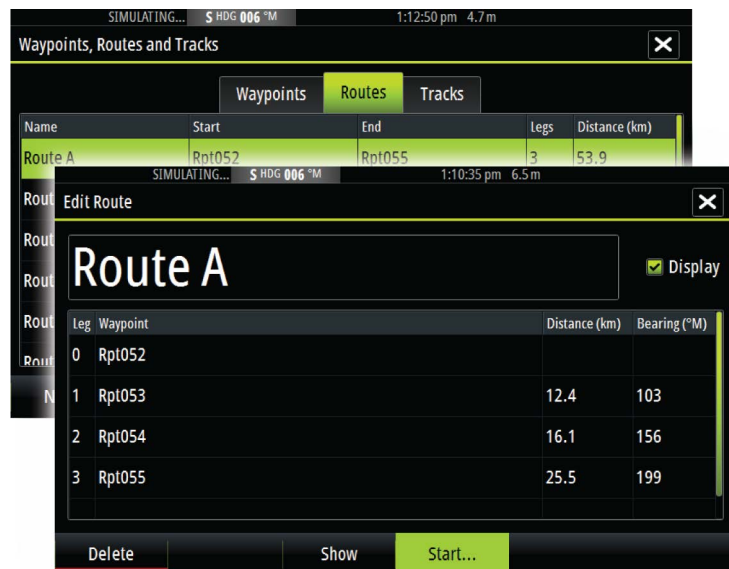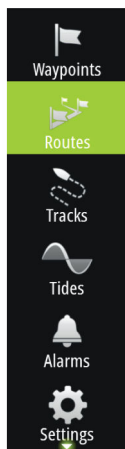
Cancel navigation

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.
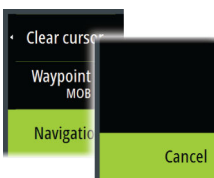
If you choose not to engage the autopilot, the autopilot can be set to navigation mode from the pilot menu later on.

For more information about autopilot functionality, refer to *"Autopilot"* on page 56.

Navigation settings
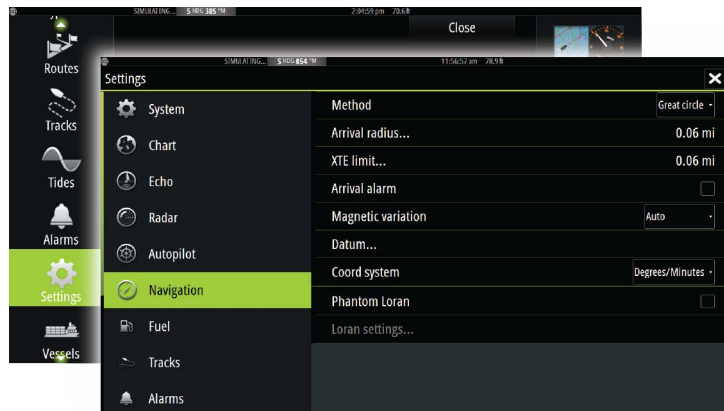
Navigation method

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 Zeus^2.

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.
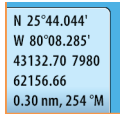
Phantom Loran

Enables use of Phantom Loran positioning system.

Loran settings

N 25°44.044'
W 80°08.285'
43132.70 7980
62156.66
0.30 nm, 254 °M

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

SailSteer panel

The SailSteer panel provides a composite view of key sailing data. All data is displayed relative to the yacht's bow, providing a clear and easy to understand image of important sailing data.

The SailSteer panel can be shown as a full screen panel, or in a multi-panel page.

The number of data fields included in the panel is dependent on available panel size.
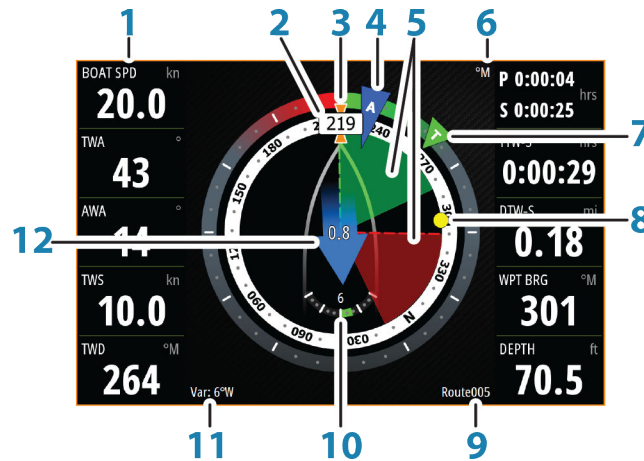
1	User configurable data fields
2	Vessel heading
3	COG (Course Over Ground)
4	Apparent wind*
5	Port and starboard laylines. Refer to *"Chart settings"* on page 34.
6	Magnetic or True reference
7	TWA (True Wind Angle) - Green if on TWA upwind or downwind. Blue if off target by 10° or more, or on a free leg. The indicator will fade from blue to green the closer you get to the exact angle.*
8	Bearing to current waypoint
9	Active (next) waypoint ID, routepoint ID, or cursor
10	Rudder angle
11	Magnetic variation
12	Tide rate and relative direction*

* Optional images. You can turn the optional images on/off from the menu.

Selecting data fields for the SailSteer panel

Data sources connected to the system can be viewed on the SailSteer panel.

1. Select the SailSteer panel to make it active.
2. Select the **MENU** button and select the edit option.
    - Edit mode is indicated in top of the panel.
3. Select the instrument field you want to change.
    - The selected field has a highlighted frame.
4. Select the **MENU** button again to select info.
5. Repeat the steps to change other instrument fields.
6. Save your settings by selecting the save option in the menu.

Sail Time calculations

The system calculates the time and distance to a waypoint taking into consideration that the vessel is sailing on a layline course to the waypoint. Data showing time calculations will be indicated with an -S extension:

DTW-S	Sailing Distance to Waypoint
TTW-S	Sailing Time to Waypoint
ETA-S	Sailing Estimated Time of Arrival

SailSteer overlay

You can overlay the SailSteer image on the Chart. You toggle the SailSteer image overlay on and off in the Chart setting dialog.
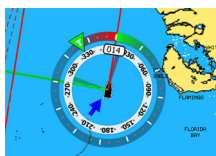
→ **Note:** If both the SailSteer image and autopilot compass overlays are enabled then only the SailSteer overlay is shown.

→ **Note:** SailSteer overlay is not shown when the cursor is activate or when panning the chart. Select the clear cursor option to display the SailSteer overlay again.

→ **Note:** If the **Look ahead** menu option is selected, then the **Heading up** orientation must also be selected in order to display the SailSteer overlay. If the **Look ahead** menu option is not selected, then the SailSteer overlay is displayed with all the orientation settings: **North up**, **Heading up**, and **Course up**.

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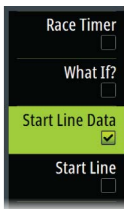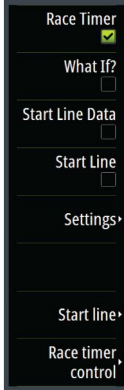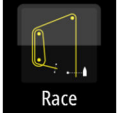
Race

Race panel

Use the Race panel to:

- Display and control the race timer
- Create and manage the race start line
- Display race start line data
- Display the race start line in a chart diagram on the Race panel

Select the Race button on the Home page to display the Race panel.

Display options

Use the Race panel menu to specify if you want to display the Race Timer, What if? data, Start Line Data, or Start Line display (display the boat and start line in graphical format).

Start Line on Chart panel

You can display a race start line overlaid on the Chart panel. The start line data can be displayed in the Instrument page. If you have an H5000 CPU on your network, start line data is calculated by the H5000 CPU. Otherwise the data is calculated in the MFD.

Viewing the start line on the chart panel allows the navigator to assess around the starting area for hazards. Use the laylines to see where the likely tracks into and out of the starting area will be relative to the chart data.

The solid black line indicates the start line (between the two starting marks) on the chart panel. You can switch off the start line overlaid on the Chart if desired.
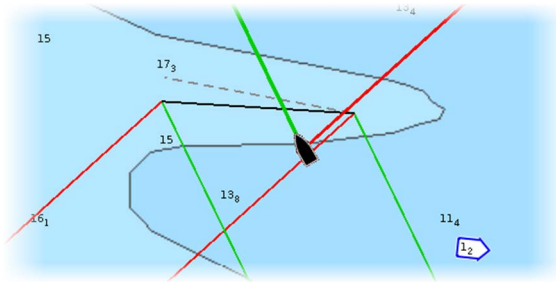
Start Line Data panel

Select the **Start Line Data** menu option to show the Start Line Data panel. The Start Line Data panel shows start line data and a graphical representation of the start line. It displays boat distance from the start line, tide direction, recommended start end bias and what advantage in degrees and distance the biased end will give.

Start line end not set (position not recorded)
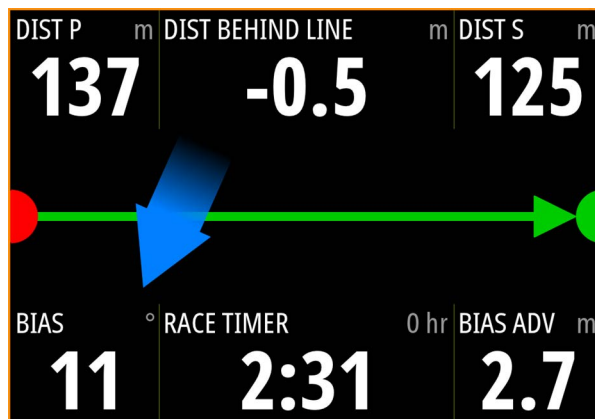
		Start line end set (position recorded)
		Start line end stale (historic start line position) Start line end becomes stale at 23:59 hrs on the day it was recorded but remains valid.
		Invalid start line - One or more ends invalid (position not recorded)
		Start line - Blue - Square line - No bias advantage
		Start line - Red & Arrow left - Port end bias
		Start line - Green & Arrow right - Starboard end bias
		Tide direction indicator

Data displayed on start line panel

The following data is displayed on the start line panel:

- DIST P - Distance to port end of start line
- DIST BEHIND LINE - Distance to start line (perpendicular)
- DIST S - Distance to starboard end of start line
- BIAS - Start line bias angle
- RACE TIMER - Time on the race timer
- BIAS ADV - Bias advantage (boat lengths)

Setting up a start line

The start line is a visual aid that shows the distance from the boat to the start line, tide direction, recommended start end bias, and what advantage in degrees and distance the biased end will give. The start line is a line between the port and starboard end points.

➔ *Note:* If you have an H5000 CPU on your network, the start line information between the MFD and the H5000 is shared. The start line data numbers are calculated on the H5000 CPU and sent across the network. There is only one start line. If you set the start line on the MFD, it will show on the H5000 Graphic Display and vice-versa.

➔ *Note:* Before setting the start line position it is important that the GPS Bow offset is updated to negate the difference between the GPS position and the bow of the vessel. This setting is made in the Advanced settings dialog under Instruments. Your Boat settings must also be entered in the Boat settings dialog which is available from the Chart settings dialog.

Menu options let you use different methods for setting the port and starboard start line ends. You can *ping* them, set them at cursor position, specify coordinates, and set one based on the setting of the other. You can also edit waypoints to create start line end points. After the ends are set you can *nudge* each end to move them, if needed.

The menu options to set the port and starboard start line end points are available in both the Chart panel and the Race panel.

Setting start line end points by pinging

Setting the start line end points by pinging requires maneuvering the boat to each end of the start line and then pinging.

➔ *Note:* Before setting the start line position using the ping method, it is important that the Bow off set is updated to negate the difference between the GPS position and the bow of the vessel.
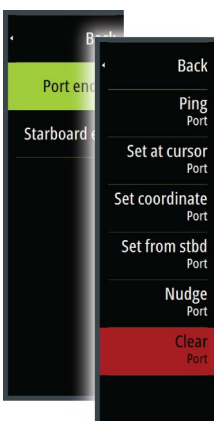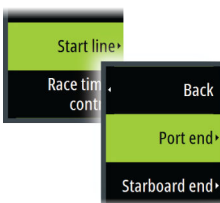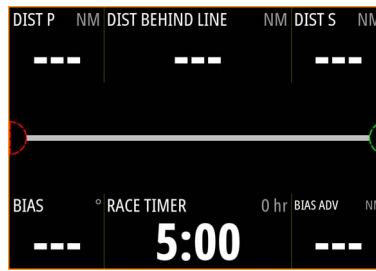
1. Approach the port end of the start line.

2. When the boat reaches the port end of the start line, open the menu and select **Start Line**, **Port end**, and then **Ping port**. The port end mark on the start line panel becomes solid red, indicating it is set.
3. Approach the starboard end of the start line.

4. When the boat reaches the starboard end of the start line, open the menu and select **Start Line**, **Starboard end**, and then **Ping Starboard**. The starboard end mark on the start line panel becomes solid green indicating it is set.

The start line end points are set and can be viewed on the Chart panel and Start line panel.
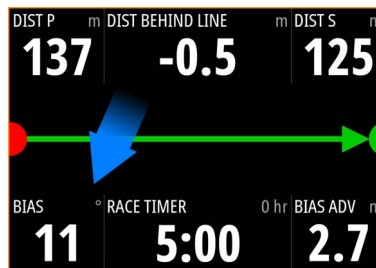
Setting end points at cursor position

1. Open the Chart panel and move the cursor to the position in the chart where you want the port end point to be.
2. Open the menu and select **Start line**, **Port end**, and then **Set at cursor**.
3. Repeat steps 1 and 2 for the starboard end point.

The start line end points are set and can be viewed on the Chart panel and Start line panel.

Setting end points at coordinates

Select the **Set coordinate Port** and then the **Set coordinate Starboard** menu options to enter the coordinates of the port and starboard end points.

Setting end points from each other

Use the **Set from stbd Port** and **Set from port Starboard** menu options to set the Range and Bearing of the end points from each other.

Removing end points and the start line

Use the **Clear Port** or **Clear Starboard** menu options to remove the start points. When both are removed, the start line is removed.
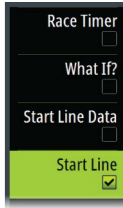
Start Line display

Select the **Start Line** menu option to show the Start Line display in the Race panel. The Start Line display shows the configured start line in scale with your boat, allowing you to clearly see distance to line and position relative to the laylines. All start settings are also shown on this display.
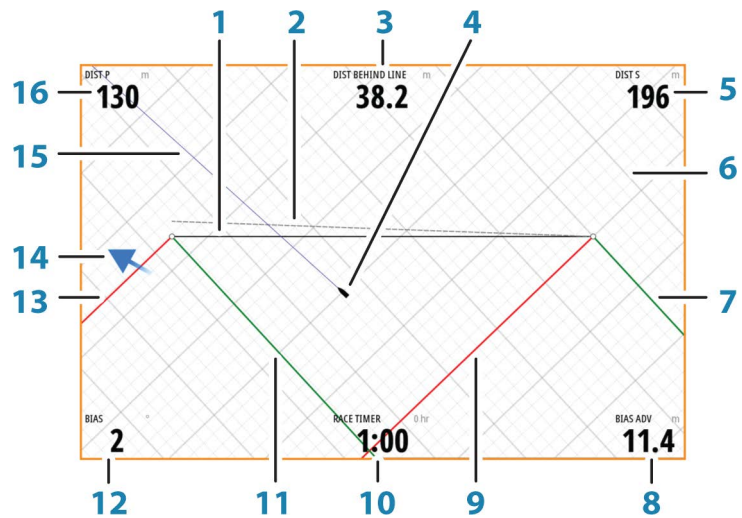
1	Start line
2	Square wind line - drawn from biased start line end perpendicular to True Wind Direction
3	Distance (perpendicular) behind line
4	Boat (drawn to scale)
5	Distance to starboard end of start line
6	Grid
7	Starboard tack layline to the starboard start line end point
8	Advantage gained by starting at favored end
9	Port tack layline to the starboard start line end point
10	Race Timer
11	Starboard tack laylines to the port start line end point
12	Start Line bias angle
13	Port tack laylines to the port start line end point
14	Tide arrow (relative to start line)
15	Extension line
16	Distance to port end of start line

In addition, when a target boat speed is available (from the Hercules Polar table, laylines targets table, or manual setting in the Zeus^2 Laylines setup, refer to *"Laylines"* on page 35) a Zero Burn line may be shown, parallel with the start line, which indicates the distance you should be from the starting line as time counts down.

Settings

Boat lengths

Select the **Use boat lengths** setting to show the distance behind the line and Bias advantage in boat length data measurements on the Start line panel. Showing the measurements in boat lengths can give a clearer indication of the distance from your boat to the start line.

Show layline grids

Select **Grid** to show layline grids in the start line diagram. The grid is a background that is aligned with the laylines. They can give a clearer indication of possible runs to the start line.

What if?

Select the **What if?** in the menu to display navigation data in the Race panel and to change variables to see what could happen. This is a tool for assessing potential changes in wind or tide in current and future legs of the course.

Deselect **Live** and enter parameters for the wind, tide, or both to see how data might change for the leg. For example, if you can see the sea breeze building in with boats sailing different angles on the horizon, you can enter this data to estimate the effect.

Race timer

The race timer can be used to countdown to zero from a specified time, ideal for counting down to a race start. It can also be used to count up from zero to record the elapsed time. You can start and stop the timer, reset it, sync it, and specify a start value.

You can display the Race timer from the Race panel menu, or by selecting Trip Calculator from the Tools panel.

The Timer set value is in hh:mm, the timer counter shows in mm:ss, with the hours showing to the right of the minutes and seconds.
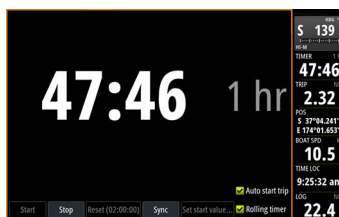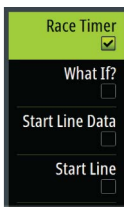
Race timer panel
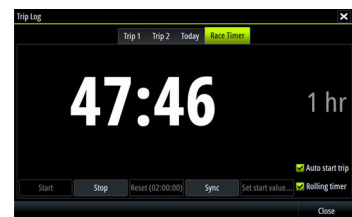
Race Timer in the Trip Log
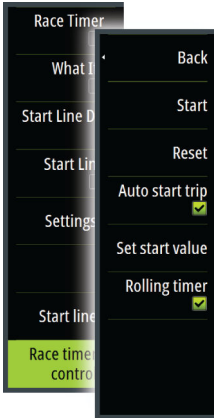
Race timer controls

You can access Race timer controls from the Race panel menu. You can also access them at the bottom of the Race timer panel displayed from the Home page and the Race timer panel displayed from the Trip Calculator (Tool panel). Different controls are enabled depending on if the timer is started or stopped.
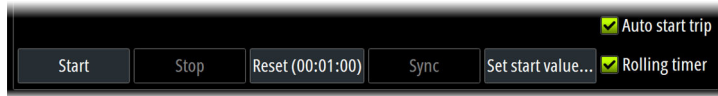
Set start value

Set a time value which the timer shall use to count down to the start time of the race. The timer starts counting down when you select **Start**.
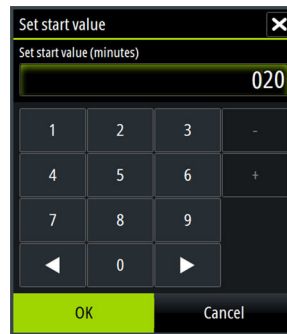
Start/Stop timer

The timer can be started at any time by selecting **Start**. If a time value is preset, the timer counts down. If the start value is set to zero (00:00) when the timer is started, the timer begins counting up, recording the elapsed time.

To stop the timer from counting select **Stop**.

Reset

Resets the timer to the start value. If the timer is running when **Reset** is selected, it continues to run from the start value.

Sync

When the timer is counting down selecting **Sync** synchronizes the time up or down to the nearest full minute.

Auto start trip

When Auto start trip is selected, the Trip Log records your time and mileage from the moment the countdown timer begins counting up from zero.

Rolling timer

When **Rolling timer** is selected, the timer restarts the countdown timer every time it reaches zero. It continues to do this until the timer is stopped.

9

Time and Wind plots

The system 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.

Wind Plot panel

A Wind Plot is a special type of Time Plot specifically designed to help you understand recent changes in wind speed and direction. The Wind Plot panel includes wind direction and wind speed. The graphics are configured vertically with the newest data being displayed at the top of the screen.

10 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 pressing the **STBY/AUTO** key, 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 by a short press on the **STBY/AUTO** key.

➔ *Note:* If the unit is connected to an EVC system via the SG05, you can take manual control of the steering regardless of the autopilot mode. Refer to *"Using the autopilot in an EVC system"* on page 64.

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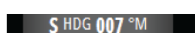
Icons are included if the autopilot is passive or locked by another autopilot control unit.

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 pressing and holding the **STBY/AUTO** key, or 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**
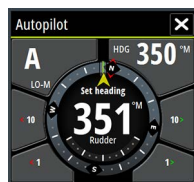
Autopilot controller   *Mode selection*   *Turn pattern selection*

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
WPT DIST	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 (STBY) mode is used when you steer the boat at the helm.

- Switch the autopilot to STBY mode from any operation by a short press on the **STBY/ AUTO** 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 STBY or FU mode.

You return to STBY mode by a short press on the **STBY/AUTO** 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 STBY 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.

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 60.

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 STBY 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 Zeus^2 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 mode menu.

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 45.

Waypoint arrival circle

The Arrival radius defines the point at which a turn is initiated when you are navigating a route.
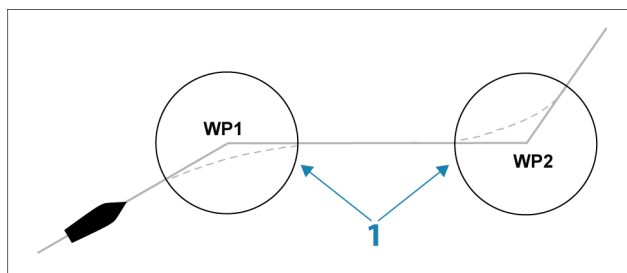
The arrival circle (**1**) should be adjusted according to boat speed. The higher the speed, the wider the circle. The intention is to make the autopilot start the heading change in due time to make a smooth turn onto the next leg.

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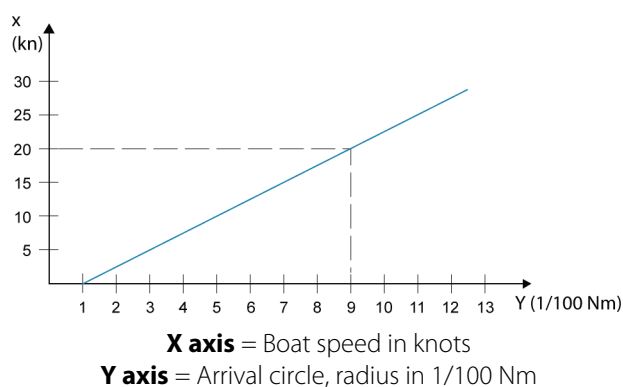
Example: With the speed of 20 knots you should use a waypoint circle with radius 0.09 Nm.

➔ **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.

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.

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.

Tack and gybe prevent
You should use the autopilot with care when beating and running.

If the sails are unbalanced when beating, yaw forces from the sails can drive the boat into the wind. If the boat is driven beyond the set minimum wind angle, the thrust from the sails suddenly disappears and reduces the boat speed. The boat becomes more difficult to steer as the rudder becomes less effective.

The tack prevent function in WIND mode has been implemented to avoid such situations. It reacts immediately when the apparent wind angle becomes 5° less than the set minimum wind angle, and more rudder is commanded.

When running, it is difficult to steer the boat with waves coming sideways or from behind. The waves can yaw the boat into an unwanted gybe; this can be hazardous for both the crew and the mast.

The gybe prevent function is activated when the actual apparent wind angle becomes greater than 175° or gets opposite to the set wind angle. More rudder is commanded to prevent an unwanted gybe.

The tack and gybe prevent functions are not a guarantee against getting into a hazardous situation. If the effect of the rudder and/or drive unit is not adequate, a dangerous situation may occur. Pay particular attention in such situations.

WIND Nav mode

➔ *Note:* The **WIND Nav** mode is only available if the system has been set up for boat type Sail. This mode is not available for NAC-2 or NAC-3 autopilot computers.

In WIND Nav mode the autopilot steers the boat given both wind and position data.

In this mode the autopilot calculates the initial course change needed to navigate towards the active waypoint, but the pilot also utilizes the current wind direction in the calculation.

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 be 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 STBY mode and manual steering.

You can also stop a turn by pressing the **STBY/AUTO** key to return to STBY 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 Zeus^2 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^{TM}

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.
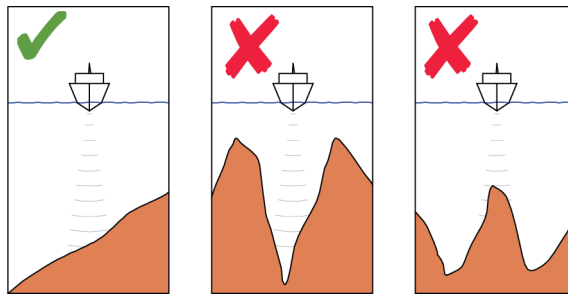
Use the following process to initiate DCT steering:

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:
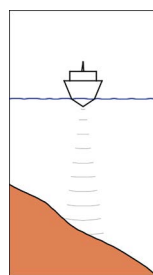
*Port option
(depth decreases to port)*   *Starboard option
(depth decreases to starboard)*
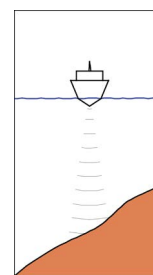
The following parameters are available for depth contour tracking:

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 Zeus^2 in an AP24/AP28 system

Command transfer

If your Zeus^2 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.

You take command from an inactive control unit by pressing the **STBY/AUTO** key to bring up the mode selection menu, and then confirming active mode.

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 Zeus^2 or other autopilot control units on the system can take place.
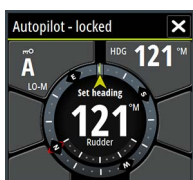
You can only unlock the remote stations from the AP24/AP28 unit in command.

Using the autopilot in an EVC system

When the Zeus^2 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 Zeus^2 control in standby mode if no rudder command is given from the EVC system within a predefined period.

Autopilot settings
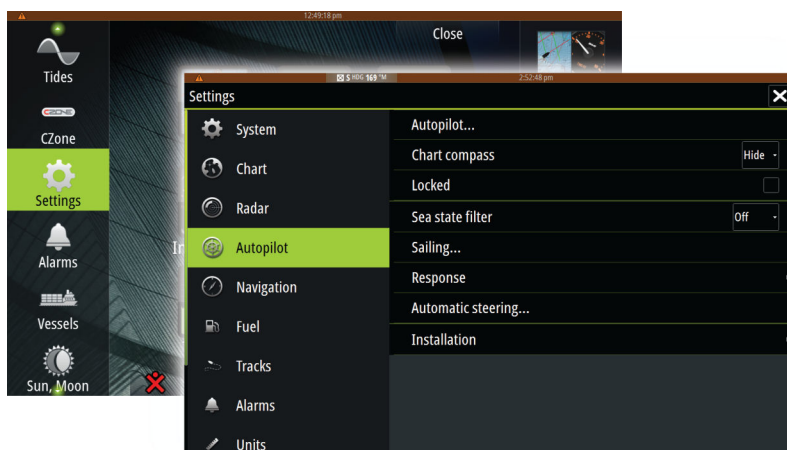
→ **Note:** Options shown on the Autopilot setting dialog varies depending on which autopilot computer is connected.

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.
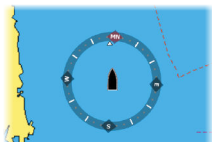
Locking autopilot operation from a unit

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 Zeus^2 is part of an AP24/AP28 system, all other autopilot control units can be locked for autopilot control from the AP24/ AP28 control unit.

Sea state filter

The Seastate filter is used to reduce rudder activity and autopilot sensitivity in rough weather. Setting options are:

• **OFF**
  Seastate filter is disabled. This is the default setting.
• **AUTO**
  Reduces rudder activity and autopilot sensitivity in rough weather by an adaptive process. The AUTO setting is recommended if you want to use the seastate filter.
• **MANUAL**
  Linked to the steering response control settings described previously. It may be used to manually find the optimum combination of course keeping and low rudder activity in rough but steady sea conditions.

Sailing parameters

→ **Note:** Sailing parameter settings are only available if the boat type is set to Sail in the Autopilot Commissioning dialog.

Tack time
When performing a tack in WIND mode, the rate of turn (tack time) can be adjusted. This gives single-handed sailors time to handle the boat and the sails during a tack.

A turn performed without shifting wind side, is also made at a controlled turn rate.

Tack angle
This value is used to preset the course change used when tacking in AUTO mode. By pressing the port and starboard indicators in the autopilot pop-up the course changes as much as this value.

Wind function
With wind function set to AUTO, the autopilot automatically selects between apparent and true wind steering. AUTO is default and recommended for cruising.

When the boat is running, it is also surfing on the waves. This may lead to significant changes in boat speed, and thereby also changes in apparent wind angle. True wind steering is therefore used when running, while steering to apparent wind is used when beating or reaching.

Apparent wind steering is preferred when you want to achieve maximum boat speed. The autopilot tries to maintain a constant apparent wind angle to get maximum thrust from a given trim of the sails.

When sailing in closed waters, the apparent wind angle may change temporarily due to wind gusts. It may then be preferred to sail to the true wind.

VMG optimizing
You can optimize the VMG to wind. When selected, the function is active for 5–10 minutes after a new wind angle has been set and only when beating.

Layline steering
Layline steering is useful when navigating. Cross Track Error (XTE) from the navigator keeps the boat on the track line. If the XTE from the navigator exceeds 0.15 NM, the autopilot calculates the layline and track towards the waypoint.

Response

By default the system switches between HI/LO parameter set based on speed (motor boats) or speed and wind (sail boats). You can however manually select which parameter set that shall be used.

HI or LO must be selected if no speed input is available.

You can manually fine tune each of the two (HI/LO) parameter sets. Level 4 is default with parameter values as set by the autotune function. If no autotune is made (not recommended) the level 4 values are the factory default values.

A low response level reduces the rudder activity and provides a more "loose" steering.

A high response level increases the rudder activity and provides a more "tight" steering. A too high response level causes the boat to start lazy-s movements.

Automatic steering

This option displays an overview of all autopilot steering parameters, and you can adjust parameters if required.

For more details, refer to the separate Zeus^2 Installation manual.

Installation

Used for autopilot installation and commissioning. See the separate Zeus^2 Installation manual.

11 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 27.

→ **Note:** Radar overlay requires data from the heading sensor.

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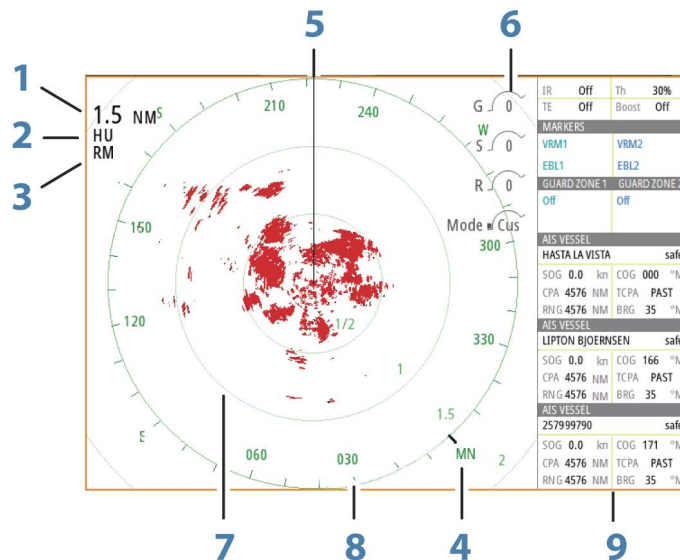
1	Range
2	Orientation
3	Motion
4	Compass*
5	Heading line*
6	Rotary controls
7	Range rings*
8	Range markers*
9	Data bar

* 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 74.

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 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 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.

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 Zeus^2 unit. The following modes are available:

Off

The power to the radar scanner is turned off.

Standby

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

Transmit

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

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 Radar only)

When connected to a Broadband 4G 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 67.

➔ **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.
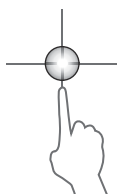
The cursor assist function

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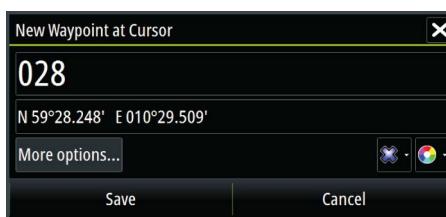
Without removing your finger from the screen, drag the selection circle to the desired position.

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

Saving waypoints

You can save a waypoint at a selected location by positioning the cursor on the panel, and then selecting the new waypoint option in the menu.

In the Chart and Nav panels, you can save a waypoint at the vessel position, when the cursor is not active, by selecting the new waypoint option in the menu.

If your unit has a **MARK** key, you can press this key to immediately save a waypoint. If the cursor is active, the waypoint is saved at the cursor position. If the cursor is not active, the waypoint is saved at your vessel's position.

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.
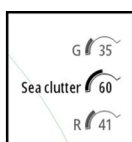
Directional clutter rejection

(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, in addition to the manual mode where you can adjust the settings. 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.

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 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 Zeus[2], 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 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 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).
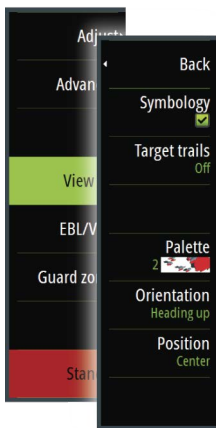
The radar position can only be changed when the radar is transmitting.

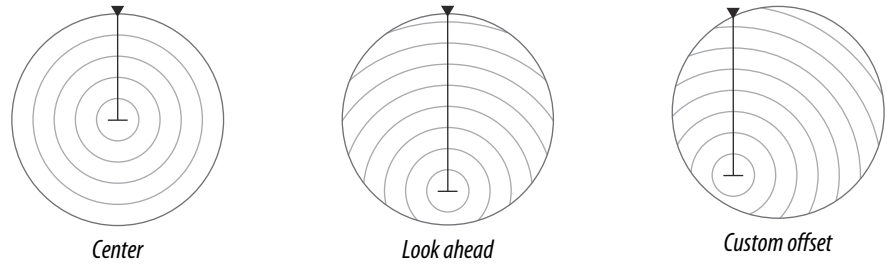*Center* *Look ahead* *Custom offset*

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 option in the menu.

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.
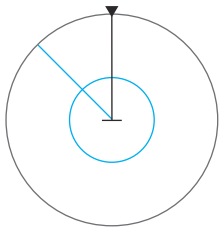
Defining an EBL/VRM marker

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 in the menu 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 in the menu 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 depends 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 in the menu to save your settings.

When positioned, you can turn the guard zones on/off by selecting the relevant section on the data bar.
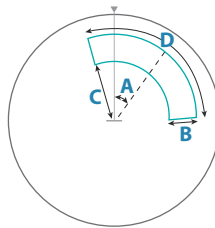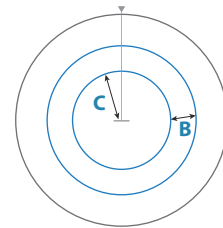
Shape: Sector　　　　　　　　　　　　　*Shape: Circle*

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 74.

MARPA tracking is an important tool for collision avoidance.

➔ **Note:** MARPA requires heading data for both the radar and the Zeus[2].

MARPA target symbols

The system uses the target symbols shown below.

⌐ ¬ L ⌐	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.
⌞O⌟	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 Zeus^2 unit, or save it onto an SD 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
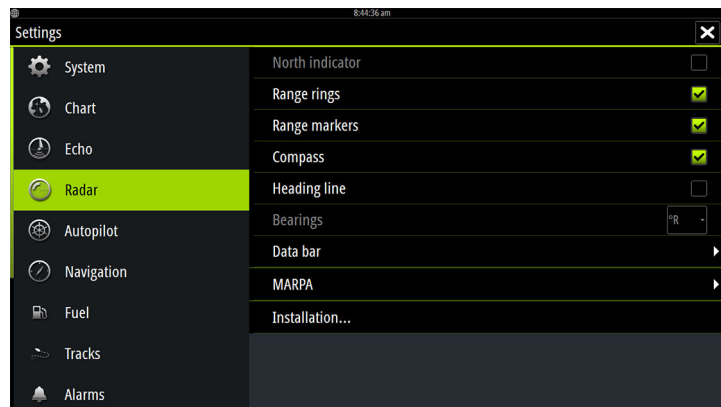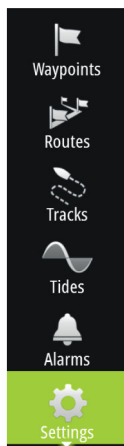
Radar symbology

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 Zeus[2] Installation manuals.

12 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 Zeus² units do not include built in echosounder or StructureScan. An external module such as the SonarHub, BSM-3 or other compatible modules must be available on the network to be able to use echosounder functionality on the system.

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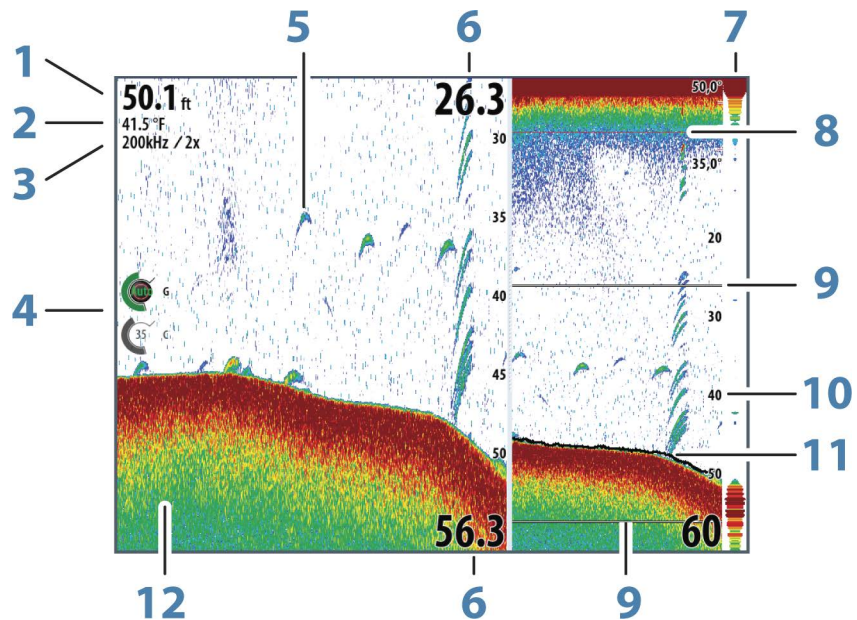
1	Depth
2	Temperature
3	Frequency / Zoom
4	Gain / Color adjustment icons
5	Fish arches
6	Upper and Lower range
7	A-Scope*
8	Temperature graph*
9	Zoom bars*
10	Range scale
11	Depth line*
12	Bottom

* Optional Echosounder items.

→ **Note:** You turn the optional Echosounder items on/off individually. Refer to *"Echosounder View options"* on page 80.

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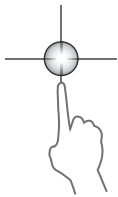
The cursor assist function
The cursor assist function allows for fine tuning and precision placement of the cursor without covering details with your finger.

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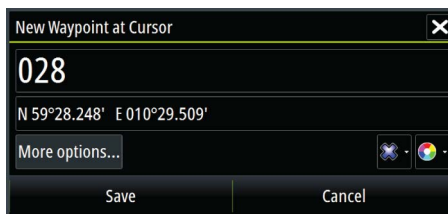
You can use the menu to re-position the start point and the end point as long as the measuring function is active.

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 selecting the new waypoint option in the menu.

| New Waypoint at Cursor	✕
028	
N 59°28.248' E 010°29.509'	
More options...	✕▾ 🎨▾
Save	Cancel

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.
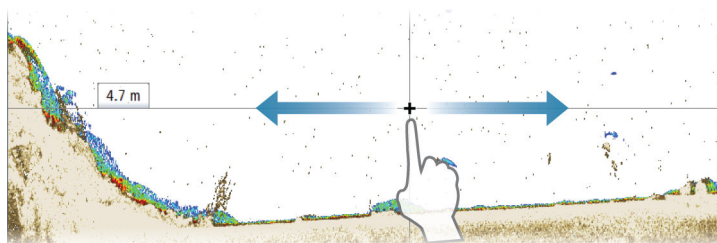
Setting up the image

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

Gain and Color control images are located in the left side of the Echosounder panel. You activate the control by tapping the image. Active control expands and displays its name in full. You can then adjust the value by using the slide bar.

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.

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, boat wakes and temperature inversions 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 a low value.

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.
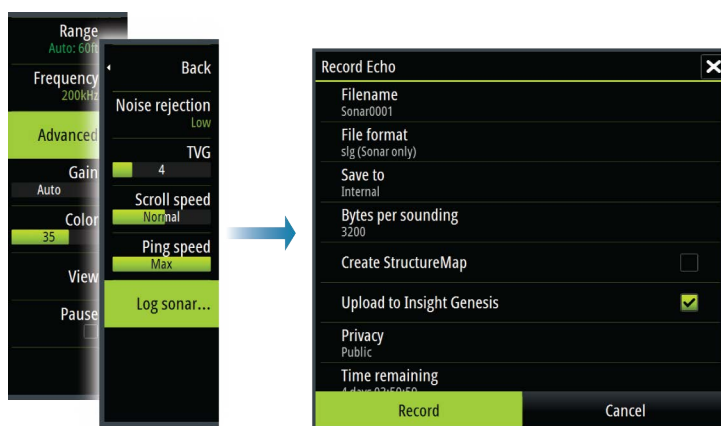
Filename

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**.
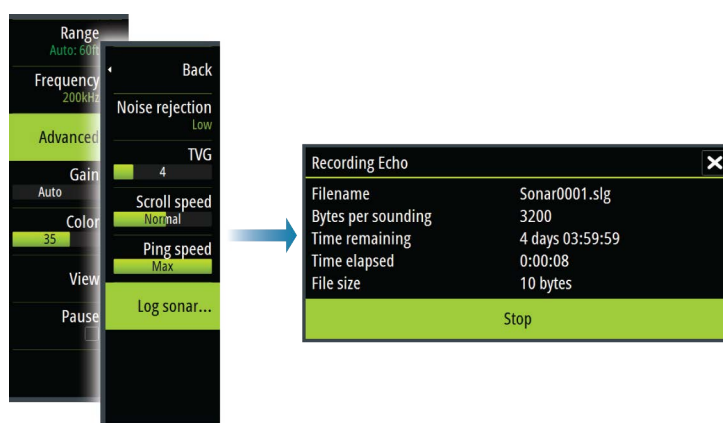
Viewing the recorded sounder data

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.
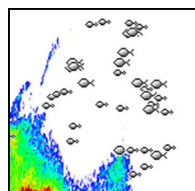
You can move the zoom bars on the right side up or down to cause the left side image to show different depths of the water column.
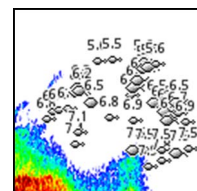
Fish ID

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.
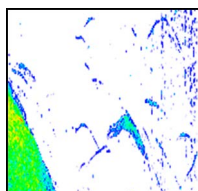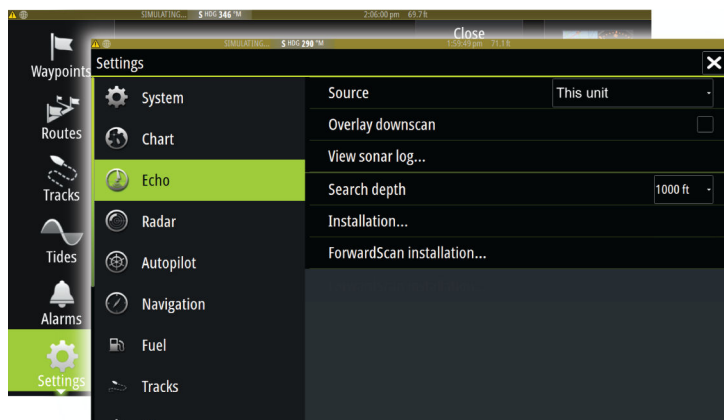

Traditional fish echoes   *Fish symbols*   *Fish symbols and depth indication*

→ **Note:** Not all fish symbols are actual fish.

Echosounder settings

Echosounder source

If you have Network Echosounder enabled and have more than one Echosounder on your network, you can select which Echosounder to be the preferred source on this unit.

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 Zeus^2 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.

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.

Installation

Used for installation and setup. See the separate Zeus^2 Installation manual.

ForwardScan Installation

Used for ForwardScan installation and setup. Refer to the *"ForwardScan setup"* on page 92.

13 StructureScan

StructureScan uses high frequencies to provide a high resolution, picture-like image of the seabed.

➜ **Note:** You must have a StructureScan HD or TotalScan transducer installed to use StructureScan features.

StructureScan is not integrated in Zeus[2]. You must have a compatible external StructureScan module available on the network to use the StructureScan features.

StructureScan provides a wide coverage in high detail with SideScan, while DownScan provides detailed images of structure and fish directly below your boat. The StructureScan page is accessed from the **Home** page when the transducer is connected.
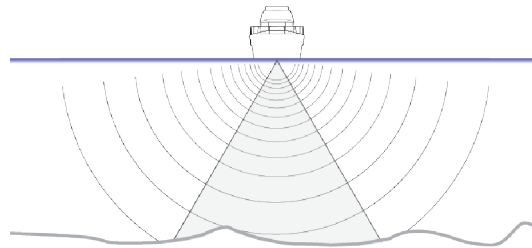
The StructureScan image

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.
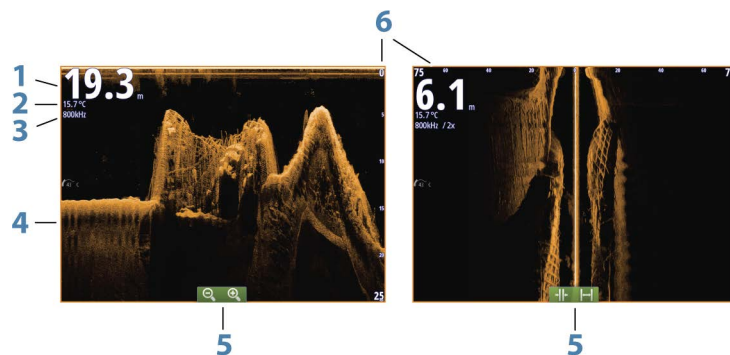
1	Depth
2	Temperature
3	Frequency
4	Bottom
5	Zoom (downscan) / Range (sidescan) icons
6	Range scale

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.

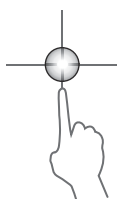## Using the cursor on the StructureScan panel

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

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

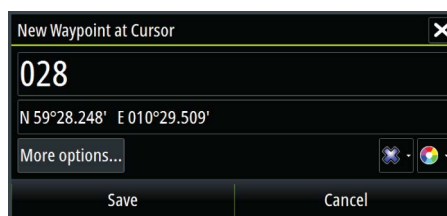The cursor can be used to measure the distance between the position of two observations on the image.

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 selecting 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**.
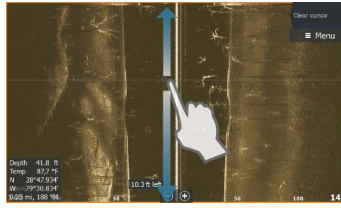
Setting up the StructureScan image

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, boat wakes and temperature inversions 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 a low value.

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 Zeus^2 unit, or onto memory card as described in *"Start Recording echosounder data"* on page 79.

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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.
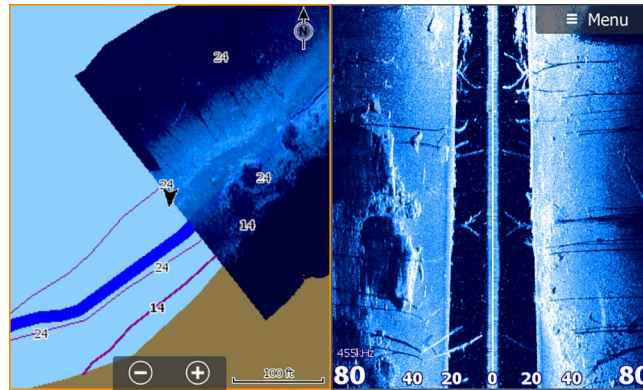
You move around in the chart as usual when you have a Structure overlay:

- 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.

15 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 is connected to a SonarHub and shared over the Ethernet network.

→ **Note:** If you have both a sonar/CHIRP and a ForwardScan transducer connected to different SonarHubs, you can view both simultaneously on a single device.

> ⚠ 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
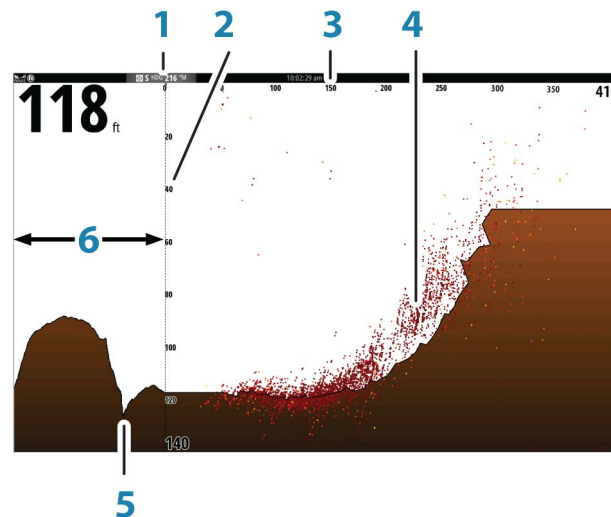
1	Transducer location shown as the origin on the page
2	Depth range scale and vessel position
3	Forward range scale
4	Point data
5	Bottom
6	Depth history
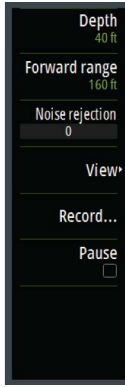
Setting up the ForwardScan image

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.
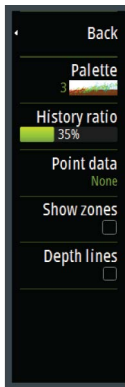
ForwardScan view options

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.
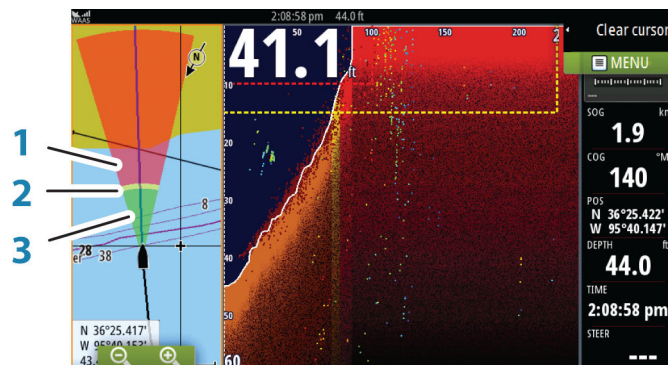
ForwardScan extension

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.
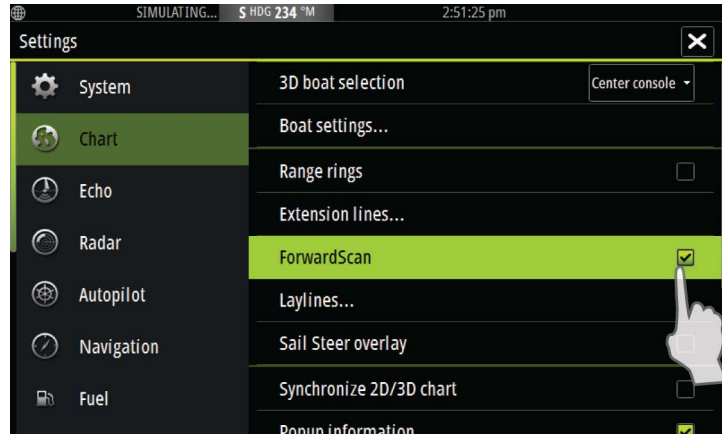
ForwardScan setup

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.
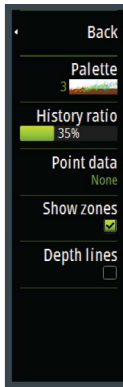
If you travel into water shallow enough to cross into the critical zone, the Critical Zone alarm is activated. You can display the critical warning zones by activating the **Show zones** menu option.
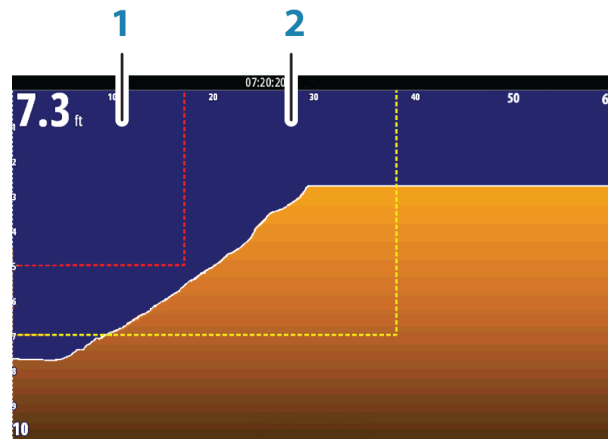
ForwardScan image with Show zones active

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

This is a value that can be entered on the Echo Installation page to make depth readings relate to any point from the water surface, to the deepest point of the vessel. Below are some typical ways in which the offset is used:

A) For Depth below Keel: Set the distance from transducer to the bottom of the keel - this should be set as a negative value. For example, -2.0.

B) For Depth Below Transducer: no offset required.

C) For Depth Below Surface (waterline): Set the distance from transducer to the surface - this should be set as a positive value. For example,+0.5.
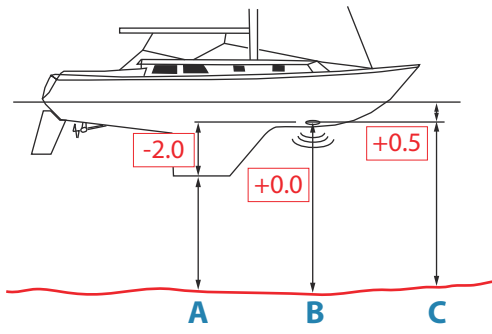
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Wireless connection

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

GOFREE

→ **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.

You must connect a WIFI-1 unit to the system to provide wireless functionality.

Installation and wiring of the WIFI-1 unit are described in the separate WIFI-1 Installation Guide. Configuration and setup are described in your system's installation manual.

→ **Note:** For security purposes we recommend that you change the administrator password of the WIFI-1 unit.
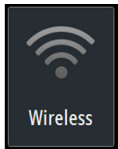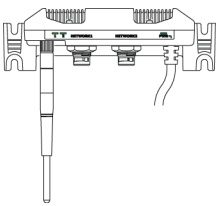
Connect and disconnect from a wireless hotspot

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 Controller & Viewer can access the vessel's navigation information.

GoFree Shop

The WIFI-1 must be connected to an external wireless hotspot in order to access the GoFree Shop from the Tools panel.

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.
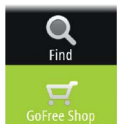
GoFree Controller & Viewer

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 Controller & Viewer 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.

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 79.
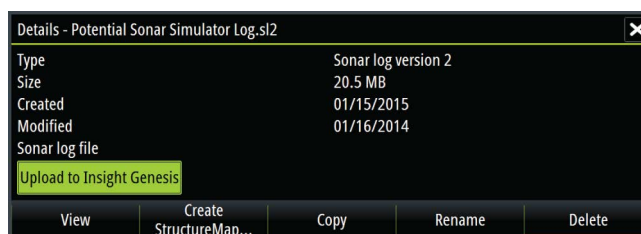
Wireless settings

Provides configuration and setup options for the wireless functionality.

For more information, refer to the Zeus^2 Installation Manual.
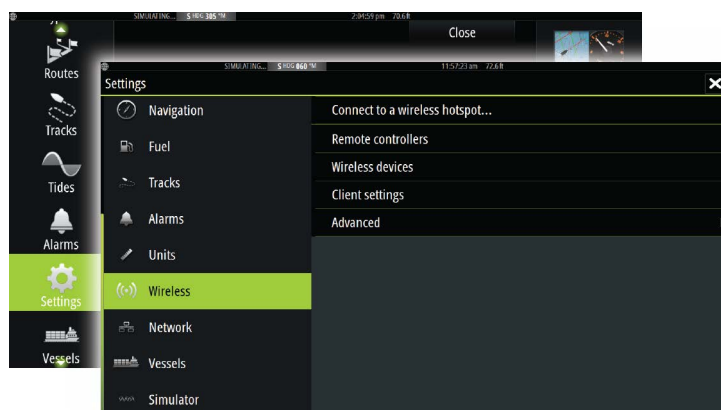
Connect to a wireless hotspot

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

Shows the internal wireless module and any connected WIFI-1 devices, as well as their IP and channel number. If a WIFI-1 is connected and the system detects the software is out of date, an option to update is also displayed. WIFI-1 updates, when required, are included with the display updates.

Select a device to view additional information about it. 'Network Name' and 'Network Key' can be edited for security, and 'Channel' can be changed if the connection to your unit is compromised due to interference. 'Mode' can be changed on WIFI-1 devices only. Restore defaults returns the unit to factory settings.

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.

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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
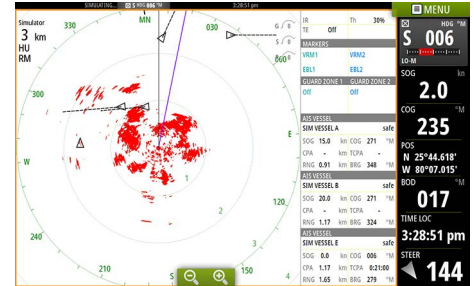
AIS vessels on a radar panel

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.

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.
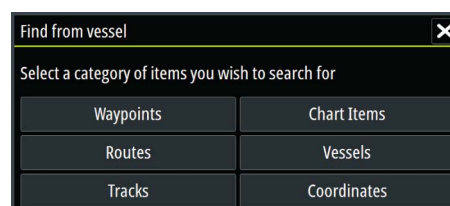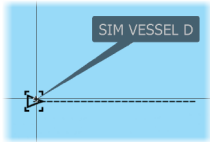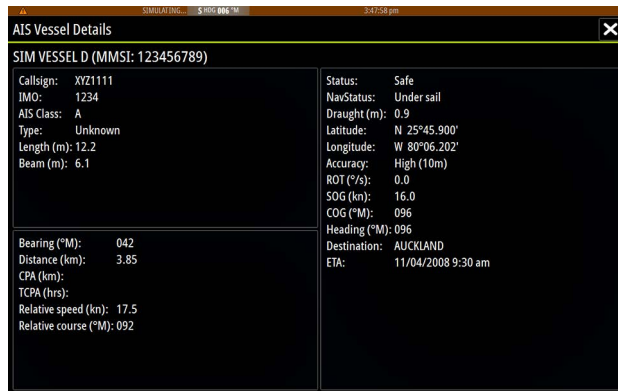
Viewing information about single AIS targets

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 Zeus[2].

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.
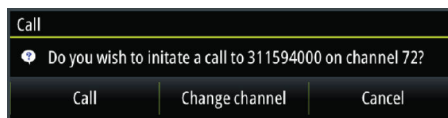
AIS SART

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.
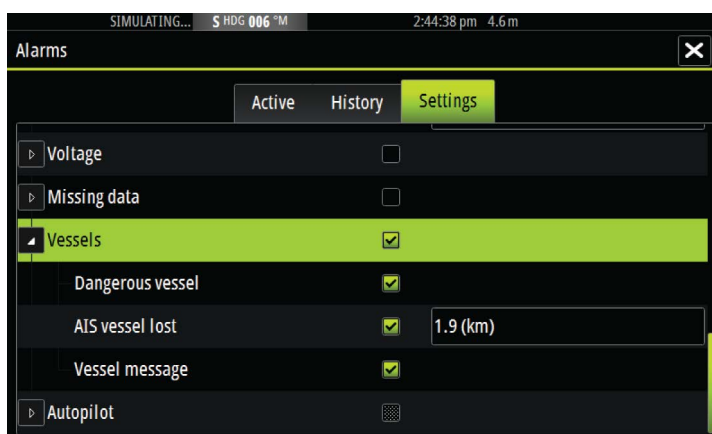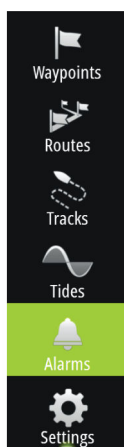
Dangerous vessel

Controls whether an alarm will be activated when a vessel comes within the predefined CPA or 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
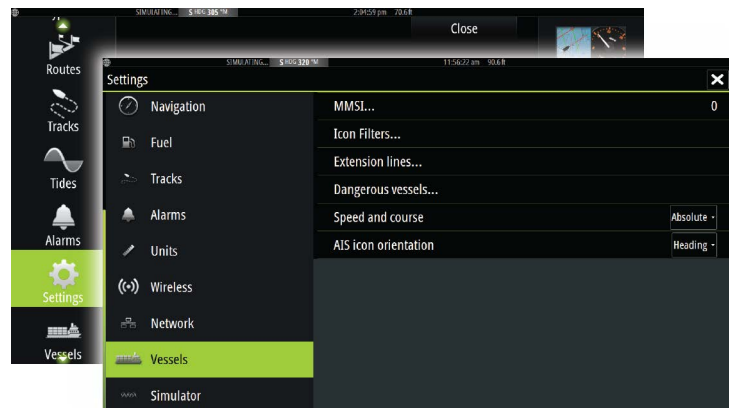
Your vessel's MMSI number

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.
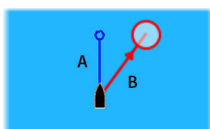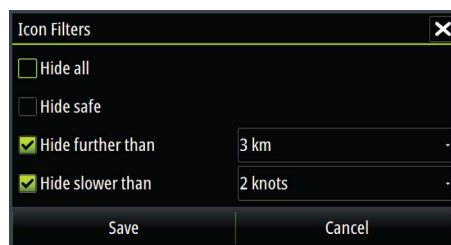

Extension lines

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.
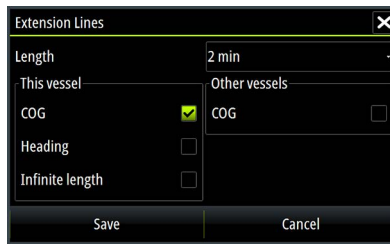
Your own vessel heading information is read from the active heading sensor, and COG information is received from the active GPS.

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 this distance, the symbol changes to the "dangerous" target symbol. An alarm is triggered if activated in the Alarm settings panel.
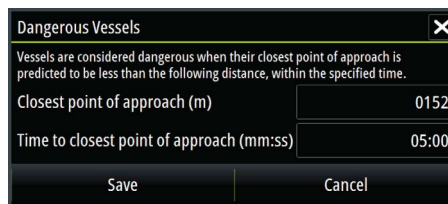
Speed and course indication

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.

18 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:

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
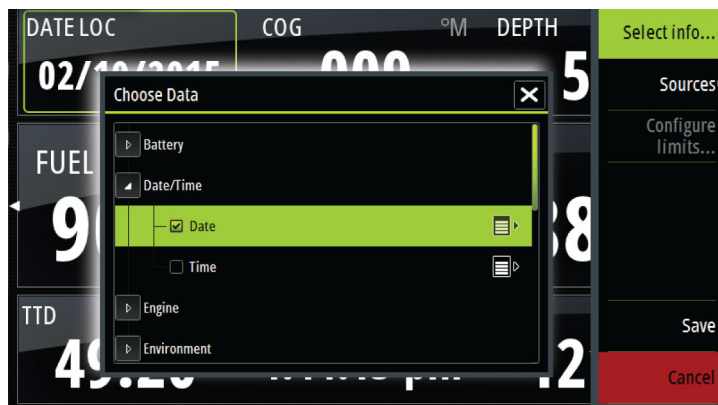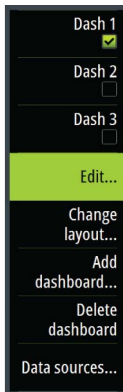
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Audio

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 Zeus[2] 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 Zeus[2] 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.
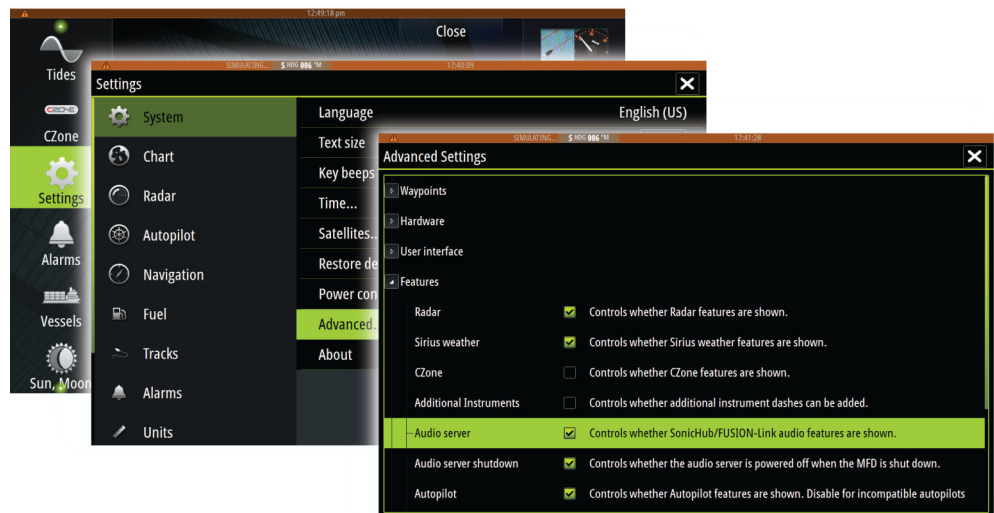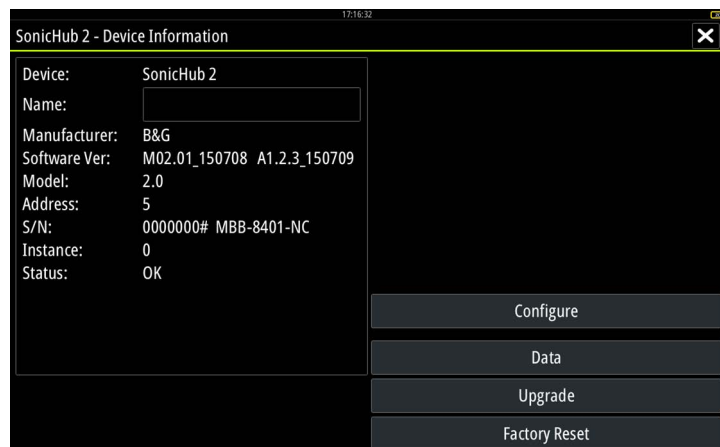

SonicHub 2

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.
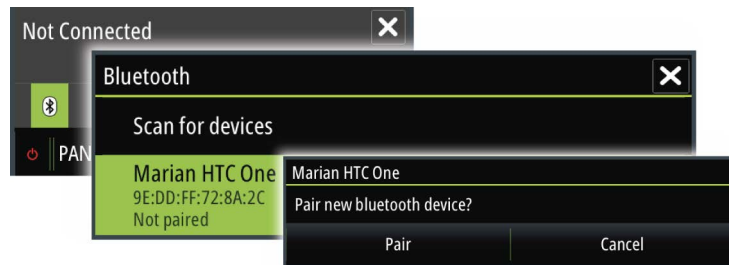
The SonicHub 2 connects to the paired device.

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**.
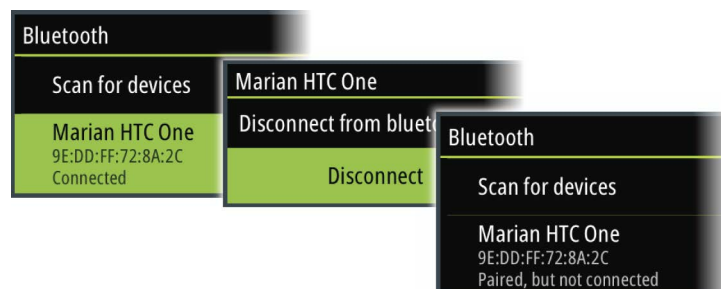
To connect to a paired device, select the paired device in the device list and then select **Connect**.
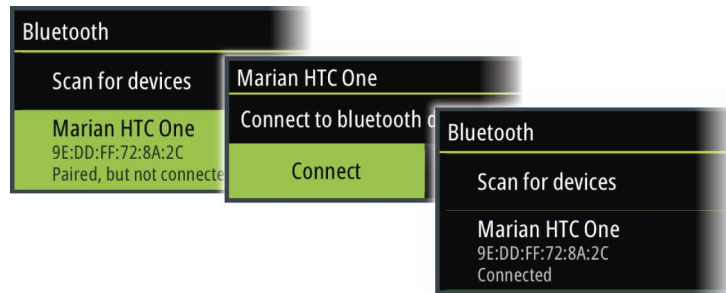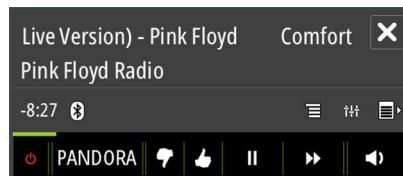

Pandora

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 Zeus^2 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 107 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.

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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*
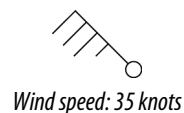
Showing weather details

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.
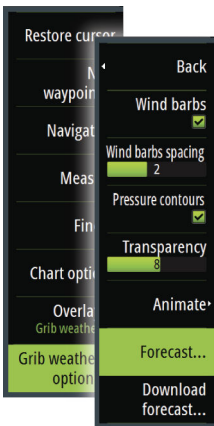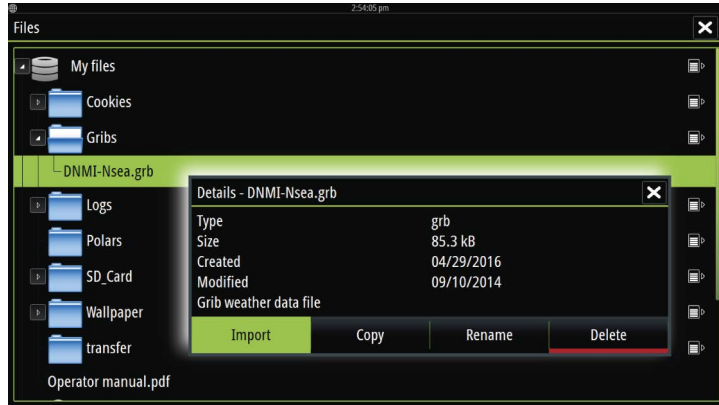
→ *Note:* GRIB data that is imported overwrites the GRIB data in memory.

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.

- 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).
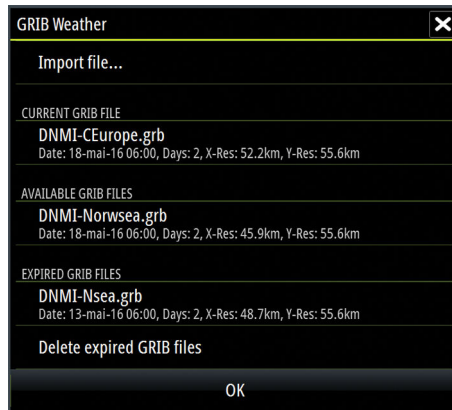
Displaying GRIB weather as overlay

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.
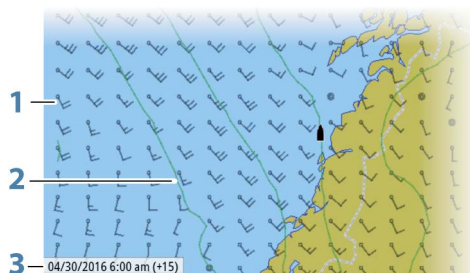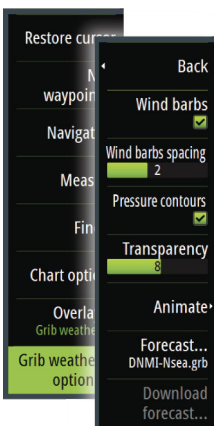
1   Wind barbs

| **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.

PredictWind weather

PredictWind weather can be displayed as GRIB weather overlay on the chart. To use this functionality, the appropriate PredictWind subscription is required. Refer to www.predictwind.com.

Only one weather file can be displayed on the chart at a time.

The PredictWind GRIB weather file can be made available for display as overlay on the chart the following ways:

- Download PredictWind files automatically or manually from the PredictWind web site using the unit's Internet connection as follows:
  - Turn on GRIB weather overlay from the Chart menu, refer to *"Turn on GRIB weather overlay"* on page 112
  - Enter your PredictWind login credentials in the unit, refer to *"PredictWind login credentials"* on page 112
  - If you want the system to automatically download the files from PredictWind, specify automatic download High resolution, Offshore (lower resolution), or both. Refer to *"Automatically download PredictWind weather files"* on page 112.
  - If you want to manually download the files from PredictWind, use the Download forecast option in the Chart menu. Refer to *"Manually download PredictWind weather files"* on page 112.
  - Import the file into memory to overlay it on the chart, refer to *"Specify PredictWind GRIB overlay file"* on page 114
- Download PredictWind files to a memory card connected to a PC and then import a file from the memory card into the unit's memory as follows:
  - Download PredictWind weather files to a memory card connected to a PC
    Note: Do not use a map memory card. Downloading files to a map card can corrupt the map card.
  - Insert the memory card in the unit's card reader
  - Turn on GRIB weather overlay from the Chart menu, refer to *"Turn on GRIB weather overlay"* on page 112
  - Import the file into memory to overlay it on the chart. You can import a weather file directly from the memory card or from any directory available to the File manager. Refer to Specify PredictWind GRIB overlay file *"Specify PredictWind GRIB overlay file"* on page 114.
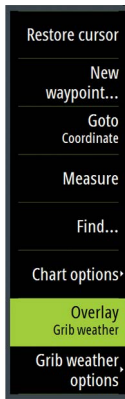
Turn on GRIB weather overlay

To view GRIB weather overlay on the chart and expand the chart menu to display GRIB weather menu options, turn on the GRIB weather overlay feature from the chart menu.

PredictWind login credentials

To automatically or manually download weather files from the PredictWind web site, enter your PredictWind login credentials in the PredictWind GRIB weather dialog.

Access the PredictWind GRIB weather dialog from the Chart settings dialog.

Select Email and enter your PredictWind login email address.

Select Password and enter your PredictWind password.
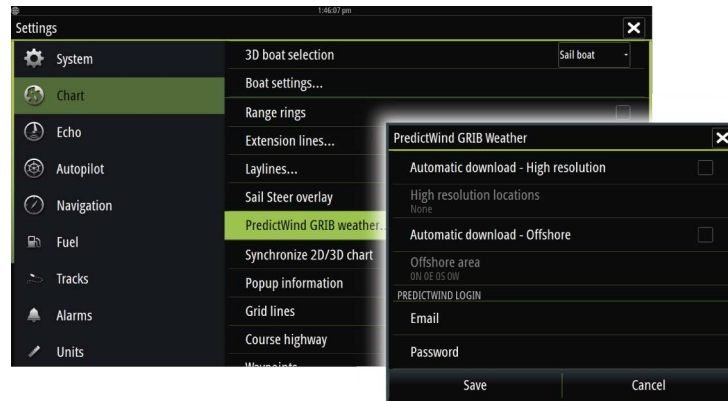
Automatically download PredictWind weather files

The automatic download feature allows your system to regularly check for weather updates and download the latest data.

Specify if you want to automatically download High resolution (refer to *"High resolution"* on page 113) or Offshore - lower resolution (refer to *"Offshore area (lower resolution)"* on page 113) or both types of GRIB data.

➔ *Note:* High Resolution downloads require a PredictWind Professional subscription.

➔ *Note:* To download data from PredictWind, the unit must have an internet connection and your PredictWind login credentials must be entered in the system (refer to *"PredictWind login credentials"* on page 112). When an internet connection is made the system will automatically login to PredictWind with your credentials and start downloading weather data as specified in the PredictWind GRIB Weather dialog.

Manually download PredictWind weather files

To download a PredictWind weather file manually, select the Download forecast option in the Chart menu to display the Select forecast type dialog. Use the Select forecast type dialog to specify the type and area.

➔ *Note:* To manually download data from PredictWind, the unit must have an internet connection. The Download forecast option is only available if you have turned on GRIB weather overlay on the Chart menu (refer to *"Turn on GRIB weather overlay"* on page 112), and your PredictWind login credentials are entered in the system (refer to *"PredictWind login credentials"* on page 112).
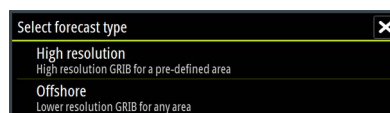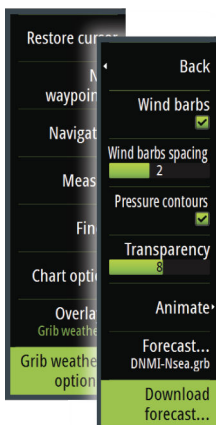
When the GRIB download is complete, the MFD will display a message to show the task is complete and will request to make the downloaded file the active file. If you confirm to make the downloaded file active, the GRIB will be displayed on the chart overlay.

If you do not want to overwrite the weather file currently being displayed, you can activate the downloaded file later using the Forecast menu option. Refer to *"Specify PredictWind GRIB overlay file"* on page 114.

High resolution

Download location areas are displayed on the chart. Select or deselect single or multiple locations. The selected areas are highlighted. You can add and remove locations by selecting Automatic download locations later.

Specify the settings for the high resolution GRIB download, refer to *"PredictWind download settings"* on page 113.
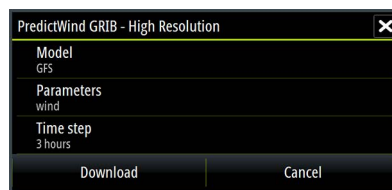

Offshore area (lower resolution)

The chart is displayed when you select the offshore area (lower resolution) option with an expandable rectangle. Drag the rectangle's corner markers to create the area rectangle you want to download GRIB weather for and choose the select menu option.

After you create your offshore area rectangle, choose the **Select** menu option.

Specify the settings for the offshore (lower resolution) GRIB download, refer to *"PredictWind download settings"* on page 113.
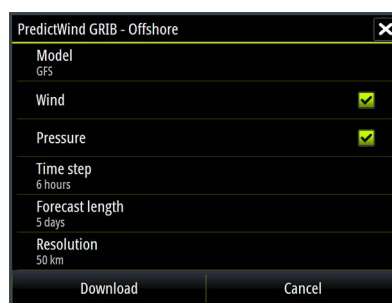
PredictWind download settings

Model

Allows you to select from the GRIB model options:

- CMC (Canadian Meteorological Centre) - a weather observation file from the Canadian Meteorological Centre
- CMCF (Canadian Meteorological Centre Forecast) – PredictWind forecast based on the weather observation from the Canadian Meteorological Centre. Available for Offshore GRIB only.

- GFS (Global Forecast System) - a weather observation file from the National Oceanic and Atmospheric Administration (NOAA) of the USA Department of Commerce.
- GFSF (Global Forecast System Forecast) - PredictWind forecast based on the weather observation from the National Oceanic and Atmospheric Administration (NOAA) of the USA Department of Commerce. Available for Offshore GRIB only.

Wind and Pressure
The wind and/or pressure data from PredictWind. Available for Offshore GRIB only.

Time step
The size of the time step in the downloaded forecast. For example, a 3 hour time step could provide weather data for 1200, 1500, 1800 etc., where a 6 hour time step could only provide 1200, 1800 etc. Smaller steps require larger downloads.

Forecast length
The period of the forecast in days. Available for CMCF or GFSF models on Offshore GRIB only.

Resolution
GRIB resolution, select 50 or 100 kilometers between forecast points. Available for Offshore GRIB only.

Specify PredictWind GRIB overlay file
The Forecast menu option shows the GRIB file which is currently displayed on the chart. If no file is displayed on the chart, then the menu option does not show a GRIB file.
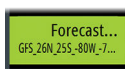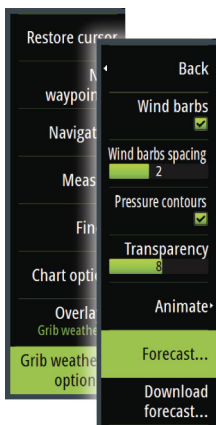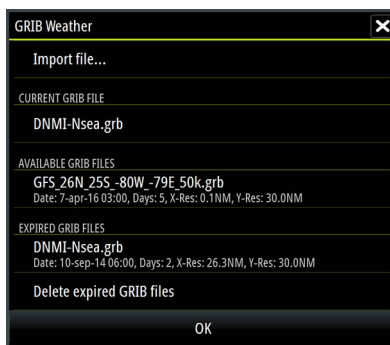
GRIB file displayed on the chart   *No GRIB file displayed on the chart*

Select the Forecast menu option to open the GRIB Weather dialog.

The GRIB Weather dialog shows which GRIB file is currently displayed as overlay on the chart and which files are available for display.

Available GRIB files are files downloaded manually or automatically from PredictWind to the Gribs directory. If you copy GRIB files from the memory card to the Gribs directory using the file manager, they will be listed as available GRIB files.

Select an available GRIB file to import it into memory and display it as overlay on the chart. Select the Import file option to import a GRIB file into memory from the memory card or any directory available to the File manager.

→ **Note:** GRIB data that is imported overwrites the GRIB data in memory.

Expired GRIB files
The system identifies GRIB files that have expired and moves them from the available GRIB files list to the expired GRIB files list. Expired files are files where the time of the final forecast has passed. Select the Delete expired GRIB files option to delete these expired files from the system.

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.
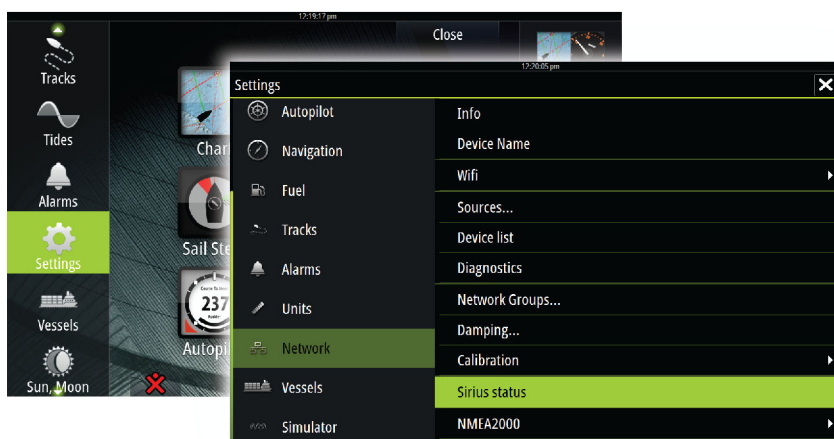
Sirius weather display

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.
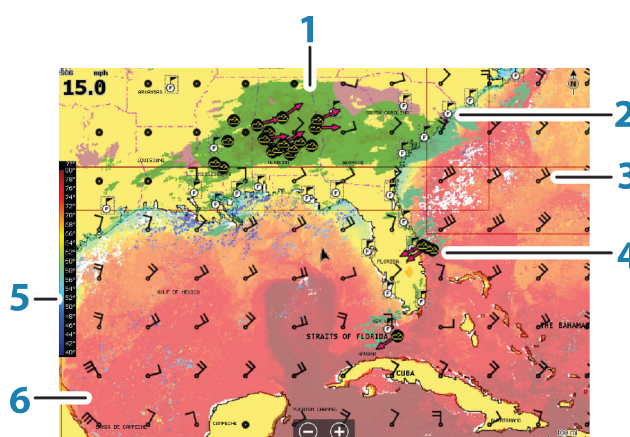
1	Precipitation color shading
2	City forecast icon
3	Wind barb
4	Storm icon
5	SST color bar

6   SST color shading

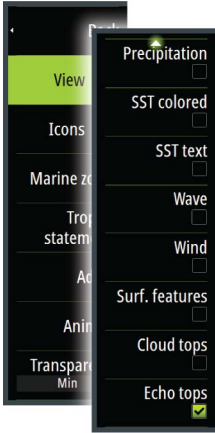Use the Sirius weather option menu to select which weather symbology that should be displayed and how they should appear on the chart panel.

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 117.

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 117.

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)

LLL	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.

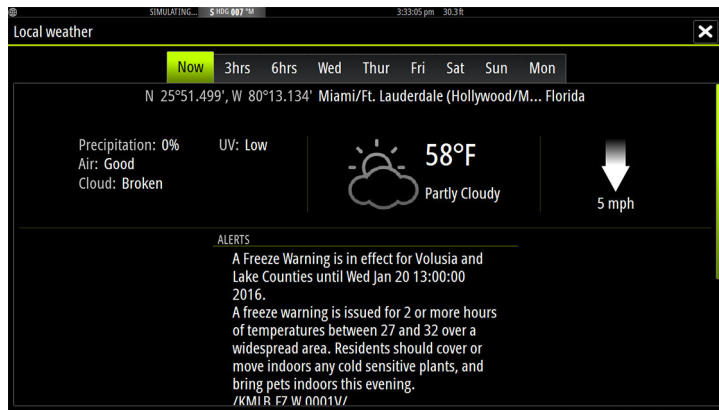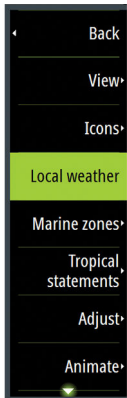Select a time-slot tab to see the forecast for it.

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 Zeus^2 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.
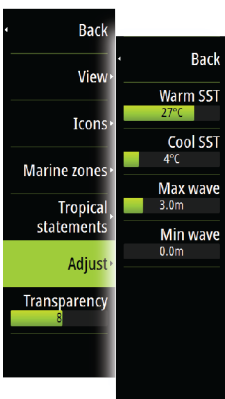
- With colored wave height overlay, you can animate the future (the predictions).

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.
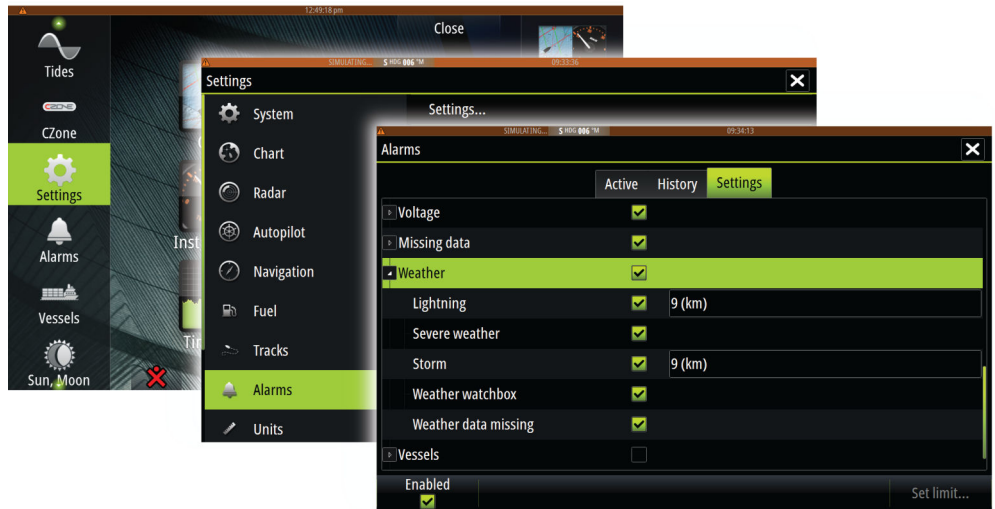
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Video

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 camera is available on the Ethernet network, you can display the video and control the camera from the system.

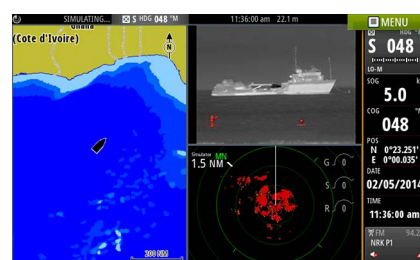For information about how to connect the camera, see the separate Zeus[2] Installation manual.

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

Zeus[2] 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

Zeus[2] 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 other MFDs connected to the Ethernet network.

Establishing connection with the FLIR video camera

When a video panel is active, the Zeus[2] 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.

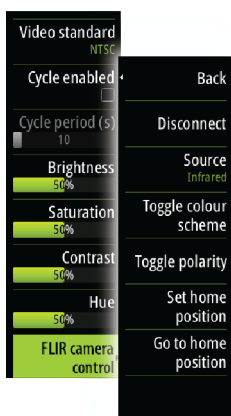→ **Note:** You can take over camera control from other MFDs connected to the Ethernet network.

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.

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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.
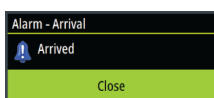
Type of messages

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.
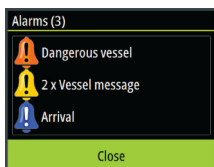
Acknowledging a message

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.
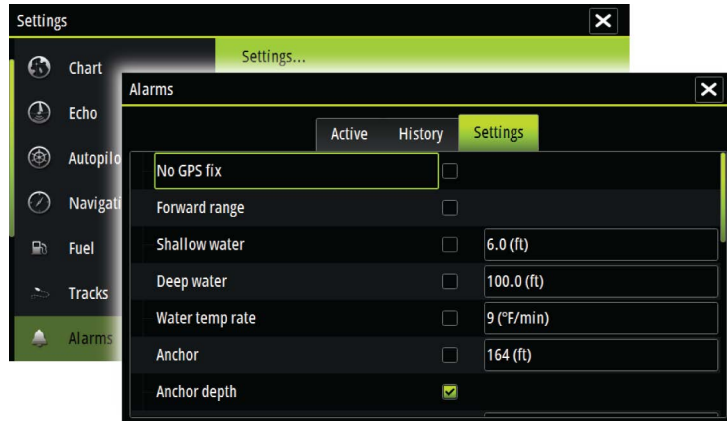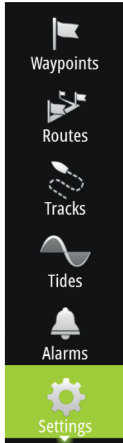
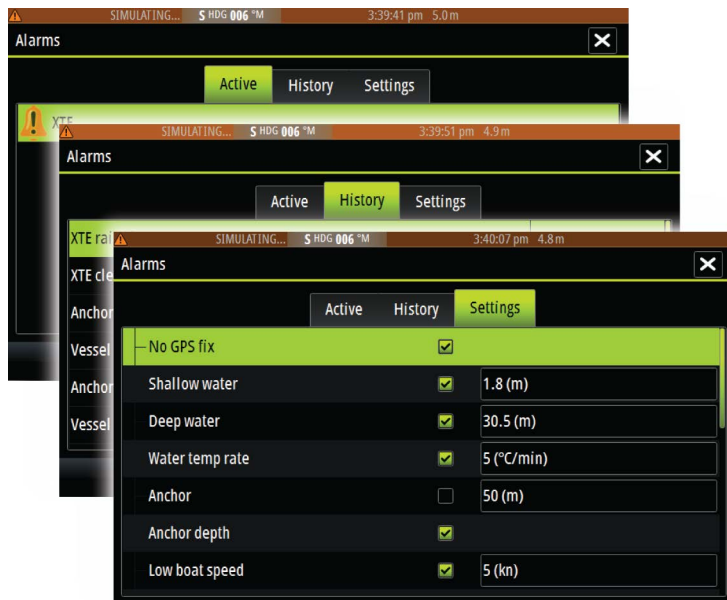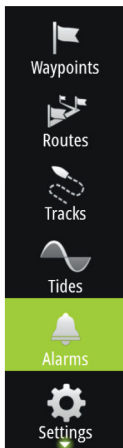The alarm dialogs can also be activated from the Tools panel. The alarm dialogs include information about active alarms and alarm history.

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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/routes/tracks

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.

Settings

Provides access to application and system 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.

Sun, Moon

Displays sunrise, sunset, moonrise and moonset for a position based on entered date and the position's latitude/longitude.

Trip calculator

Trip 1 / Trip 2
Displays voyage and engine information, with reset option for all data fields.

Today
Displays voyage and engine information for current date. All data fields are automatically reset when the date changes.

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 127.

Find

Search function for chart items (waypoints, routes, tracks, etc.).

GoFree Shop

→ ***Note:*** The WIFI-1 must be connected to an external wireless hotspot in order to access the GoFree Shop.

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.
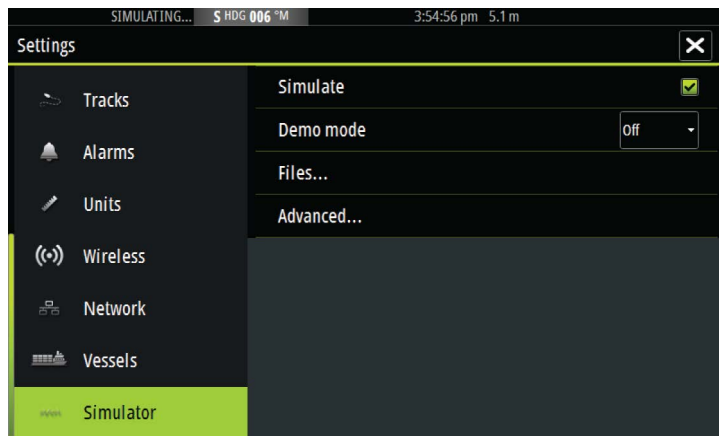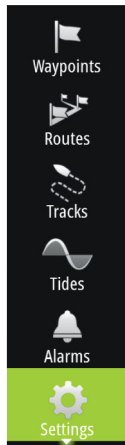
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Simulator

The simulation feature lets you see how the unit works in a stationary position and without being connected to sensors or 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.
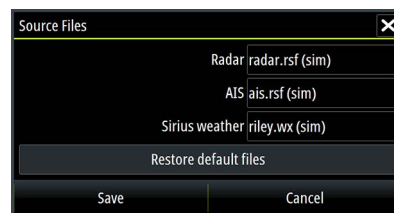
Advanced simulator settings

The Advanced simulator settings allows for manually controlling the simulator.
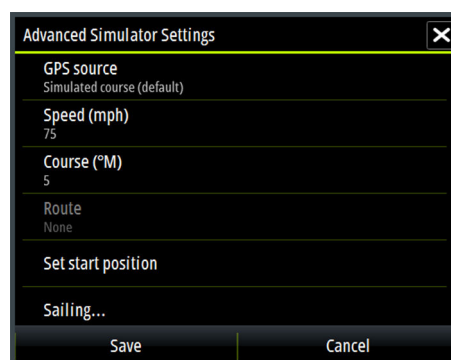
GPS source

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.
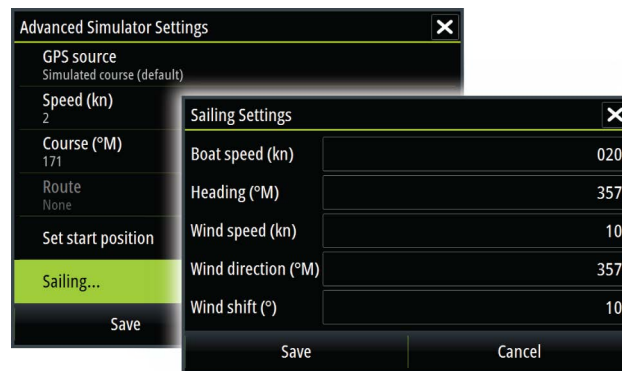
Set start position

Moves your vessel to the current cursor position.

➔ **Note:** This option is only available when the GPS source is set to Simulated course.

Sailing

Opens dialog for selecting sail specific simulator data.

25 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.
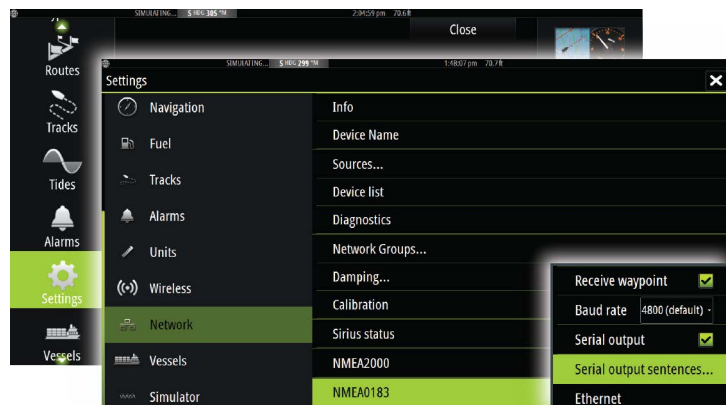
Exporting the log file

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.bandg.com.

Detailed instructions for how to install the software are included in the upgrade files.

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:

→ *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.

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.

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 competitors unit.
- **Northstar.dat (no Tracks)**
  Used to transfer data to a legacy Northstar device.

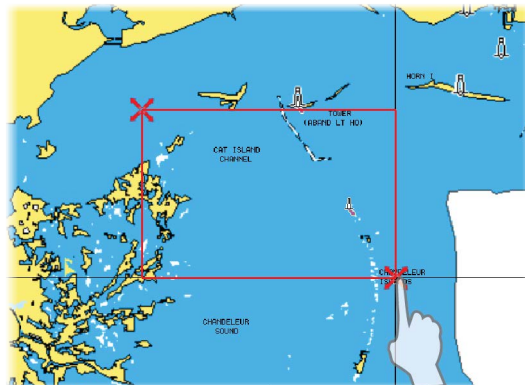### Export all Waypoints, Routes and Tracks

Use the export option if you want to backup all Waypoints, Routes, Tracks and Trips on your system.
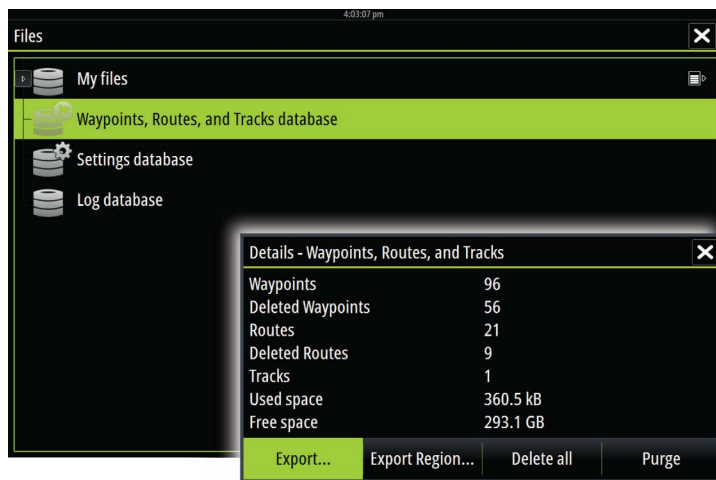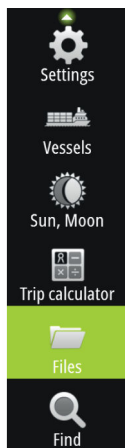
Export region

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.

Index

Zeus² series
Installation Manual

ENGLISH

B&G

bandg.com

Preface

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.bandg.com

Declarations and conformance

This equipment is intended for use in international waters as well as coastal sea areas administered by countries of the E.U. and E.E.A.

Compliance Statements

The B&G Zeus² series;

- complies with CE under R&TTE directive 1999/5/EC
- complies with the requirements of level 2 devices of the Radio-communications (Electromagnetic Compatibility) standard 2008

The relevant Declaration of Conformity is available on the following website, under the model documentation section:

www.bandg.com

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

Trademarks

- NMEA 2000 is a registered trademark of the National Marine Electronics Association
- Navionics is a registered trademark of Navionics SpA
- B&G, Lowrance, StructureScan, Navico, SonicHub, SimNet, Skimmer, InsightHD, Broadband Radar, Broadband Sonar, and SonarHub are trademarks of Navico, registered in the US and other countries

About this manual

This manual is a reference guide for installing the B&G Zeus² series.

The manual does not cover basic background information about how equipment such as radars, echosounders and AIS work.

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

Zeus² overview

The Zeus² range of multifunction displays consist of rugged marine displays with built in powerful marine processors. Display size choices are 7", 9", and 12". All models come with a built in 10 Hz high gain GPS antenna.

The ability to network over NMEA 2000 and ethernet allows access to data as well as control of numerous optional devices that can provide radar, audio entertainment, weather and even digital switching.

All displays can operate on 12 V or 24 V systems.

Each size display may be flush or bracket mounted.

Included Items
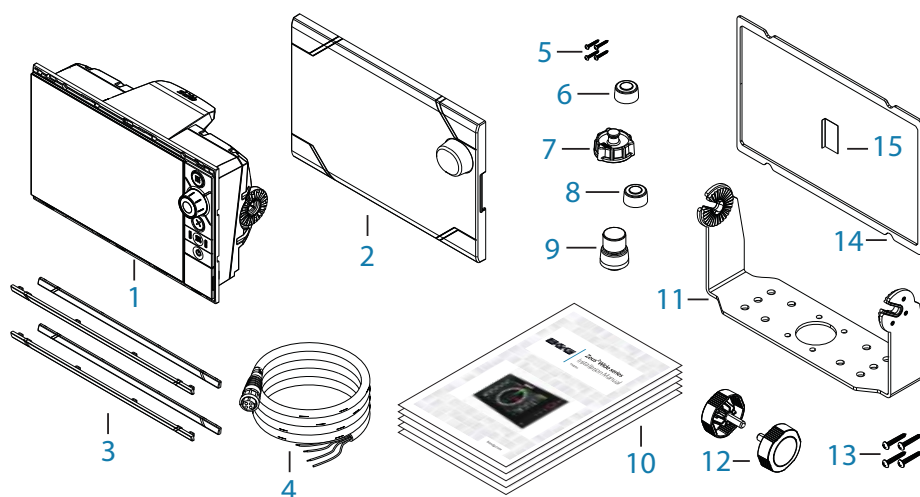
1 **Zeus² display**

2 **Sun cover**

3 **Bezels trim (black and silver)**

4 **Power cable**

5 **Self tapping pozi screws, 4Gx1/2" (x4 for 7/9, x8 for 12)**

6 **Ethernet dust cap (x2 for Zeus² 12)**

7 **HDMI dust cap (only for Zeus² 12)**

8 **NMEA 2000 dust cap**

9 **Video/NMEA 0183 dust cap**

10 **Document pack (includes: installation manual, user manual, quick start guide, templates, and warranty card)**

11 **Bracket**

12 **Bracket knobs**

13 **Self tapping pozi screws for bracket**

14 **Dash mount foam gasket**

15 **Self adhesive decal**

Front - controls

ZEUS² 9/12   **ZEUS² 7**
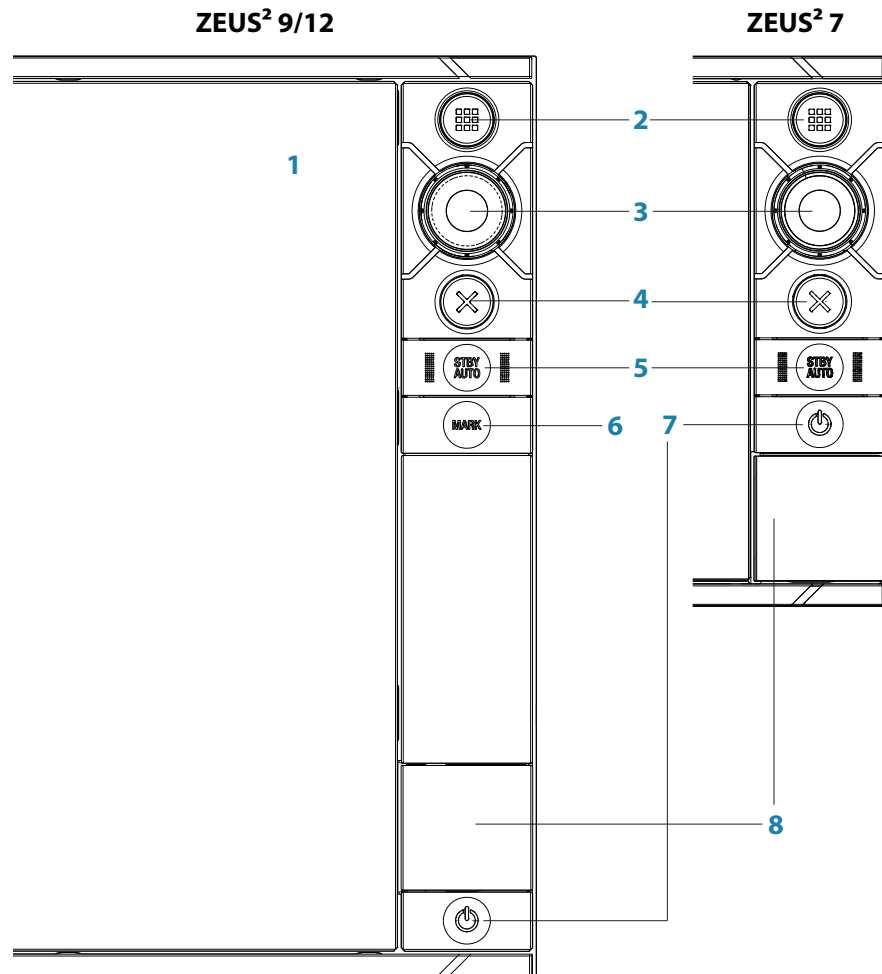
1. **Touch screen - cursor control, chart panning and zoom, context related menus**

2. **Home key - opens home page for page selection and setup options**

3. **Rotary knob - zooming and menu scrolling / selection by press**

4. **Exit - exits menu dialogue, clears cursor from screen**

5. **STBY/AUTO - autopilot control**

6. **Mark - places waypoint at vessel location**

7. **Power - turns on unit, opens System Controls dialogue, long press turns off**

8. **Card reader door - access to dual card reader slot**

Rear - connections

ZEUS² 12

ZEUS² 7/9
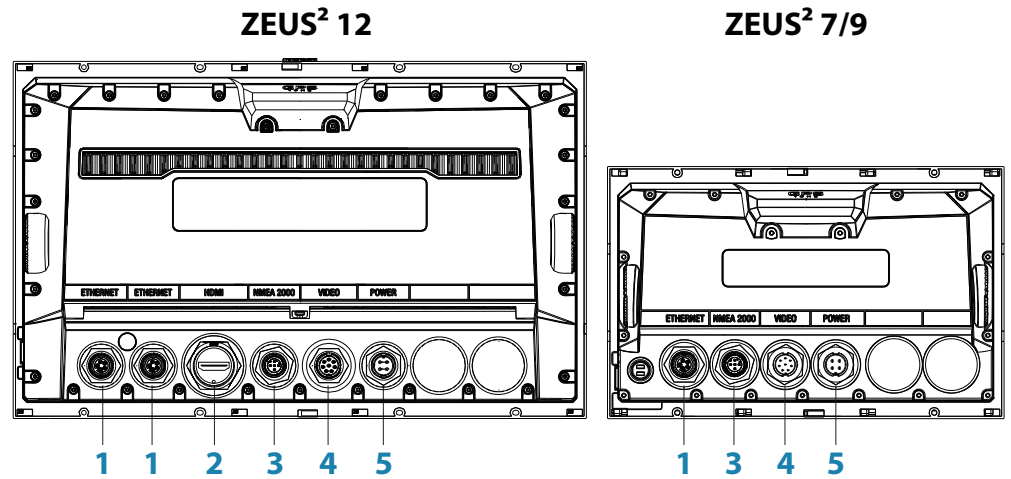
1 Ethernet - connection to high bandwidth network modules

2 HDMI - video output for external monitor

3 NMEA 2000 - dynamic data and user database sharing

4 Video - input for video sources such as cameras

5 Power - 12 V or 24 V supply input

Hardware installation

Display mounting location

Choose the mounting locations carefully before you drill or cut; The display should be mounted so that the operator can easily use the controls and clearly see the display screen. B&G displays are high-contrast and anti-reflective, and are viewable in direct sunlight, but for best results install the display out of direct sunlight. The chosen location should have minimal glare from windows or bright objects.

If bracket mounting the display, choose an area where the display will not be subjected to excessive vibration.

The mounting location will affect the internal GPS receiver. Test the unit in it's intended location to ensure satisfactory reception. An external GPS source may be added to overcome poor reception areas.

Leave sufficient clearance to connect all relevant cables.

Check that it is possible to route cables to intented mounting location

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.

Before cutting a hole in a panel, make sure that there are no hidden electrical wires or other parts behind the panel.

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.

Choose an area where the unit will not be subjected to excessive vibration, or heat.

Choose a location that will not expose the unit to conditions that exceed the IP rating - refer to "Specifications" on page 39.

→ *Note:* Where flush mounted, the enclosure should be dry and well ventilated. The ventilation of the space behind the unit should be enough to prevent excessive heat build up as a combined result of radiated heat off the heat sink, and sunlight heating of the enclosure. In very small enclosures, it may be required to fit forced cooling.

⚠ **Warning:** *Inadequate ventilation and subsequent overheating of display may cause unreliable operation and reduced service life. Ensure enclosure does not consistently exceed +55° C (+131° F) during normal daytime operation (in direct sunlight, and at full screen brightness).*

⚠ **Warning:** *When installing, ensure appropriate safety equipment is used, e.g. ear muffs, protective glasses, gloves and a dust mask. Power tools may exceed safe noise levels, and can cast off dangerous protectiles. The dust from many materials commonly used in boat construction may cause irritation or damage to eyes, skin, and lungs.*

Display installation

Bracket mounting

Place the bracket in the desired mounting location, and use a pencil or permanent marker to mark drilling locations.

→ *Note:* ensure that the chosen location has enough height to accomodate the display fitted in the bracket, and allows tilting of the display. Also adequate space is required on both sides to allow tightening and loosening of the knobs.

Use fasteners suited to the mounting surface material. If the material is too thin for self tappers, reinforce it, or mount bracket with machine screws and large washers. Use only 304 or 316 stainless steel fasteners. Mark the screw locations using bracket as template, and drill pilot holes.
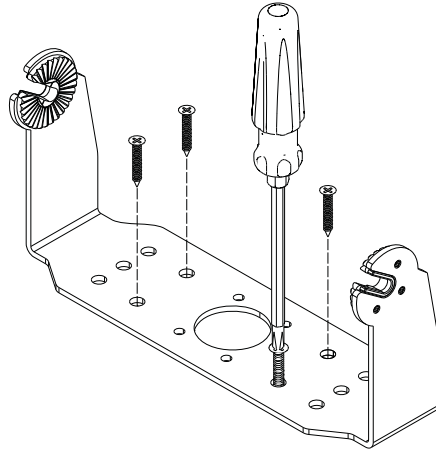
Screw down the bracket.
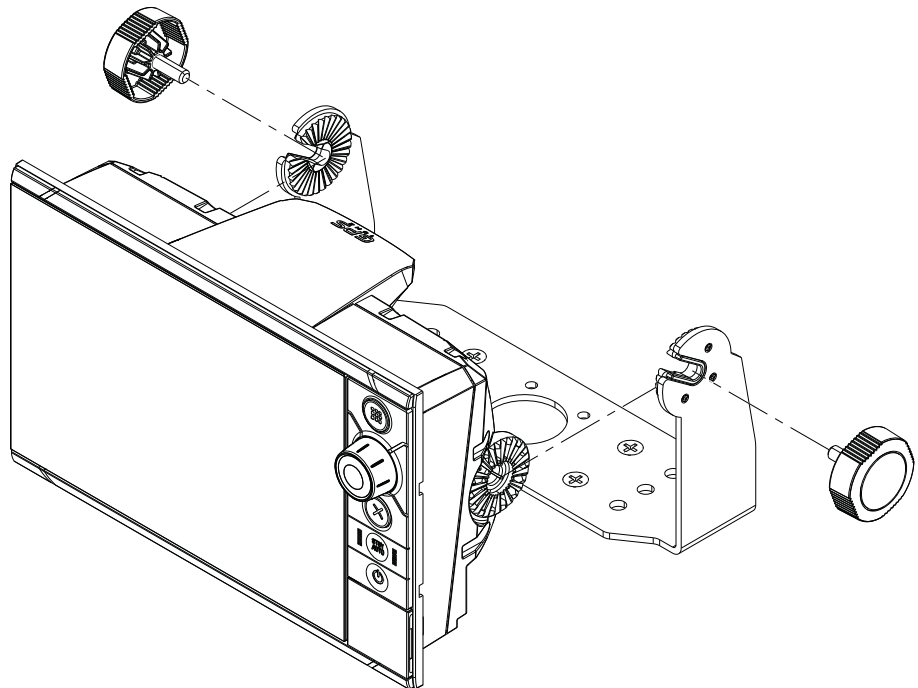
Mount the display to the bracket using the knobs. Hand tighten only. The ratchet teeth in the bracket and display case ensure a positive grip and prevent the unit changing from the desired angle.

Flush mounting
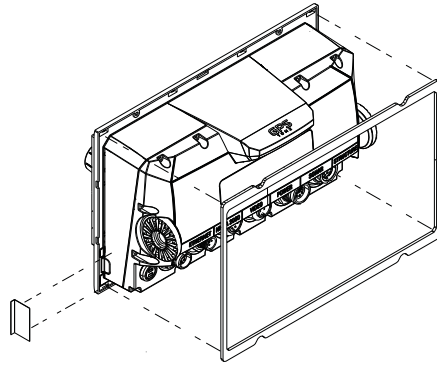
Fit the small self adhesive decal to right side of unit, covering rubber tab of SD card reader gasket. Then attach self adhesive foam gasket to rear of display.
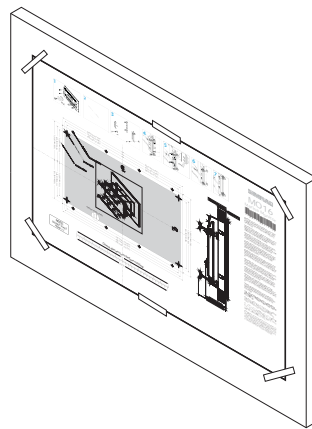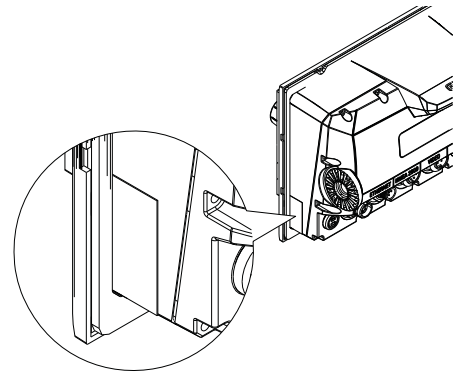
Check the template for scaling accuracy, using a tape measure or ruler against the ruler printed on the template.

Cut away excess paper if required, and tape template to mounting surface. Check it is correctly aligned to a vertical or horizontal reference. Do not use a bubble level as vessel may be listing! Adjust where required.

Drill all marked pilot holes, then using an appropriate saw, cut through the template and mounting surface, along the dotted line bordering the shaded area of the template.

Check the fit of the display, and file away remaining obstructions. Secure the display with the supplied screws. Once screws are fully tightened, ensure there is complete contact with the mounting surface.
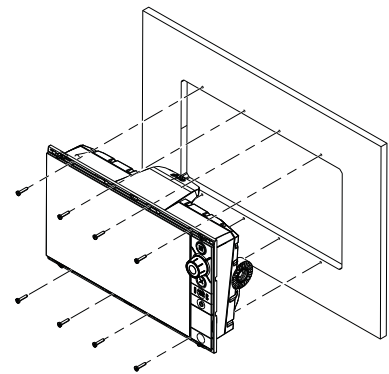
Bezel Fitment and Removal

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, it is necessary to 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.
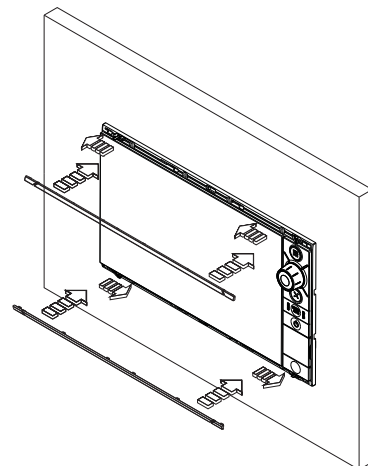
Wiring

Guidelines

Care must be taken when running cables in a boat, to ensure that the cables are protected from damage and do not interfer with mechanical systems such as throttle cables and hatch covers.

At each end of a cable, it is advisable to leave a short loop hanging lower than the termination point. This prevents any water that may get in contact with the cable from running down it to termination points vulnerable to corrosion.

Extending cables should be done with suitable crimp connectors or solder and heat shrink. Keeps joins as high as possible to minimize possibility of water immersion.

Routing cables adjacent to high current or high frequency signal cables could cause noise to be induced from one device to another. Allow spacing between cables where possible.

Secure all cables at regular intervals, to prevent movement during boat operation. Cable movement may cause fatigue at termination points or cause the cable to interfere with other boat systems.

Allows enough cable slack for easy access to connectors when removing the device from a bracket or flush mount installation.

⚠ **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 Zeus² display*

⚠ **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

Zeus² displays are designed to be powered by a 12 or 24 V DC system. They are protected against reverse polarity, under voltage and over voltage.
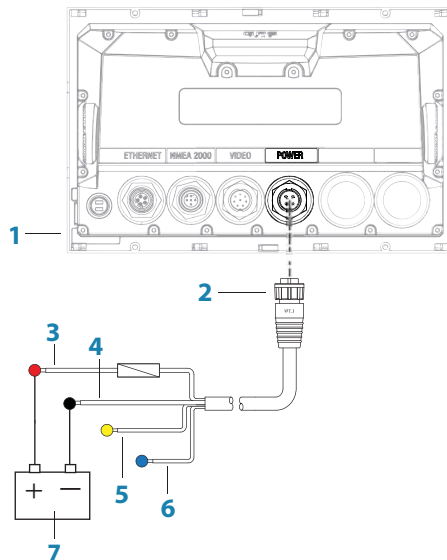
1 **Zeus² display**

2 **Four pin power cable**

3 **Positive supply, 12/24V (red wire)**

4 **Negative (black wire)**

5 **Power control (yellow wire)**

6 **Alarm output (blue wire)**

Power Control connection

The yellow Power Control wire on the Zeus² power cable can either be an input that will turn on the processor when power is applied, or an output that turns on other devices when the processor 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 Zeus² can be set to be a Power Control Slave or Power Control Master.

Power Control configuration options of the Zeus² are:-

- Zeus² to turn on when power key pressed: Yellow wire not connected
- Zeus² to turn on when power source is turned on: Common red and yellow wires
- Zeus² to turn on with power key, as well as other compatible devices such as Broadband Radar: Yellow wire connected to a 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 yellow Power Control wire disconnected. Tape or heat-shrink end to prevent shorting.
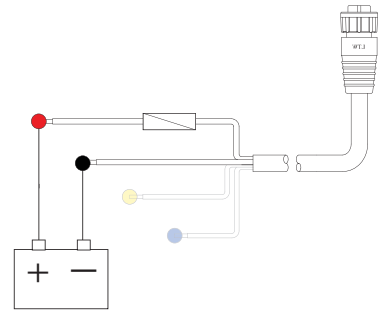
Power Control to supply positive (auto on)

Device will turn on immediately when power is applied. Common the yellow wire with the red wire after the fuse.

→ **Note:** The unit can not be powered down by power button, but can be put in to standby mode. (screen backlight also turns off).
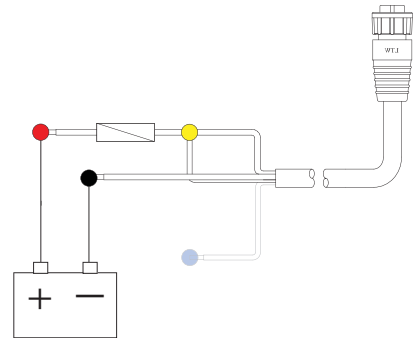
Power Control master/slave bus

Turning on the 'master' device turns on connected 'slave' devices.
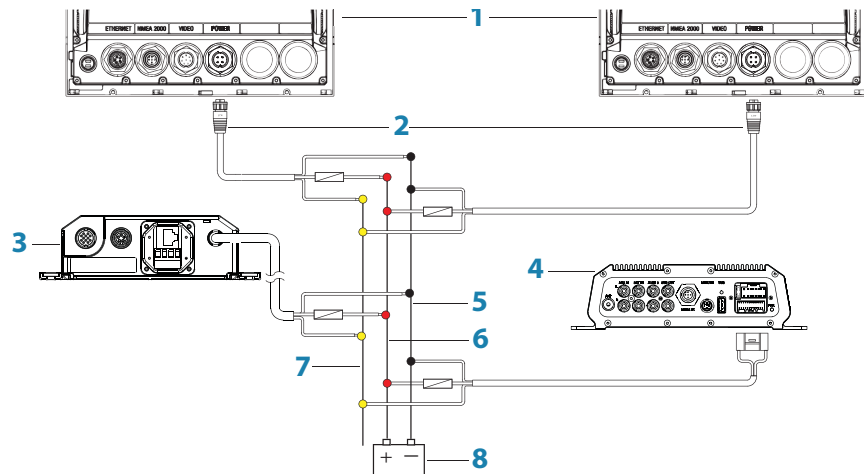
1 **Zeus² displays**

2 **Power cable**

3 **Radar Interface box**

4 **Sonic Hub**

5 **Ground wire**

6 **Positive wire**

7 **Power control wire**

If the left Zeus² turns 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 Zeus², the Radar Interface, and the SonicHub.

If the right Zeus² is set to Power Control Slave, it cannot be powered down using its own power button, but can be set to standby.

If the left Zeus² (Power Control Master) is off, the right Zeus² can be turned on using its own power button, but won't turn on any other devices.

To turn on all network devices from either Zeus², both devices can be configured as Power Control Masters.

→ *Note:* If an Zeus² has its power state controlled by another device (or ignition switch), it can't be totally powered down. It can however enter a standby state to save power. If the power button is pressed and Power Off selected, a message will appear "Preparing to standby…"

External alarm

Blue wire on power cable:

An external alarm can be connected to one or more Zeus² displays on the network. The external alarm can be a small peizo buzzer connected directly, or a horn siren connected via a relay.

Alarms are configured globally in the system i.e they can be configured on any one networked multifunction device or Triton instrument, and be seen, heard, and acknowledged from all devices. Individual devices can also be configured to not to sound their internal buzzer, but still display the alarm information. For information on configuring alarms, refer to the Alarms section in the Operator manual.
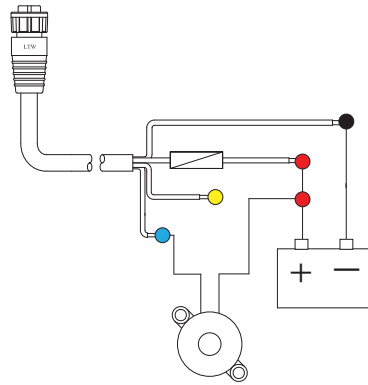
For sirens that draw more than 1 Amp, use a relay
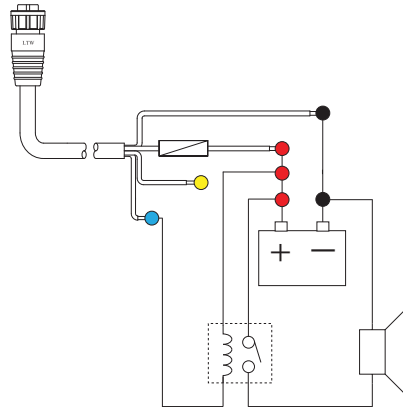
Connect an external monitor

The Zeus² 12 offers an HDMI output which can be connected to an external monitor to replicate video at a remote location.
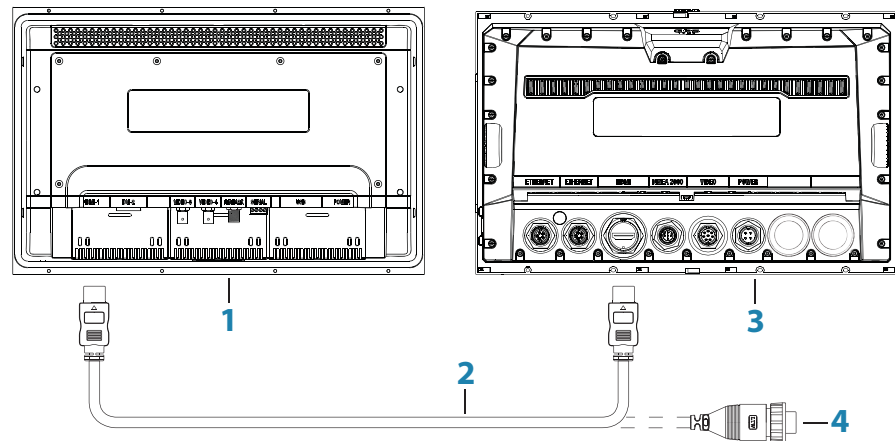
1 **MO series monitor**

2 **HDMI cable**

3 **Zeus² 12**

4 **HDMI cable - waterproof connector (use in exposed installations)**

➔ *Note:* If connected to an HDTV it is possible the image may appear cropped, ie missing some detail at the outer edges of the screen. This is usually due to overscan applied by the TV. Refer to your TV operator manual to find if and how overscan can be turned off.

NMEA 2000 – connection to backbone

Device connection
The Zeus² multi function displays are equiped with an NMEA 2000 data port, which allows the receiving and sharing of a multitude of data from various sources.

Essential network information
- The standardised physical cables/connectors for NMEA 2000 are 'Micro-C' and 'Mini-C', directly derived from the automation industy's 'DeviceNET' - 'Micro-C' being the more commonly used size.
- 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 78m (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 Micro-C 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), 4.55 m (15 ft), and 7.58 m (25 ft) cables
- T-connector. Used to connect a drop cable to the backbone
- Micro-C power cables. Connected to backbone via a T-connector

→ **Note:** When using a wind sensor, the mast cable should be connected at one end of the backbone, as the sensor is fitted with a termination resistor.

→ **Note:** Most NMEA 2000 devices can be connected directly to a SimNet backbone and SimNet devices can be connected to a NMEA 2000 network by using adapter cables.

→ **Note:** B&G devices are fully compatible with a SimNet network by using a Micro-C to SimNet adapter cable.

→ **Note:** Triton displays have two Micro-C connectors, and can either be connected inline with the backbone, or wired individually off a drop cable. Connecting from device to device is known as 'daisy chaining' This network topology is not officially NMEA 2000 compliant.

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 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 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, radar, bow thruster or other high current devices.

The following drawing demonstrates a typical small network. The backbone is made up of direcly interconnected T-piece joiners and an extension cable, which is terminated at each end.
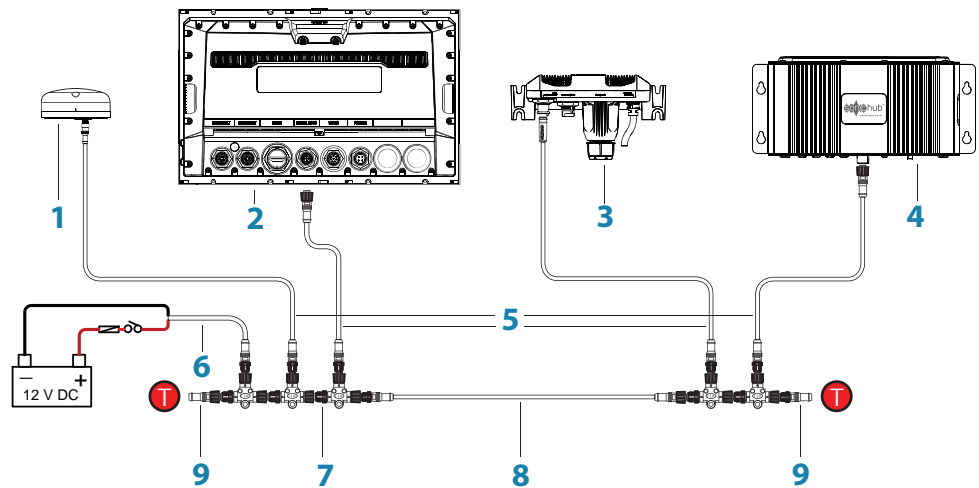
1 **GPS antenna**

2 **Zeus²**

3 **Broadband radar interface**

4 **SonicHub**

5 **'Drop' cables (should not exceed 6m (20') each)**

6 **Power cable**

7 **Micro-C T junctions**

8 **Backbone**

9 **Micro-C terminator (one male, one female)**

NMEA 0183 device connection

The Zeus² display has an 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.
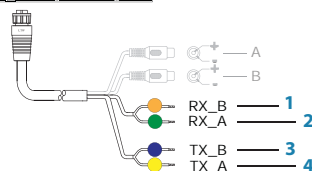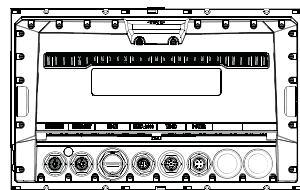
1 **NMEA 0183 RX_B (orange)**

2 **NMEA 0183 RX_A (green)**

3 **NMEA 0183 TX_B (blue)**

4 **NMEA 0183 TX_A (yellow)**

→ *Note:* The connector for NMEA 0183 is labelled VIDEO, as the cable is dual purpose and carries both composite video and NMEA 0183 (on seperate wires).

Talkers and Listeners

Do not connect multiple devices outputing data (Talkers) on to the serial input (Rx) of the unit. The NMEA 0183/RS422 standard is not intended for this type of connection, and data will be corrupted if multiple devices transmit simultaneously. The output however may drive

multiple receivers (Listeners). The number of receivers is finite, and depends largely on the receiving hardware. Typically driving three devices is possible.

Ethernet device connection

Ethernet is used to interconnect high bandwidth devices such as radar, sonar, and other multi function displays. The Zeus² 7/9 have one ethernet port, whereas the Zeus² 12 has two. Connection of network devices can be made directly, or via a NEP-2 ethernet expansion port. Additional NEP-2s can be added to provide required number of ports.
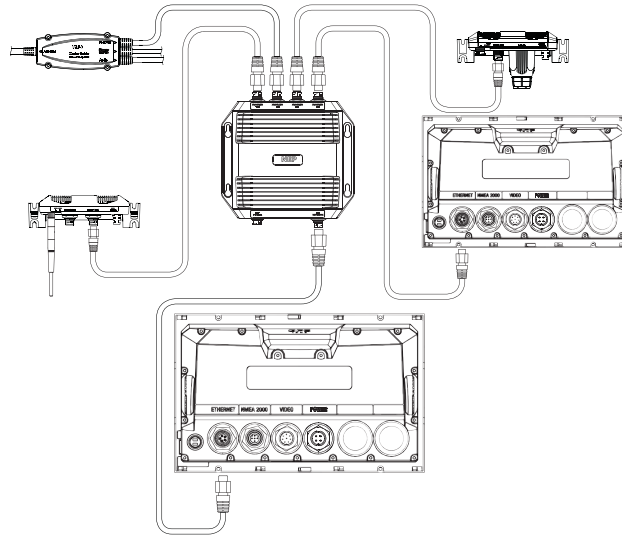
→ *Note:* some ethernet devices are equiped with two or more ethernet ports, which allow connection of additional devices, and may eliminate the need for an extra NEP-2.

Video in

Each Zeus² can be connected to two composite video cameras, and display video images on its displays. Both NTSC and PAL formats are supported. The Zeus² video input cable is fitted with female RCA plugs - the camera cables should be terminated with male RCA cables to suit.
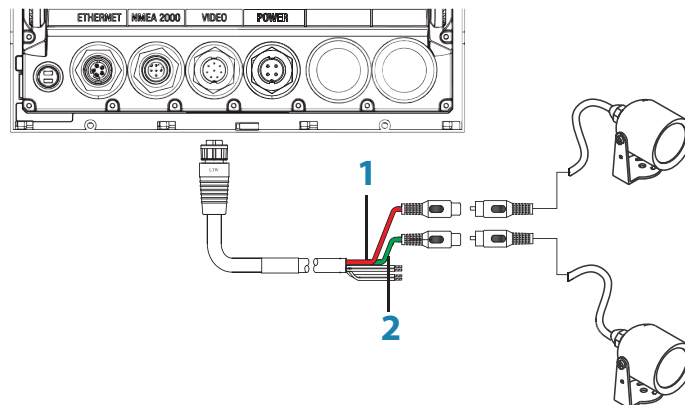
1 Camera input 1 - red cable

2 Camera input 2 - green cable

→ *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.

Software setup

The Zeus² requires some initial configuration before use, in order to get the most out of the product.

The following sections focus on settings that typically will not require change once configured. User preference settings and operation are covered in the operator manual.

Pressing the home key brings up the home page, which has three distinct panels.

The scrollable left column of icons access most settings that require configuration;
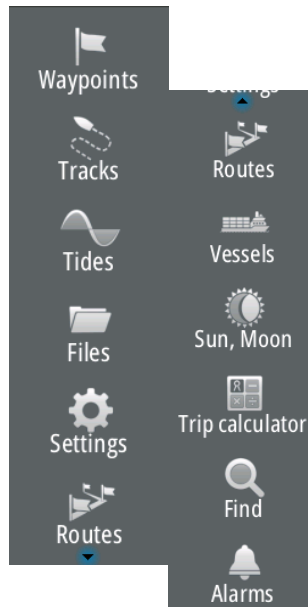
First time startup

When the Zeus² is started for the first time, or after a factory default, the unit will raise prompts requesting the user to select some fundamental setup options;

Choose language.
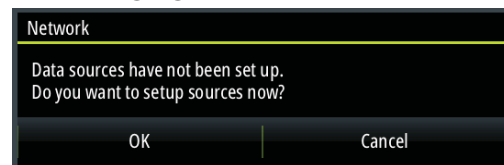
Initiate source selection for data sources both internal and external to device.
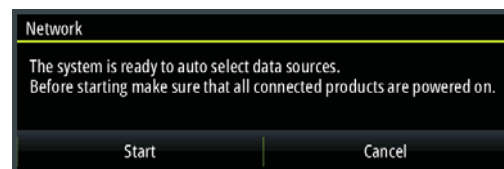
Check all external data sources and NMEA 2000 data bus are turned on.

Simulation uses recorded data to allow product demonstration of features otherwise not possible without physical installation on a vessel.

⚙ System

Time and Date

Configure time settings to suit vessel location.

Time	✕
01/06/2014 11:31 pm	
Local time offset	GMT -06:00
Time format	12 hr ▾
Date format	MM/dd/yyyy ▾
Save	Cancel
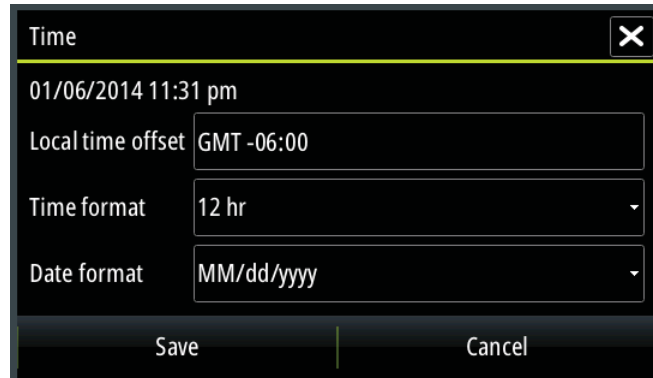
⚙ System

Power Control setup

Determines unit response to signal applied to yellow wire of power cable.

Power Control	✕
Slave ☑	This display is controlled by any master on the network, when wired for power control.
Master ☐	This display controls the power for all devices on the network wired for power control. There can be more than one master on the network.
Save	Cancel
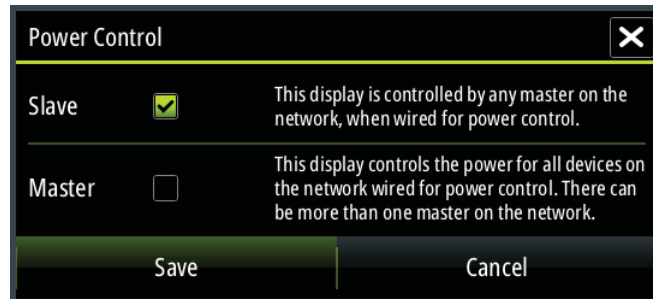
These settings do not require adjustment if the yellow wire is connected to ignition or to a stand-alone switch that applies 12V/24V.

➔ **Note:** The System Controls menu will not display the 'Power Off' option when unit is configured as slave. To power down device, the master device must be powered down, or system power removed.

🖧 Network

Source selection

Data sources provide live data such as GPS position, heading, wind speed, and temperature. The data may originate from modules internal to the device (eg internal GPS), or external modules connected via NMEA 2000 or NMEA 0183. The internal 'virtual' devices typically include echo, MFD, Navigator, Pilot Controller, and iGPS. When a device is connected to more than one source providing the same data, the user has the flexibility to choose the prefered source. Before commencing with source selection make sure all external devices and the NMEA 2000 bus are connected and are turned on.

Auto Select

The Auto Select option will look for all sources connected to the device. If more than one source is available for each data type, selection will be made from an internal priority list. This option will be 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.

Auto Select		
Compass ▸	Group	None ▾
Navigation ▸	Advanced...	
Position ▸	RC42 Rate compass [007356#] ☑	
Apparent wind ▸		
True wind ▸		
Boat speed ▸		
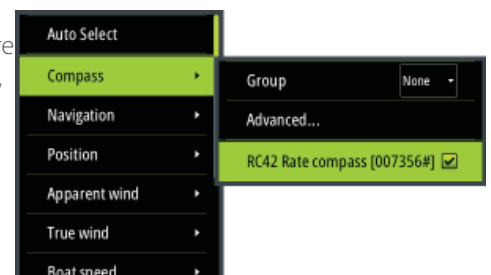
Group source selection

B&G multifunction displays, autopilot controllers, and instruments have the ability to;

- use data sources (eg position, wind direction, etc) 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 will only include products set to Group mode.)

In order to enable group selection, the display must be set to 'Default' group.
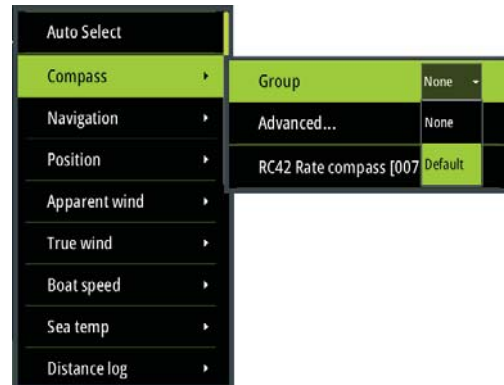
Devices with Group set to None can be set to use different sources to those of the rest of the network devices.

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 via the Advanced menu. Occassionally 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 can't determine which engine is fitted on the port and which is fitted on the starboard side.

Device list

The device list shows the physical and virtual devices that provide data. This may include a module inside the Zeus², the NMEA 0183 port, or any external NMEA 2000 device.

Selecting a device in this list will bring up additional details and actions:
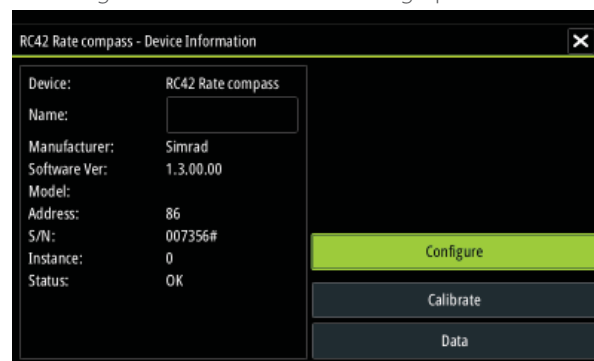
All devices allow allocation of an instance number via the **Configure** option. Set unique instance numbers on any identical devices on the network. The **Data** option shows all data being output by the device. Some devices will show additional option(s) specific to the device - the RC42 illustrated above has a **Calibration** option, to allow easy setup of this device which does not have it's own user interface.

Network Groups

It is possible to group certain settings so they are duplicated across the network on multiple displays. **Display** (ie backlighting), **Units** (ie metric, imperial), **Damping** (to dynamic data), and **Alarms** can be grouped either in 'Default' group, or groups '1' through to '6'. If any of the settings require discrete control, set it to 'none'.

Diagnostics

The NMEA 2000 tab on the diagnostics page can provide information useful for identifying an issue with the network.

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 CAN driver got too many messages for its buffer before the application could read them.

Rx Overruns: The CAN hardware got too many messages for its buffer before the CAN 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 missed frame, or 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).

Alarms

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.

Radar

Radar setup

Setup and configuration of the Broadband radar has been simplified compared to traditional pulse radars. There is no zero range (time delay), no warm up time, and no burn-in required..

Radar source

In a system with more than one radar, the correct device to configure can be selected from this menu.

→ **Note:** some radar like the broacband 4G support dual radar mode, and therefore 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 website for the latest version.

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

The earlier Zeus models only support one radar on the network. Should a radar be connected, that has been connected to a dual radar network in the past, it may not be detected by the Zeus because it may have an invalid Device ID. With the radar connected and power 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 Zeus with Zeus².

Adjust bearing alignment

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 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.

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 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

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 harbour 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 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:

- Set Radar range to between 1/2 nm to 1 nm and Sidelobe Suppression to Auto.
- 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
- Traverse the area until the strongest sidelobe returns are seen.
- 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.

- Traverse the area again and readjust if sidelobes returns still occur.
- Exit the installation menu.

Restore radar to Factory Default
This can be used to revert all user adjustments.

Video In configuration

Press the menu key when on the video page or panel to open the setup dialogue.

Enable PAL or NTSC depending on the video ouput 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 rearview mirror, ie, on the same side as they actually are.

Video source
Video1
Video standard
NTSC
Cycle enabled
☐
Cycle period (s)
10
Brightness
50%
Saturation
50%
Contrast
50%
Hue
50%
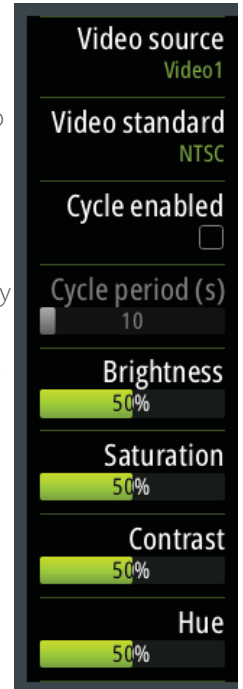
Autopilot setup

Verifying the autopilot connection

When an AC12N, AC42N, or SG05 is connected to the Zeus² system, the Zeus² will automatically detect the autopilot and an Autopilot menu icon will be included in the 'Settings' menu.

If no 'Autopilot' icon is available in the menu, establish the connection by running the auto select process.

If the AC12N, AC42N or SG05 is turned off independantly of the display, the 'Autopilot' menu icon will remain available, but only a few of the menu items will be available.

Commissioning the autopilot

When the autopilot installation is completed, the commissioning procedures must be performed. Failure in setting up the autopilot correctly may prohibit the autopilot from functioning properly.

The setup of the autopilot computers (AC12N/42N) can be done in full from compatible B&G displays that feature AP control, or a Triton display. The following sections describe how you configure the autopilot from the Zeus² unit.

If you connect the Zeus² to an already commissioned autopilot system, you only have to do an automatic source selection as described above before the autopilot is ready to be used.
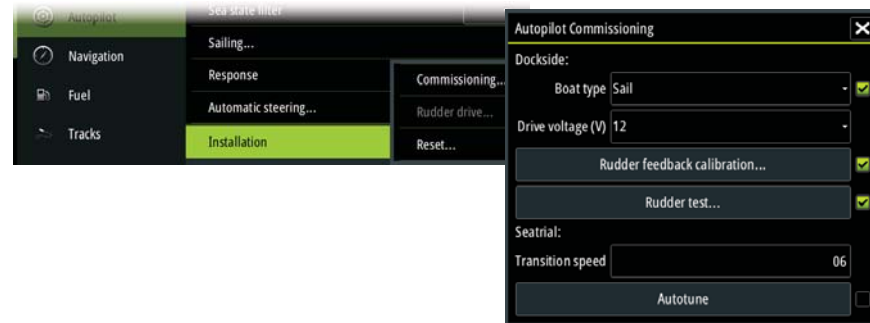
Dockside setup

Initiating the required dockside setup is done from within the Commissioning dialog. Completed procedures are labelled with a tick.

When the autopilot computer is delivered from factory AND ANY TIME AFTER AN AUTOPILOT RESET HAS BEEN PERFORMED, you will have to run a complete setup again.

All steps in all commissioning procedures are clearly described on-screen, and you will be guided step by step through the process.

1. Press the 'STBY/AUTO' key to ensure that the autopilot is in standby mode
2. Activate the autopilot commissioning dialog as shown above
3. Select boat type
   - The boat type setting is used by the system to select appropriate preset steering parameters. It will also affect available autopilot features.
4. Perform the rudder calibration
   - Used if you have a rudder feedback unit installed. This calibration is used to ensure that the physical rudder movement corresponds to the rudder angle displayed on the Zeus² unit.

VRF (Virtual Rudder Feedback) calibration
   - The Virtual Feedback option enables your autopilot to steer without a conventional rudder feedback unit. This function is designed for vessels up to 40 ft. powered by outboard or stern drives only.
   - The Virtual Feedback option will only be available when there is no feedback unit connected at first time turn on, or at turn on after an autopilot reset.

→ *Note:* Installing a feedback unit will enhance the performance of the autopilot and provide an accurate rudder angle indicator on the autopilot display. Unless impractical or impossible, a rudder feedback unit should be installed.

5. Set the drive voltage

- Refer to the drive unit table in the AC12N/AC42N Installation manual or to your drive unit documentation for information.

6. Run the rudder test as described in the on-screen instructions

→ *Note:* If the boat uses power assisted steering, it is important that the engine or electric motor used to enable the power assist steering is turned on prior to this test.

Stand CLEAR of the wheel and do not attempt to take manual control of the wheel during this test!

- When this test is started the autopilot computer will issue a series of PORT and STBD rudder commands and automatically verify correct rudder direction. It detects minimum power to drive the rudder and reduces the rudder speed if it exceeds the maximum preferred speed (8°/sec.) for autopilot operation. The system will also detect whether the drive unit is a reversible motor or if a solenoid valve is operated.

Rudder drive setup

The rudder drive setup controls how the autopilot computer controls the steering system.

Rudder Drive	✕
Drive voltage (V)	12 ▾
Drive engage	Auto ▾
Motor output	Auto
Rudder deadband	Clutch
Manual deadband	Min
Save	Cancel
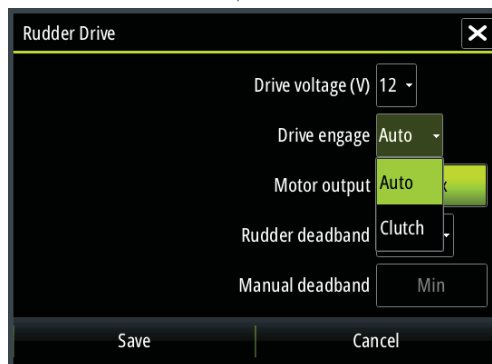
Drive voltage

Voltage specified for your drive unit.

The Drive unit voltage setting does not apply when the system operates solenoids on a continuous running pump/steering gear. Hence, the output voltage to the solenoids will be the same as the input voltage.

Refer to the drive unit table in the AC12N/AC42N Installation manual or to your drive unit documentation for information.

⚠ **Warning:** *Selection of improper voltage level for your drive unit may damage both the drive unit and the AC12N/AC42N even if the protection circuits are activated.*

Drive engage

Clutch	This is the default setting and it allows you to steer the boat with the helm or wheel when in STBY mode (FU and NFU modes) as well as in all auto steering modes
Auto	This option is typically used to switch between two rudder speeds on a continuous running pump, used when different rudder speeds are required for automatic and Follow-up/Non-Follow-up steering

Motor output

Shows the amount of power needed to achieve the correct rudder speed. The reading is obtained from the Rudder test.

The automatically set value may be increased or decreased.

Rudder deadband

This parameter is used to prevent the rudder from hunting. The reading is obtained from the Rudder test which optimizes the deadband to the speed of the boat and the pressure on the rudder.

If the auto-setting does not perform properly due to high inertia from the wheel or a loose steering gear, it can be adjusted manually. Find the lowest possible value that will prevent the

rudder from continuous hunting. A deadband will cause inaccurate steering.

→ **Note:** The rudder deadband setting is not available when the autopilot is configured for Virtual Rudder Feedback.

Seatrials

A seatrial can only be performed if the dockside settings are completed and confirmed.

The seatrial must always be performed in open waters at a safe distance from other traffic.

→ **Note:** You can switch the autopilot to standby mode and take manual control of the boat at any time during the seatrial by pressing the 'STBY/AUTO' key.

The following seatrial calibration should be done:

- Compass calibration; used to automatically compensate for on-board magnetic interference
- Compass offset adjustment, used to compensate for a fixed offset in the final heading readout
- Wind vane offset to compensate for a wind vane that is not mounted facing in exactly the same direction as the bow of the vessel (dead ahead)
- Boat speed calibration
- Transition HI/LO speed setting (the speed at which you want to change the set of steering parameters)
- Automatic tuning of the steering parameters
- Setting the seastate filter
- 'Saiboat Setup' menu items

Compass calibration

Before the compass calibration is started, make sure that there is enough open water around the vessel to make a full turn.

The calibration should be done in calm sea conditions and with minimal wind to obtain good results. Follow the on-screen instruction, and use about 60-90 seconds to make a full circle.

During the calibration, the compass will measure the magnitude and direction of the local magnetic field.

- If the local magnetic field is stronger than the earth's magnetic field (the local field is reading more than 100 %), the compass calibration will fail
- If the local field is reading more than 30 %, you should look for any interfering magnetic objects and remove them, or you should move the compass to a different location. The (local) field angle will guide you to the local interfering magnetic object.

→ **Note:** Calibration must be made on the compass that is active for the autopilot. If the compass is not possible to initiate calibration from the device list on the Zeus², refer to the compass' own instructions regarding calibration.

→ **Note:** In certain areas and at high latitudes the local magnetic interference becomes more significant and heading errors exceeding ±3° may have to be accepted.

Compass mounting offset

After compass calibration, the difference (if any) between the compass lubber line and the boat's center line should be compensated for.

1. Find the bearing from the boat position to a visible object. Use a chart or a chart plotter
2. Steer the boat so that the center line of the boat is aligned with the bearing line pointing towards the object
2. Change the offset parameter so that the bearing to the object and the compass readout becomes equal. Refer graphic above

→ **Note:** Make sure that both the compass heading and the bearing to the object have the same unit (°M or °T).

Setting the Transition speed (HI/LO)

This is the speed at which the system automatically changes from LO to HI steering parameters.

On power boats it is recommended that you set a value that represents the speed where the hull begins to plane or the speed where you change from slow to cruising speed.

On sailboats the transition speed should be set to around 3-4 knots to give the best response in a tack.

A deadband of 2 knots is incorporated to prevent oscillation of HI/LO settings when vessel is travelling at the transition speed.
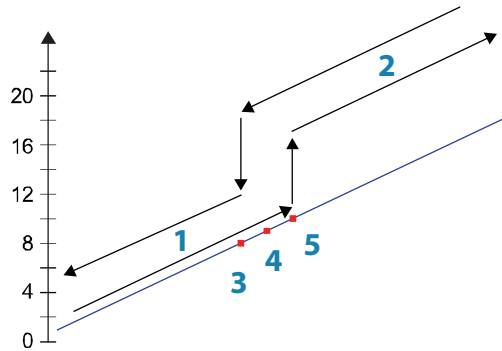
1 HI response

2 LO response

3 Transition to HI parameters with decreasing speed: 8kn

4 Transition speed set to 9kn

5 Transition to LO parameters with increasing speed: 10kn

Active response parameter set is shown in the autopilot popup, and the following abbreviations are used:

	HI-A	High response parameters set automatically
	LO-A	Low response parameters set automatically
	HI-M	High response parameters set manually
	LO-M	Low response parameter set manually

Autotuning

The autotune feature will run the boat through several tests and then automatically set the most important steering parameters.

Autotune is not required for the autopilot to function, as it is preset with steering parameters that should steer most boats in the 30-50 foot range.

You can manually adjust all parameters that are set during autotuning.

Seastate filter

The Seastate filter is used to reduce rudder activity and autopilot sensitivity in rough weather.

OFF	Seastate filter is disabled. This is default
AUTO	Reduces rudder activity and autopilot sensitivity in rough weather by an adaptive process. The AUTO setting is recommended if you want to use the seastate filter
MANUAL	Linked to the steering response control settings described previously. It may be used to manually find the optimum combination of course keeping and low rudder activity in rough but steady sea conditions
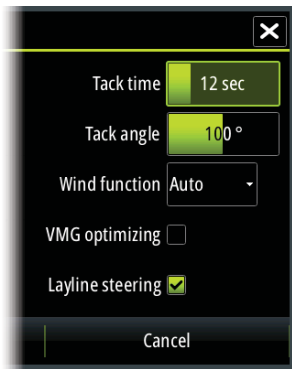
Setting sailing parameters

→ **Note:** Sailing parameter settings are only available if the boat type is set to Sail.

Tack time

When performing a tack in WIND mode, the rate of turn (tack time) can be adjusted. This will give single-handed sailors time to handle the boat and the sails during a tack.

A turn performed without shifting wind side, will also be made at a controlled turn rate.

Range	Change per step	Default	Units
2 - 50	1	12	seconds

Tack angle

This value is used to preset the course change used when tacking in AUTO mode. By pressing the left/right arrow keys the course will change as much as this value.

Range	Change per step	Default	Units
50 - 150	1	100	°

Wind function

With wind function set to Auto, the autopilot will automatically select between apparent and true wind steering. Auto is default and recommended for cruising.

When the boat is running or on a broad reach, there is a heightened chance it will surf on the waves. This may lead to significant changes in boat speed, and thereby changes in apparent wind angle. True wind steering is therefore used to prevent undesired corrections by the autopilot when heading downwind (or close to), while steering to apparent wind is used when beating or reaching.

Apparent wind steering is preferred when you want to maintain maximum boat speed without continuous trimming of the sails.

VMG optimizing

You can optimize the VMG to wind. When selected the function will be active for 5–10 minutes after a new wind angle has been set and only when beating.

Layline steering

Layline steering is useful when navigating. Cross Track Error (XTE) from the navigator will keep the boat on the track line. If the XTE from the navigator exceeds 0.15 nm, the autopilot will calculate the layline and track towards the waypoint.

Manually adjusting steering parameters

The autotune function in the autopilot is so refined that the majority of boats will need no further adjustments of the steering parameters. On some boats however, or in particular sea conditions, fine tuning of the steering parameters may improve the performance of the autopilot.

Transition speed

Refer previous description.

Rudder

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

Counter rudder is the amount of rudder used to try to prevent the boat from yawing around the set course. Higher counter rudder settings result in more rudder being applied.

The best way of checking the value of the Counter rudder setting is when making turns.

The figures illustrate the effects of various Counter Rudder settings;
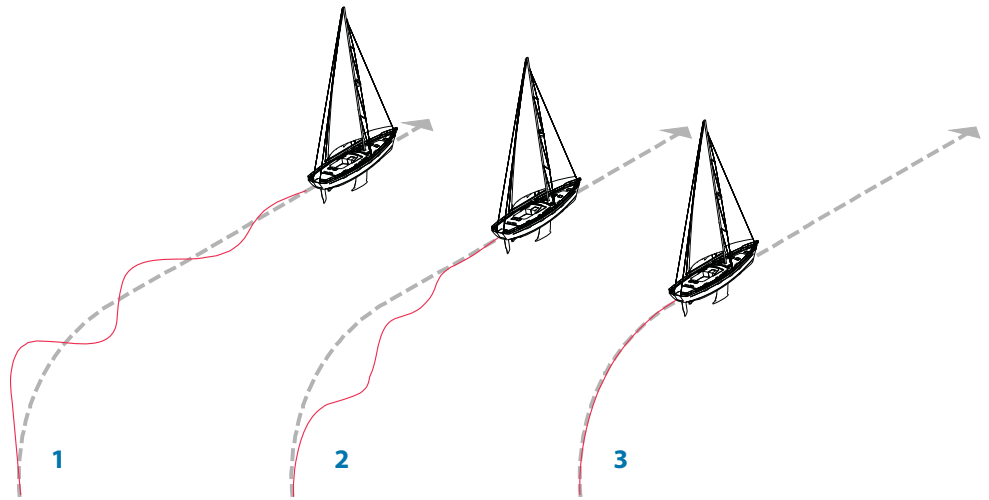
1 **Counter rudder too low; overshoot response**

2 **Counter rudder too high; sluggish and creeping response**

3 **Correct setting or counter rudder; ideal response**

Auto trim

This parameter defines how fast the autopilot shall correspond after having registered a heading error.

The standard value is 40 seconds which should work well on most boats. Rule of thumb: Set to same value (seconds) as the boat's length in feet. On boats operating on VRF the value should be set to 20 seconds.

Rate limit

Sets the maximum allowed rate of turn.

The value should be kept at 6.0°/second unless there is a need for more rapid response in turns.

Minimum rudder

This parameter filters small rudder commands to prevent high rudder activity.

Some boats may have a tendency to not respond to small rudder commands around the "course keeping" position because of a small rudder, a rudder deadband, whirls/disturbance of the water-stream passing the rudder or it is a single nozzle water jet boat.

By increasing the Minimum rudder parameter you may improve the course keeping performance on some boats. This will however increase the rudder activity.

Minimum wind angle to port and starboard

These parameters should be set identical to the minimum apparent wind angle that will keep the sails from stalling and maintain boat speed. The parameters will vary from boat to boat.

The settings are used for the tack-prevent function. They also apply when the autopilot is operating in WindNAV mode.

You can select different minimum wind angles for port and starboard. The difference between port and starboard will be taken into account when calculating the Distance To Turn (DTT).

Navigation change limit

This parameter defines the maximum course change that the autopilot is allowed to make when the Zeus² is following a route (NAV steering).

If the required course change to the next waypoint in a route is more than the set limit, you are prompted and must acknowledge the course change before the autopilot will turn the vessel.

Fuel setup

The fuel utility monitors a vessels fuel consumption. This information is totalled 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 (petrol/gasoline only), 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 seperate 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 physical connection is made, ensure source selection is completed. Multiple engine installations using Fuel Flow sensors, or Fuel Data Storage devices, will require setup of related engine location in the device list. For general source selection information refer to "Source selection" on page 15.

→ *note:* Multiple engines utilising a single gateway will not work with the Navico Fuel Storage device.

Vessel setup

This dialog must be used to select the number of engines, the number of tanks and vessel's total fuel capacity across all tanks.
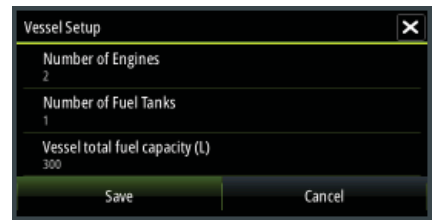
Fuel flow configuration

Once the number of engines are set, it's required to set which fuel flow sensor is connected to which engine. Under 'Device list' on the Network page, view the 'Device Configuration' page for each sensor, and set 'Location' to match the engine the device is connected to.
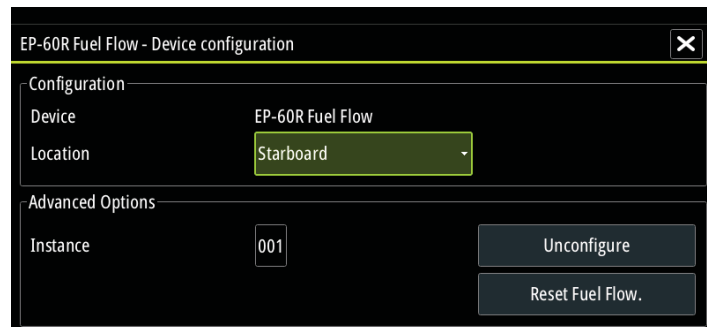
'Unconfigure' is for defaulting the device clearing all user settings, and 'Reset Fuel Flow' will restore only the 'Fuel K-Value' setting, if set in 'Calibrate'. Only Navico devices can be reset.

Calibrate

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.
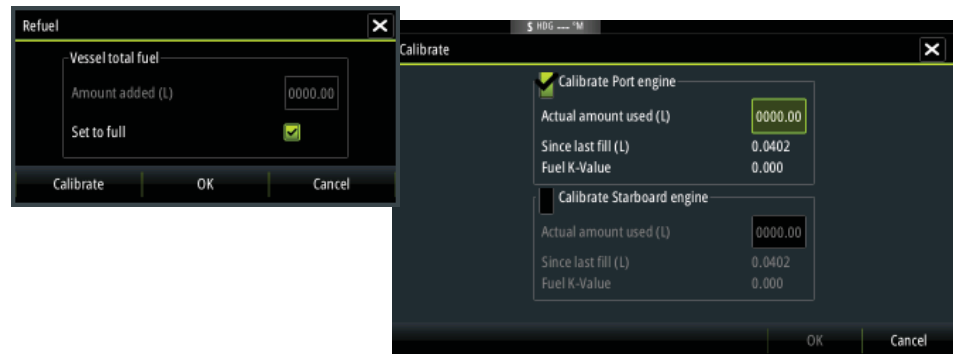
1. Start with a full tank and run the engine as it would normally be operated.
2. After at least several litres (a few gallons) have been used, the tank should be fully refilled, and the 'Set to full' option selected.

3. Select the 'Calibrate' option.

4. Set the 'actual amount used' based on amount of fuel added to 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 engine simultaneously, and divide the 'Actual amount used' by the number of engines. This assumes reasonably even fuel consumption on all engines.

→ **Note:** 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 equiped tank. The number of tanks must be set in 'Vessel Configuration' to allow discrete tank assignment of the Fluid Level devices. Under 'Device list' on the Network page, view the 'Device Configuration' page for each sensor, and set Tank location, Fluid type, and Tank size.
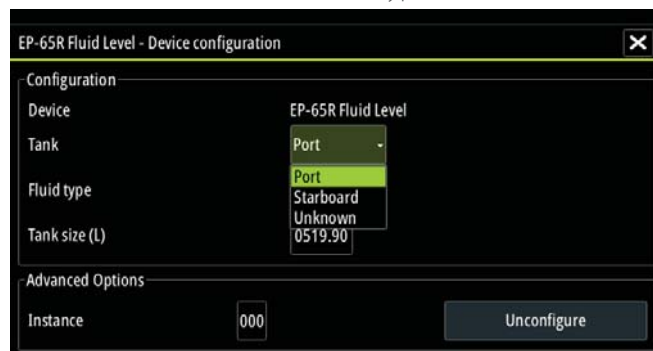
Refer to the Operator manual on setting up the Instrument bar or a gauge on the Instruments page using the Fluid Level device data.

→ **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 via the Zeus² displays.

CZone setup

In order to communicate with the CZone modules connected to the network, the Zeus² 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 supported B&G displays, such as the Zeus². The file is created using the CZone Configuration Tool, a specialised PC application available from BEP Marine Ltd, and associated CZone distributors.

The Zeus² 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.
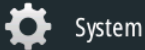
Enabling CZone functionality

If the Czone device(s) are not automatically detected, it is possible to manually enable CZone.
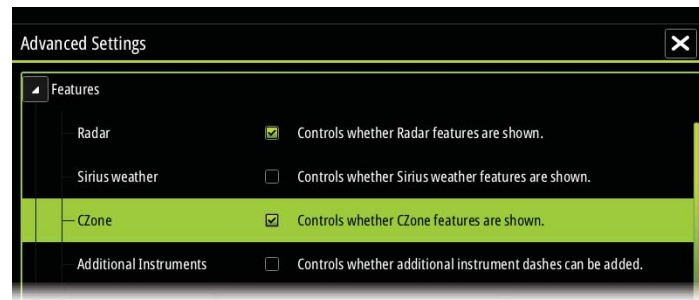
Assigning the dipswitch setting

Every B&G 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 config 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 config is already available on the network, it will immediately commence uploading to the Zeus² 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 will be shown first, every time the Zeus² is powered up.

CZone backlight control

Enabling this will cause the Zeus² 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 Zeus² set as a controller.

Import and backup a config file

The files page may be used to import CZone config files, or export a copy to a Micro SD card. Importing will overwrite the existing file on the Zeus² and all connected CZone devices.

For further information see "Backing up and Importing user data" on page 33

Upgrading module firmware

The files page also allows the loading of CZone module firmware updates. For further information refer to "NMEA 2000 and Ethernet device updates" on page 33

Software updates and data backup

From time to time B&G releases software updates to its 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 B&G website: http://www.bandg.com/Support/Downloads/ The Zeus² may be used to apply software updates to itself, and to supported NMEA 2000 and ethernet devices, with files read off an SD card.

Before initiating an update to the Zeus² itself, be sure to back up any potentially valuable user data.

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 new pages, and Czone configuration files)

The backup procedure is similar for both - simply select which you want to backup and select the destination to save to, e.g. on the unit, or to an SD card.

The user has the option of exporting all waypoints, or exporting only waypoints contained within a specific region.

Waypoint backup offers different file formats to save as:

- User data file version 5: Use with current Navico MFDs. Offers most detail
- User data file version 4: Use with current Navico MFDs
- User data file version 3 (with depth): Use with legacy Lowrance GPS chartplotters
- User data file version 2 (no depth): Use with legacy Lowrance GPS chartplotters
- GPX (GPS Exchange): Use with some other manufacturers' GPS products, and PC applications
- Northstar .dat (no Tracks): Use with legacy Northstar chartplotters

The 'Serial port' option outputs the waypoints over NMEA 0183. The receiving GPS/PC will typically need to be set to allow import of waypoints.

Later, if the Zeus² is defaulted or user data is accidentally deleted, simply return to the files page, highlight the backed up file, and select 'Import'. View file details for creation date.

Zeus² software upgrades

The update file must be loaded to the root directory of an SD card.

In the files menu, locate the update file on the SD card and select 'Upgrade'. Accept the prompt to reboot the unit, and wait a few moments as the unit restarts. Do not remove the SD card or repower the Zeus² until the process is completed (this will typically take no more than a couple of minutes). Backup may also be initiated at boot up - simply insert the SD card, before turning unit on, boot unit and follow on-screen instructions.

NMEA 2000 and Ethernet device upgrades

The update file must be loaded to the root directory of an SD card.

To update NMEA 2000 and ethernet devices 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. Select device and initiate upgrade. Do not interrupt the upgrade process.

→ *note:* If no device is shown, check device to be updated has power, and run any outstanding updates for the display first.

NMEA 0183 setup

The NMEA 0183 port must be set to suit the speed of connected devices, and can be be configured to output only the sentences required by listening devices.

Sources...	
Device list	
Diagnostics	
Network Groups...	Receive waypoint ☑
Damping...	Baud rate 4800 (default) ▾
Water Speed	Serial output ☐
NMEA2000	Serial output sentences...
NMEA0183	Ethernet
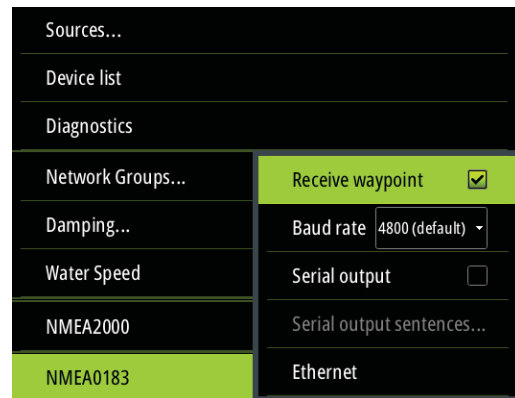
Receive waypoint

Select this option to allow device capable of creating and exporting waypoints via NMEA 0183 to transfer directly to the Zeus².

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.

	4800 (default)
es...	9600
e list	19200
ostics	
rk Groups...	Receive wa 38400
ing...	Baud rate 4800 (default) ▾
Speed	Serial output ☐
2000	Serial output sentences...
0183	Ethernet

Serial Output

Selection will determine the whether 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 transmit 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 are selected, the higher the output rate of the enabled sentences.

NMEA0183 Output Sentences	✕
▲ GPS	
☑ GGA	
☑ GLL	
☐ GSA & GSV	
☑ RMC	
☑ VTG	
☐ ZDA	
Output rate 1.0Hz, HDG 9Hz	
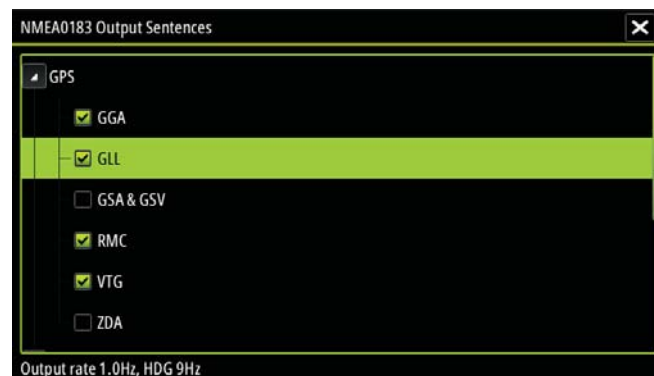
Commonly used sentences are enabled by default.

NMEA 0183 over Ethernet

The NMEA 0183 data stream is also output over ethernet, which is made available to tablet devices and PCs, using the WiFi1 wireless adaptor.

The ethernet dialogue provides IP and port data typically required for configuring the application on the third party device.

Ethernet setup

No special setup is required for establishing an ethernet network, it is all 'plug and play'. An NEP-2 connected between an Zeus² and another network module (e.g. 4G radar) will automatically start working, and relay data between the two devices.

Network

Diagnostics

The UDB (User Data Base) tab on the diagnostics page, provides information on Ethernet activity, as shown below.

The 'Reset Display List' 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 B&G display 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 tick box 'Dirty' is ticked, the unit has identified that its database is older than that of another device on the network. The tickbox 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 have the power cycled.

IP addresses

The lower table shows the IP address of the display being viewed (top of list), the Master display (with a tick next to it), and any other displays in a multi display network. The function of the Master is invisible to the end user - It manages database synchronisation, 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 acheived by loading the latest software on to your display - refer to "Software Updates and Screen Calibration" on page 36.

Module network light

The network LED on modules such as NEP-2, GoFree WiFi-1, and RI10, 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 B&G website www.bandg.com or contact B&G technical support.

Wifi setup

To connect to a GoFree device a suitable wifi Android tablet or Apple ipad is required. Navigate to the wifi network connection page on the tablet, and find the 'GoFree Wifi xxxx' network. Connect to the network using the eight character password printed on the silver label of the GoFree module. If the module is installed out of easy access, see the following section 'Access Points' on how to identify the 'Network Key' (password) from the Zeus².

Allow "Nexus 7" remote MFD control?
| Yes | No | Always |
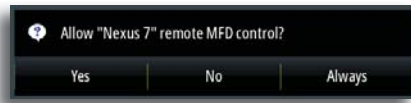
The above dialogue will appear on the Zeus² display when connection is attempted. Select 'Yes' for one-time connection, or 'Always' if device is to be remembered for regular connection.

Devices

When a wifi device is connected, it should appear in the wifi devices list. Selecting 'Always allow' will mean the device can automatically connect without needing a password each time. This menu also allows disconnection of devices that no longer require access.

Devices
Name	Always allow	Options
Nexus 7 - Connected	☑	☰ ▸

Always allow ☑
Disconnect

Access Points

This page shows connected GoFree devices and their IP address.

Access points
Network name	GoFree Wifi 0756
Network key	D7TNLODN

IP	Mode
192.168.0.1	Primary

Mode

When more than one device is connected, only one may operate as 'Primary'. Primary mode determines that the device is acting as DHCP server - only one DHCP server may exist on a network at a time.

Access Point
Mode	Primary ▾
Channel	AutoSelect ▾

Firmware Version V2.0.0.EN.4M32M.IP.3600.20121004
MAC Address 00:42:42:00:07:56

Restore Defaults

To set a device as secondary, the Zeus² must initially be connected to only one GoFree module. Pressing 'menu' with the device highlighted, opens the dialogue that allows setting to secondary. Once completed, a second module may be plugged in, and will automatically default to primary.
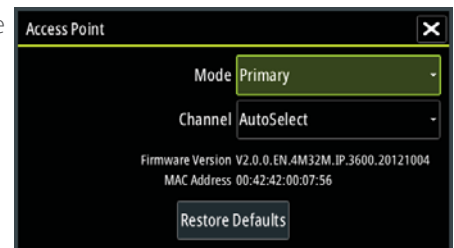
→ **Note:** Use of multiple devices is solely for range extension purposes, and is usually only required on larger vessels.

Channel

Channel setting is available in order to overcome potential interference to the GoFree device by another RF device transmitting in the same frequency band.
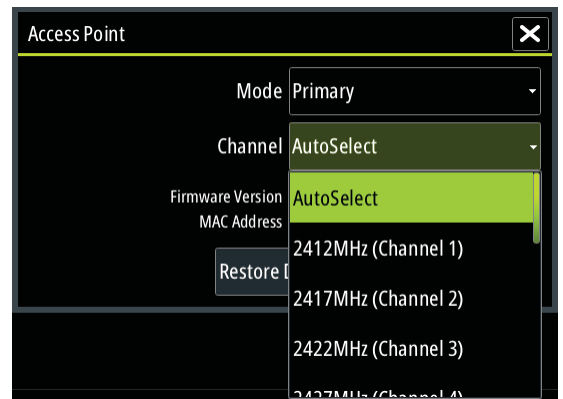
Advanced

Tools are available within the Zeus² software to assist in fault-finding and setting up the wifi network.

Iperf

Iperf is a commonly used network performance tool. It's provided for testing Wifi network performance around the vessel so weak spots or problem areas can be identified. The application must be installed on and run from the tablet device. The Zeus² must be running Iperf server before initiating the test from the tablet. On exiting the page, Iperf will automatically stop running.

DHCP Probe

The GoFree Wifi module contains a DHCP server that will allocate IP addresses for all the MFDs, radars and sonars 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 Zeus². .

Only one DHCP device may be operational on the same network at a time. If a second device is found, turn off it's 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 can not provide support related to their use.

Accessories

Part number	Description
000-11586-001	Zeus² LITERATURE PACK
000-11587-001	Zeus² CHART CARD DOOR
000-11588-001	Zeus² CONNECTOR COVERS (7/9")
000-11589-001	Zeus² CONNECTOR COVERS (12")
000-11591-001	Zeus² 7 SUN COVER
000-11593-001	Zeus² 9 SUN COVER
000-11595-001	Zeus² 12 SUN COVER
000-11598-001	Zeus² 7 EDGE BEZELS (PAIR - SILVER AND BLACK)
000-11599-001	Zeus² 9 EDGE BEZELS (PAIR - SILVER AND BLACK)
000-11600-001	Zeus² 12 EDGE BEZELS (PAIR - SILVER AND BLACK)

Supported data

NMEA 2000 compliant PGN List

NMEA 2000 PGN (receive)

59392	ISO Acknowledgement
59904	ISO Request
60928	ISO Address Claim
61184	Parameter Request/Command
65285	Temperature with Instance
65289	Trim Tab Insect Configuration
65291	Backlight Control
65292	Clear Fluid Level Warnings
65293	LGC-2000 Configuration
65323	Data User Group Request
65325	Reprogram Status
65341	Autopilot Mode
65480	Autopilot Mode
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	DistanceLog
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
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
130840	Data User Group Configuration
130842	SimNet DSC Message
130845	Parameter Handle
130850	Event Command
130851	Event Reply
130817	Product Info
130820	Reprogram Status
130831	Suzuki Engine and Storage Device Config
130832	Fuel Used - High Reolution
130834	Engine and Tank Configuration
130835	SetEngineAndTankConfiguration
130838	Fluid Level Warning
130839	Pressure Insect Configuration
130843	Sonar Status, Frequency and DSP Voltage

NMEA 2000 PGN (transmit)

61184	Parameter Request/Command
65287	Configure Temperature Insects
65289	Trim Tab Insect Calibration
65290	Paddle Wheel Speed Configuration
65291	Backlight Control
65292	Clear Fluid Level Warnings
65293	LGC-2000 Configuration
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	DistanceLog
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
130840	Data User Group Configuration
130845	Parameter Handle
130850	Event Command
130818	Reprogram Data
130819	Request Reprogram
130828	Set Serial Number
130831	Suzuki Engine and Storage Device Config
130835	SetEngineAndTankConfiguration
130836	Fluid Level Insect Configuration
130837	Fuel Flow Turbine Configuration
130839	Pressure Insect Configuration
130845	Weather and Fish Prediction and Barometric Pressure History
130850	Evinrude Engine Warnings

NMEA 0183 supported sentences

TX / RX	GPS								
Receive	GGA	GLL	GSA	GSV	VTG	ZDA			
Transmit	GGA	GLL	GSA	GSV	VTG	ZDA	GLC		
	Navigation								
Receive	RMC								
Transmit	AAM	APB	BOD	BWC	BWR	RMC	RMB	XTE	XDR
	Echo								
Receive	DBT	DPT	MTW	VLW	VHW				
Transmit	DBT	DPT	MTW	VLW	VHW				
	Compass								
Receive	HDG	HDT	HDM						
Transmit	HDG								
	Wind								
Receive	MWV	MWD							
Transmit	MWV	MWD							
	AIS / DSC								
Receive	DSC	DSE	VDM	AIS sentences are not bridged to or from NMEA 2000.					
	MARPA								
Transmit	TLL	TTM	These are only output sentences						

Specifications

Mechanical/Environmental			
Model	**Zeus² 7**	**Zeus² 9**	**Zeus² 12**
Casing	PC / ABS		
Operating temp	-15℃ to +55℃		
Water ingress	IPX6 and 7		
Weight (exluding mounting hardware)	1.071 kg	1.414 kg	3.171 kg
Display brightness	1200nits	1200nits	1200nits
Display resolution	480 x 800 (H x W)	480 x 800 (H x W)	800 x 1280 (H x W)
Viewing angle in degrees (typical value @ contrast ratio =10)	L/R: 70 top: 50 bottom:60	L/R: 70 top: 50 bottom:70	L/R: 88 top: 88 bottom:88
Dimensions (overall)	See dimensioned drawings		
Electrical			
Model	**Zeus² 7**	**Zeus² 9**	**Zeus² 12**
Operating voltage	9 - 31.2 V DC		
Power consumption	11.9 W	11.9 W	25.7 W
Low power standby mode	yes		
Protection	reverse polarity and temporary over-voltage to 36V		
Alarm output current	1 A max		
Processor	iMX61 single core	iMX61 single core	iMX61 dual core
Conformity	CE, C-Tick		
Interfaces			
Model	**Zeus² 7**	**Zeus² 9**	**Zeus² 12**
Ethernet	1 port	1 port	2 ports
NMEA 2000 (compliant)	1 port (Micro-C male)		
Video input	2 analogue ports - NTCS or PAL format		
Video output	N/A	N/A	HDMI
SD	dual micro SD - up to 32GB ea.		
NMEA 0183 port baud rate	4800, 9600, 19200, & 38400		
Charting support	Embedded low detail backround + Insight, Navionics and CMap on SD card		

Dimensioned drawings

Zeus² 7 and Zeus² 9

ZEUS² 7: 231.5mm (9.11"), ZEUS² 9: 279.4mm (11")

ZEUS² 7: 147.2mm (5.8"), ZEUS² 9 163.6mm (6.44")

ZEUS² 7: 163.6mm (6.44"), ZEUS² 9: 178.27mm

ZEUS² 7: 251.1mm (9.89"), ZEUS² 9: 305.1mm (12.0")

ZEUS² 7: 105.6mm (4.16")
ZEUS² 9: 106.6mm (4.20")

ZEUS² 7: 84.0mm (3.31")
ZEUS² 9: 84.0mm (3.30")

ZEUS² 7: 122mm (4.8")
ZEUS² 9: 147.1mm (5.79")

Zeus² 12

345.0mm, (13.58")

215.0mm (8.46")

249.5mm (9.82")

375.1mm (14.77")

105.6mm (4.16")

84.0mm (3.3")

126mm (4.96")

B&G