Vulcan Series
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.

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.

Trademarks

Lowrance® and Navico® are registered trademarks of Navico.

Simrad® is used by license from Kongsberg.

Navionics® is a registered trademark of Navionics, Inc.

NMEA® and NMEA 2000® are registered trademarks of the National Marine Electronics Association.

SiriusXM® is a registered trademark of Sirius XM Radio Inc.

Fishing Hot Spots® is a registered trademark of Fishing Hot Spots Inc. Copyright© 2012 Fishing Hot Spots.

FUSION-Link™ Marine Entertainment Standard™ is a registered trademark of FUSION Electronics Ltd.

C-MAP is a trademark of Jeppesen.

The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.

SD™ and microSD™ are trademarks or registered trademarks of SD-3C, LLC in the United States, other countries or both.

Wi-Fi® is a registered trademark of the Wi-Fi Alliance®.

Additional mapping data: Copyright© 2012 NSI, Inc.: Copyright© 2012 by Richardson's Maptech.

Bluetooth® is a registered trademark of Bluetooth SIG, Inc.

Navico product references

This manual can refer to the following Navico products:

- Broadband Sounder™ (Broadband Sounder)
- DownScan Imaging™ (DownScan)
- DownScan Overlay™ (Overlay)
- ForwardScan™ (ForwardScan)
- GoFree™ (GoFree)
- INSIGHT GENESIS® (Insight Genesis)
- StructureMap™ (StructureMap)
- StructureScan® (StructureScan)
- StructureScan® HD (StructureScan HD)

Copyright

Copyright © 2016 Navico Holding AS.

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: 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 2014/53/EU Directive

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

The relevant Declaration of conformity is available in the Vulcan section on the following website: bandg.com.

About this manual

This manual is a reference guide for operating the Vulcan. 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 1.0. The manual is continually updated to match new software releases. The latest available manual version can be downloaded from 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 bandg.com.

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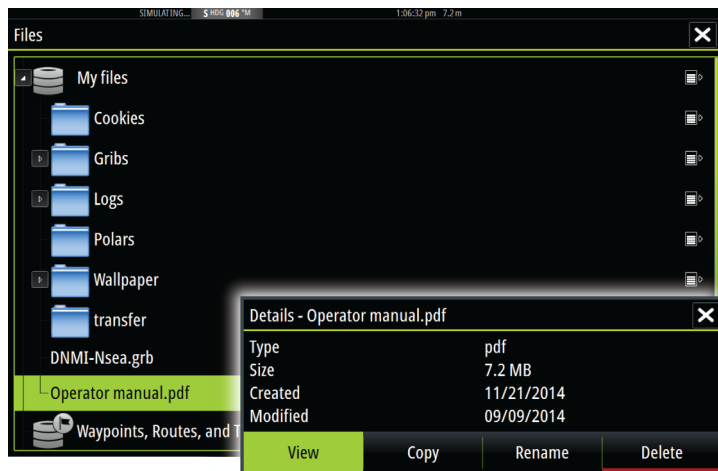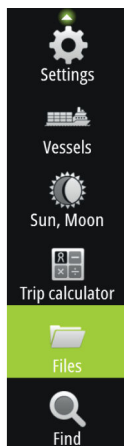
Use the menu options and on-screen buttons to maneuver in the PDF file as described below:

- Search, Goto page, Page Up and Down
  Select the relevant panel button.
- Scroll pages
  Drag finger on the screen in any direction.
- Panning on the page
  Drag finger on the screen in any direction.
- Zoom In/Out
  Select the relevant panel button.
  Touch operation: Use pinch or spread gestures.
- Exit the PDF viewer
  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 154.

Contents

158 Touchscreen operation

1

Introduction

The Home page

The **Home** page is accessed from any operation by selecting the **Home** button in the upper left corner of a panel.
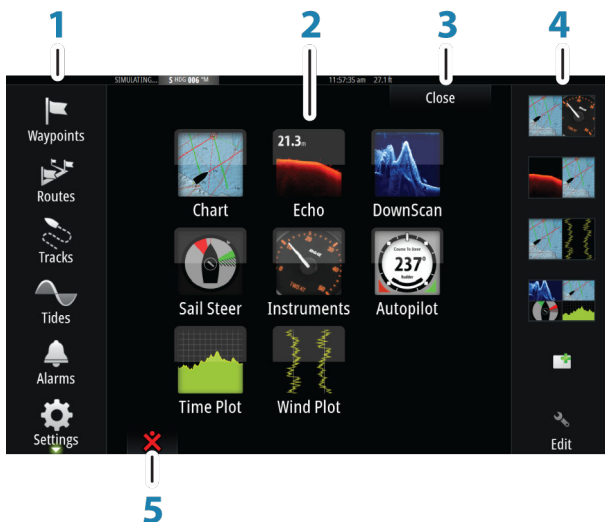
1   Tools
Select a button to access dialogs used for carrying out a task, or for browsing stored information.

2   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.

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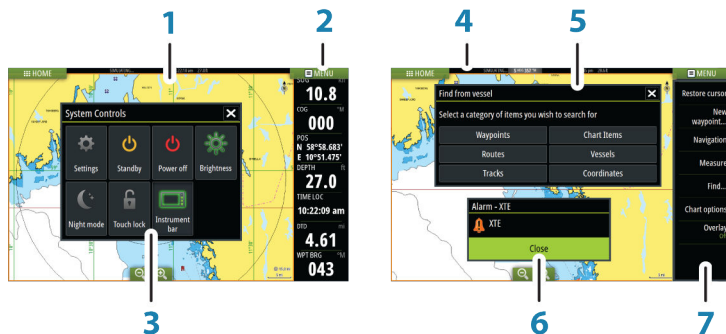
Each application connected to the system is presented on panels. The application can be presented as a full page, or in combination with other panels in a multiple panel page.

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.

Split pages

You can have up to 4 panels on each page.

2 panels page   *3 panels page*   *4 panels page*

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

Pre-configured split pages

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

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

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

Favorite pages

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

For more information, refer to *"Adding new favorite pages"* on page 24.

Integration of 3rd party devices

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

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

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

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

SmartCraft VesselView integration

SmartCraft data can be displayed and interaction are enabled through the Vulcan when a VesselView 7 or VesselView 4 gateway device is present on the network.

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

FUSION-Link integration

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

Refer to *"Audio"* on page 138 for more information.

BEP CZone integration

The Vulcan 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 Vulcan 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 136.

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:

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 or by swiping down from the top of the screen.

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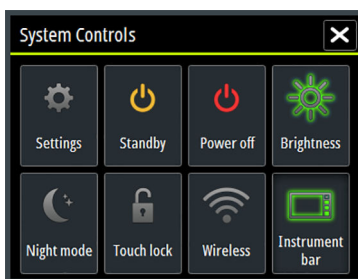
Activating functions

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

Turning the system on and off

You turn the system 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.
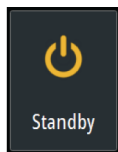
Standby mode

In Standby mode, the Sonar and 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.

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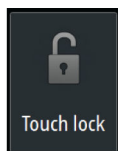
You can temporarily lock a touchscreen to prevent accidental operation of the system. Lock the touchscreen when large amounts of water are on the screen, for example, in heavy seas and weather. This feature is also useful when cleaning the screen while the unit is turned on.

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

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

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

Select the **Back** menu option 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

Numeric and alphanumeric keyboards are automatically displayed when required for entering user information in dialogs.

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.

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.

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. Select the MOB waypoint's pop-up 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

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

To view files, refer to *"Files"* on page 150.
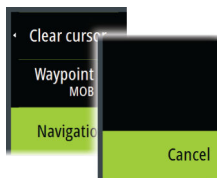
3

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.

Settings

Vessels

Sun, Moon

Trip calculator

Files

Find
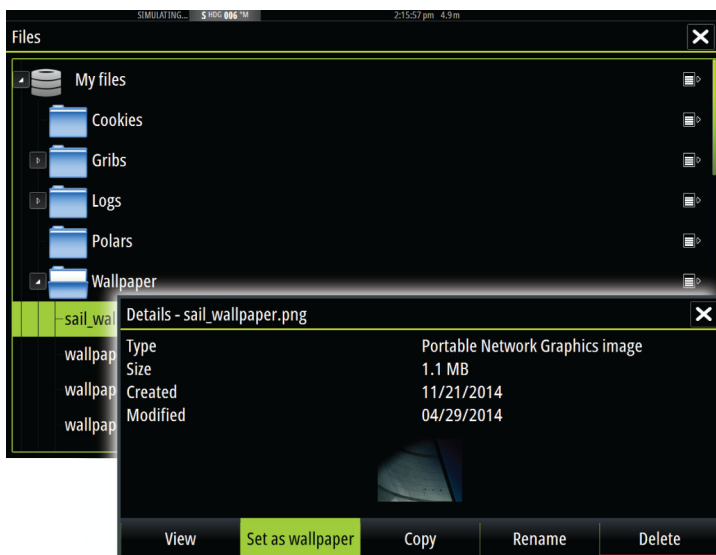
Adjusting panel size

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 or selecting the save option in the menu.
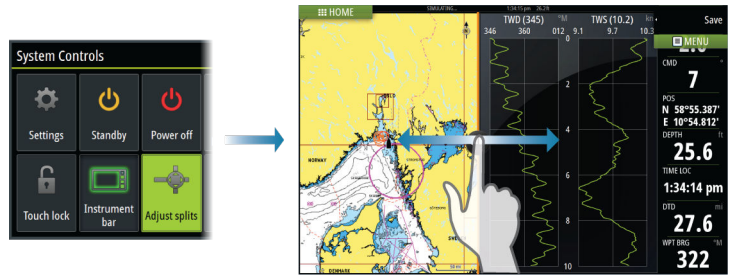
The changes are saved to the active favorite or split page.

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.
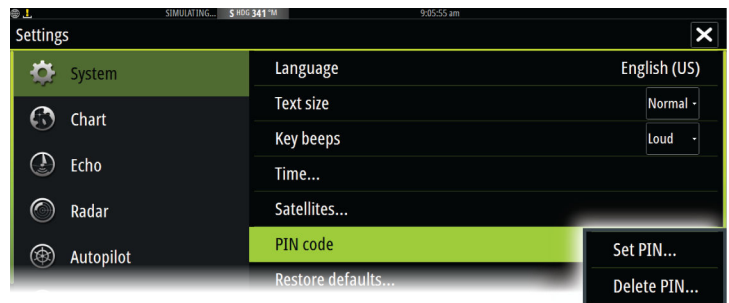
Adding new favorite pages

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

→   ***Note:*** Vulcan 5 favorite pages can have a maximum of 2 applications. Vulcan 7 FS favorite pages can have a maximum of 4 applications.

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.
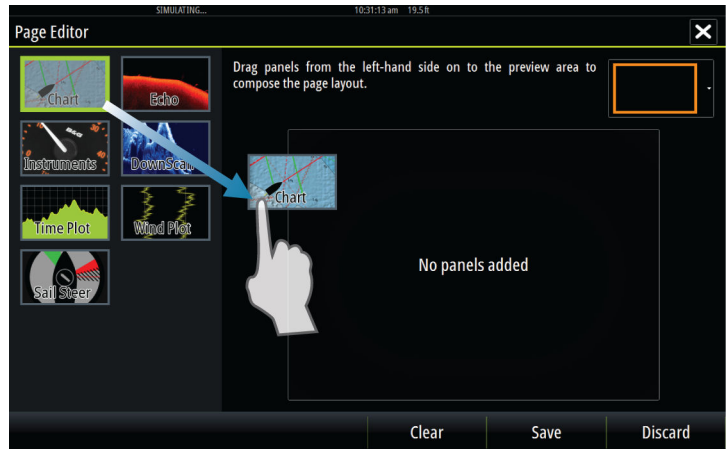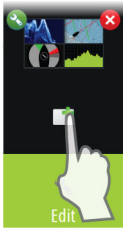
Edit favorite pages

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.

Select a predefined activity bar

1. Select the **MENU** button to open the menu
2. Select **Bar 1** or **Bar 2** and then a predefined activity bar.

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

Edit the content of the Instrument bar

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

4

Charts

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

The Chart panel
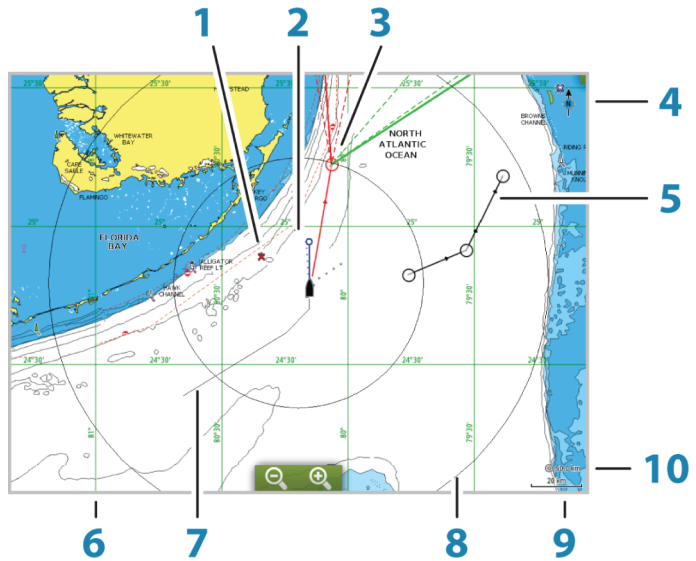
1 MOB (Man Over Board) mark

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.

➔ **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 or in the card slot - 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.
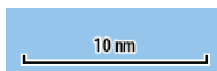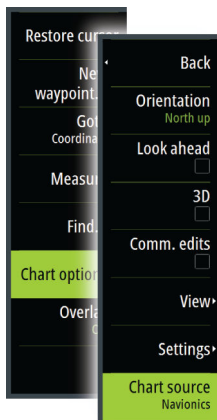
Selecting chart type

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 or in the card slot - the system automatically selects the chart with most chart details for your displayed region.

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.

Chart scale

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

Panning the chart

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

Select the **Clear cursor** menu option to remove the cursor and cursor window from the panel. This also centers the chart to the vessel position.
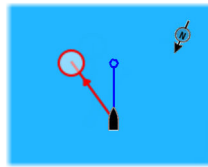
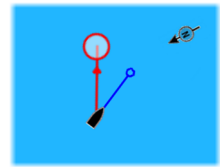## Positioning the vessel on the chart panel

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.
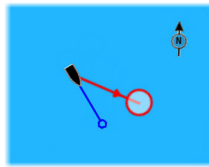
| North up | Heading up | Course up |

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.
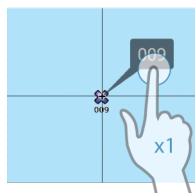
Using the cursor on the chart panel

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

N 59°01.280'
E 13°37.148'
110.5 mi, 104 °M

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.

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.

Press and hold your finger on the screen to switch the cursor symbol to a selection circle, appearing above your finger.
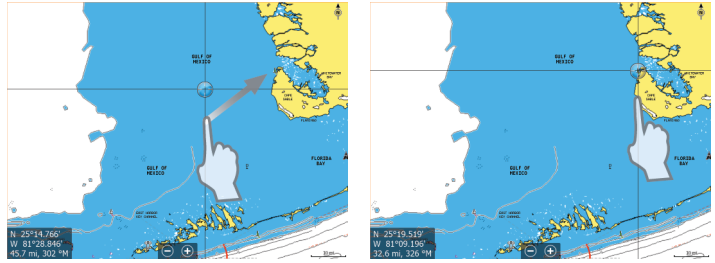
Without removing your finger from the screen, drag the selection circle over the desired item to display item information.

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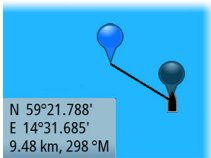
Measuring distance

N 59°21.788'
E 14°31.685'
9.48 km, 298 °M

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** menu option.

Creating routes

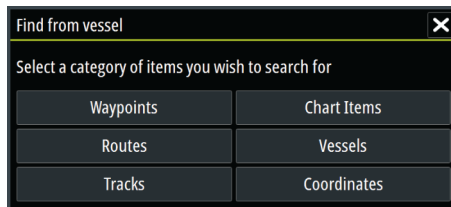You can create routes as follows on the chart panel.

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 56.

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.

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 28.

Zooming a 3D chart

You zoom in and out on a 3D chart by using the zoom (+ or -) buttons, or the touch method of pinching and spreading your fingers.

Chart overlay

Structure sonar (StructureMap) information 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.

For more information about the StructureMap menu functions, refer to *"Structure options"* on page 116.
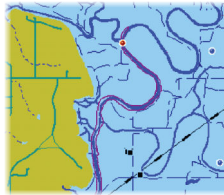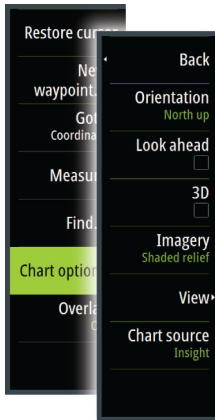
Insight charts

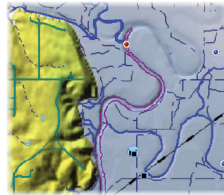## Insight specific chart options

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.
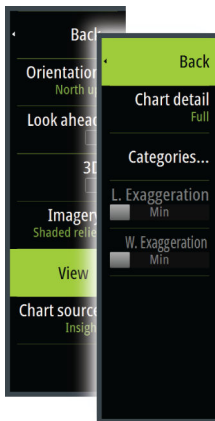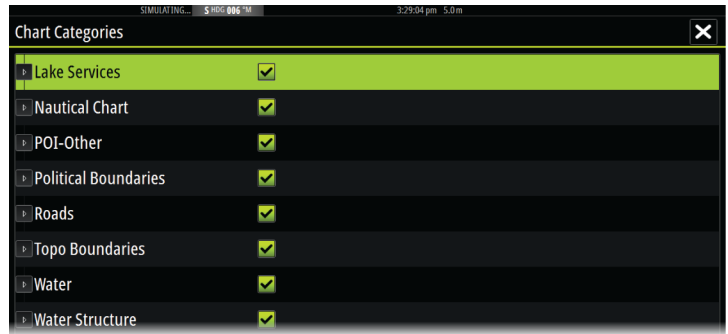
Land Exaggeration and Water Exaggeration

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.
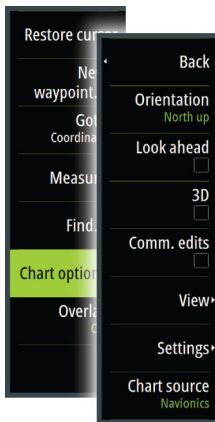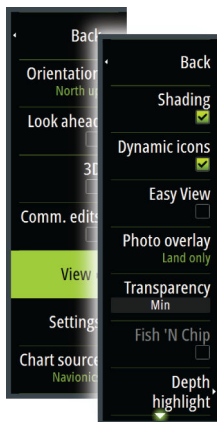
Navionics view options

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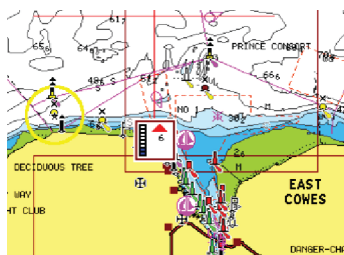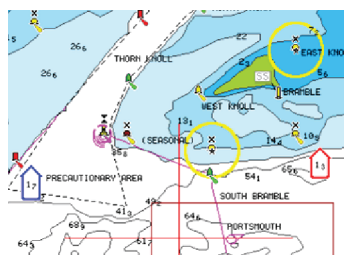
The tide and current data available in Navionics charts are related to a specific date and time. The system animates the arrows and/or gauges to show the tides and currents evolution over time.

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.
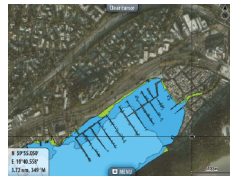
No Photo overlay   *Photo overlay, land only*   *Full Photo overlay*
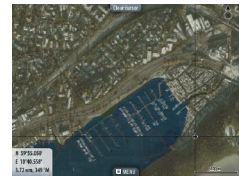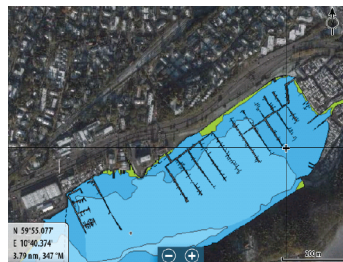
Photo transparency

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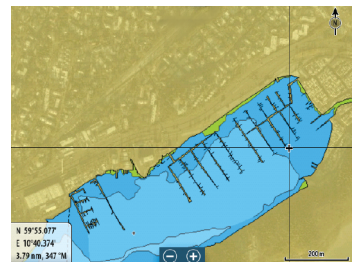
Minimum transparency   *Maximum transparency*

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.
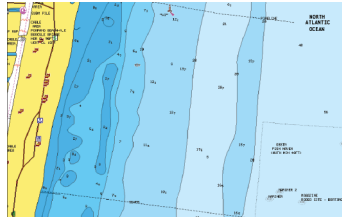
No Depth highlight range   *Depth highlight range: 6 m - 12 m*
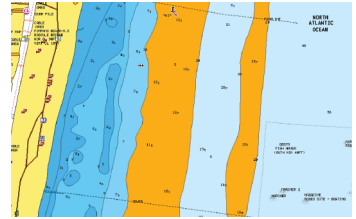
Shallow water highlight

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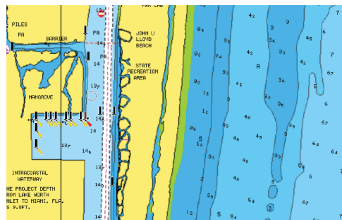
No shallow water highlighted   *Shallow water highlight: 0 m - 3 m*

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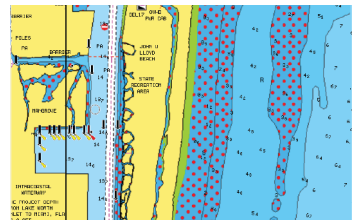
Safety depth, based on a selected limit, is drawn without blue shading.

➔ **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.
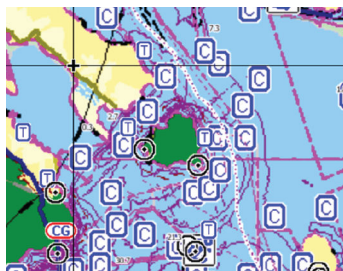
Static Current and Tide icons
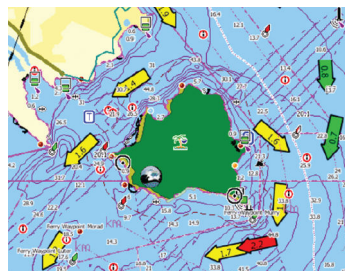
Dynamic Current icons
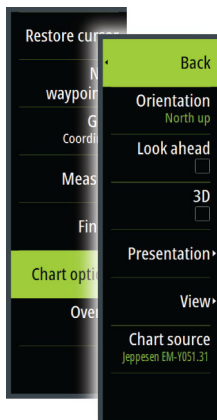
Jeppesen specific chart options

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
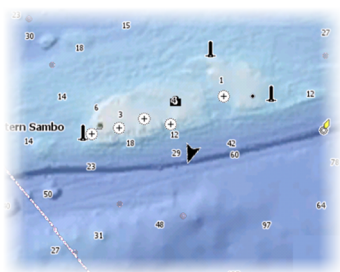
No contours
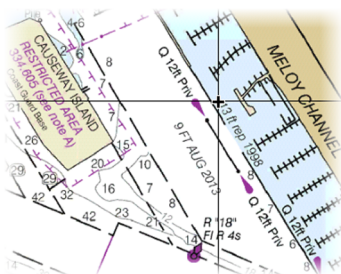
Raster imagery
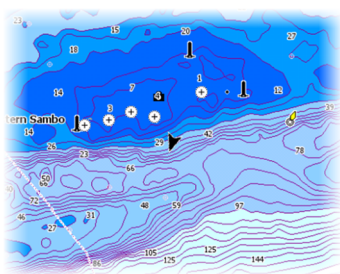
High resolution bathymetry
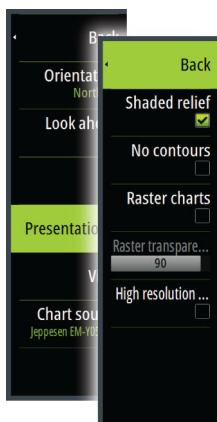
Shaded relief
Shades seabed terrain.

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.
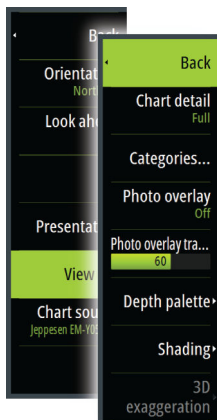
Jeppesen view options

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.
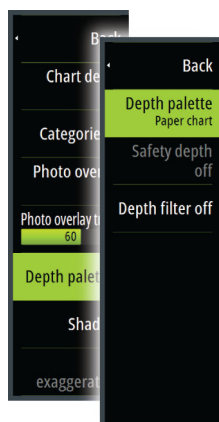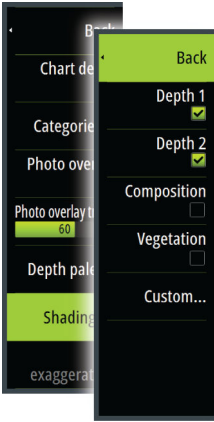
Depth 1 and Depth 2

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.

Depth (m)	Color	Opacity (%)
0		100
10		40
24		100
37		100
49		100
Add Point...		

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.
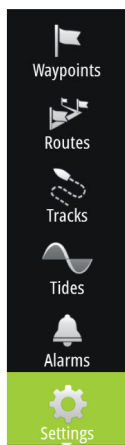
Chart settings

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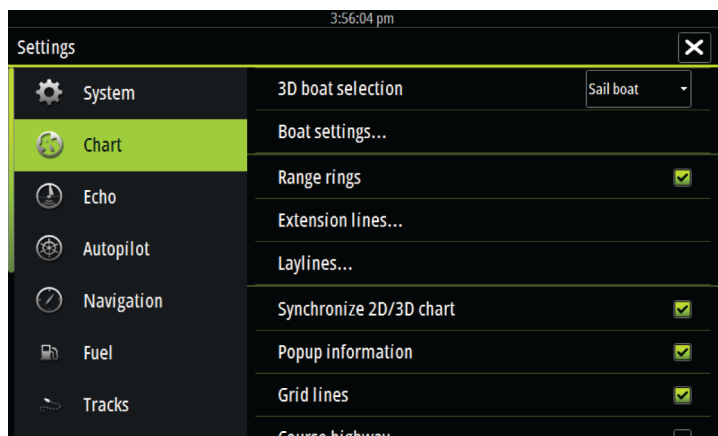
3D boat selection

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

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
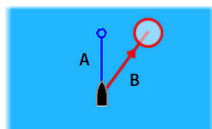
period. If no options are turned on for the vessel then no extension lines are shown for your vessel.

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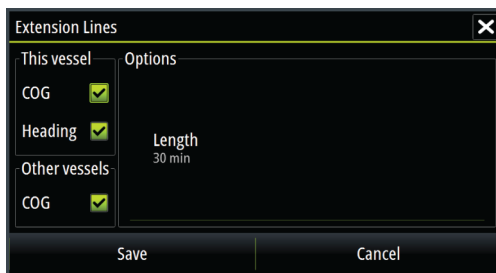
Laylines

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

The image shows laylines from mark/waypoint with limits.
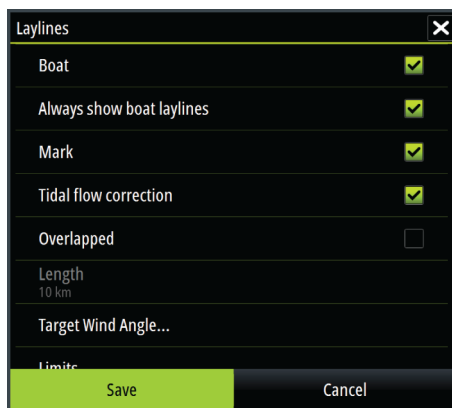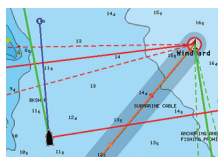
The following settings are available:

- **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.
- **Target wind angle**
  Defines the target for the TWA (True Wind Angle). The target can be read from your polar table, it can be read from the live measurements, or it can be manually entered upwind and downwind sailing angles.
- **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 120.

SailSteer overlay

Turns on/off viewing of SailSteer image overlay on the chart. Refer to *"SailSteer overlay"* on page 63.

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 60.

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, 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.

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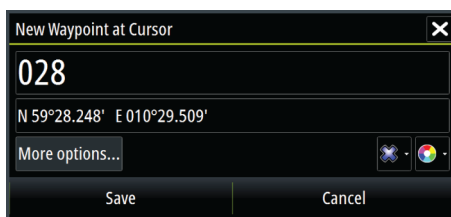
In the Chart and Nav panels, you can save a waypoint at the vessel position, when the cursor is not active, by selecting the new waypoint option in the menu.

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. Select Finish in the menu.

The waypoint is now automatically saved at the new position.
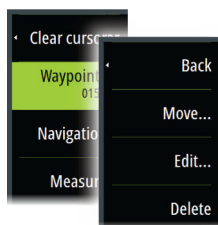
Edit a waypoint

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

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

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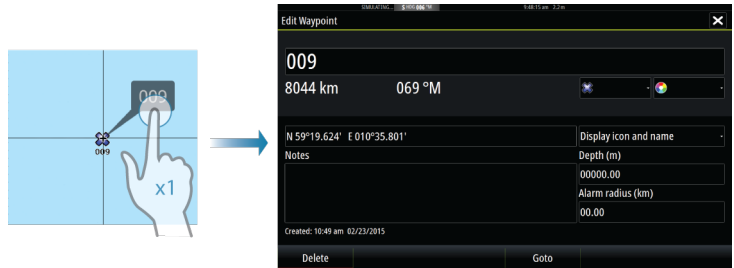
Delete a waypoint

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 147.

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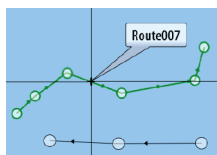
A route consists of a series of routepoints entered in the order that you want to navigate them.

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

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

Creating a new route on the chart panel

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

Edit a route from the chart panel

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

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

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
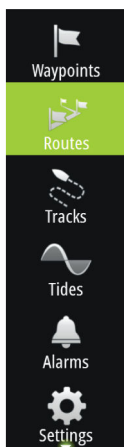
Creating routes using existing waypoints

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.
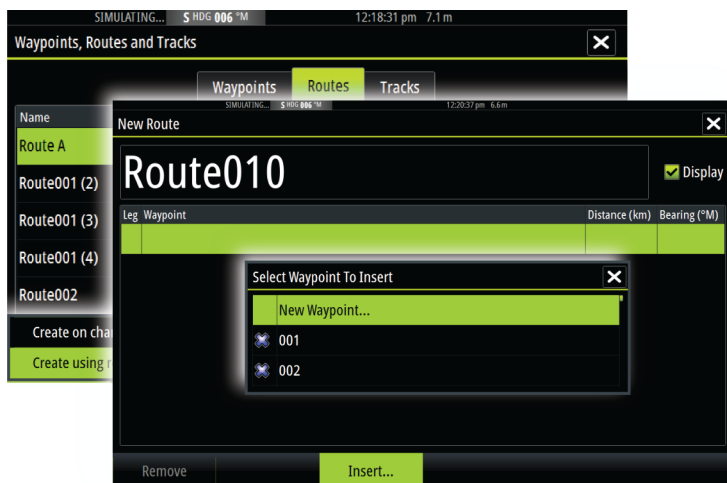
Converting Tracks to Routes

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, or by selecting the info option from the menu.

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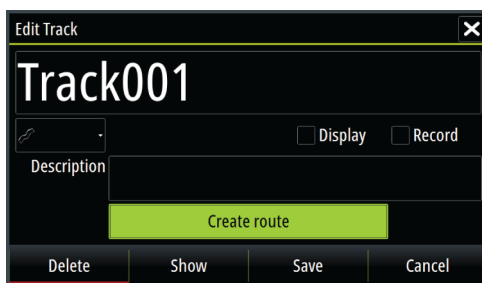
The Edit Route dialog

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

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

			16:05:24		
Edit Route					✕
Route008					☑ Display
Leg	Waypoint			Distance (km)	Bearing (°M)
0	Rpt040				
1	Rpt041			2.72	256
2	Rpt042			2.04	294
3	Rpt043			2.18	242
	Delete		Show	Start...	

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.

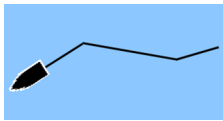From the factory, the system is set to automatically track and draw the vessel's movement on the chart panel. The system continues to record the Tracks until the length reaches the maximum points, and then automatically begins overwriting the oldest points.

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.
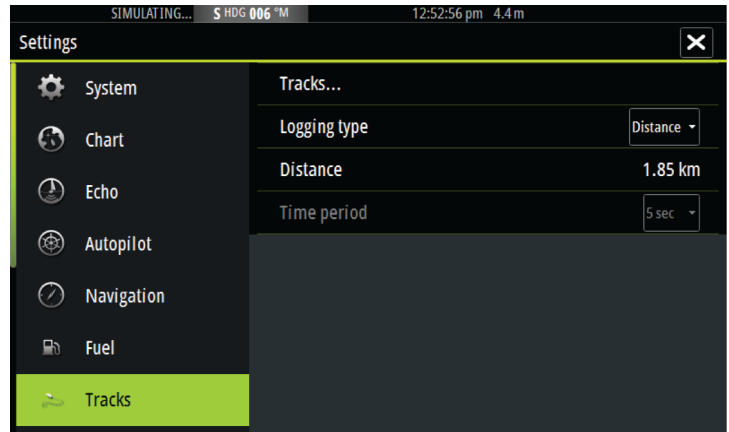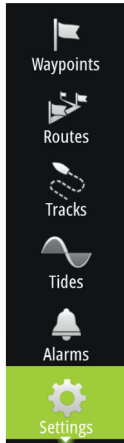
Waypoints, Routes, and Tracks dialogs

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.
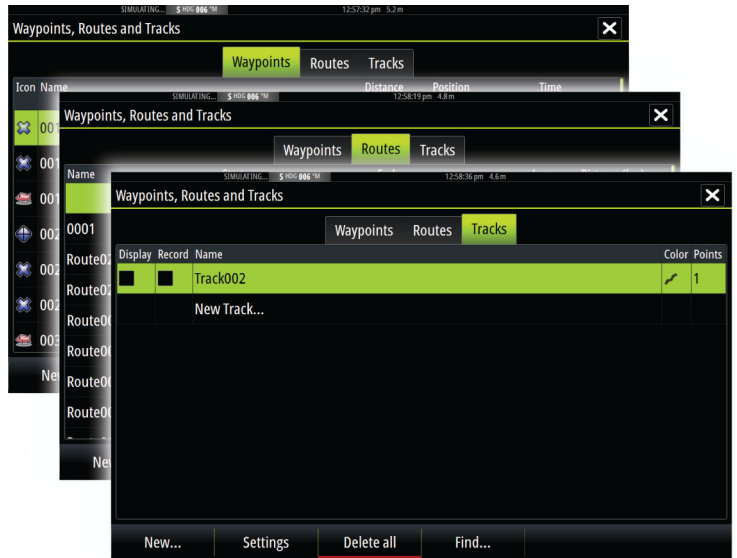
6

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 49.

Navigate to cursor position

You can start navigating to a cursor position on any chart, 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
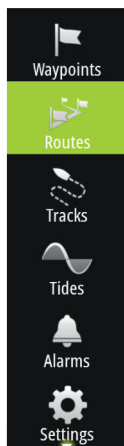
You can start navigating from the **Route** dialog, activated by:

- 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.
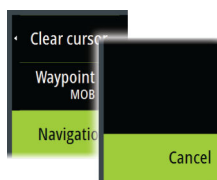
Navigating with the autopilot

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 Autopilot Controller later on.

For more information about autopilot functionality, refer to *"Autopilot"* on page 77.

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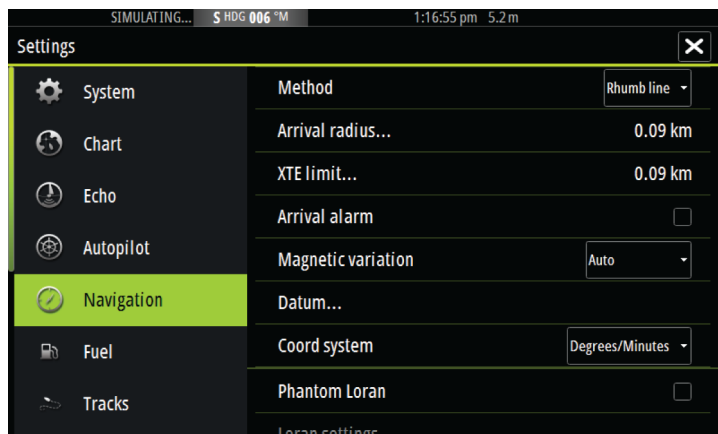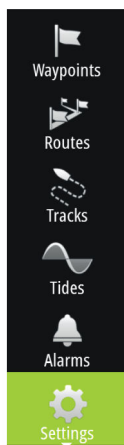
Rhumb lines are tracks of constant bearing. It is possible to travel between two locations using Rhumb line computation, but the distance would usually be greater than if Great circle is used.

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 Vulcan.

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
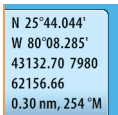
Enables use of Phantom Loran positioning system.

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.
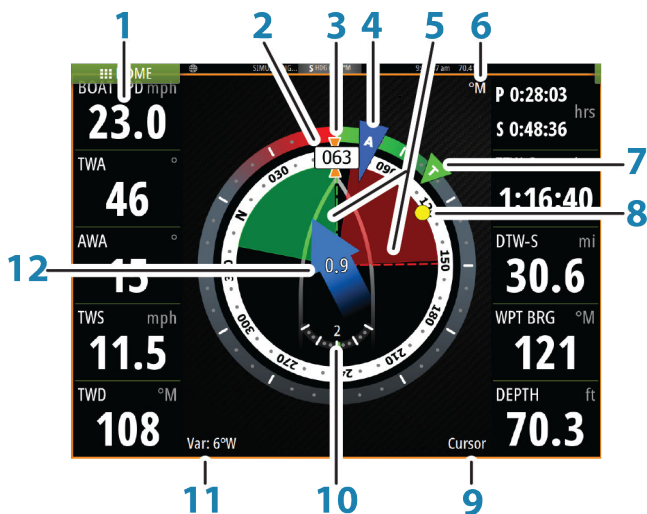
1	User configurable data fields
2	Vessel heading
3	COG (Course Over Ground)
4	Apparent wind*
5	Port and starboard laylines.
6	Magnetic or True reference
7	TWA (True Wind Angle) - Green if on TWA upwind or downwind. Blue if off target by 10º or more, or on a free leg. The indicator will fade from blue 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**.

8

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
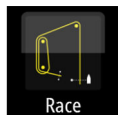
Race

➔ **Note:** The Race start line feature requires an H5000 system that includes a Hydra, Hercules, or Performance CPU running on your NMEA2000 network.

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. The start line calculations are done in the H5000.

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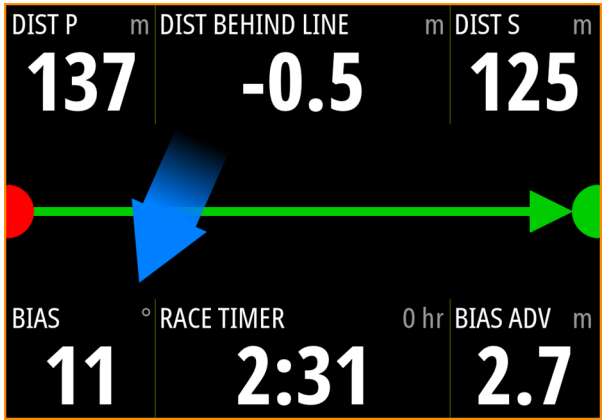
The solid black line indicates the start line (between the two starting marks) on the chart panel. You can switch off the start line overlaid on the Chart if desired.
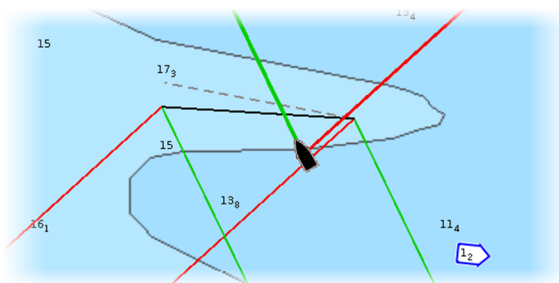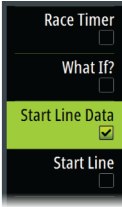
Start Line Data panel

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 in the same way as an H5000 Graphic Display. 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
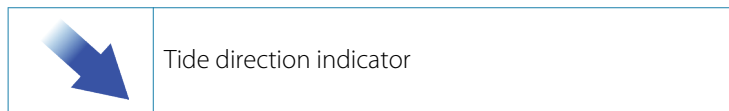
Data displayed on start line panel

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:** 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.

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
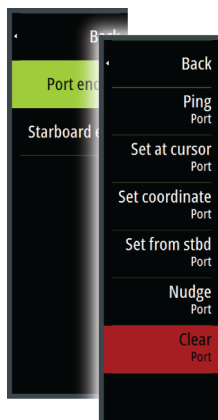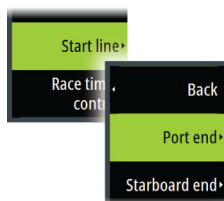
negate the difference between the GPS position and the bow of the vessel.

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.
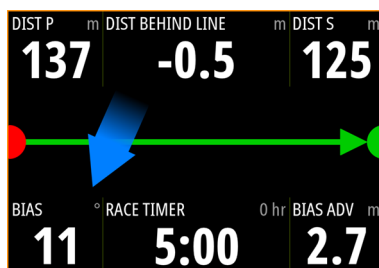
Setting end points at cursor position

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 or manual setting in the Vulcan Laylines setup) 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
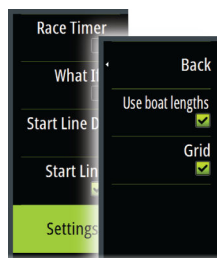
Boat lengths

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.
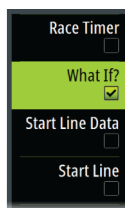
Show layline grids

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.

Boat to Rpt001			320 °M 9142 NM
True Wind	008 °M	12.0 kn	☑ Live
Tide	311 °M	20.2 kn	☑ Live
	Port		Starboard
Heading	342 °M		342 °M
COG	320 °M		320 °M
Boat Speed	7.5 kn		7.5 kn
SOG	27.7 kn		27.7 kn
TWA	27°		27°
AWA	16°		16°
AWS	19.0kn		19.0kn
Distance	9141.61 NM		9141.61 NM
Time	330		330
Prev	Current Leg		Next

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.
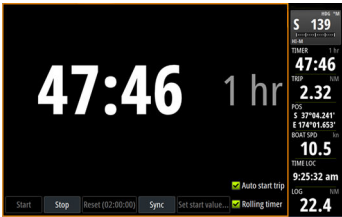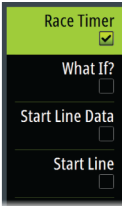
Race timer panel
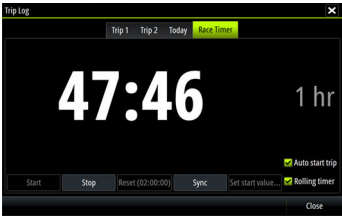
Race Timer in the Trip Log

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.
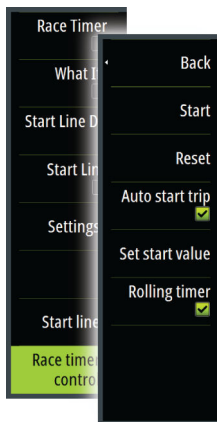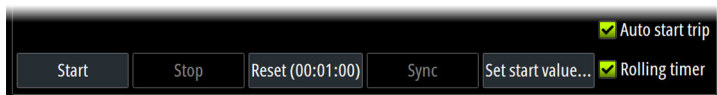
Set start value

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**.
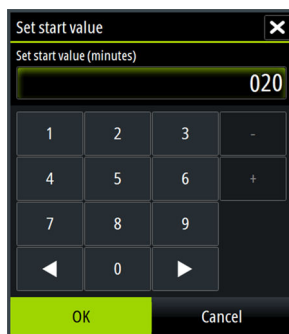
Start/Stop timer

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.
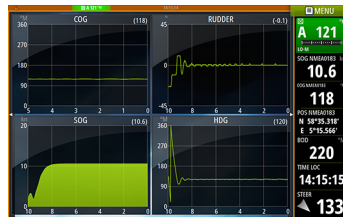
Layout 1   Layout 2

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.
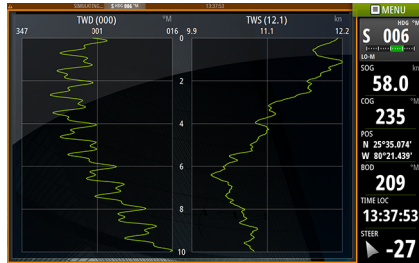
10 Autopilot

If an AC12N, AC42N, or an H5000 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.

The Vulcan Installation manual describes installation and configuration of the AC12N and AC42N autopilot computers. H5000 specific options are found in the separate H5000 Installation manual delivered with the H5000 Pilot.

An Autopilot is designed to maintain an accurate course in various sea conditions with minimal helm movements.

Safe operation with the autopilot

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

> ⚠ **Warning:** A physical standby button should be available for the autopilot. The NAC-1 comes with a standby button, compatible remote controllers with a standby button can be used with the other autopilot computers.

Activating the autopilot

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

Switching from automatic mode to manual steering

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

→ **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 91.

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
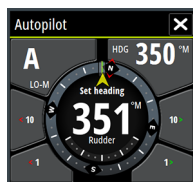
You control the autopilot from the autopilot pop-up.

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. You turn it on again by selecting the autopilot tile in the instrument bar.

The following pop-ups are available:

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

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)

Mode overview

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

- **Standby**
  Standby mode used when manually steering at the helm. Compass and rudder angle is shown on the display.
- **NFU**
  Non-Follow Up steering where the rudder movement is controlled by using the Port and Starboard keys in the Pilot pop-up, or by another NFU unit.
- **FU**
  Follow-up steering where the rudder angle is set by another FU unit.
- **AUTO**
  Automatic steering where the set heading is maintained.
  - **Heading capture**
    Aborts the turn and uses the instantaneous compass reading as set heading.

- **Turn patterns**
  Moves the vessel automatically in pre-defined turn steering patterns.
- **Tacking**
  Only available if the boat type is set to Sail in the Autopilot Commissioning dialog.
  Tacking with a fixed angle.

• **NoDrift**
  Automatic steering, keeping the vessel on a straight bearing line by compensating for drift.
  - **Dodging**
    Returns to NoDrift mode after a heading change.

• **NAV**
  Navigation steering. Steers the vessel to a specific waypoint or through a route.

• **WIND**
  Only available if the boat type is set to Sail in the Autopilot Commissioning dialog.
  Automatic steering where the vessel heading is changed to maintain a set wind angle.
  - **Tacking/Gybing**
    Only available if the boat type is set to Sail in the Autopilot Commissioning dialog.
    Tacking/Gybing with apparent or true wing angle as reference.

• **WIND Nav**
  Only available if the boat type is set to Sail in the Autopilot Commissioning dialog.
  Automatic steering, using both wind and GPS data to steer the vessel to a specific waypoint or through a route.

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 selecting the **STBY** mode button in the autopilot pop-up.

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 selecting the STBY mode button in the autopilot pop-up.

Follow-up steering (FU)

➔ **Note:** FU mode is only available if you have a ZC1 or similar included in the system. The Vulcan does not have a rotary knob.

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 Port and 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 86.

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 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 Vulcan 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 60.

Waypoint arrival circle

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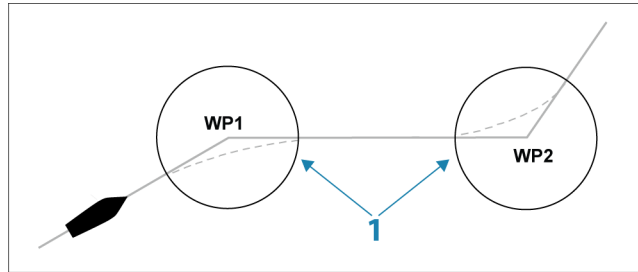
The arrival circle (**1**) should be adjusted according to boat speed. The higher the speed, the wider the circle. The intention is to make the autopilot start the heading change in due time to make a smooth turn onto the next leg.

The figure below may be used to select the appropriate waypoint circle when creating the route.
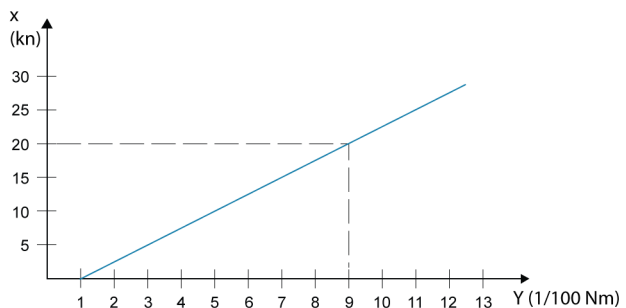
X axis = Boat speed in knots
Y axis = Arrival circle, radius in 1/100 Nm

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 sailboat in the Autopilot Commissioning dialog.

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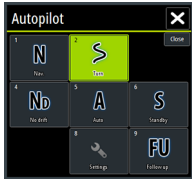
➔ **Note:** The turn steering option is not be available if the boat type is set to SAIL in the Autopilot Commissioning dialog, instead the tack/gybe feature is implemented.

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.

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 Vulcan 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.
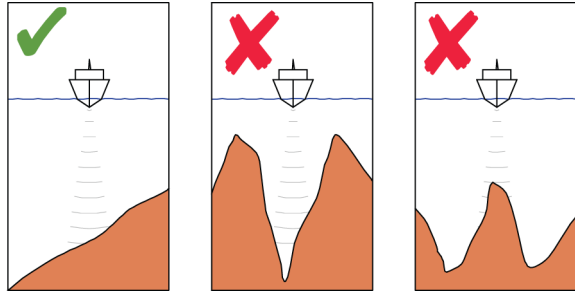
Use the following process to initiate DCT steering:

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:
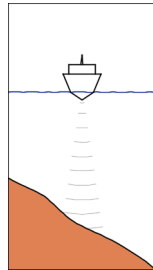
Port option
(depth decreases to port)
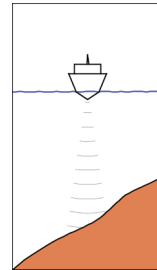
Starboard option
(depth decreases to starboard)

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 Vulcan in an AP24/AP28 system

Command transfer

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

Locking remote stations

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

When the remote lock function is enabled on an AP24/AP28 control unit, only the active control unit stays in command. No transfer of command to Vulcan 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 Vulcan 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 Vulcan control in standby mode if no rudder command is given from the EVC system within a predefined period.

Autopilot settings

🚩 Waypoints	
🏁 Routes	
〰 Tracks	
〜 Tides	
🔔 Alarms	
⚙ Settings	

SIMULATING... **S HDG 006 °M**	1:31:47 pm 6.1 m	
Settings		✕
⚙ System	Chart compass	Hide ▾
🌐 Chart	Locked	☐
🕐 Echo	Autopilot...	
🧭 Autopilot	Sea state filter	Auto ▾
⊘ Navigation	Sailing...	
🗐 Fuel	Response	▶
〰 Tracks	Automatic steering...	
	Installation	▶
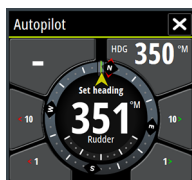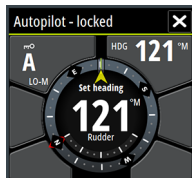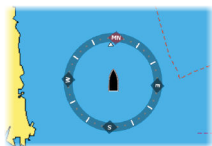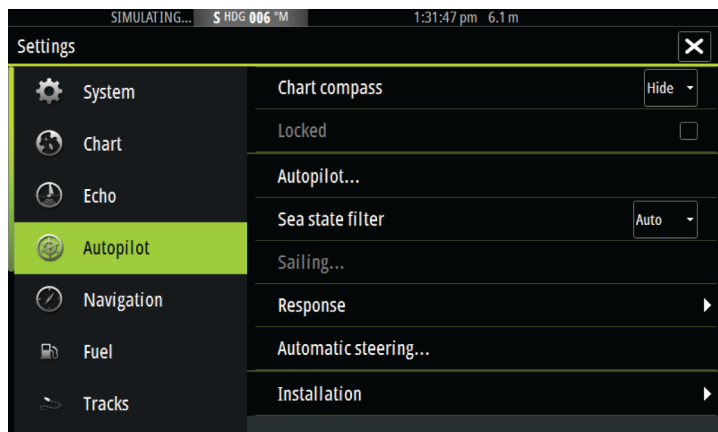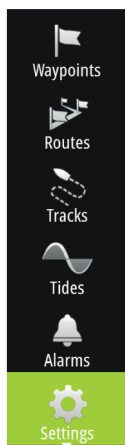
Chart compass

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

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

If the Vulcan 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 Vulcan Installation manual.

Installation

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

11

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 Echosounder image
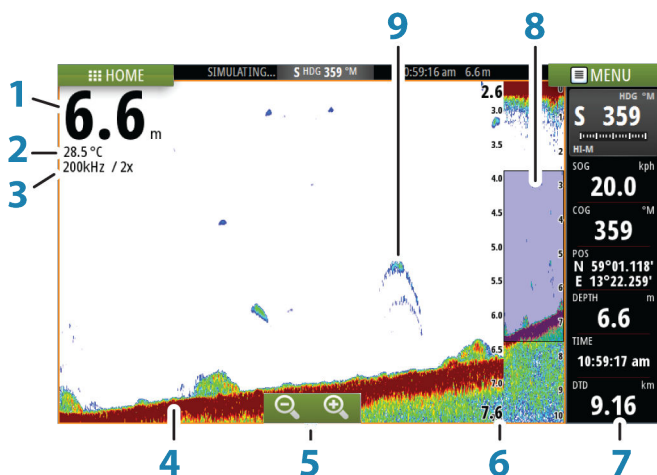
1. Depth
2. Temperature
3. Frequency and Zoom scale
4. Bottom
5. Zoom buttons
6. Depth range scale
7. Instrument panel
8. Zoom column
9. Fish arches

* Optional Echosounder items.

Zooming the image

You can zoom the image by:

• using the zoom (+ or -) buttons

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 is activated.

To remove the cursor and cursor elements from the panel, select the **Clear cursor** menu option.

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.

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 over the desired item to make a new waypoint or display item information such as depth and 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**, 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 history

You can view echosounder history by panning the image.
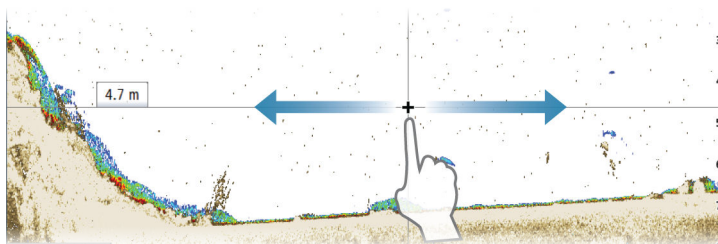
Setting up the image

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.
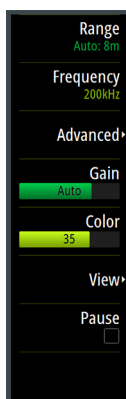
The range

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.

Gain

The gain controls the sensitivity. 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 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 are displayed in the color at the strong return end of the scale.

DownScan options

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 *"Echosounder settings"* on page 105.

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.
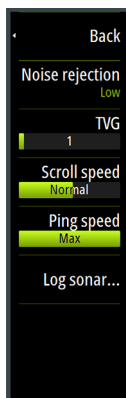
Advanced options

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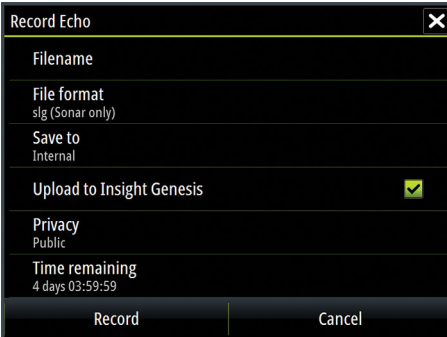
Ping speed controls the rate the transducer transmits the signal into the water. By default, the ping speed is set to max. It may be necessary to adjust the ping speed to limit interference or to adjust for specific fishing conditions.

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.

Record Echo	✕
Filename	
File format slg (Sonar only)	
Save to Internal	
Upload to Insight Genesis	☑
Privacy Public	
Time remaining 4 days 03:59:59	
Record	Cancel

Filename
Specify the name of the recording (log).

File format
Select a file format from the drop-down, slg (Echosounder only), xtf (DownScan only*), or sl2 (Echosounder and DownScan).

→ **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 124.

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**.

Recording Echo	✕
Filename	Sonar0007.slg
Time remaining	4 days 03:59:59
Time elapsed	0:00:22
File size	437.5 kB
Stop	
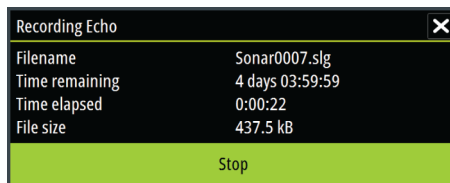
Viewing the recorded sounder data

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 105.

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 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.
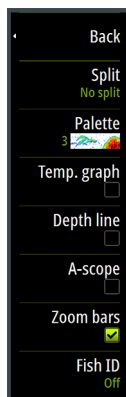
Depth line

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.
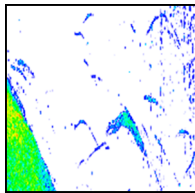
Traditional fish echoes   *Fish symbols*   *Fish symbols and depth indication*
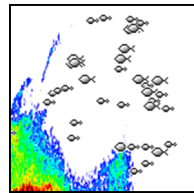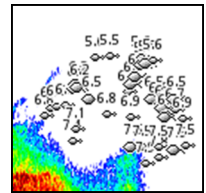
➔   ***Note:*** Not all fish symbols are actual fish.

Echosounder settings
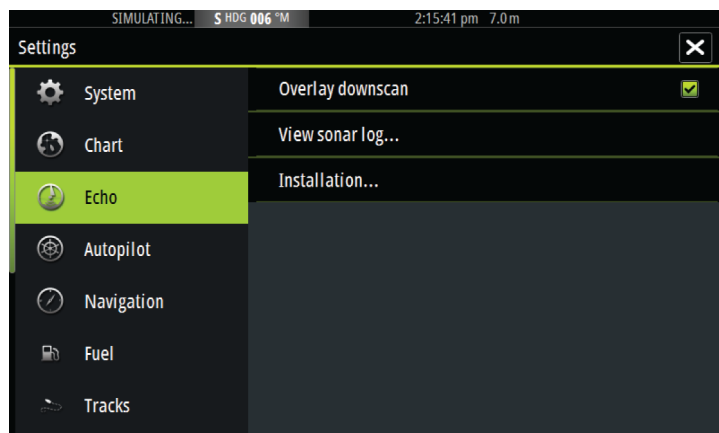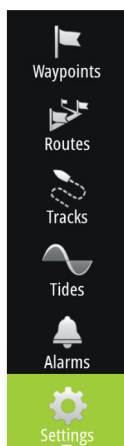
Overlay downscan

When a HDI transducer with DownScan 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 Vulcan Installation manual.

ForwardScan Installation
Used for ForwardScan installation and setup. Refer to the *"ForwardScan setup"* on page 121.

12

StructureScan

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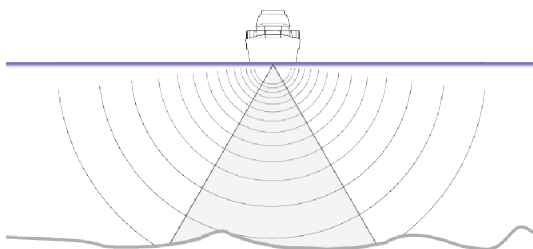
The StructureScan image

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.
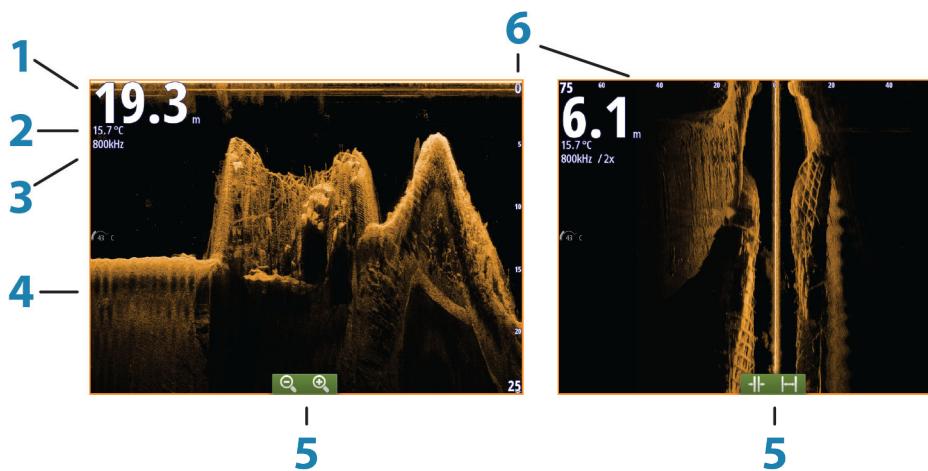
1   Depth

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:

- using the panel zoom icons
- by pinching or spreading on the screen

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.

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 over the desired item to make a new waypoint or display item information such as depth and 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**, 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**.
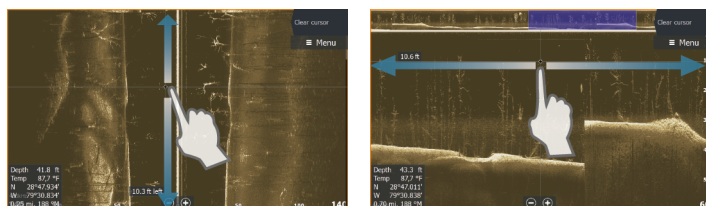
Setting up the StructureScan image

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.

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.
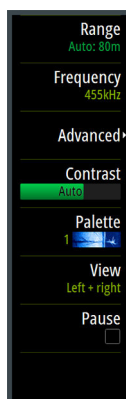
To adjust the contrast setting:

1. Select the contrast icon or activate the contrast option in the menu to display the color adjustment bar
2. Drag the bar up or down to get the desired contrast setting or select **Auto contrast**.

➔ *Note:* We recommend that you use **Auto contrast**.

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.

Select the view menu option and then the view you want displayed.

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.
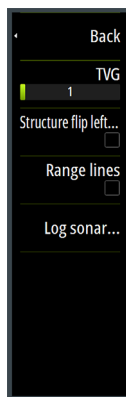
Range Lines

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 Vulcan unit, or onto memory card as described in *"Start Recording echosounder data"* on page 100.

13 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:

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.

14

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.

> ⚠ **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
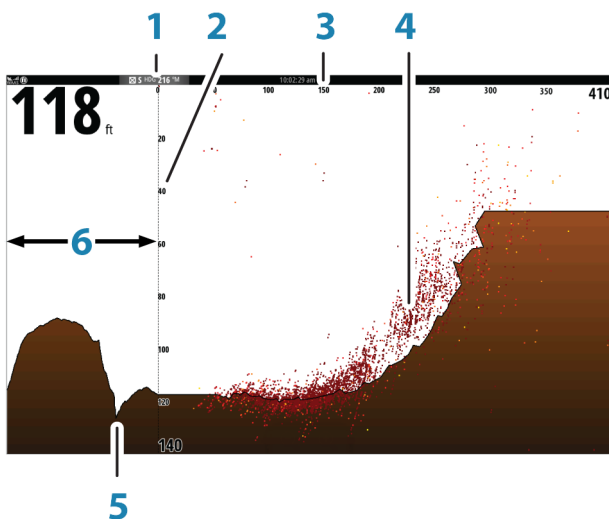
1   Transducer location shown as the origin on the page

2   Depth range scale and vessel position

3   Forward range scale

4   Point data

5   Bottom

6   Depth history

Setting up the ForwardScan image
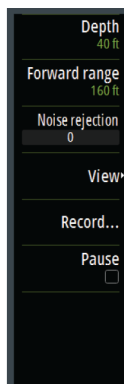
Depth
Controls depth range. Depth range is set to auto mode by default.

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
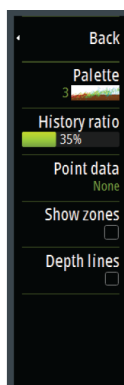
Palette
Several display palettes are available for a variety of water conditions.

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 121.

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.
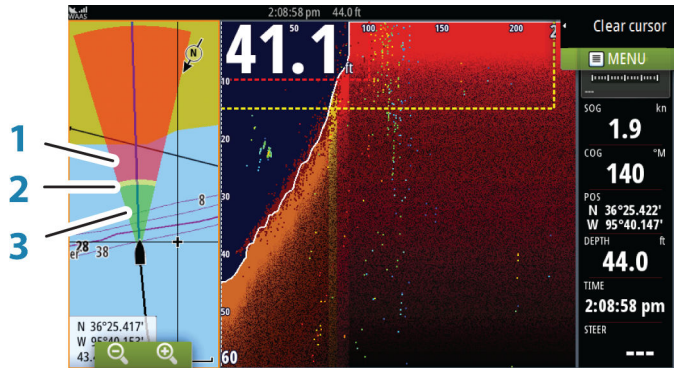
ForwardScan extension

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.
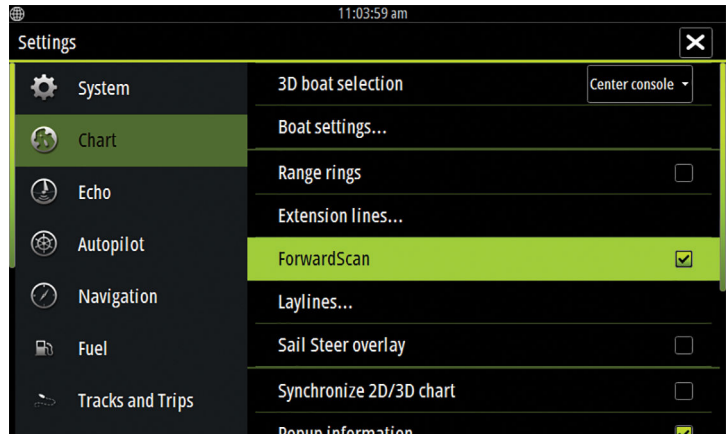
ForwardScan setup

Specify the setup in the **ForwardScan installation** dialog.
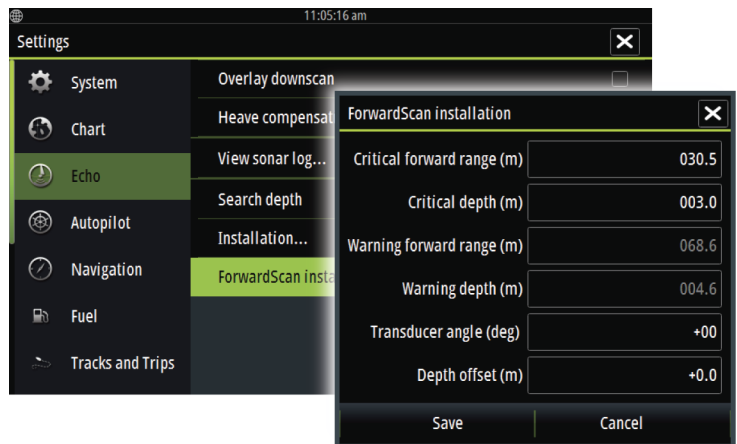
Critical forward range and Critical depth

Critical Forward Range and Critical Depth are user-selected thresholds that define a critical zone forward of your vessel.
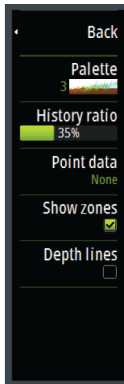
If you travel into water shallow enough to cross into the critical zone, the Critical Zone alarm is activated. You can display the critical warning zones by activating the **Show zones** menu option.
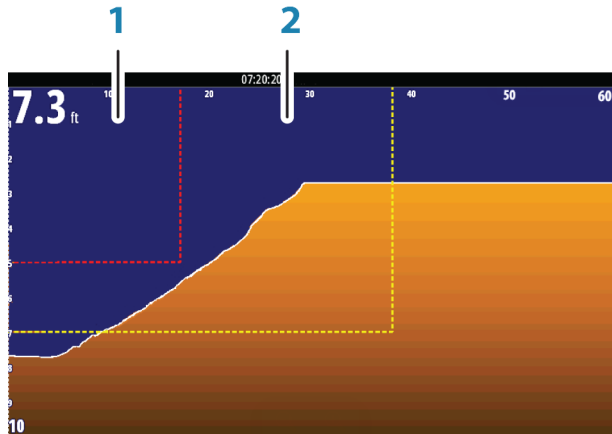
ForwardScan image with Show zones active

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.
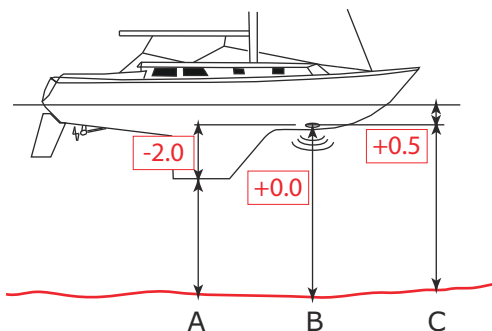
15

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

GO FREE

➔ **Note:** Maps, charts, software updates, and other data files can be large. Your data provider may charge you based on the amount of data you transfer. If you are unsure contact the service provider for information.

The unit includes Built-in wireless functionality for connecting to the internet and wireless devices such as smartphones and tablets.

Initial configuration and setup of the built-in wireless functionality is described in your system's Installation Manual.

Connect and disconnect from a wireless hotspot
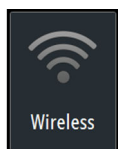
Wireless

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.
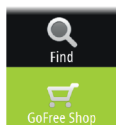
GoFree Shop

The built-in wireless functionality must be connected to an external wireless hotspot in order to access the GoFree Shop.

At the GoFree Shop you can browse, purchase and download compatible content for your system including navigation charts and Insight Genesis Maps. When you log on, the system automatically gives you a notification if a new software version is available for your system. If an update is available, you can download it to a card slot or defer the download until later. If you defer the download until later, the notification is available in the About dialog accessible from the System Settings.

GoFree 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 100.
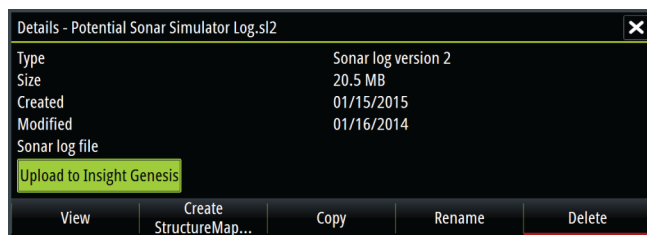
Wireless settings

Provides configuration and setup options for the wireless functionality.

For more information, refer to the Vulcan Installation Manual.
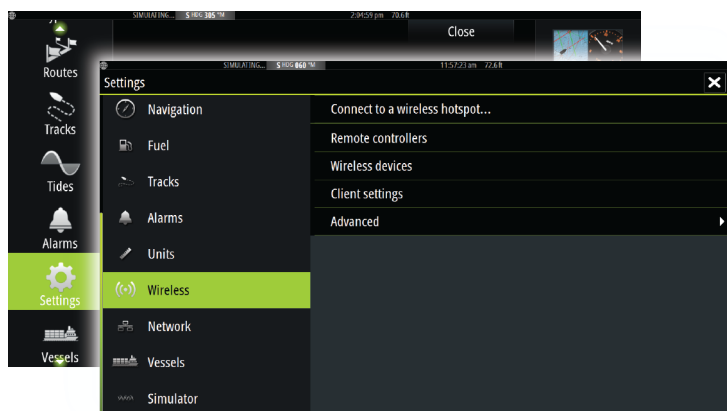
Connect to a wireless hotspot

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.

16

AIS

If an NAIS400, an AI50 or an NMEA 2000 VHF that can do AIS (Automatic Identification System) is connected to the network, 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 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.
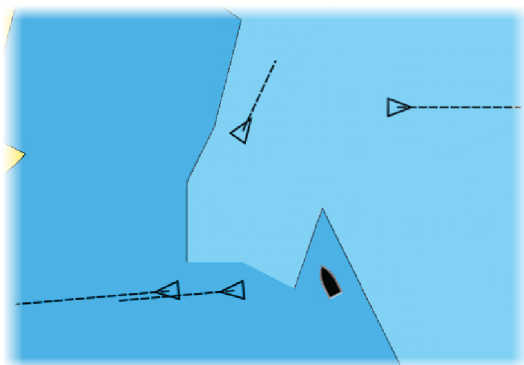
AIS target symbols

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 134.

	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.

Find from vessel	✕
Select a category of items you wish to search for	
Waypoints	Chart Items
Routes	Vessels
Tracks	Coordinates
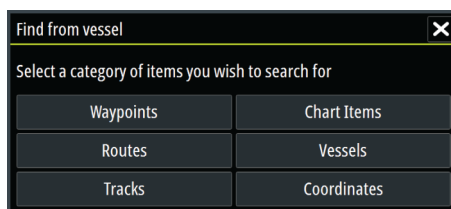
Viewing information about single AIS targets

When you select an AIS icon on the chart 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.
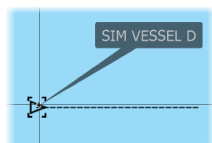
Calling an AIS vessel

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 Vulcan.

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.
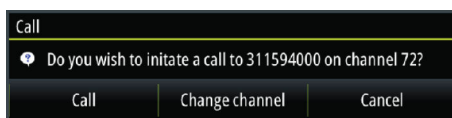
AIS SART

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.

Man Overboard	✕
AIS SART Activated	
MMSI:	972035502
Latitude:	S 36°34.897'
Longitude:	E 174°51.571'
Bearing (°M):	348
Distance (mi):	17.8
Ignore	Save waypoint	Activate MOB
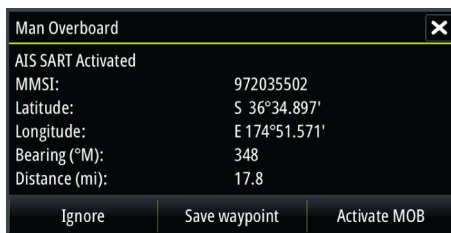
You have the following options:
- Ignore the alarm
  - The alarm is muted and the message closed. The alarm does not reappear

→ **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.
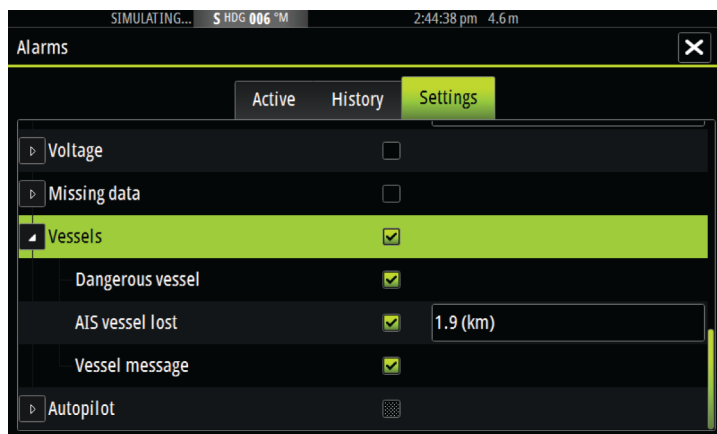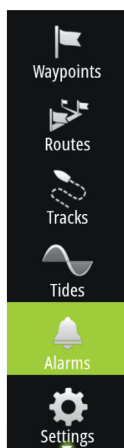
Dangerous vessel

Controls whether an alarm will be activated when a vessel comes within the predefined CPA or TCPA. Refer to *"Defining dangerous vessels"* on page 134.

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
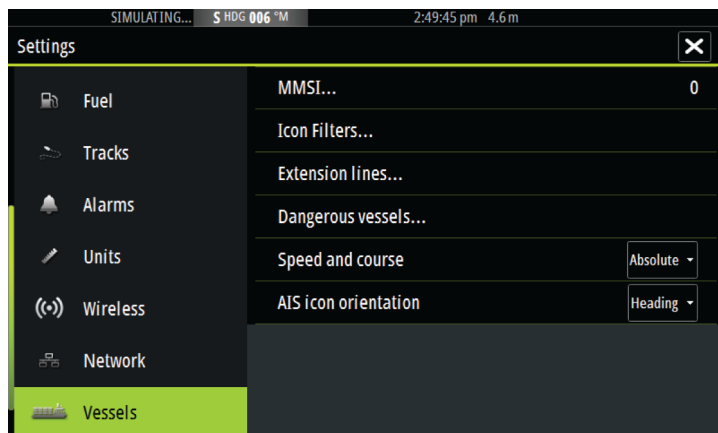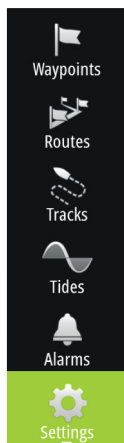
Your vessel's MMSI number

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.
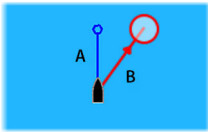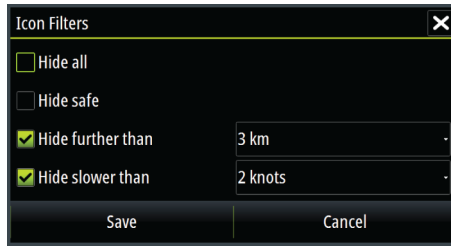
Extension lines

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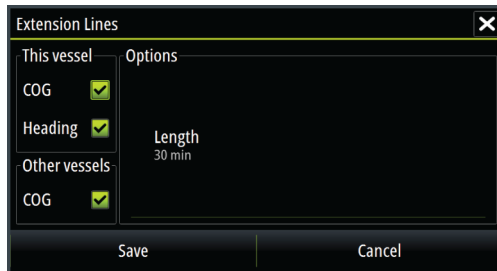
Your own vessel heading information is read from the active heading sensor, and COG information is received from the active GPS.

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.

Dangerous Vessels

Vessels are considered dangerous when their closest point of approach is predicted to be less than the following distance, within the specified time.

Closest point of approach (m)	0152
Time to closest point of approach (mm:ss)	05:00

Save	Cancel

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.

17

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.
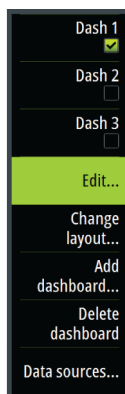
Edit a dashboard

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
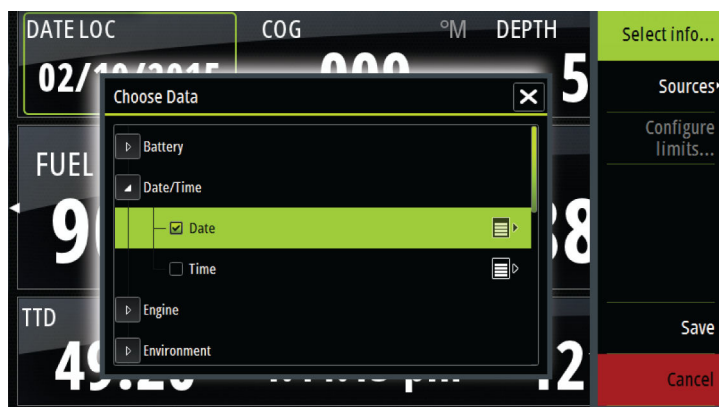
18

Audio

If a SonicHub server or a FUSION marine entertainment system is connected to the NMEA 2000 network, you can use the Vulcan 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 Vulcan 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.
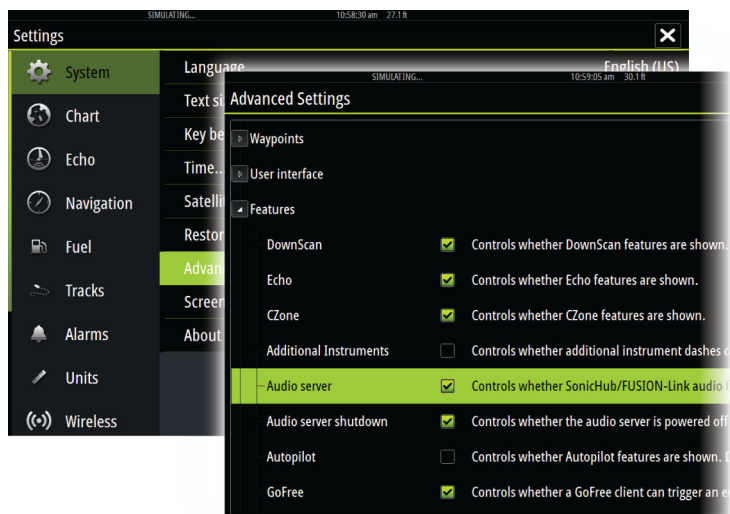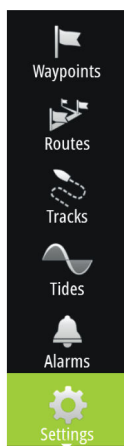
SonicHub 2 supported

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.
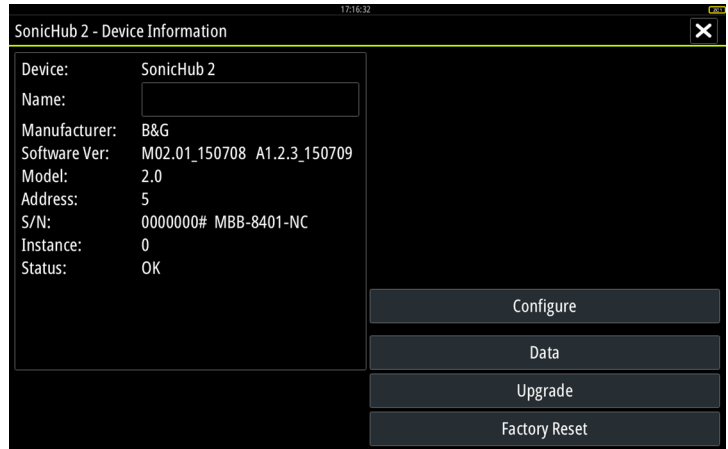
Configure

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.
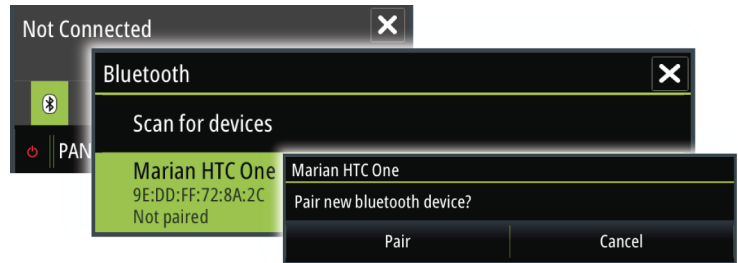
The SonicHub 2 connects to the paired device.

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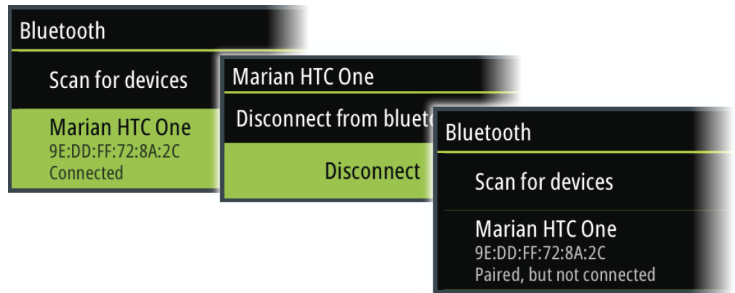
To connect to a paired device, select the paired device in the device list and then select **Connect**.
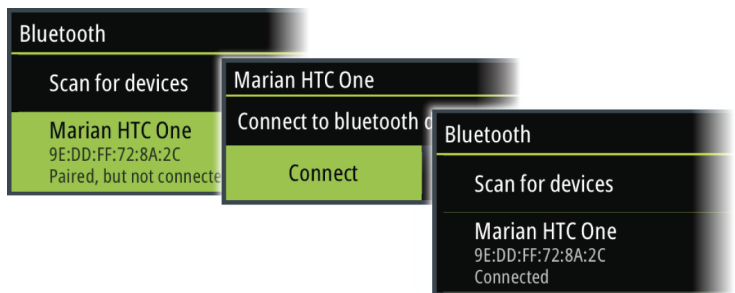
Pandora

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.
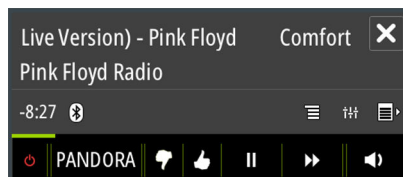
The Audio panel

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.
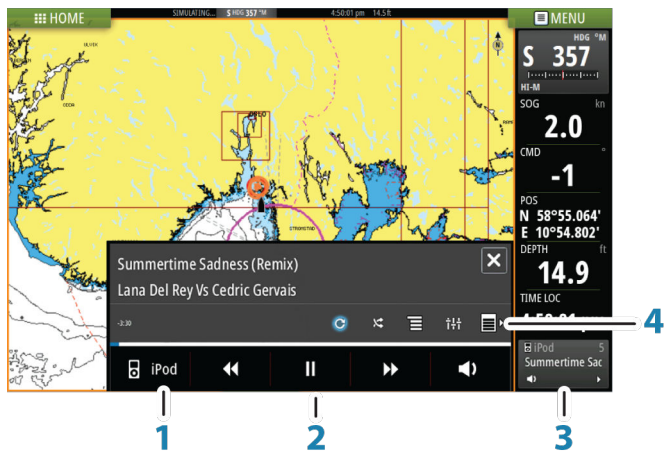
1 Audio source
2 Audio control buttons
3 Audio tile
4 Audio tools

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

Icon	Tuner	VHF	DVD	Playback
▲ ▼	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		

Icon	Tuner	VHF	Playback
☰	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 Vulcan 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 142 and *"Audio Tools"* on page 143.

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.

19

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.

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.
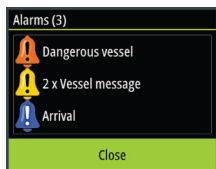
Acknowledging a message

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.
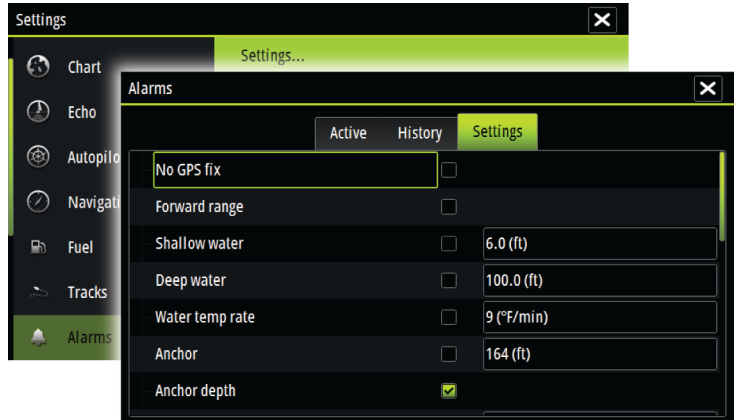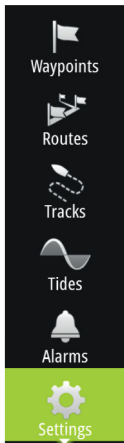
The alarm dialogs can also be activated from the Tools panel. The alarm dialogs include information about active alarms and alarm history.
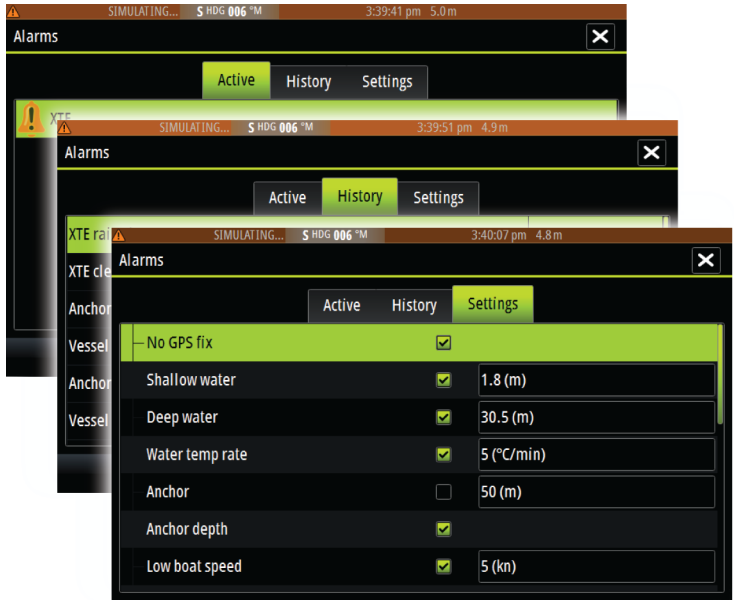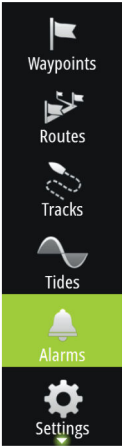
20

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 and DSC vessels with available information.

Waypoints

Routes

Tracks

Tides

Alarms

Settings

Vessels

Sun, Moon

Trip calculator

Files

Find

GoFree Shop

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 for Files, Waypoints, Routes, Tracks, and Settings.

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 154.

Find

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

GoFree Shop

→ **Note:** The built-in wireless functionality must be connected to an external wireless hotspot in order to access the GoFree Shop. Refer to *"Connect and disconnect from a wireless hotspot"* on page 124.

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.

21

Simulator

The simulation feature lets you see how the unit works in a stationary position and without being connected to the Echosounder, GPS, etc.

Use the simulator to become familiar with your unit before using it on the water.
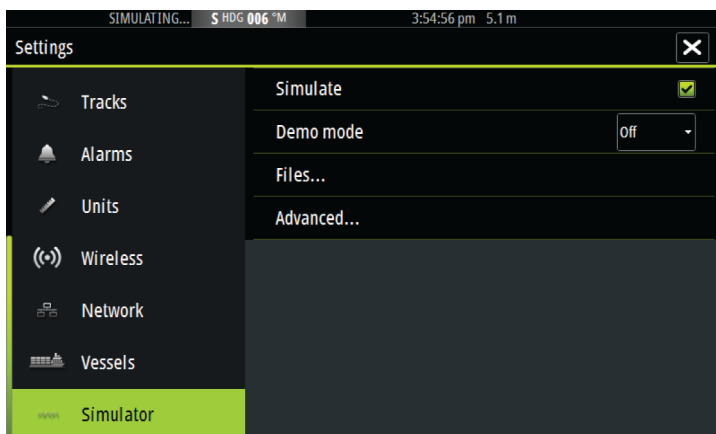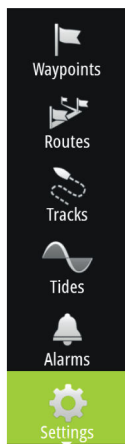
The status bar indicates if the simulator is toggled on.

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 the touchscreen 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.

Source Files	×
Echo	Cougar Island.sl2 (sim)
AIS	ais.rsf (sim)
Restore default files	
Save	Cancel
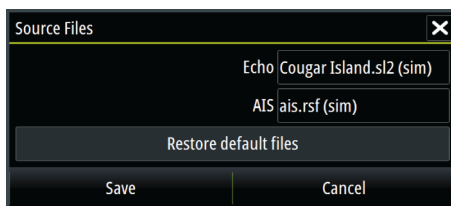
Advanced simulator settings

The Advanced simulator settings allows for manually controlling the simulator.

Advanced Simulator Settings	×
GPS source Simulated course (default)	
Speed (mph) 75	
Course (°M) 5	
Route None	
Set start position	
Sailing...	
Save	Cancel

22
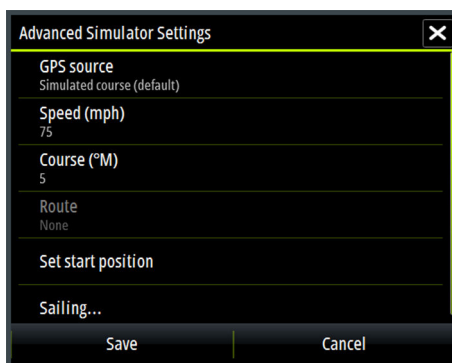
Maintenance

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.

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 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.

Software upgrades

The latest software is available for download from our website, bandg.com.

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

Service assistant

The system has a built-in network analyzer that creates a report of the devices installed on the NMEA 2000 network. It can also create a service report about your system and network devices such as the software versions, serial numbers, and information from the settings file.

To use the analyzer, open the About page of the System settings dialog and select Support. Two options are displayed:

Create report

Prompts you for information for support and creates the report with information automatically gathered from the network. You can add screenshots and log files to the report. The maximum report size is 20 MBs. You can save the report to a memory card and email it to support.

Check system for updates

Checks if updates are available for compatible devices on your network.

➔   *Note:* To ensure the internal list of software versions is up to date, your system must be 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.

Settings

Vessels

Sun, Moon

Trip calculator

Files

Find
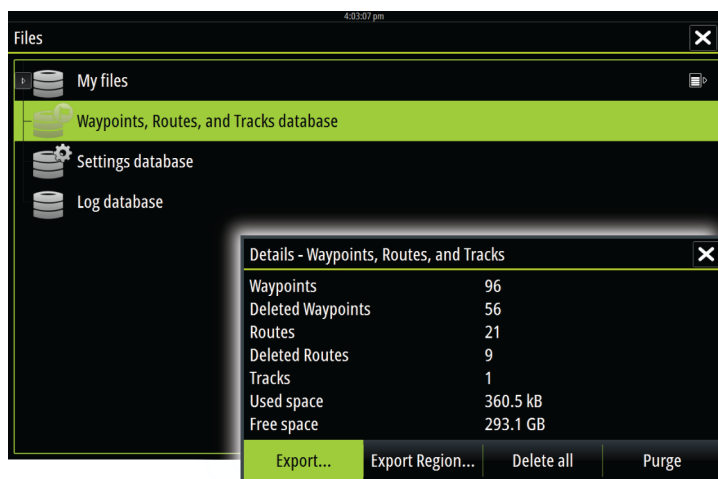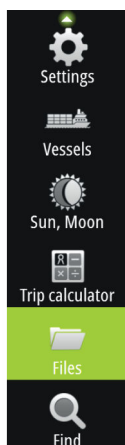
Export region

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
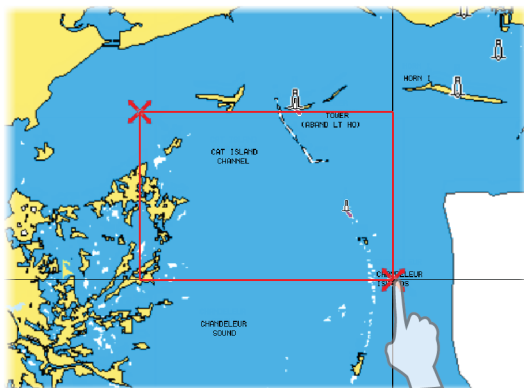
3. Select the export option from the menu
4. Select the appropriate file format
5. Select Export to start the export

Purging Waypoints, Routes and Tracks

Deleted Waypoints, Routes and Tracks are stored in the display unit's memory until the data is purged. 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.

23

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.

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

Index

B&G

CE 0980