SIMRAD

E50xx ECDIS System

Operator Manual

ENGLISH

www.navico.com/commercial

Preface

Disclaimer

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

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

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This manual represents the product as at the time of printing. Navico Holding AS and its subsidiaries, branches and affiliates reserve the right to make changes to specifications without notice.

Copyright

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Warranty

The warranty card is supplied as a separate document.

In case of any queries, refer to the brand website of your display or system: www.navico.com/commercial.

Regulatory statements

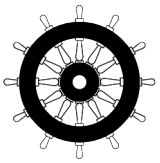
This equipment is intended for use in international waters as well as coastal sea areas administered by countries of the E.U. and E.E.A.

This system complies with:

- CE under EMC directive 2014/30/EU
- The requirements of level 2 devices of the Radiocommunications (Electromagnetic Compatibility) standard 2008

The relevant Declaration of conformity is available at the following website: www.navico.com/commercial.

The Wheelmark



The Marine Equipment Directive 96/98/EC (MED), applies to all new ships, to existing ships not previously carrying such equipment, and to ships having their equipment replaced for ships flying EU or EFTA flags. This means that all system components covered by annex A1 must be type-approved accordingly and must carry the Wheelmark, which is a symbol of conformity with the Marine Equipment Directive.

This system is produced and tested in accordance with the European Marine Equipment Directive 96/98./EC

Navico has no responsibility for incorrect installation or use of the equipment, so it is essential for the person in charge of the installation to be familiar with the relevant requirements as well as with the contents of the manuals, which covers correct installation and use.

About this manual

This manual is a reference guide for operating the E5024 and E5027 ECDIS. 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 2.0. The manual is continually updated to match new software releases. The latest available manual version can be downloaded from www.navico.com/commercial.

Contents

8 Introduction
8 The ECDIS system
8 ECDIS requirement
8 System components

10 The user interface
10 The main panel
11 Shortcut buttons
12 The Main menu
12 The Panel menu
13 The Settings dialogs
14 The Instrument bar
14 The Navigation panel
14 The Overview map
14 Layers
15 Radar overlay
15 Object information
16 On-screen keyboard

18 Basic operation
18 Start-up
18 Turning the system off
18 Using the trackball
18 Adjusting display brightness
19 Selecting the chart scale
19 Moving the chart center

20 Installing charts
20 Installing charts from the NavStick
23 Installing charts from other suppliers
24 Selecting charts to display

25 Setting up the chart panel
25 Chart settings
29 Own vessel's display settings
30 Chart symbols

31 Tools for safe navigation
31 Man Over Board
31 Setting a guard zone around the vessel
32 Showing distance lines and zone rings
33 Measuring distance and bearing
34 Navigational calculations
35 Manually calculating vessel position
36 Anchor watch

38 Other vessels on the chart panel
38 AIS targets
42 Radar targets
43 Viewing target information
44 Finding a target on the chart panel
45 Target update frequency
45 Lost target warnings

46 Route planning
46 The route menus

47 Route settings
48 Creating a new route
48 Displaying a route
49 Modifying routes
50 Reversing a route
50 Adding an event mark
51 Displaying information about danger objects in a route
51 Copying a route
52 Exporting routes
52 Importing routes
53 Transferring routes

54 Sailing along a predefined route
54 Starting a voyage
54 Stopping the voyage
54 The Navigation panel

55 Managing the chart database
55 The Chart database
55 Displaying chart information
56 The Chart library
57 Viewing the chart update history
58 Manual chart updates
58 User chart objects
60 Manual updates and User chart objects update history

61 The Log book

62 PLECDIS systems
62 Defining main and backup ECDIS systems
63 Automatic data synchronization
64 Manual data synchronization

65 Maintenance
65 Maintenance philosophy
65 Checking the connectors
65 Verifying the display color
66 Backup and restore of system data
66 Software upgrades

68 System messages
68 The ECDIS message system
68 Alert notifications
69 Acknowledging alerts
69 Indications
69 Power failure alarm
69 External bridge alert systems
70 The Alerts list

71 Fault finding
71 Fault identification

73 Terms and abbreviations

76 Icons
76 Shortcut buttons
77 Chart panel icons
77 General interface icons

77 Main menu icons
78 Route icons
78 Chart management icons
79 Icons in Manual update menus
80 User chart objects menu icons
81 System settings icons
81 Object information icons
81 Target symbols

1 Introduction

The ECDIS system

This is a type approved Electronic Chart Display and Information System (ECDIS), and conforms to the International Maritime Organization (IMO) requirements for vessels that are subject to SOLAS regulations.

The system displays the vessel position, speed and course in real time on the chart, based on information received from navigational sensors. The vessel's symbol is displayed with actual heading, and speed vectors may also be indicated. Chart information critical to safe navigation defined by IMO will always appear on the display, while other chart information may be switched off.

Based on speed and course information, the system generates danger and grounding alerts, independent of mode of operation.

The system includes route planning, and routes are planned independent of the actual vessel position. The routes are checked for dangerous position of waypoints and legs as the route is planned. The routes are stored and may be recalled whenever necessary. The system has no limitations to the number of waypoints in a route.

Both hardware and software in the system are ECDIS type approved. The type approval certificates are available from the product site on www.navico.com/commercial.

The operational area of this ECDIS using ENC charts is between latitude 85° N and 85° S.

The International Hydrographic Organization (IHO) standards the system should meet are available at www.iho.int.

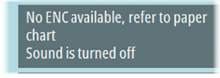
This ECDIS complies with IHO S64 test data set 3.0.1.

ECDIS requirement

According to the SOLAS convention 3 key components must be fulfilled if a vessel is to satisfy the chart carriage requirements in SOLAS by electronic means:

- The ECDIS must conform to the International Maritime Organization (IMO). To meet these requirements the system must be type approved
- The ECDIS system must have a back-up arrangement. This could be either a folio of paper charts or other non-paper, back-up solution decided by the relevant maritime administration. This could e.g. be Simrad's type approved duplex ECDIS system (PLECDIS ™)
- The charts used on the ECDIS system must be Electronic Navigational Charts (ENCs) following the standard set by the International Hydrographic Organization (IHO)

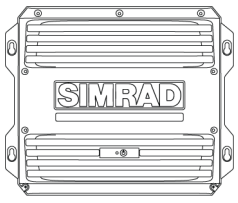
> ⚠ Warning: An ECDIS system is allowed to be used with non-approved charts. However, the use of the system with non-approved charts is limited to those areas where approved charts are not available. When non-approved charts are used, the ECDIS must be used together with an appropriate folio of up-to-date paper charts!



When using a non-approved chart, this will be indicated with a message.

System components

The E5000 Processor

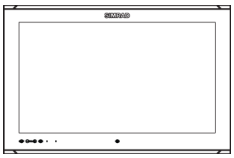


The E5000 Processor includes two independent CPUs, each with their own inputs and outputs.

CPU1 is used for the ECDIS system. As an option, CPU2 can be used as part of an NSO MFD (Multi-function Display).

The E5000 Processor is fitted with a MicroSD card slot. Both CPU1 and CPU2 may use the SD card slot. If an SD card with charts (Navionics) is inserted into the slot, then the NSO (CPU2) will automatically use the charts.

Two or more E5000 Processors can be connected through Ethernet to form a PLECDIS™ (Paperless ECDIS) system.



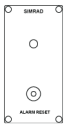
The Monitor

The E5024 system includes an M5024 monitor, the E5027 system includes an M5027 monitor. The monitors are non-touch monitors, color calibrated and type approved for ECDIS.

A separate manual is delivered with the monitor. This manual includes installation and operational instructions.

The trackball

A wireless trackball is used as pointing device in the system. The device is a standard Logitech Wireless Trackball (M570).

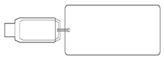


The E0102 Alarm panel

The Alarm panel is the audio source for the system.

The unit gives an audible and a visual alert for any faults from the system, including power supply failure.

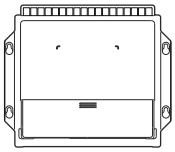
Audible alerts are mandatory for any systems requiring Wheelmark certification.



The NavStick

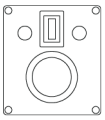
A NavStick USB drive from NAVTOR is included in the system. The NavStick is used for chart updates, and acts as the bridge between the E5000 Processor and a computer with internet access.

When delivered from Navico the NavStick includes detailed world-wide charts. The detailed charts on the NavStick are copied to the E5000 Processor when zones are purchased and permit codes received from Navico.



SI80 Signal Interface unit

The optional SI80 Signal Interface unit is used for expanding the number of interface channels. This unit includes a four channel NMEA 0183 interface computer board and voltage supply for the CAN bus backbone.



LTSX50 Trackball

The optional LTSX50 is a panel mounted, water proof (IP68) trackball with scroll wheel.

The Chart database

The system is designed for using approved ENC charts in S57 or S63 formats.

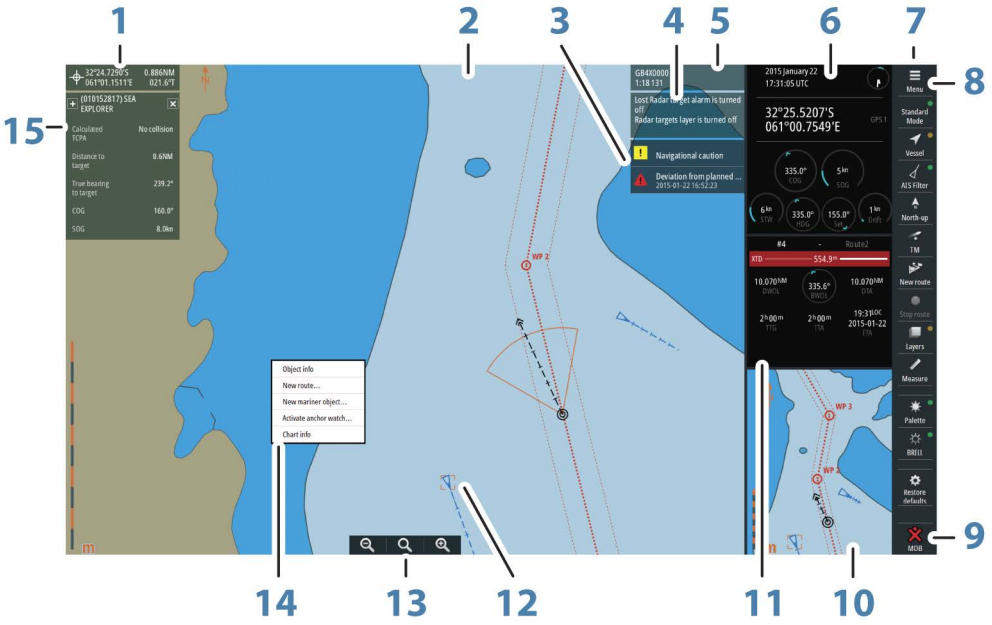
A word-wide overview chart is pre-installed in the system. During installation and setup of the system the required and detailed charts must be installed.

For details about chart installation procedure, refer to *"Installing charts"* on page 20.

2 The user interface

The main panel

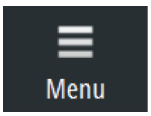
The main panel is divided into predefined areas as shown in the figure below.



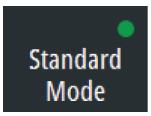
1 Cursor readout
2 Chart area
3 Alerts panel
4 Indications
5 Chart information
6 Instrument bar
7 Shortcut buttons
8 Menu button
9 Man Over Board button
10 Overview map
11 Navigation panel
12 Selected target
13 Zoom buttons
14 Panel menu
15 Target information

Shortcut buttons

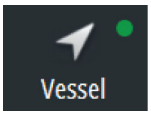
→ ***Note:*** Some of the shortcut buttons have a light indicator that can be green or yellow. Green indicates standard ECDIS mode, while yellow indicates non-ECDIS mode. One-click on a shortcut button with a yellow indicator reverts to ECDIS mode.



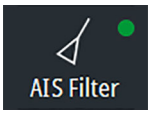
Menu
- Click to open the main menu



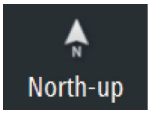
Display mode
- Click to return to Standard mode
- Right-click to show display mode options



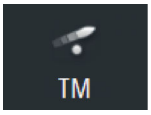
Follow own vessel
- Click to move the chart view to the vessel position and then follow the vessel. Vessel position in the chart depends on user settings



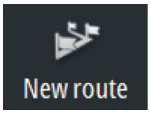
AIS Filter
- Click to turn OFF AIS filter
- Right-click to display options



Orientation
- Click to loop through chart orientation options
- Right-click to display options

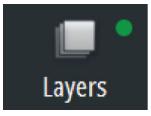


Motion
- Click to toggle vessel motion options
- Right-click to display options

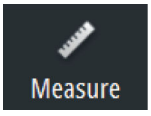


New route
- Click to start creating a new route

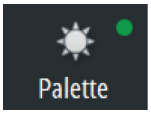
Stop route
- Click to stop navigating an active route



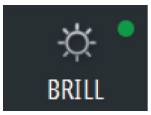
Layers
- Click to turn OFF all layer options
- Right-click to display options



Measure
- Click to toggle measure function on/off



Palette
- Click to return to Night palette when Red and Black palette is selected
- Right-click to display palette options



Brilliance
- Click to return to calibrated brightness for the selected palette

Restore defaults
- Resets settings to defaults set by the IEC standard.

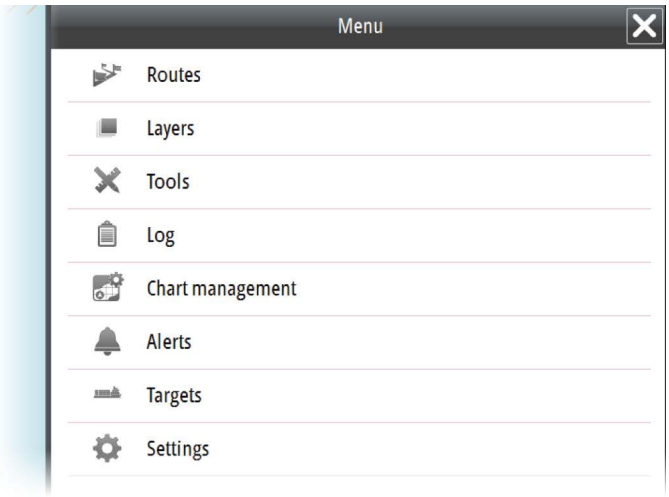
Man Over Board (MOB)

- Click to create a MOB waypoint at the vessel's position
- Right-click to remove single or all MOB waypoints

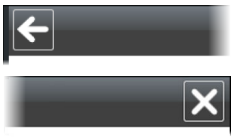
The Main menu

The Main menu is used for selecting options and for setting up the system.

The menu is displayed by selecting the **Menu** button.



You activate a menu item and toggle on/off a checkbox by selecting it.



A sub-menu is indicated with an arrow in the top left corner. Select this arrow to return to the previous menu level.

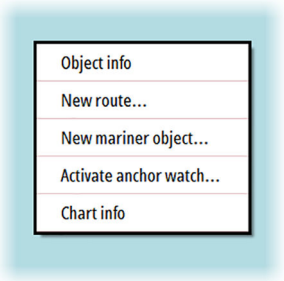
You close the menu by selecting the **X** button.

The Panel menu

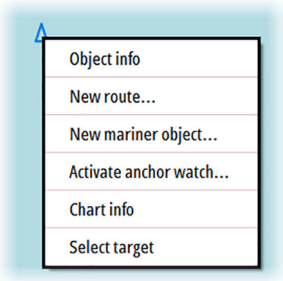
The Panel menu gives quick access to creating routes and mariner objects, and for displaying details about chart and objects.

The Panel menu is displayed by pressing the right trackball key.

The content in the Panel menu depends on whether there are objects under the cursor when you press the right trackball key.



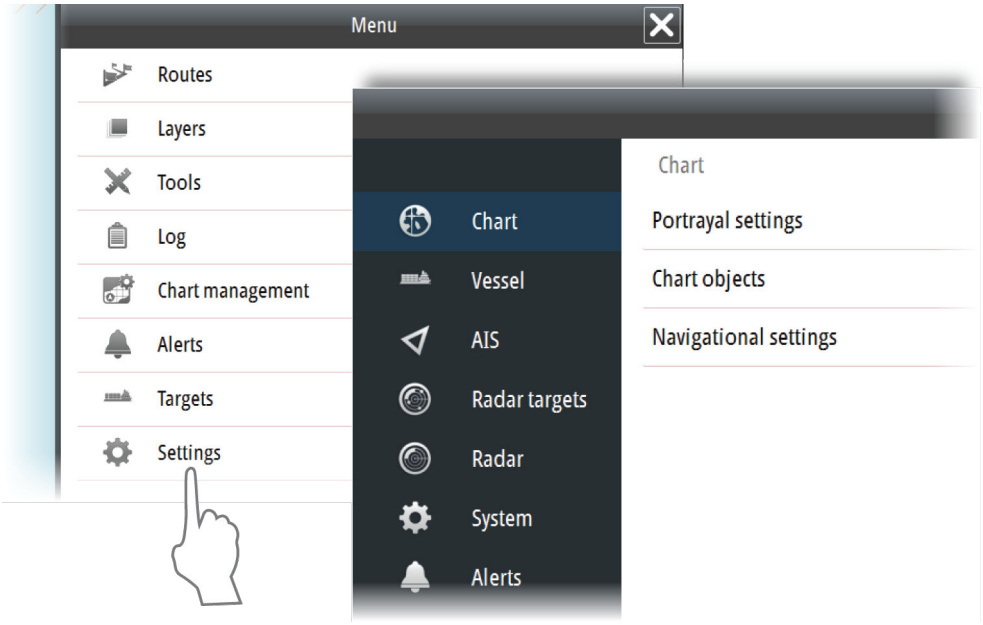
Default Panel menu



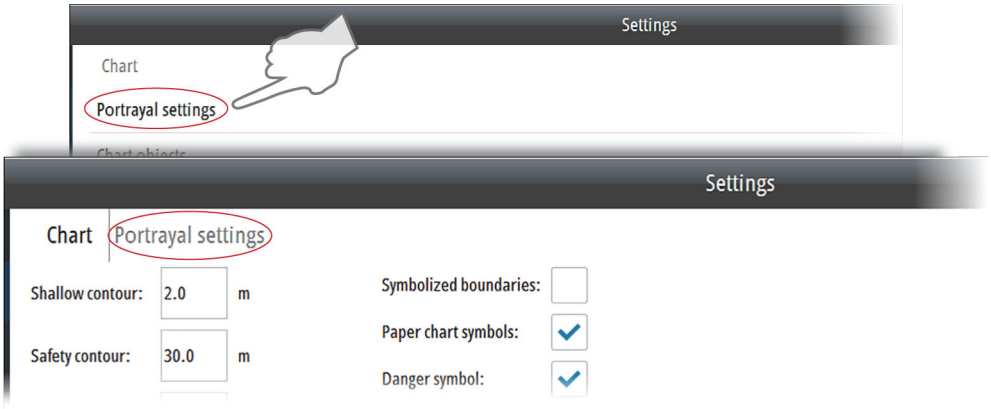
Panel menu when right-clicking a target

The Settings dialogs

The various Settings dialogs are used for setting up the ECDIS system.
All Settings dialogs are displayed as a full screen panel.



Sub-dialogs are indicated in the top of a dialog as shown below.



You close a Settings dialog by selecting the **X** button.

The Instrument bar

The Instrument bar includes time and position read from an EPFS (Electronic Position-Fixing System) sensor, together with indicators for the system's main sensors.

Where multiple sensors exist, the information displayed is for the sensor with the highest priority that is receiving data.

Valid sensors are indicated with a blue outline. Missing sensors or sensors sending invalid or bad data have a yellow outline.

The Navigation panel

The Navigation panel is automatically activated when you start navigating a route. See information in *"Sailing along a predefined route"* on page 54.

The Overview map

The Overview map makes it possible to display an overview or a detailed chart independent of vessel position and chart scale in the main chart view.

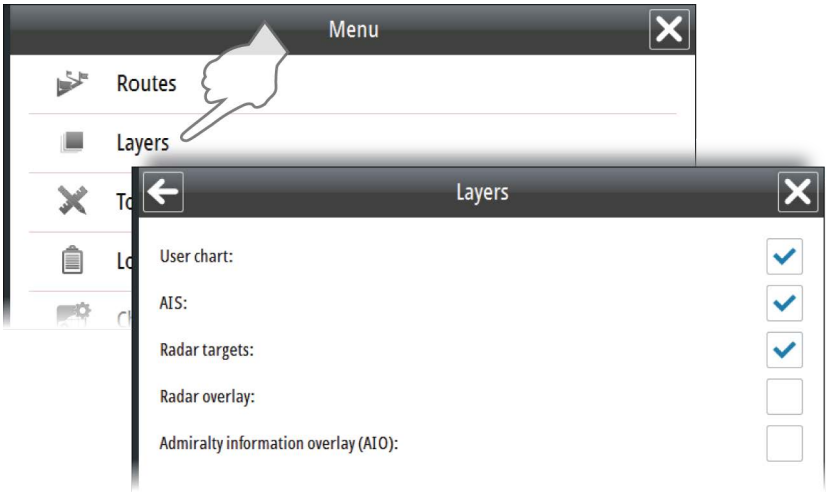
In this panel the chart is always shown with north up.

There is no indication in the Vessel button if the vessel is not shown on the overview map.

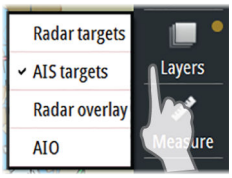
Layers

The system organizes chart overlay information in separate layers.

You turn these layers on and off from the Layers option in the main menu.



You can switch on and off all layers except User chart by right-clicking the Layers shortcut button.



If any other layer than User chart is turned on, the light indicator in the Layers shortcut button turns yellow.

You turn off all layers except User chart by left-clicking the Layers shortcut button.

Radar overlay

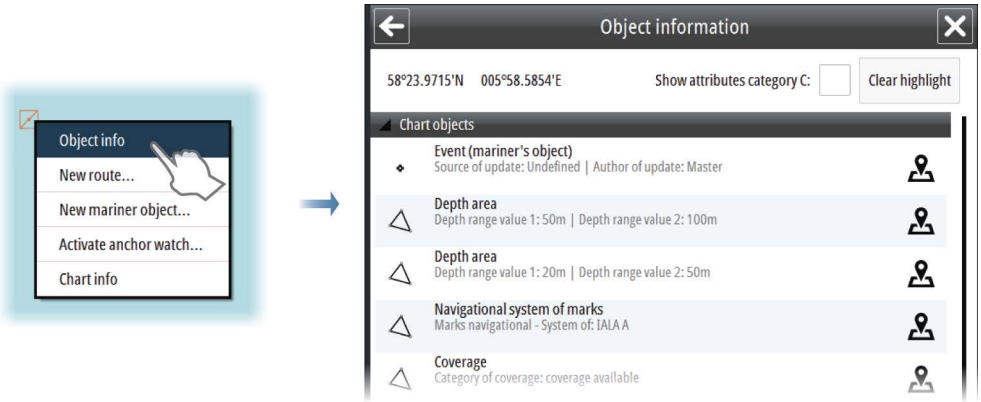
If a Simrad ARGUS radar is connected to the system, you can display radar overlay on the chart.

→ ***Note:*** The Radar overlay has to be turned ON to see the radar image as an overlay on the chart.

Object information

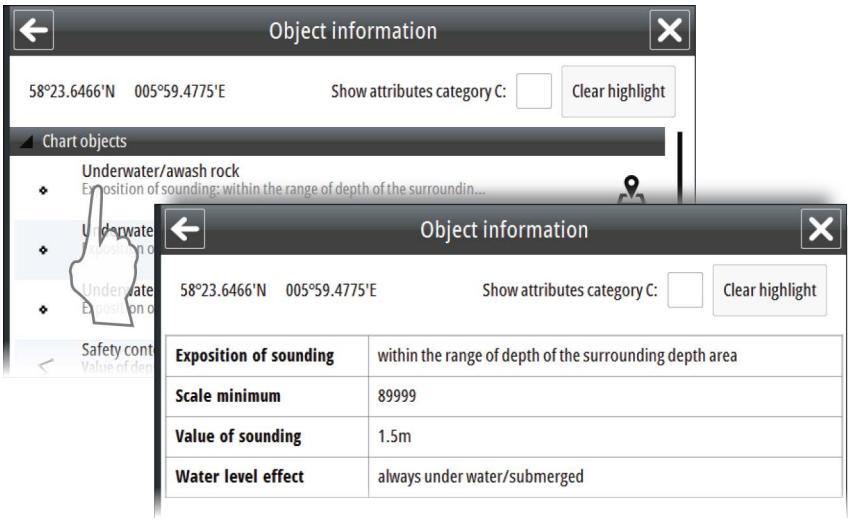
Information about an object is available in the Object information dialog.

The dialog is displayed by moving the cursor to the object and clicking the right cursor key. The dialog shows a list of information for the selected object/area, and cursor position when the right cursor key was pressed.



The number of objects in the Object information dialog depend on available information for the selected area.

You display detailed object information by selecting an object item in the dialog.



Different icons are available in the Object information dialog:

Highlights the object in the chart, and moves chart center to the selected object

Displays a txt file with additional object information in a separate window

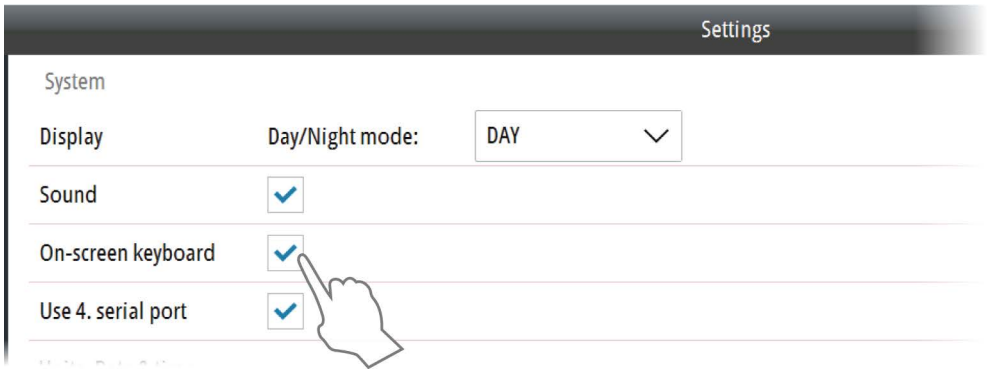
Displays an image file related to the selected object

On-screen keyboard

A virtual keyboard is by default displayed when required for entering user information in dialogs. The keyboard is operated by selecting the virtual keys.

You remove the keyboard from the panel by selecting the **X** in the upper right corner.

You can select to disable the keyboard from the System Settings panel.


Settings
System
Display
Day/Night mode:
DAY
Sound
On-screen keyboard
Use 4. serial port

3 Basic operation

Start-up

The system should be left with the power ON.

The system is switched on using the external power switch.

When power is switched on, the operating system will be started, automatically followed by the system program.

When the system is switched on after the first-time initialization, the system will start with the settings that were active when the system was turned off.

Turning the system off

The system is turned off by using the external power switch.

→ ***Note:*** Always let the system boot completely up before shutting it down.

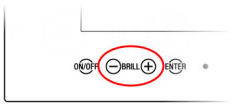
Using the trackball

The trackball is used to position the cursor on the screen and to maneuver in menus and dialogs.

The trackball keys have the following functions:

- Left key: used to click on buttons and operate menus.
- Right key: used to display the Object information dialog. Refer *"Object information"* on page 15
- The scroll wheel: used to increase/decrease the chart scale, for scrolling up/down in lists and for editing values in text boxes
- The trackball: used for moving the cursor on the screen. The trackball can also be used for panning the chart by holding down the left key.

Adjusting display brightness

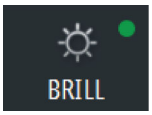


Brilliance

The display brilliance is adjusted by the plus and minus keys on the M5024 and M5027 monitors.

The monitors are color calibrated from factory, and has its individual backlight brightness setpoint in accordance with the ECDIS standard. ECDIS approved brilliance setting is indicated with a green indicator in the **BRILL** shortcut button. If the brilliance is changed on the monitors, the indicator changes to yellow.

> ⚠ Warning: Use of the Brilliance may inhibit visibility of information, particularly when using the night pallete.

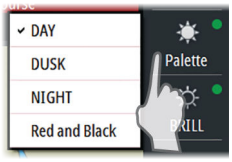


You return to ECDIS approved brilliance settings by selecting the **BRILL** shortcut button.

Display palettes

4 display palettes are available for optimum color contrast under different light conditions.

The **Red and Black** palette is not included in the ECDIS standard. When this palette is selected, this will be indicated with a yellow indicator on the **Palette** button.



The display brightness is set by using the **Palette** button:

- Right-click to display and select palette options
- Left-click to return to ECDIS approved palette

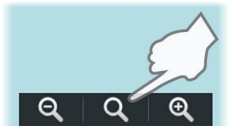
> ⚠ Warning: Details in the chart may be less visible when one of the dark palettes is selected. To increase the chart readability for the dark palettes, select the 2 colors option in Portrayal settings. Refer *"Portrayal settings"* on page 25

Selecting the chart scale

Current chart scale is shown in the Chart Info panel.

The chart scale is changed by:

- scrolling up/down with the scrollwheel
- using the zoom buttons on the chart panel



Select the middle zoom button for selecting the best scale available for the vessel's position. For more details see *"Keep best scale"* on page 28.

Moving the chart center

You move the chart by:

- Panning (moving the cursor while holding down the left cursor key)
- Left click to center the chart on the current cursor position
- Left clicking the Cursor read-out panel and then entering the selected position for the chart center

You can also move the chart to a route or to a selected chart. See more information in *"Displaying a route"* on page 48 and *"Chart catalogs"* on page 56.

4 Installing charts

Installing charts from the NavStick

The system is delivered with a pre-installed overview chart. Detailed world-wide charts are available on the NavStick USB drive included with the system.

The charts are installed and maintained by using the following services:

- NavTracker - a customized web interface from NAVTOR giving the navigator and ship management full overview of chart usage, chart update history and chart management. The customized NavTracker web interface is created and log-on details submitted to the user when the charts are purchased
- NavSync - a PC program from NAVTOR used for receiving and updating the content on the NavStick

The system allows for installing and using charts in S57 and S63 format from other chart suppliers. Refer to *"Installing charts from other suppliers"* on page 23.

Before the charts can be copied from the NavStick to the system the following steps must be performed:

1. Submit the User permit code to Navico
2. Verify your chart subscription from the NavTracker web site
3. Update the content of the NavStick to include chart updates and Chart permit codes
4. Copy content of the NavStick to the system

The next sections describe the required steps in detail.

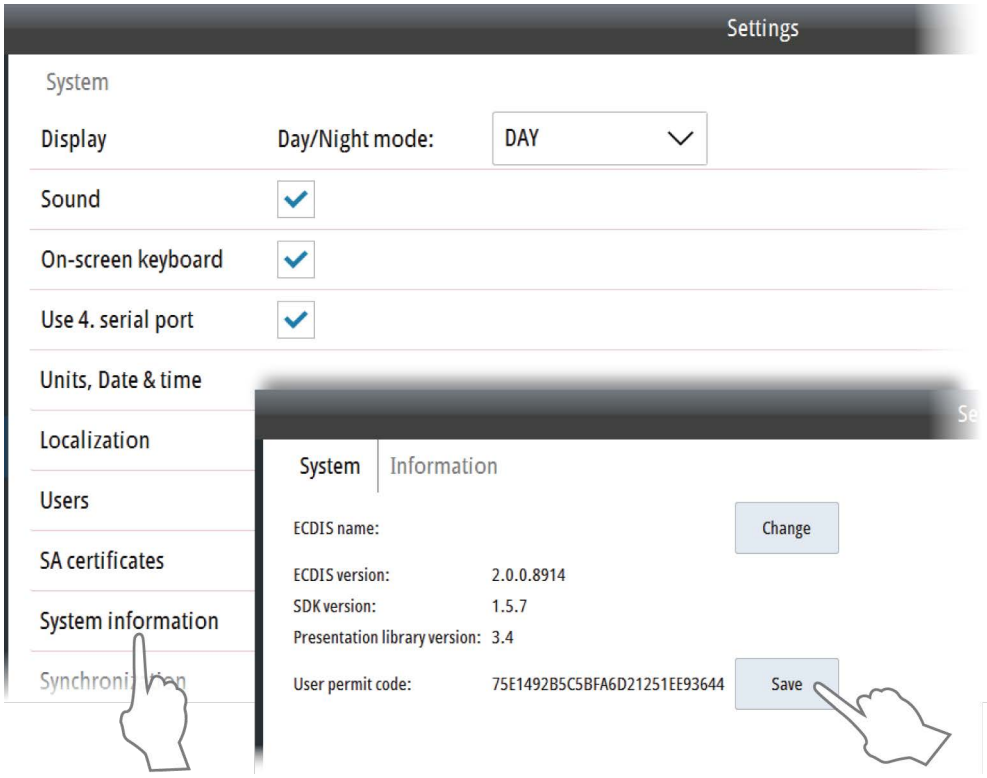
Submitting the User permit code to Navico

A chart permit code has to be obtained from Navico before the charts can be installed from the NavStick. To obtain this code the system's User permit code must be submitted to Navico.

The system's User permit code is automatically generated in the E5000 computer. If the E5000 is replaced, a new User permit code has to be submitted to Navico to be able to use the charts.

Insert a card in the SD card slot or a memory stick in the USB port on the E5000, and save the User permit code from the **System Information** dialog. This code is sent to Navico by email at **chartservice@navico.com**.

→ ***Note:*** You can **NOT** save the User permit code to the NavStick.

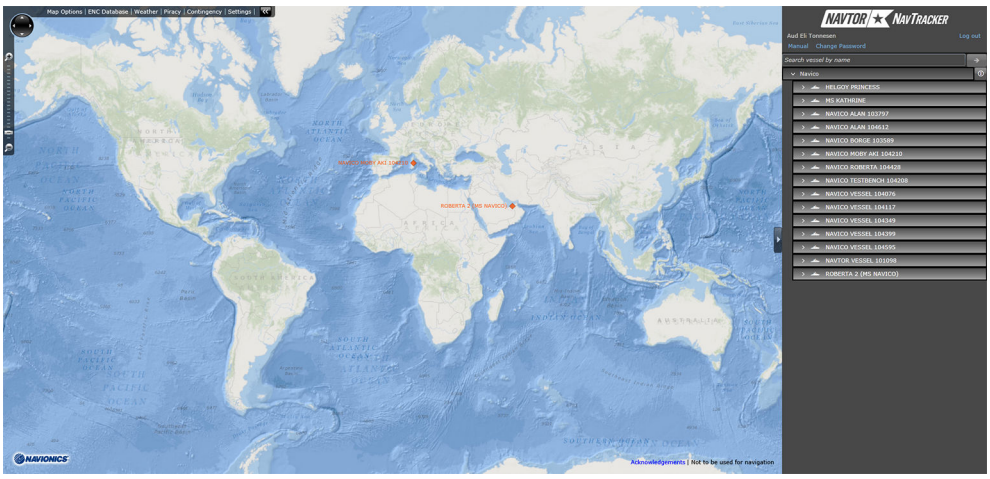


Verifying or changing your chart subscription

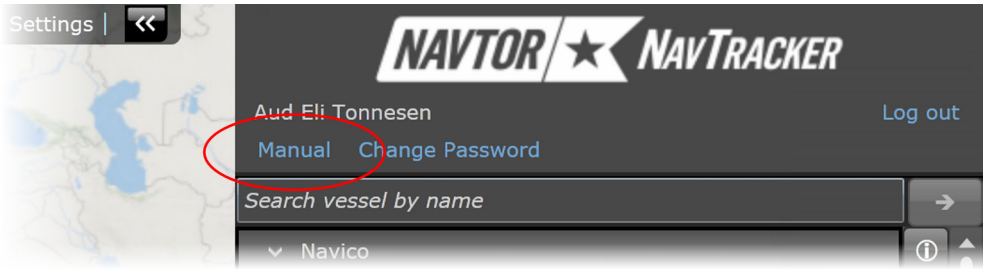
When Navico receives the User permit from the vessel and the chart subscription is agreed, Navico creates a custom account and a customized web site in NAVTOR NavTracker. From this web site you can view and manage your subscription.

You log on to this system via a web browser (http://navtracker.navtor.com/). You can use an iPhone, iTouch or iPad app for viewing NavTracker information.

1. Log on to the NavTracker
2. Enter your email and password received from Navico when the subscription was agreed
3. Sign in to enter your customized NavTracker web site



4. Download the NavTracker User guide for detailed information about how to use the NavTracker



5. Verify that your subscription is correct, eventually request changes according to the guidelines in the NavTracker User guide

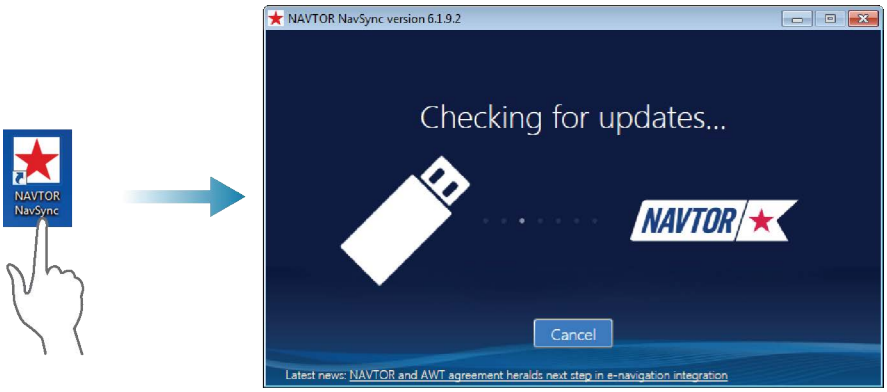
When completed the NavTracker system updates your subscription information, and chart updates and Chart permit codes for the purchased charts are prepared. These chart updates and Chart permit codes are downloaded to the NavStick by using the NavSync program.

→ ***Note:*** The images from the NavTracker system are examples only.

Updating the content of the NavStick

When the chart subscription is agreed, available chart updates and Chart permit codes for the purchased charts are prepared. These files are downloaded to the NavStick by using the NAVTOR NavSync program.

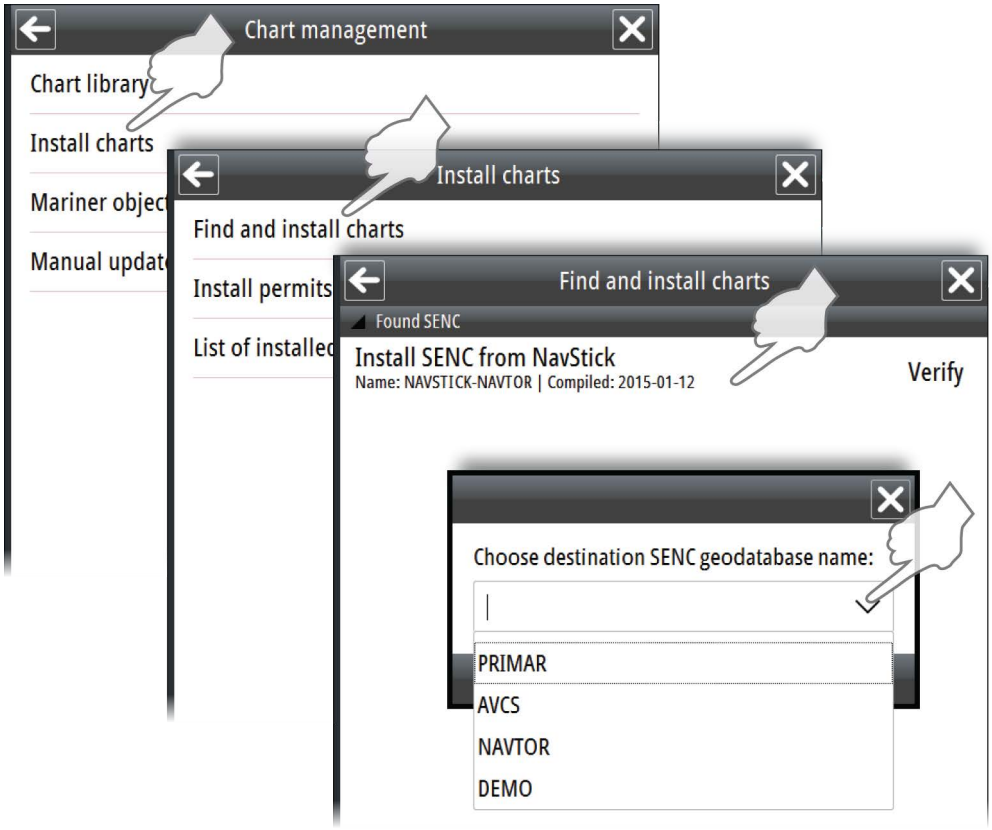
1. Download and install the NavSync program from http://navsync.navtor.com/ on your PC
   - The NavSync icon are added to your desktop when the installation is completed
2. Insert the NavStick in the PC
3. Double-click on the NavSync icon to start the program
4. Follow the instructions on the screen to update the content of the NavStick with the latest available charts



Copying the contents from the NavStick to the system

1. Insert the NavStick with the charts and the license code into the USB drive on the E5000 processor
2. Open the **Chart management** menu, and select **Install charts**
3. Select **Find and install charts**
   - The system will now automatically recognize the NavStick and list the content
4. Select the charts you want to install

Selected charts and license codes are now copied to the NAVSTICK-NAVTOR geodatabase.



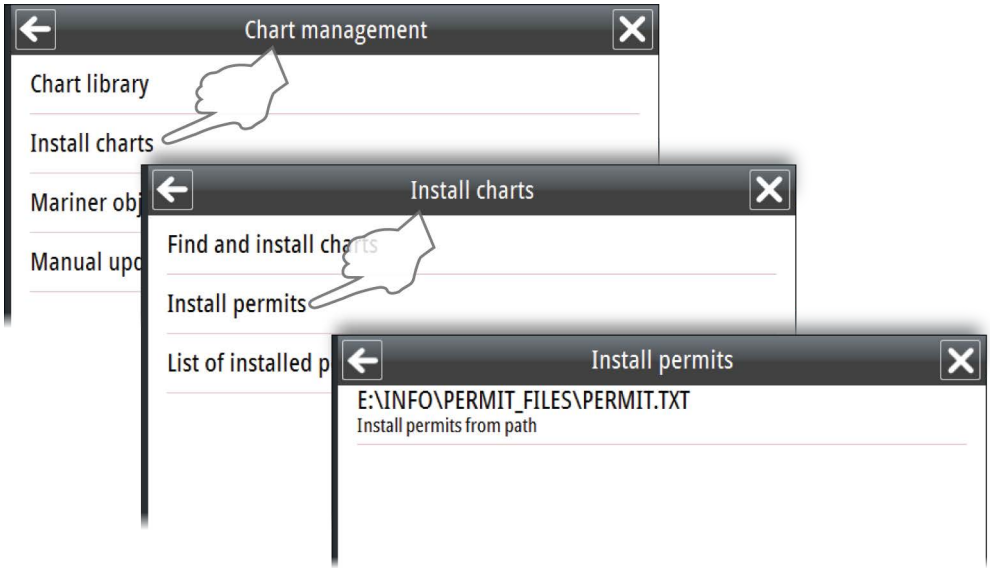
Installing charts from other suppliers

The chart suppliers have different procedures for submitting Chart permit codes and charts. For chart suppliers other than NAVTOR it is required to install Chart permits before charts can be copied to the system. Refer to the supplier documentation for details.

→ ***Note:*** A DVD drive is NOT included in the system type approval.

→ ***Note:*** Charts from vendors that use CD/DVD for distribution have to be copied to a USB memory stick. The whole content of the CD/DVD has to be copied to the USB memory stick before applying it to the E5000.

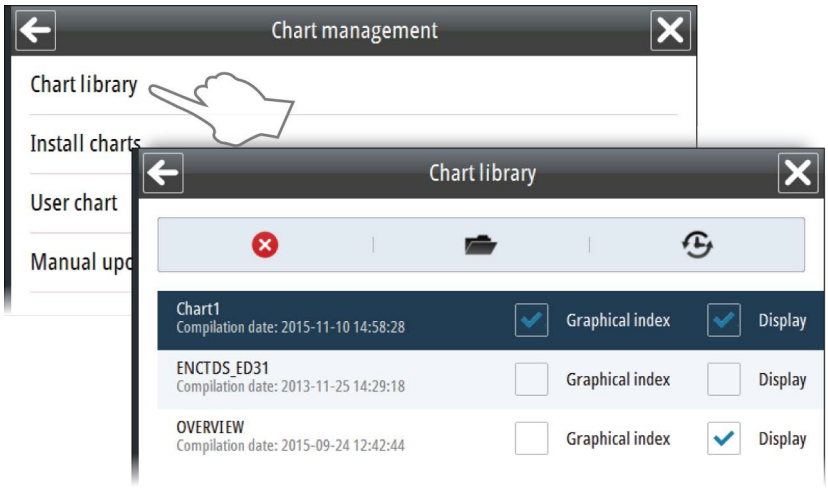
Chart permits are copied to the system by using the **Install permits** menu option.



When Chart permits are installed, the charts have to be copied from an USB or SD drive to the system by using the **Find and install charts** menu option.

Selecting charts to display

All chart databases installed in the system are listed in the Chart library.



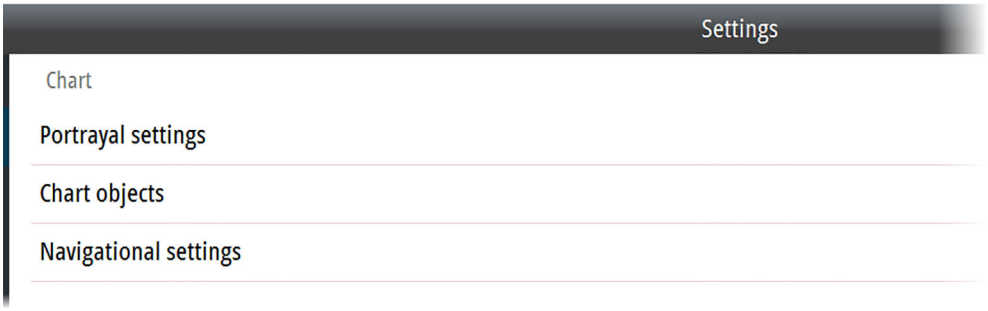
Select the **Display** option for the chart databases you want to use.

If you have more than one database available, you can select to show multiple charts. The system will however only display one chart at the time, and it will automatically select the best chart available based on your vessel's position .

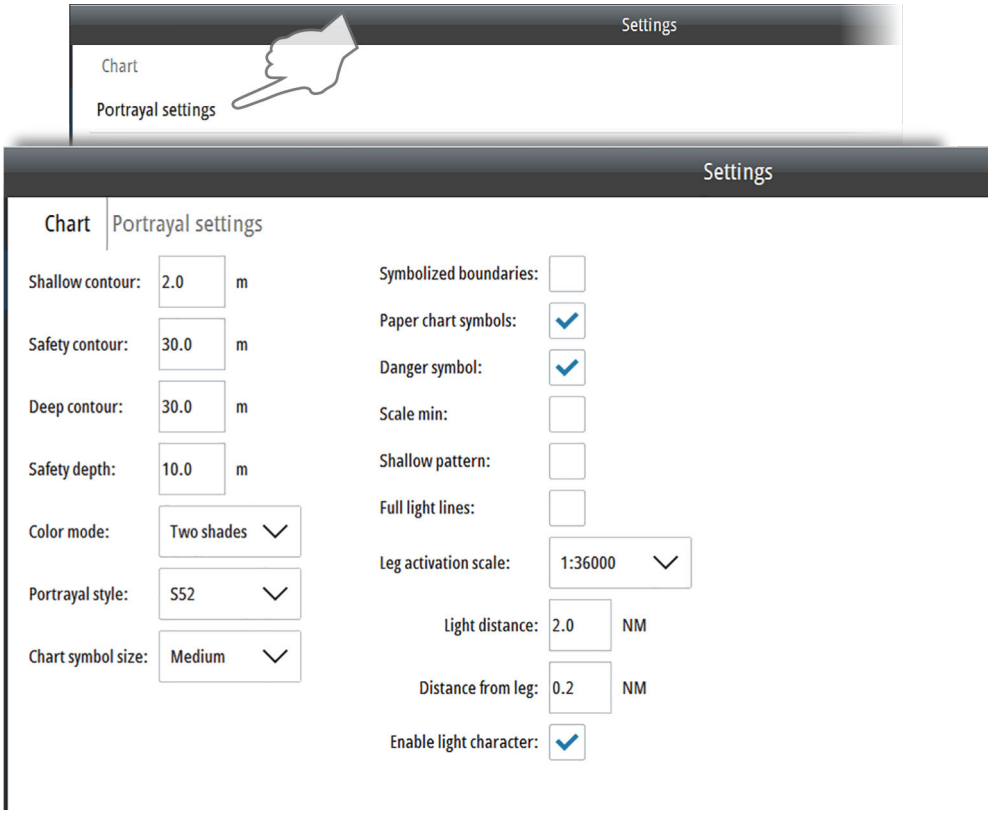
5 Setting up the chart panel

Chart settings

The chart settings are divided in 3 logical groups as described in the following sections.



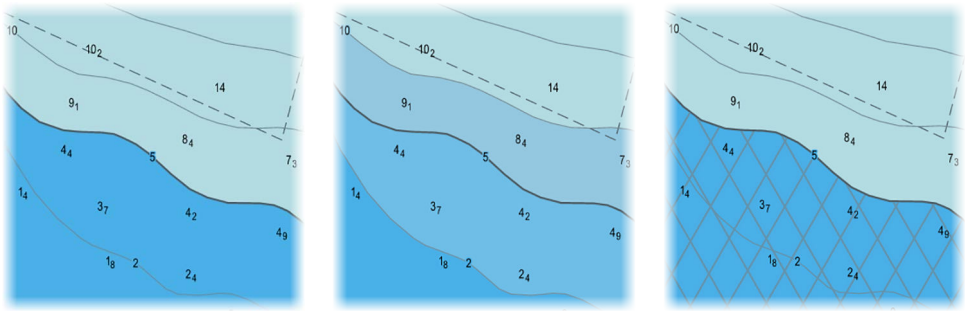
Portrayal settings



Depth display settings

Various settings are available to visualize the depths and depth area:

- **Shallow contour**: Limit for shallow waters. Depth less than Shallow contour will be displayed in dark blue color.
- **Safety contour**: Contour related to own vessel. To be used by the system to distinguish between safe and unsafe water. Depths between Safety contour and Shallow contour settings are displayed in medium blue color.
- **Deep contour**: Limit for deep waters. Depths between Deep contour settings and Safety contour setting are displayed in light blue color.
- **Safety depth**: The ship's draft plus under keel clearance. Sounding are displayed in black if they are equal to or more shallow than the safety depth settings. Soundings are displayed in grey if they are deeper that the set value.
- **Color mode**: Number of colors used to indicate depth:
  - 2 color mode: unsafe water (from the 0 meter contour to the safety depth) and safe water (from the safety depth and deeper)
  - 4 color mode: very shallow area (from the 0 meter contour to the shallow contour), medium shallow area (from the shallow contour to the safety contour), medium deep area (from the safety contour to the deep contour), and very deep area (from the deep contour and deeper)
- **Portrayal style**: You can select to display the chart symbols in the S52 portrayal style or in the INT1 portrayal style. The S52 portrayal style displays the chart symbols according to the ECDIS standard, while the INT1 style displays the chart symbols and color as required in the Symbols and Abbreviations Used on Admiralty Charts publication.
- **Chart symbol size**: Option for selecting size of chart symbols
- **Symbolized boundaries**: Displays boundaries lines as symbols rather than as plain lines
- **Paper chart symbols**: Displays navigation aids as paper chart symbols rather than as simplified symbols. This option is available only for the S52 portrayal style.
- **Danger symbol**: Displays dangerous object with a danger symbol
- **Scale min**: Reduce the scale-dependent objects (objects with the attribute SCAMIN) scale at which they are drawn. At display scales smaller than SCAMIN the object is not drawn. For example, an object with a SCAMIN value of 50,000, indicating a scale of 1/50,000, is not drawn on a display of 1/60,000.
- **Shallow pattern**: Fills the shallow area from the coast line to the safety contour with a parallel pattern.

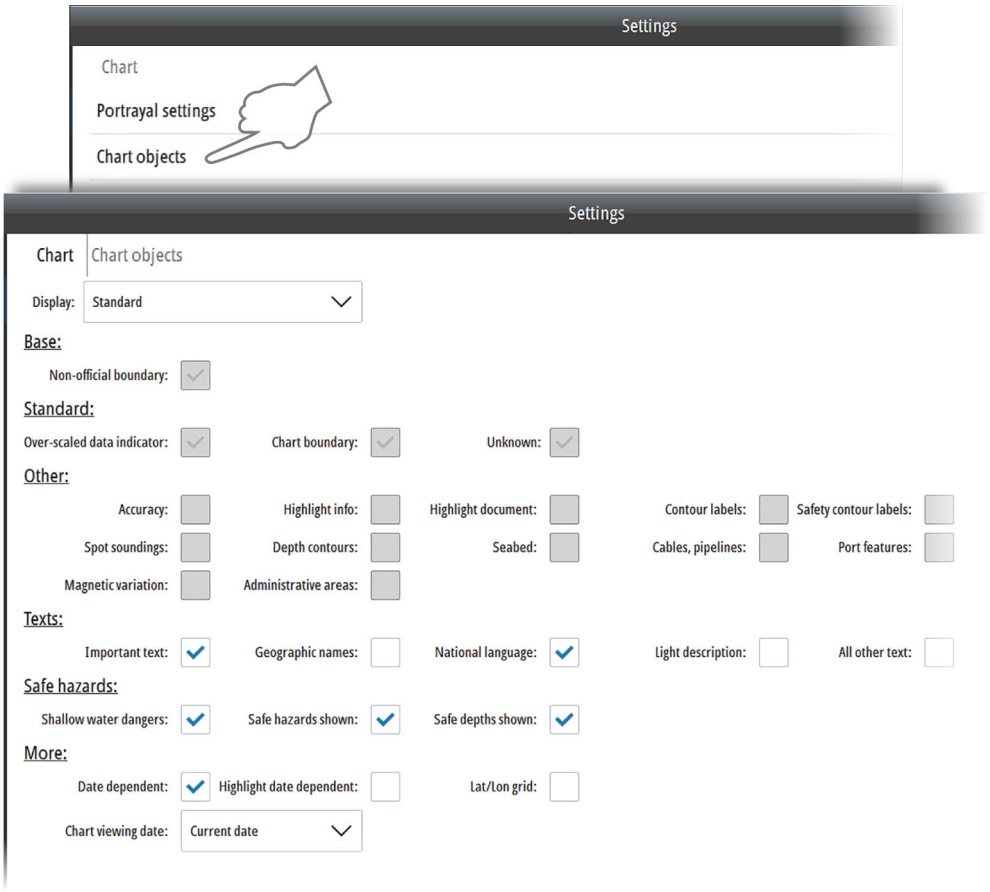


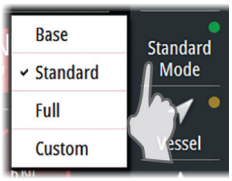
2 color mode *4 color mode* *Shallow pattern*

- **Full light lines**: Displays light sector legs in real length rather than as short lines
- **Leg activation scale**: Set the scale to turn on the light sector feature. Additional options appear:
  - Set the distance from the vessel to the navigation light (**Light distance**) and distance from the vessel to the sector leg (**Distance from leg**) to determine when the sector light is shown on the chart.
  - **Enable light character**: Displays a blinking light character

Chart objects

The system has 4 display modes. **Base**, **Standard** and **Full** mode have predefined standard objects that are displayed. In addition these modes includes optional objects that manually can be turned on. For the **Custom** mode all chart objects can be manually selected.





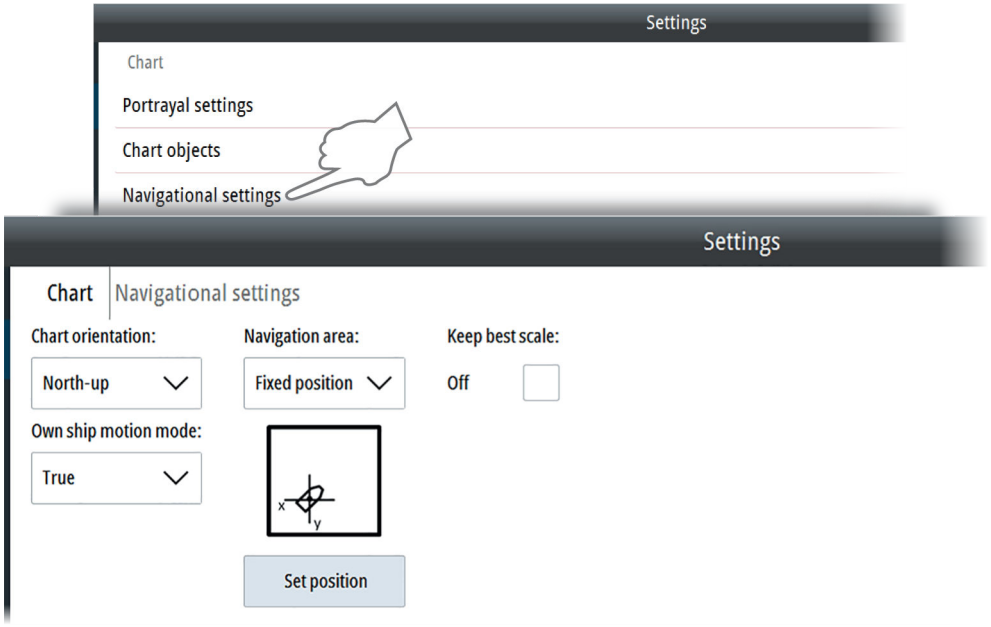
You select display mode by right clicking the Mode shortcut button, and you use the Chart objects settings dialog to set up which optional chart object that should be displayed with each mode.

→ ***Note:*** The Standard mode is the default ECDIS mode. If another mode is selected this is indicated with a yellow indicator in the Mode shortcut button. You return to Standard mode by selecting the Mode shortcut button.

Chart viewing date

Some objects on the chart can be date dependent. Change the chart viewing date in the Chart objects settings dialog to see if new items appear, existing items have moved or are removed from the chart on a particular date or date range.

Navigational settings



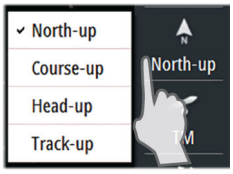


Chart orientation

Several options are available for how the chart is rotated in the panel. You select the options by right-clicking the chart orientation shortcut button.

- **North-up**: Displays the chart with north upward. Corresponds to the usual orientation of nautical charts.
- **Course-up**: Displays the chart with the vessel's course over ground directed upward. COG is received from the active EPFS sensor.
- **Head-up**: Displays the chart with the vessel's heading directed upward. Heading information is received from a gyro compass or from a marine transmitting heading device. If heading is not available, then the COG from active GPS is used.
- **Track-up**: Rotates the chart in the direction of the next waypoint when navigating a route. If not navigating, the heading up orientation will be used until navigation is started

The north arrow in the top left corner of the panel shows the north orientation.

Navigational area

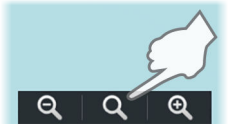
The Navigation area setting defines where your vessel is displayed in the chart view.

- **Fixed position**: Used for setting the position on the screen where you want to display the vessel.
  Press the Set position button to close the dialog and display the chart panel, allowing you to manually select the preferred position for vessel. The display returns to displaying the vessel in this position whenever you press the Vessel shortcut button
- **Area**: Used for manually defining the navigation area for true and relative motion.
  In true motion the chart is redrawn with the vessel on the outer circle when the vessel reaches the inner circle. In relative motion the vessel's position in the chart is on the outer circle

> ⚠ Warning: The navigation area options must be used with care. The manually selected vessel position and area must be set considering safe navigation!

Keep best scale

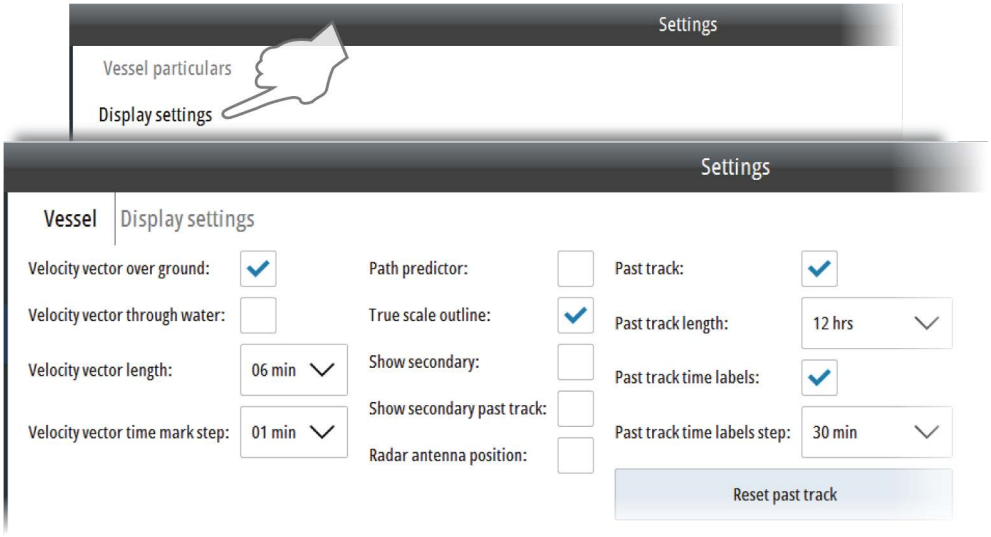
When the Keep best scale option is selected, the system automatically displays the chart with the largest scale available for the current position of the vessel.



→ ***Note:*** The Keep best scale option is turned off when you manually zoom the chart. You can temporarily display the best scale available by pressing the best scale zoom button, but this does not turn on the Keep best scale option.

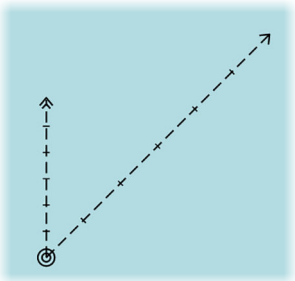
Own vessel's display settings

You select how your own vessel is displayed on the chart panel from the Vessel Display settings dialog.

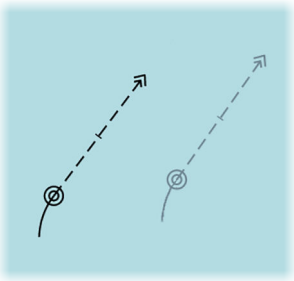


The following options are available:

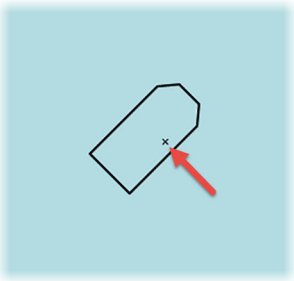
- **Velocity vector settings**: Velocity vector of the vessel is a vector predicting position of the vessel in a specified period of time based on the current speed and course. Two velocity vectors are available: Velocity vector over ground based on speed over ground and course over ground, and Velocity vector through water based on speed through water and heading. You select the vector length in minutes and the time between the marks on the vector
- **Path predictor**: Along with the velocity vectors you can display a path prediction vector. Path predictor is based on speed over ground, course over ground and rate of turn
- **True scale outline:** Displays the vessel with a true scale symbol at large chart scale. The symbol size is based on the vessel characteristics settings
- **Show secondary/Show secondary past track:** Displays the vessel's past position and past tracks read from the secondary sensors. Data from the sensor in use is drawn with black lines. If there is valid data from sensors not in use, these appear as greyed
- **Radar antenna position**: Indicates the radar antenna position on own vessel outline or symbol
- **Past track settings**: Displays the vessel's past tracks on the chart. You select the track length in minutes and the time between the marks on the track. The past track length, time marks, mark steps and reset option affect tracks for both primary and secondary sensors.



Velocity vectors



Primary and secondary sensors

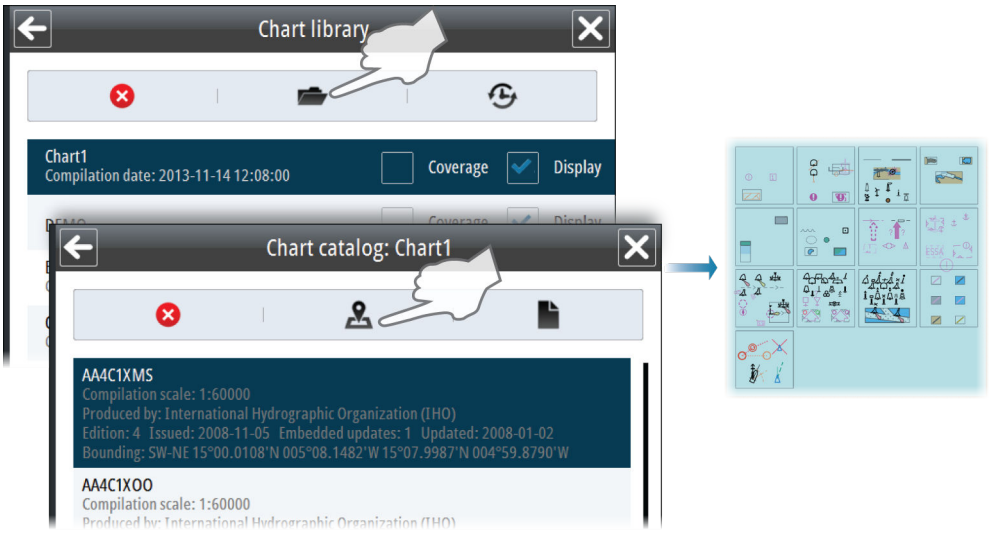


True scale outline with radar antenna position

Chart symbols

All chart symbols used by the system can be displayed as follows:

1. Open the Chart library panel
2. Open the chart catalog for the **Chart1** database
3. Select the Display Object icon for one of the datasets included in the database
   - The display moves and scales the chart to show all symbols included in the selected dataset
4. Right-click a symbol to display object information
5. Return to the Chart library panel and select your preferred chart database to go back to normal operation

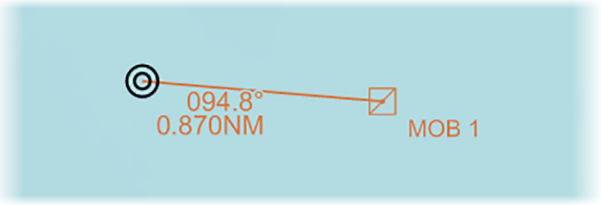


6 Tools for safe navigation

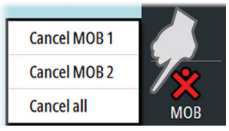
Man Over Board

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

Bearing and Range from the **MOB** to the vessel's position are displayed on the chart.



If the cursor is moved to the marker and the left cursor key pressed, the **MOB** position is displayed in the **Object information** dialog.



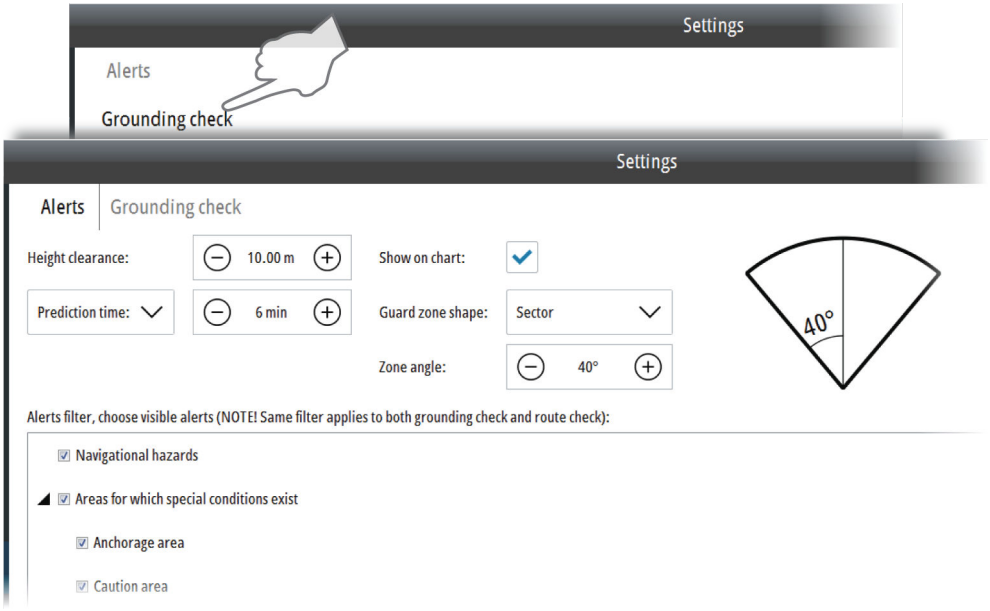
A **MOB** cannot be moved. Individual or all **MOBs** are removed by right-clicking the **MOB** button.

Setting a guard zone around the vessel

The grounding check option is used to warn you about dangerous and caution objects inside a specified zone ahead or around your vessel.

The grounding alert is based on if your vessel will cross the Safety contour setting or the Safety depth setting. Refer to *"Depth display settings"* on page 26.

If an object is within the guard zone, a navigational caution is displayed in the Alert panel. This caution will remain in the Alert panel as long as the condition remains.

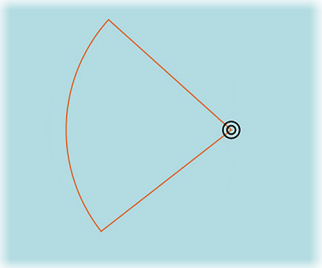


The following values should be defined:

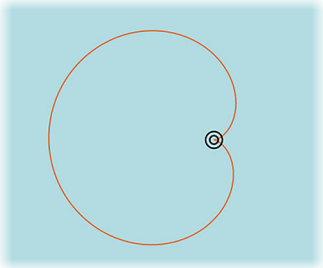
- the height required for your vessel to pass under a crossing overhead object
- the prediction time or safety distance
- the guard zone shape

You should also set the Safety contour setting and the Safety depth setting. Refer to *"Depth display settings"* on page 26.

You can select to display the guard zone on the chart.



Guard zone: Sector



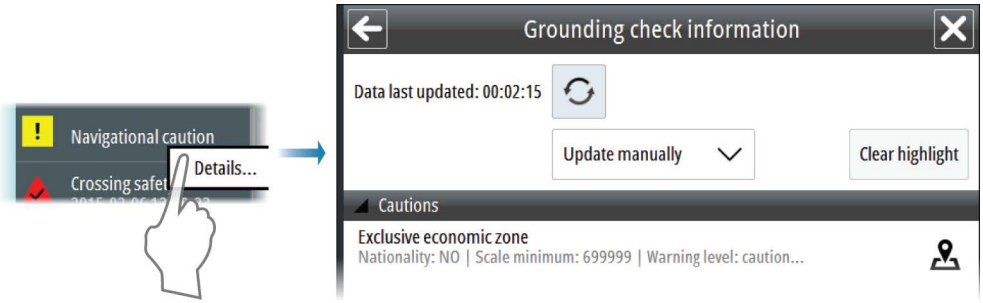
Guard zone: Cardioid

→ ***Note:*** If the guard zone is displayed on the chart, dangerous objects inside the zone are indicated as red, and caution objects indicated as yellow. There is no indication of dangerous objects within the guard zone if the guard zone is not displayed on the chart.

Displaying information about navigational cautions

Navigational cautions are displayed in the Alerts panel.

You display details about a caution by right-clicking Navigational caution.



Filtering alert items on the chart

Too many visible alert items can clutter the chart. The visible alert items can be filtered so they are shown or not shown on the chart. Toggle ON/OFF the visible alert items in the Grounding check dialog.

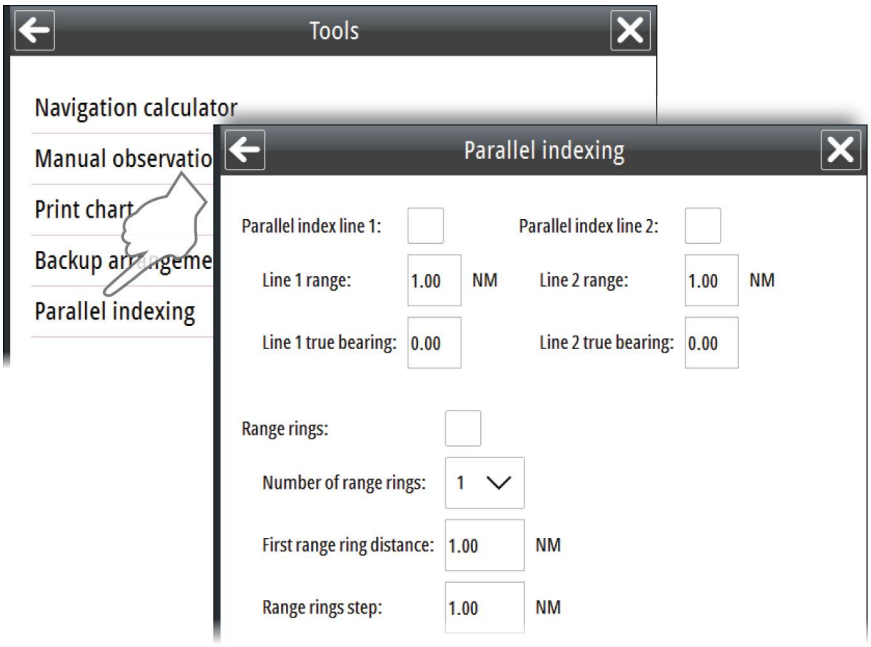
→ ***Note:*** This filter does not filter alert messages. Alert messages continue to appear in the Alerts panel regardless of this filter setting. It only filters the visible alert items on the chart. For example, if you filter off Navigational hazards, then the hazards are not displayed on the chart but a hazard alert will appear in the Alerts panel if you sail into a hazard.

Showing distance lines and zone rings

The system includes two options for indicating a distance from your vessel to other chart objects:

- Parallel index lines
- Range rings

→ ***Note:*** Index lines and range rings do not activate any alerts.



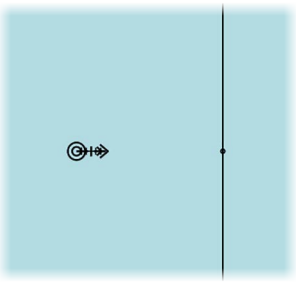
Parallel index lines

One or two index lines can be positioned on the chart. A single Index line is used to visualize a distance to the vessel or to land objects, either parallel to or in front of the vessel. Two index lines can be used to indicate a corridor - typically used to visualize an area you want to maneuver within.

The bearing of an index line is measured from the true north direction. To draw a line parallel to the vessel the bearing must be set equal to the vessel's true heading. To draw a bearing line on the opposite side of the vessel the bearing must be offset with 180°.

→ ***Note:*** The bearing of parallel index lines do not follow the vessel's heading!

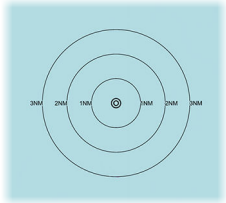
The distance to an index line is measured along the perpendicular from the own vessel's Common Reference Point (CPR) to the index line.



Single Index line - perpendicular to vessel's heading

Index lines parallel to vessel heading

Range rings



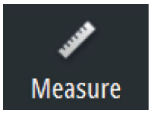
The range rings are used to indicate up to ten circular distances to your vessel. The rings are fixed relative to the vessel and will move with the vessel.

You define the distance from the vessel to the first range ring and the steps between the rings.

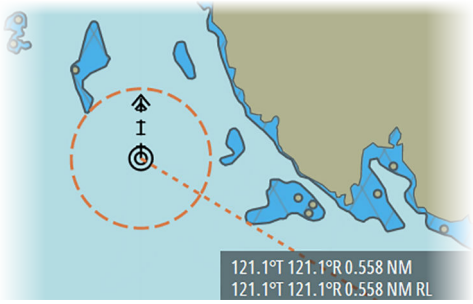
Measuring distance and bearing

The cursor panel shows the cursor's coordinates, range and bearing from the vessel to the cursor. You can therefore use the cursor to measure a distance from your vessel to any chart object.

You can also use Electronic Bearing Lines (EBL) and Variable Ranger Marker (VRM) feature to measure distance and bearing.



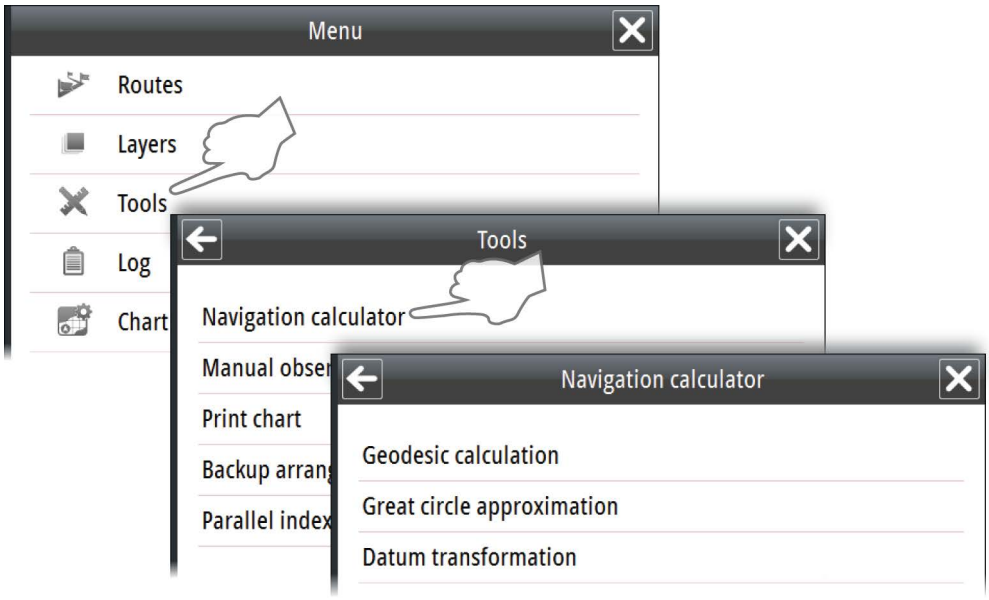
1. Select the Measure shortcut button to activate the EBL/VRM feature
   - A circle is drawn with the center at the vessel position
   - An information panel in the display's lower right corner shows range and true bearing from the circle center to cursor position. The first line shows range and bearing along the great circle line, the second line shows range and bearing along the rhumb line



2. Move the cursor to the object to which you want to measure range and bearing
3. Move the cursor to an object and press the left cursor button to move the circle center. You can then move the cursor to measure the distance between the new circle center and another object in the chart.
4. Re-press the left cursor button to move circle center back to the vessel

You stop the measuring function by re-selecting the Measure shortcut button.

Navigational calculations



Geodesic calculation

This is a tool used for calculating a position based on a known starting position, the bearing and the distance to the position you want to calculate. You can also do the calculation in reverse and calculate bearing and distance between two known positions.

You can select whether you want to use rhumb line or great circle calculation.

Great circle approximation

The system can calculate waypoints between two coordinates using great circle computation.

1. Enter the latitude and longitude for start and end point for the route
2. Select method for positioning the waypoints, either with equal distance or equal arc
3. Select distance between the waypoints
4. Select Calculate to display the list of the calculated waypoints

Datum transformation

This function is used for converting position information from the active dataset format to a selected target data format.

Enter latitude and longitude, and select the Forward or Inverse buttons to convert the position to the selected format.

Manually calculating vessel position

When no GPS is available, the Lines Of Position function (LOP) can be used to calculate your vessel's position.

The LOPs can be positioned based on known bearing and/or on distance to the selected objects. The following guidelines apply:

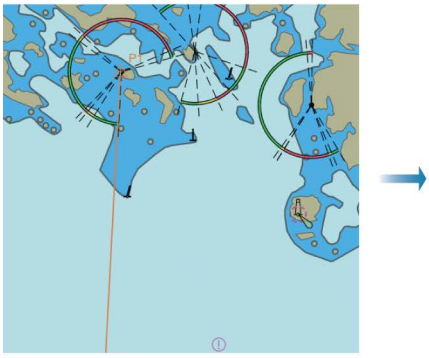
- Two bearing LOPs or 2 distance LOPs will give you an inaccurate position
- Three bearing LOPs give an accurate position if the length of the line from the objects to the crossing point is less than 0.5 NM
- A combination of 1 bearing LOP and 1 distance LOP gives an accurate position

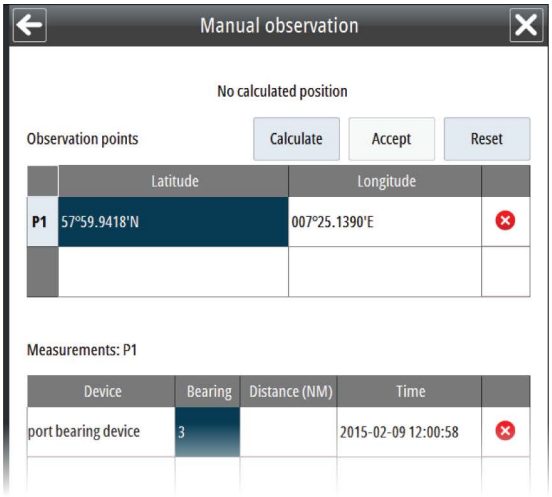
The system will automatically calculate an estimated position based on the plotted LOP's. You can use this information to update the own ship position during dead reckoning operation.

In the example and illustrations below two bearing LOPs are used to calculate the position.

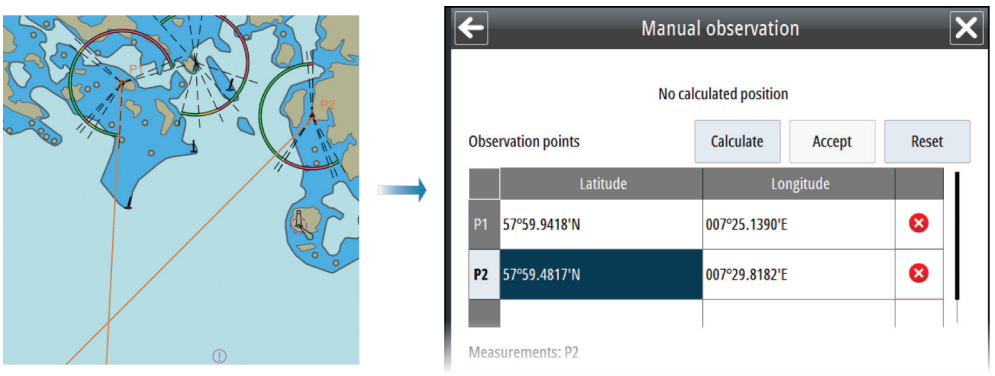
1. Select Manual observation from the Tools menu to display the manual observation menu
2. Select the empty Latitude field in the Observation points table
3. - The object is labelled with **P1** and an observation object symbol, and the object's coordinates are listed in the Observation points table

   Move the cursor to the first observation point in the chart and press the left cursor button
   - A second empty row is added to the Observation points table
4. Double-click any of the observation point fields if you want to manually edit the position
5. Select the identification of the equipment used to measure bearing to the observation point, and enter the bearing to the observation point
   - The first bearing LOP is drawn in the chart based on the input values

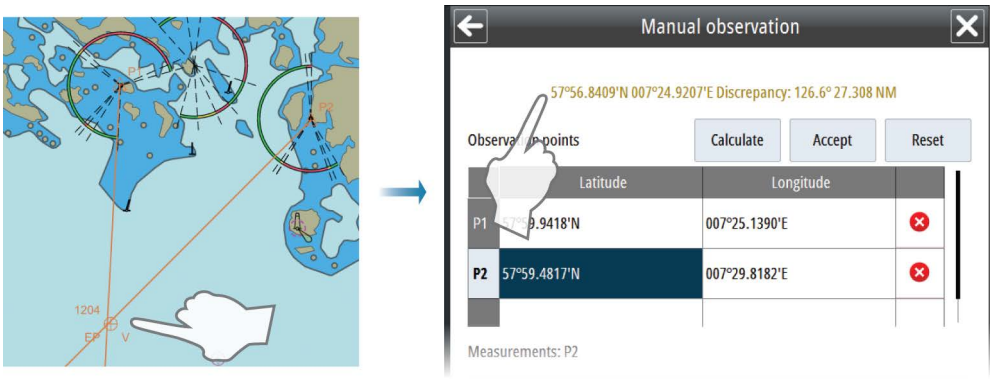




6. Repeat step 2, 3, 4 and 5 to position the second observation point (**P2**)
   - The second LOP is drawn in the chart based on the input values
   - Previously taken measurements are automatically corrected according to the distance own ship traveled between the measurements



7. Select the **Calculate** button to confirm the observation points' position and measurement
   - The calculated position is displayed in the upper right part of the manual observation menu, and the estimated position (**EP**) is indicated in the chart



8. Select the **Accept** button to use the calculated position for dead reckoning
   - The Dead reckoning values are updated
   - The labelled position in the chart is changed from **EP** to **DR**
9. Select **Enable correction** if you want to manually update the dead reckoning position

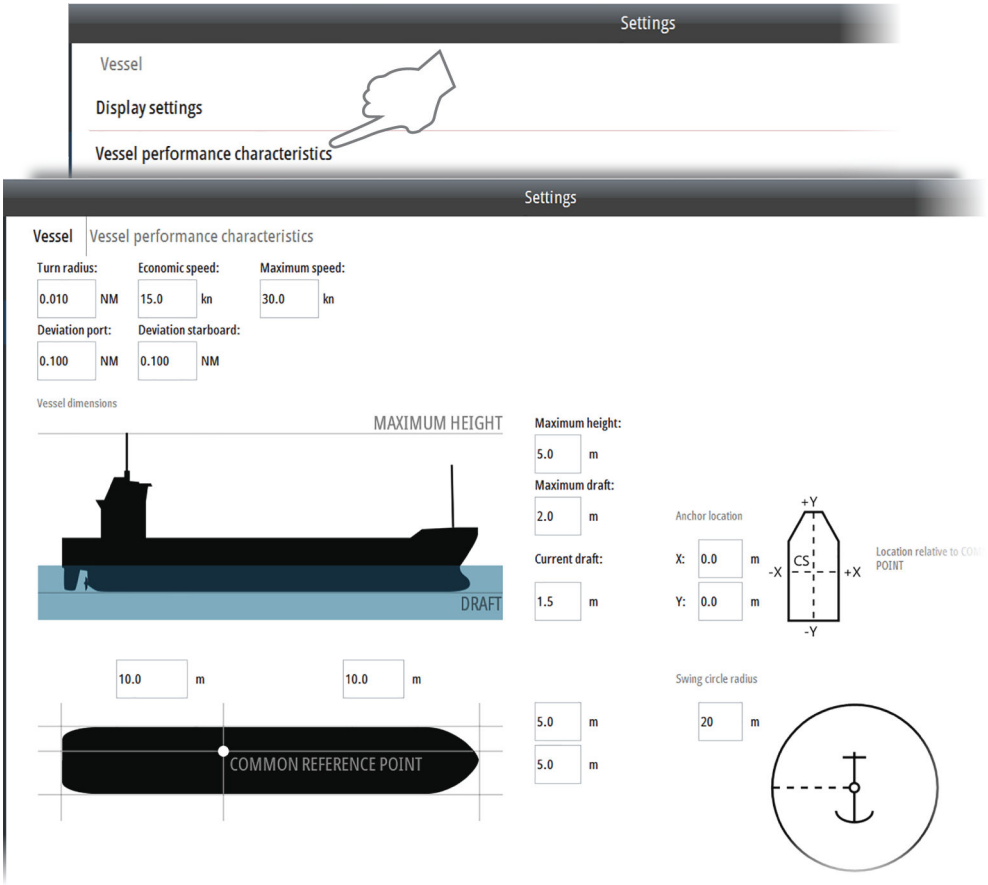
The vessel's icon is moved to the calculated dead reckoning position.

Anchor watch

The system provides an anchor watch feature. When activated, the system sends an alert when the vessel moves a set distance from the anchor spot.

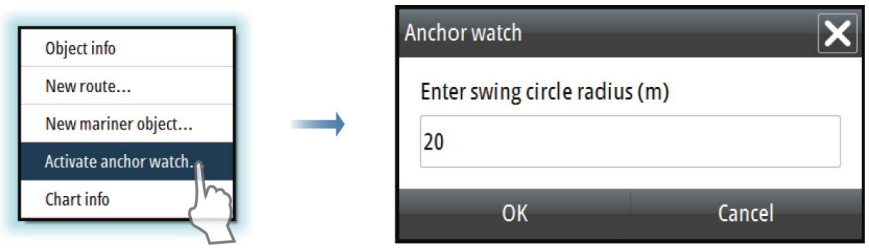
Anchor watch setup

Use the Vessel performance characteristics dialog to set the Anchor location relative to the common reference point and the swing circle radius.



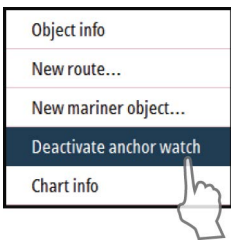
Activating the anchor watch

To activate the anchor watch feature, right-click the chart when you drop your anchor and select the **Activate anchor watch** panel menu option. When you activate the anchor watch feature, the system displays the swing circle radius setting in the Anchor watch dialog. You can change the setting in the Anchor watch dialog.

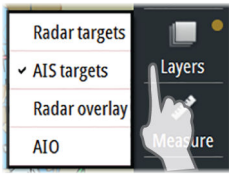


Turn off the anchor watch

To deactivate the anchor watch feature, right-click the chart and select the **Deactivate anchor watch** panel menu option.



7



Other vessels on the chart panel

Other vessels' movement can be displayed in the chart by connecting an AIS system or an ARPA radar to the system.

The system can alert the user about potentially dangerous targets and loss of communication with a target.

AIS and ARPA targets are displayed in separate layers. The layers can be toggled on/off by right-clicking the **Layers** shortcut button.

→ ***Note:*** If any other layer than Mariner objects is turned on, the light indicator in the Layers shortcut button turns yellow. You turn off all layers except Mariner objects by left-clicking the Layers shortcut button.

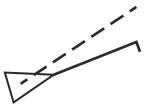
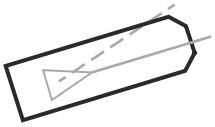
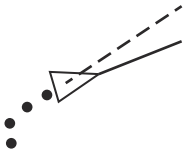
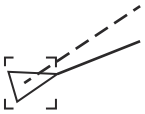
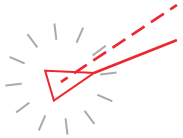
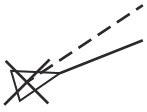
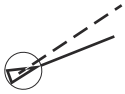
The system does not have any limits for maximum number of AIS or ARPA targets. However, warnings are issued as follows:

- ARPA targets:
  - A 95% limitation warning is issued when 38 targets is reached
  - A 100% limitation warning is issued when 40 targets is reached
- AIS targets:
  - A 95% limitation warning is issued when 950 targets is reached
  - A 100% limitation warning is issued when 1000 targets is reached

AIS targets

AIS target symbols

The following icons are used for AIS targets in the system:

Symbol	Description
	Sleeping AIS target, aligned with received heading information or with COG information if heading is not available
	**AIS target** with heading line and SOG/COG (dotted line), and with indicated turn direction
	**AIS target** with true scaled outlines
	**AIS target** with past track
	**Selected AIS target**, indicated with a square (dotted line) around the target symbol
	**Dangerous AIS target** indicated with bold line and with red color. The symbol flashes until the target alarm is acknowledged by the operator
	**Lost AIS target**, indicated with crossed lines centered on the target symbol. The symbol is located at the last received position from the target
	**Associated target** - using AIS data

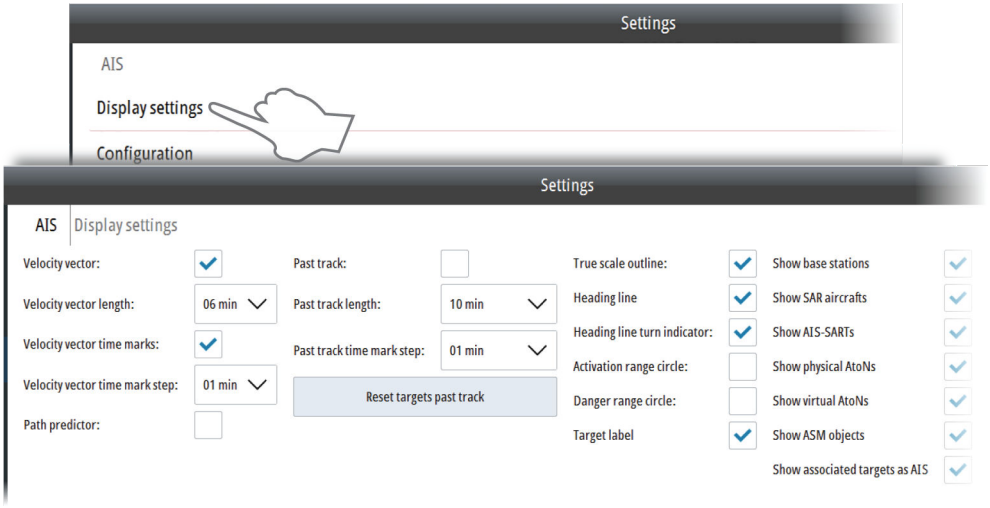
Symbol	Description
	AIS SART (AIS Search And Rescue Transmitter)
	AIS Base station
	Real AtoN (Aids To Navigation)
	Virtual AtoN

For a complete list of AIS and AtoN symbols, refer to *"Target symbols"* on page 81.

→ ***Note:*** A symbol is drawn with a dotted line if the collision avoidance cannot be calculated.

Display settings for AIS targets

You select how the AIS targets are displayed on the chart panel in the AIS Display settings dialog.

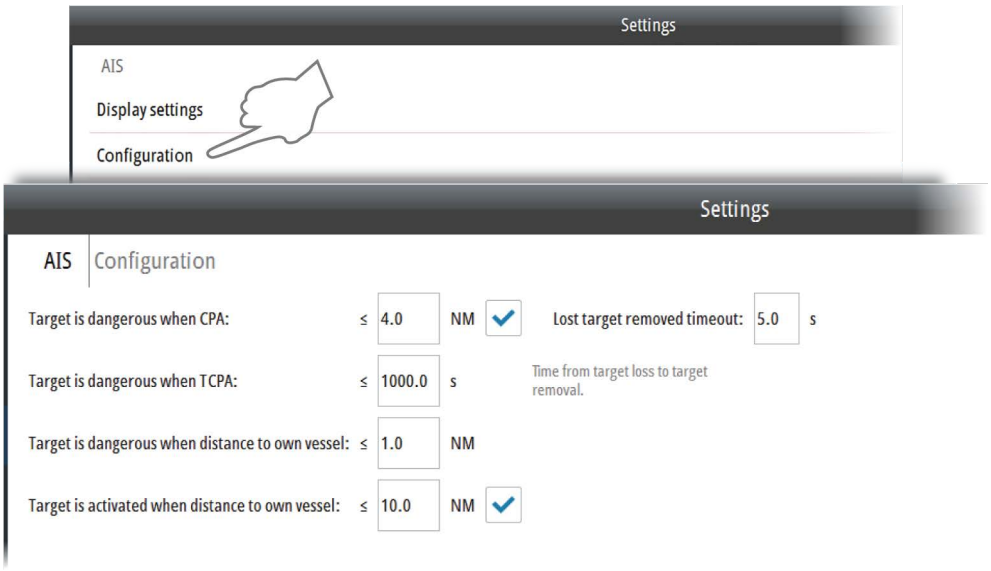


- **Velocity vector**: Predicted position of the target in a specified period of time based on the target's current speed and course over ground (SOG and COG). Time marks and steps between each mark can be defined and added to the view
- **Path predictor**: Predicted vector based on speed over ground (SOG), course over ground (COG) and rate of turn
- **Past track**: The target's track over a set time period. Time stamps can be added to the track line
- **True scale outline**: Displays the targets as true scale symbols in large chart scale. The displayed size is based on dimensions received in the target's AIS messages
- **Heading line**: The target's heading and eventually turn direction pointing in the direction of the turn
- **Range circles**: Circles added relative to own vessel position to show the ranges where a target is visible, active or defined as dangerous
- **Target label**: Target name as received in the AIS message
- **Show AIS targets**: Select to show specific AIS target types on the chart
- **Show associated targets as AIS**: Displays associated Radar/AIS targets as AIS. To enable AIS/Radar targets associations, refer to *"Configuring Radar targets"* on page 43.

Configuring AIS targets

You specify the distance for when an AIS target should be activated and considered dangerous from the AIS Configuration dialog. From this dialog you also define when a lost AIS target are removed from the chart view.

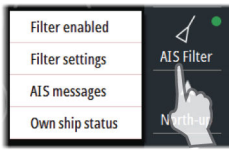
➔ ***Note:*** You specify when an AIS target should be visible on the chart using the AIS Filter, refer to *"AIS functions"* on page 40.



➔ ***Note:*** You can select to display the distance limits. See *Display settings for AIS targets*.

AIS functions

Use the AIS Filter option to filter the AIS objects on the chart, set your vessel AIS status, and for communicating with another vessel's AIS system.

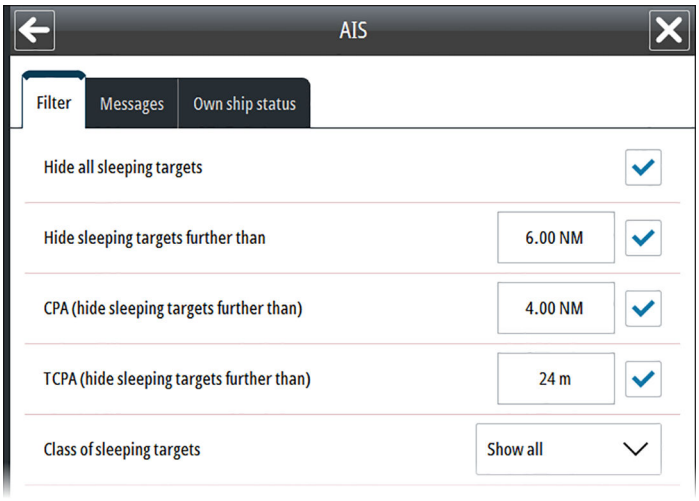


Right-click the AIS Filter shortcut button to display options. Select the **Filter enabled** option to apply the filter.

AIS target filter settings

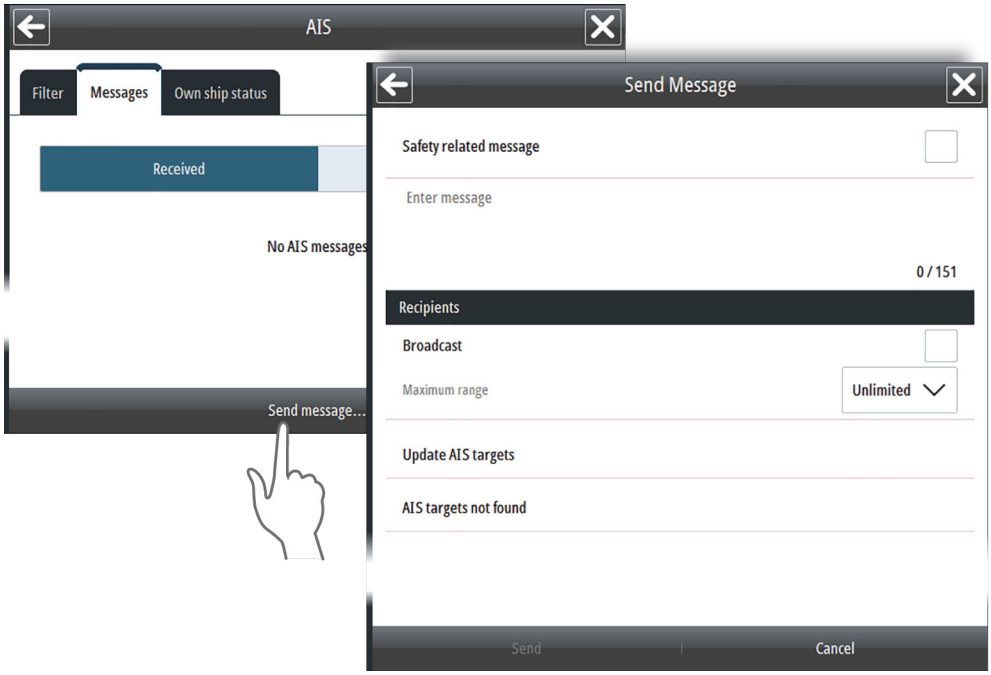
Use the AIS Filter settings option to specify when and which AIS sleeping targets should be visible on the chart. Hiding sleeping targets can reduce chart clutter.

➔ ***Note:*** You specify the distance for when an AIS target should be activated and considered dangerous using the AIS Configuration dialog. From the AIS Configuration dialog you also define when a lost AIS target are removed from the chart view. Refer to *"Configuring AIS targets"* on page 39.



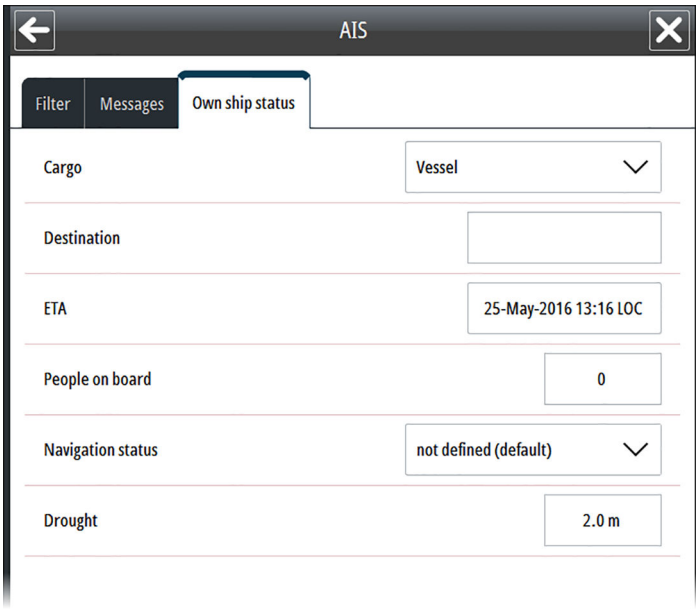
AIS messages

Use the AIS messages option to create and view sent or received AIS messages.



AIS own ship status

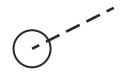
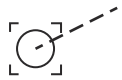
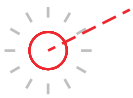
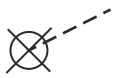
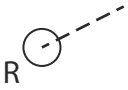
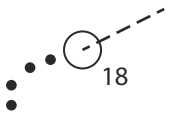
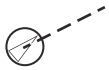
Use the AIS own ship status to set the status of your vessel which is seen by other vessels.



Radar targets

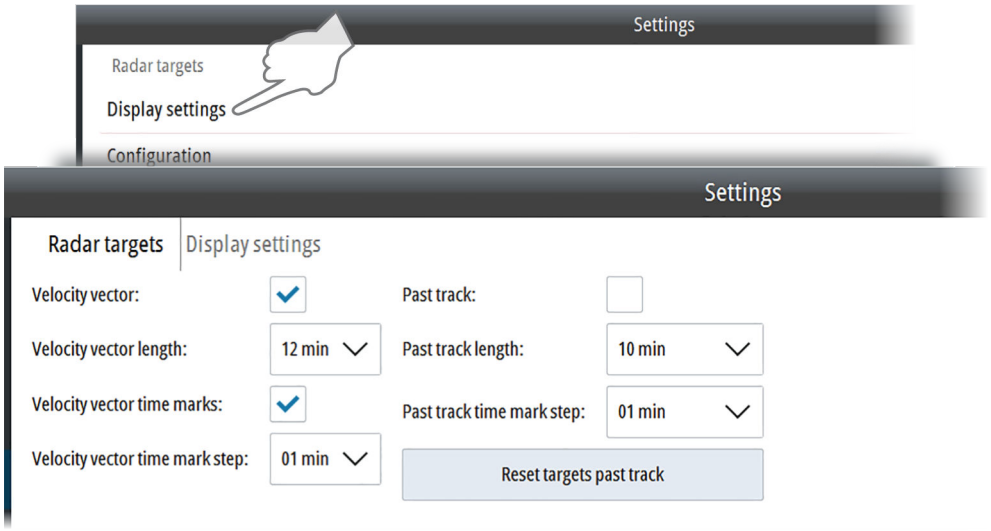
Radar target symbols

The following symbols are used for radar targets in the system:

Symbol	Description
	**Tracked Radar target** with velocity vector
	**Selected Radar target**, indicated with a square (dotted line) around the target symbol
	**Dangerous Radar target**, indicated with bold line and with red color. The symbol flashes until the target alarm is acknowledged by the operator. It remains red until the system no longer defines it as a dangerous target
	**Lost Radar target**, indicated with crossed lines centered on the target symbol. The symbol is located at the last received position from the target
	**Reference target**
	**Radar target** with past position and velocity vector
	**Associated target** - using radar data

Display settings for Radar targets

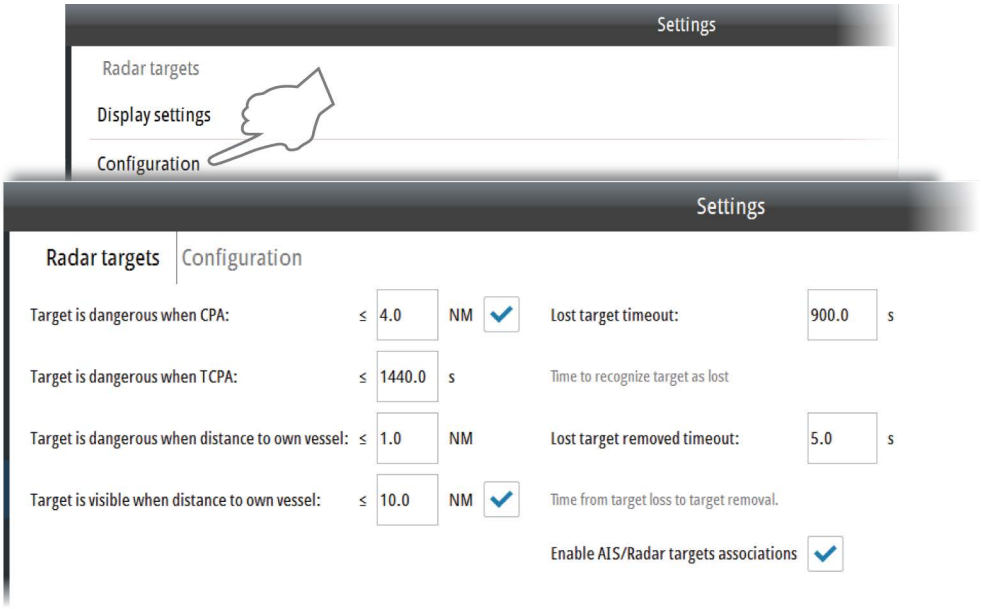
You select how the Radar targets are displayed on the chart panel in the Radar Targets Display settings dialog.



Configuring Radar targets

You specify the distance for when a Radar target should be defined as dangerous from the Radar Configuration dialog. From this dialog you also define time limits for when a target should be considered lost, and when it should be removed from the chart panel.

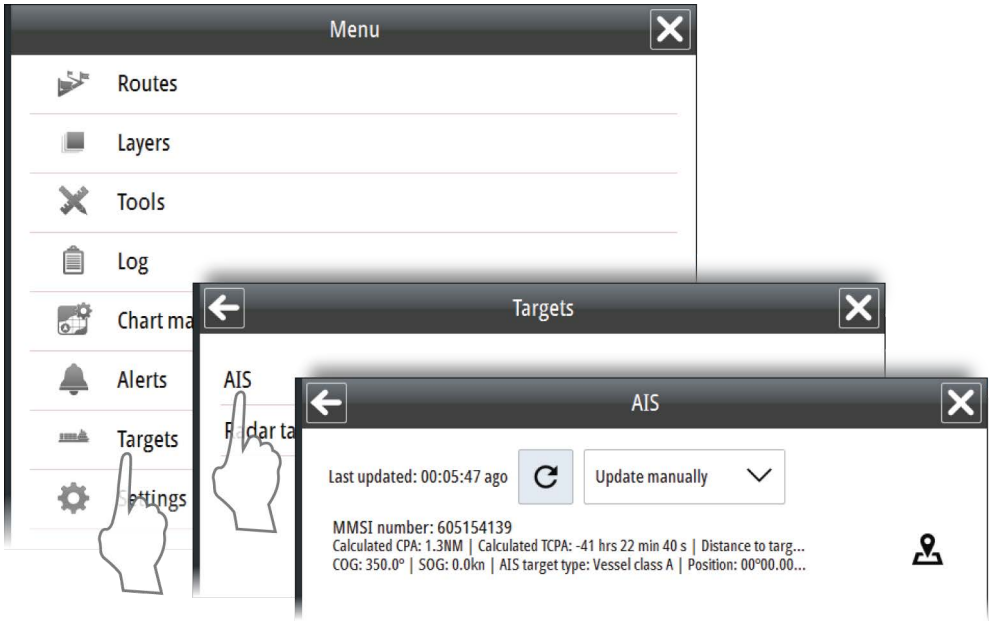
You can use this dialog to enable AIS/Radar targets associations if your radar supports associations. To show associated targets as AIS, refer to *"Display settings for AIS targets"* on page 39.



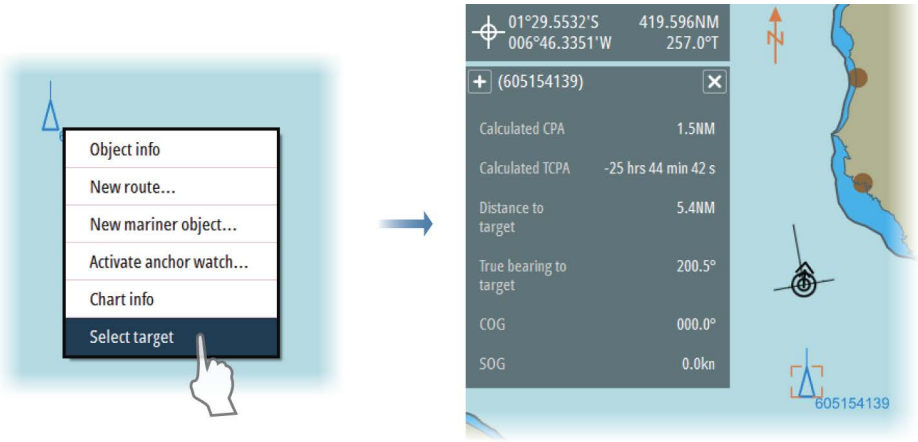
Viewing target information

You can view a list of all tracked targets and basic information for each targets from the Targets menu option. This list shows all tracked targets, independent on AIS or Radar target display settings.

The following example shows a list of AIS targets.



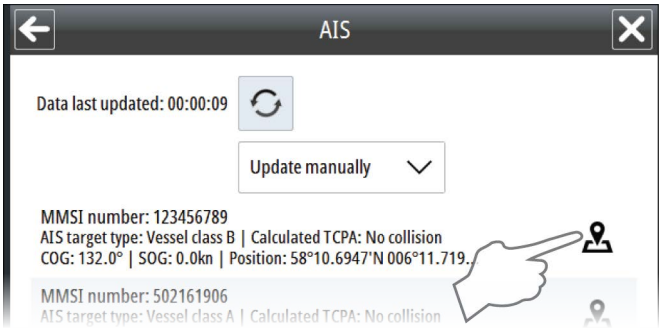
You can view more details about a single target by right-clicking it in the chart panel. This will open the target panel on the left side of the screen.



Select the **+** sign on the upper left side of the target panel to expand the panel to show all available information for the selected target.

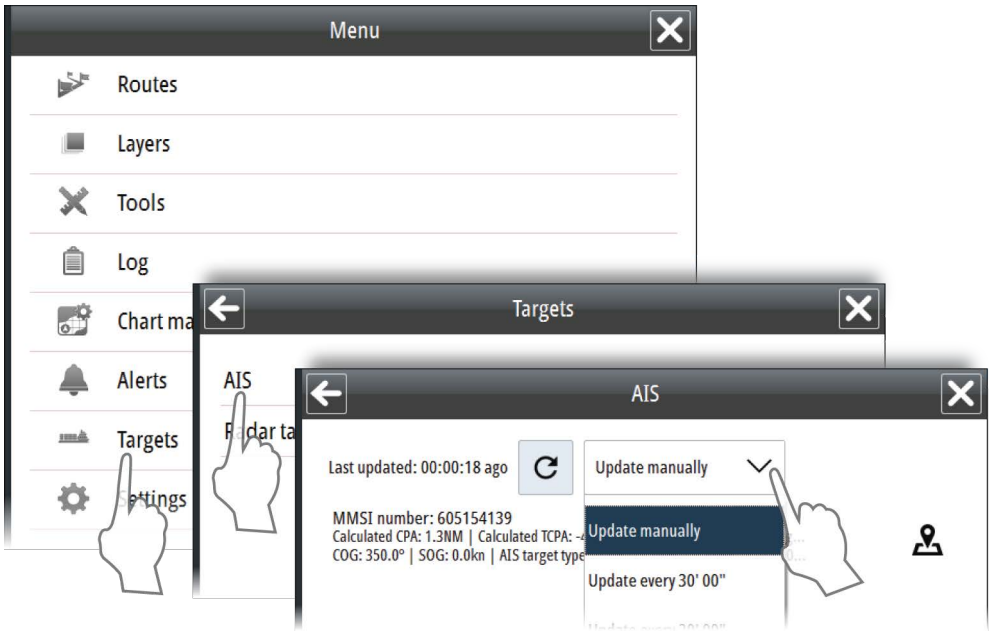
Finding a target on the chart panel

You can display a tracked target by using the display option in the Radar or AIS target list.



Target update frequency

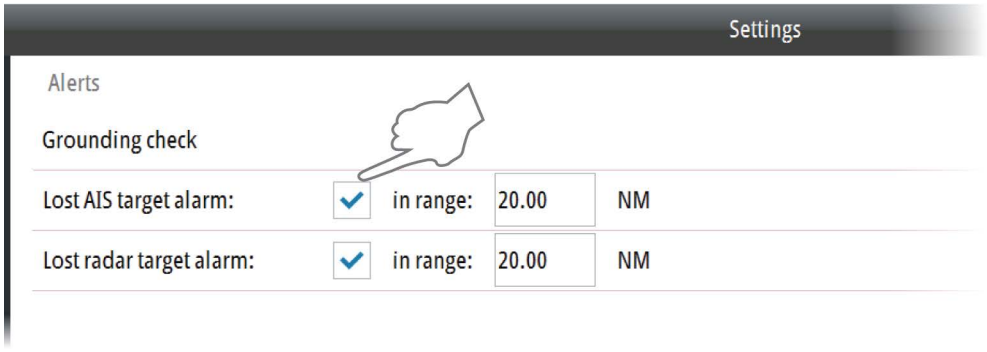
The update frequency for AIS targets and Radar targets is defined in the Targets menus. The frequency is set individually for AIS and Radar targets. From within these menus you can also select to manually update the target information.

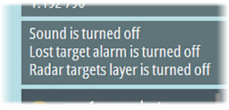


Lost target warnings

A warning is automatically triggered if an AIS target or Radar target is lost.

By default a lost target warning filter is enabled for both AIS and Radar targets. The filter will, if enabled, only generate warnings for lost targets within a specified range. The filter is intended to minimize the number of alerts presented to the user while still following general guidelines for safety. The filter can be disabled by unchecking the checkbox. Settings for AIS and Radar targets can be configured independently.





If any of the lost target warnings are turned off this will be indicated in the Indication panel.

8

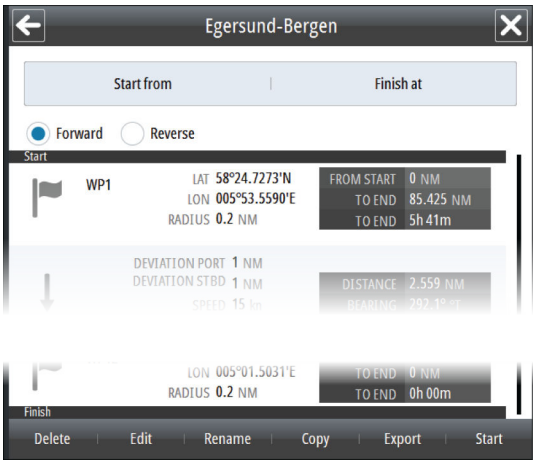
Route planning

Routes may be planned independent of the actual vessel position. The routes may be stored and recalled whenever necessary. There are no limitations to the number of waypoints in a route that can be stored in the system.

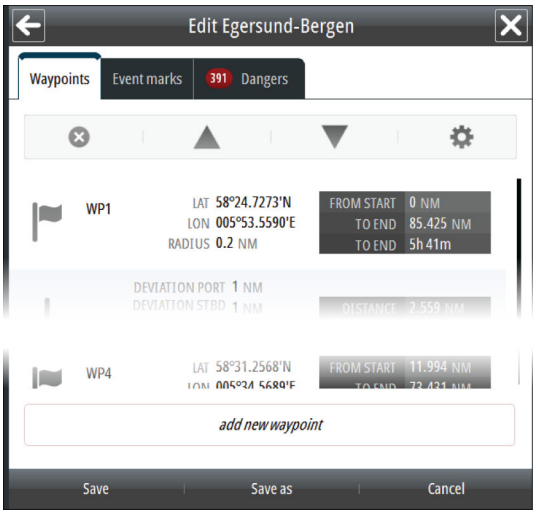
The route menus

Routes are managed by using the following menus:

The **Route list**, displayed by selecting the Routes option in the main menu.
The Routes list displays all saved routes in the system. From this list you can select which routes to display and edit, add new routes, transfer routes to other ECDIS systems, or import routes from other ECDIS systems.



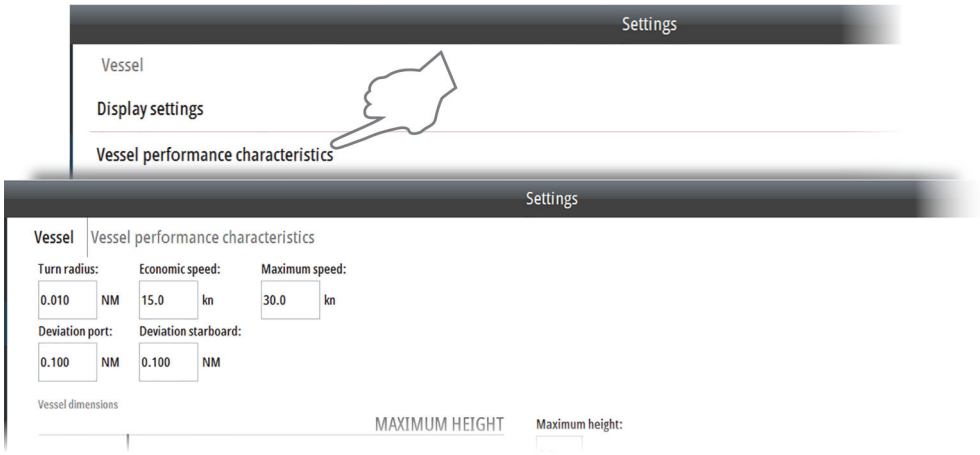
The **Route Details** menu, displayed when you save a route or when you select a route in the Route list.
The Route details menu shows details for all waypoints and legs in a route.
This menu includes options for reversing, deleting, editing, renaming, copying, exporting and start navigating a route.



The **Route Edit** menu, displayed when you start creating a new route or when you select the Edit option in the Route Details menu.
The menu includes options for adding new waypoints, editing waypoint and leg details, re-ordering the waypoints, adding event marks, and for displaying dangers in the route.

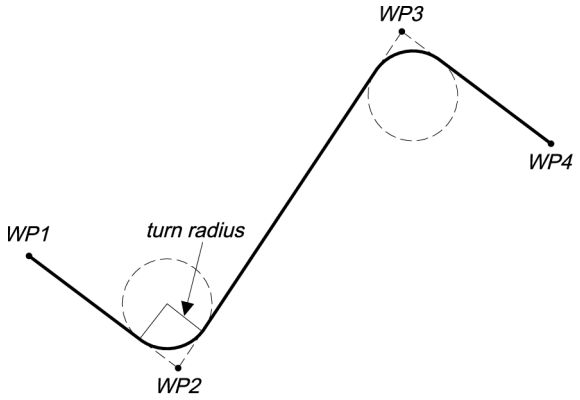
Route settings

When a new route is created or when a waypoint is added to a route, the system will use the vessel's performance characteristics defined in the Vessel settings.

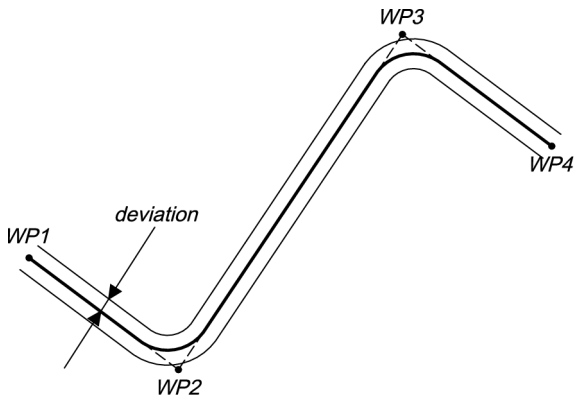


The route settings may be set individually when creating or editing a route.

- **Turn radius**: Each waypoint in a route, except the first and the last, has an associated turn radius defined. This turn radius will make the ship turn over before the waypoint is reached.



- **Economic speed**: Used for calculating estimated time of arrival (ETA). During route navigation **Current speed** is used for calculating ETA.
- **Maximum speed**: Defines the vessel's maximum speed.
- **Deviation**: Defines the vessel's offset distance from leg before an alert is given. The caution and dangerous objects (in the Dangers tab) are also determined by this parameter.



Creating a new route

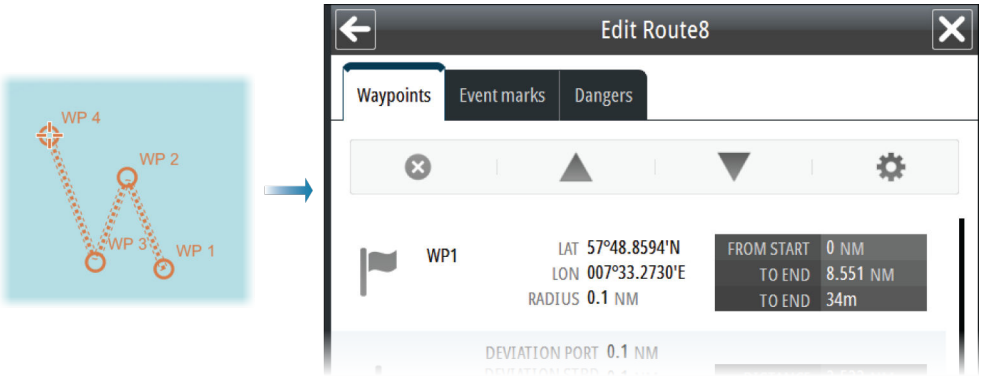
Two methods may be used when creating a new route:

- Plotting the waypoints in the chart
- Manually enter waypoints into the Route Edit dialog

Plotting waypoints is used when a rough position of the waypoints is sufficient, while the waypoint's coordinates may be exactly defined in the dialog. Generally, a combination of these two methods may be the best.

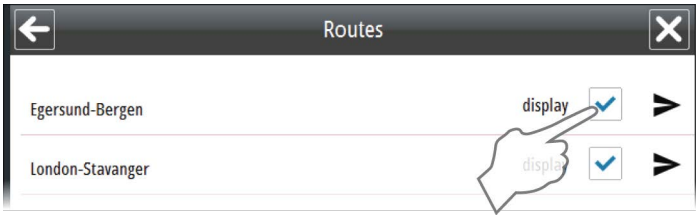
1. Start creating a new route by selecting the **New route** shortcut button, by selecting the **New route** option from the panel menu activated by right-clicking in the chart panel, or by selecting the **Add new route** option in the Routes list
2. Enter the new route name, and confirm your selection
   - The Route Edit dialog is displayed
3. Move the cursor to the position of the first waypoint, and press the left cursor key
   - The waypoint with waypoint number is positioned on the chart and waypoint details are shown in the Route Edit dialog
4. Continue entering new waypoints by moving the cursor to new positions and pressing the left cursor key
5. Save the route by selecting the **Save** button in the Route Edit dialog
   - The Route Edit dialog is replaced with the Route Details dialog

If it should be required to move the chart while using the cursor for planning a route, the chart can be panned to selected position.



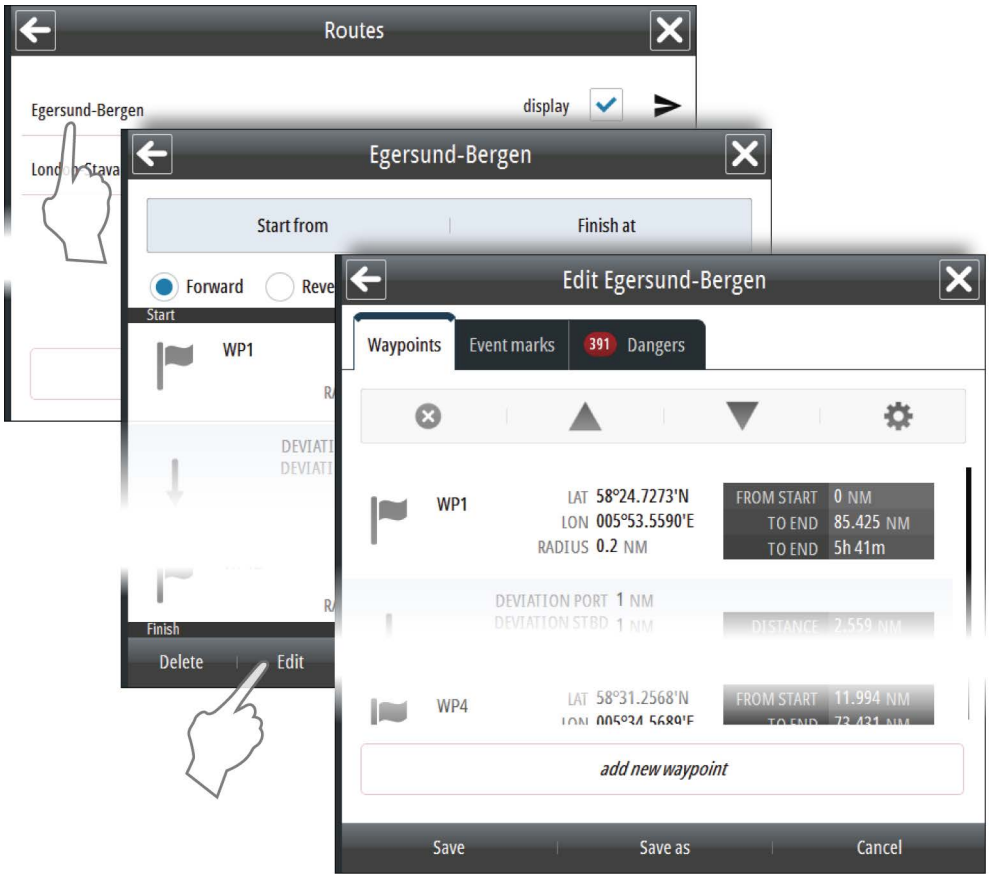
Displaying a route

You display a route in the chart by selecting the **Display** option in the Routes list.



Modifying routes

Some parameters in a route may be modified from the Route dialog when the route is created or after the route has been saved.



→ ***Note:*** You need to select the **Edit** button to turn a saved route into edit mode.

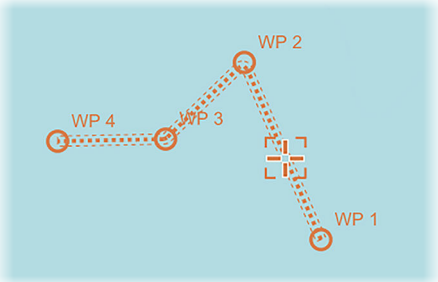
Adding and moving waypoints

To add or move a waypoint by using the cursor

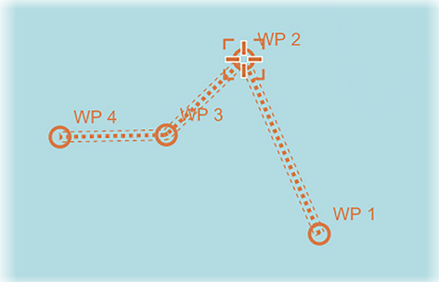
1. Move the cursor to the waypoint you want to move or to the leg where you want to insert a new waypoint
   - A dotted square is displayed under the cursor to indicate edit mode
2. To add a new waypoint: press the left cursor key on the leg where you want to position a new waypoint

→ ***Note:*** The new waypoint is added as the last waypoint in the route if the cursor is not positioned on a leg when you press the left cursor key.

3. To move a waypoint: press the left cursor button on the waypoint to unfix it, move the cursor to the new position, then repress the left cursor button to fix the waypoint to the new position



New waypoint to be created on leg



Movable waypoint

To add a new waypoint by entering coordinates

Select the **Add new waypoint** option in the Route Edit dialog.

→ ***Note:*** Using this option you can only add a waypoint to the end of the route.

To re-arrange waypoints

Use the arrow keys in the Route Edit dialog.

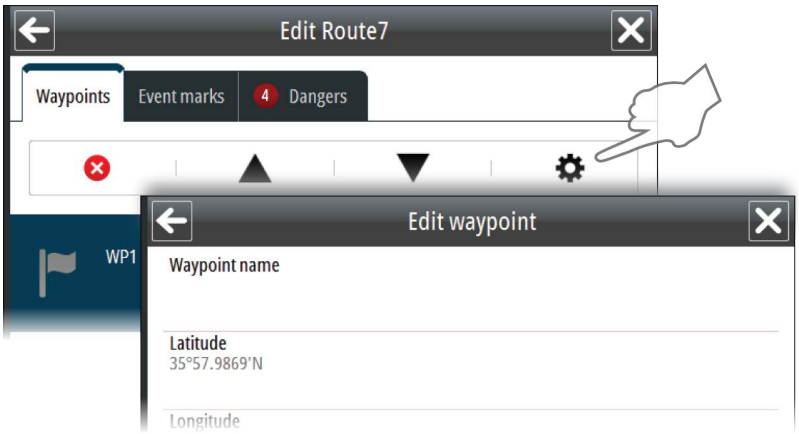
Deleting a waypoint

A waypoint is deleted by selecting the Delete icon in the Route Edit dialog.

When confirmed the waypoint is deleted from the list of waypoints and from the chart view.

Edit waypoint details

You edit waypoint details from the Route Edit dialog.



Reversing a route

A route may be reversed by selecting the **Reverse** option key in the **Route** window. The waypoints will immediately be shown in reversed order in the Waypoint table, and will be re-ordered in the chart view when you start the voyage.

→ ***Note:*** The reversing is a navigational setting to a route, and the renumbering of waypoints will not be saved as a permanent modification to the route.

Adding an event mark

You can add event marks to a route to inform about an event that is planned to happen.

A warning will be triggered within the specified time or distance before the event mark is reached.

You can add an event mark when a route is created or when a route is modified.

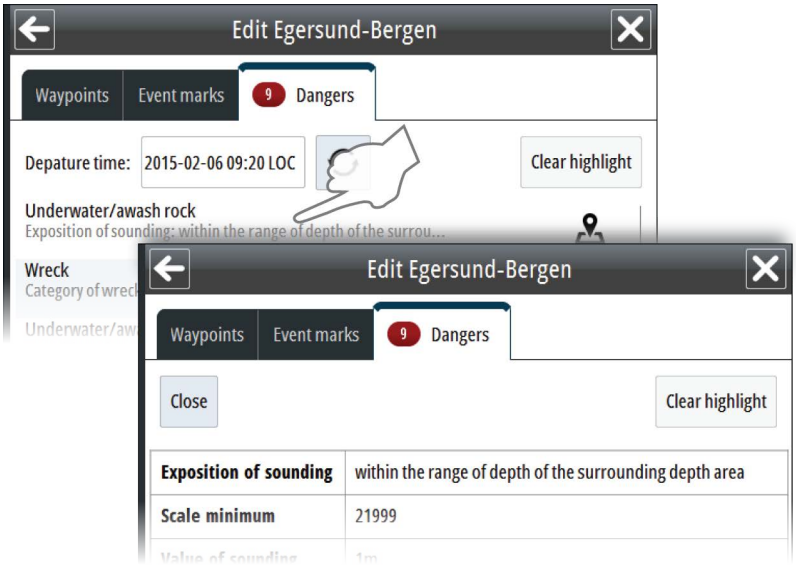
1. Select the Event Marks tab in the Waypoint list
2. Select the Add new event mark button
   - A new event mark will be positioned in the center of the chart panel, and the Edit event mark dialog is displayed
3. Enter details for the event mark, including warning time as either time or distance to the event. If you enter a description for the event this text will be displayed in the navigation panel when the event is triggered.
4. If required, move the cursor to the event mark to activate it, then drag it to a new position. Confirm the new position by pressing the left cursor key
5. Save your changes to leave the route's edit mode and to return to the route's list of waypoints

Displaying information about danger objects in a route

The system will automatically check for danger and caution objects when you create a route or when you open a route for modification.

The list of all danger and caution objects in a route is displayed in the Routes dialog.

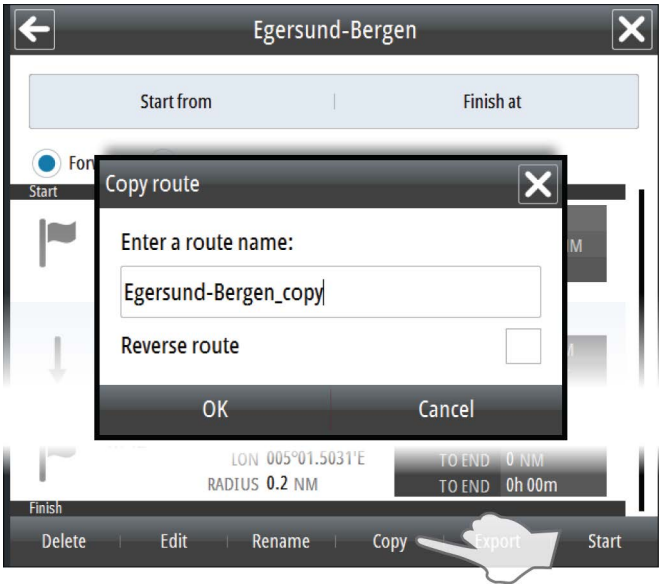
You display details about an object by selecting it.



Copying a route

You copy a route from the Route Details dialog.

Select the route you want to copy, enter a route name and whether you want to reverse the route.



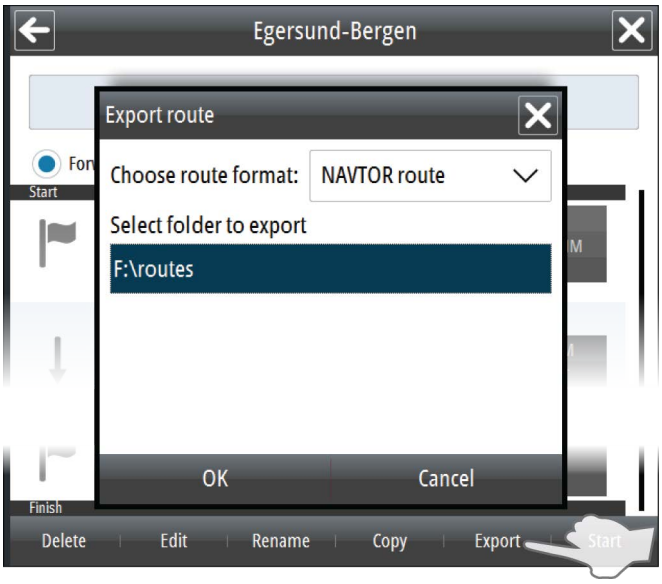
When confirmed the route is copied to the Route list.

→ ***Note:*** This feature creates a copy of the route in the system. See also *"Exporting routes"* on page 52

Exporting routes

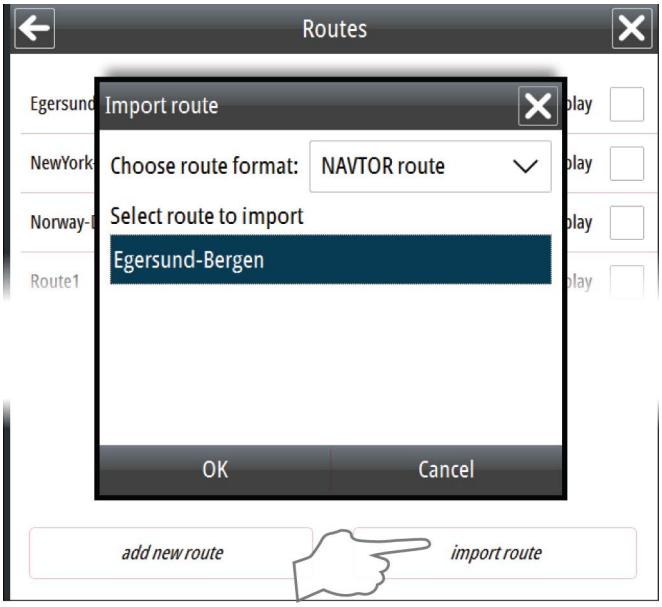
You export a route to an SD card or to a USB drive from the Route Details dialog.

When format is confirmed the route is copied to the selected media. The exported route name will be identical to the original route name.



Importing routes

You can import routes from an SD card or from an USB drive.



When the route is confirmed the route is copied to the system and listed in the Routes list.

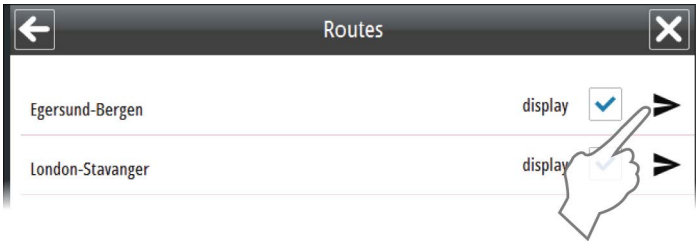
→ ***Note:*** Only routes stored on the root level or in the "routes" folder of the device will be found.

Transferring routes

You can transfer (send) routes to another unit on the network. Select the Transfer route icon next to the route to send it to the destination unit. For destination unit ID information refer to the E50xx ECDIS Installation manual.

When a route is transferred, the destination unit receives a message that a route transfer needs acceptance or rejection. When the route transfer is accepted or rejected, the sending unit receives a message that the route transfer is accepted or rejected by the destination unit.

You can see the status of the transfer by selecting the **Route transfer status** option in the Tools dialog. You open the Tools dialog from the main menu.

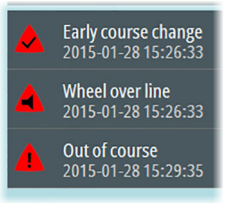


9

Sailing along a predefined route

The Route function in the ECDIS system makes it possible to sail along any preplanned route. The system will give an alert if the vessel's heading or position differs from predefined values defined when the route was planned. The system will also give a wheel over warning before a planned turn.

- The SOLAS convention requires that all charts must be updated for intended voyages. Before planning or editing a route it is required to receive the latest chart updates. Refer to *"Installing charts"* on page 20.



When the Route function is started, the Navigation panel is activated to show current voyage information.

Starting a voyage

A voyage is started by selecting the **Start** button in the Route dialog.

When the route is started, the following changes appear:

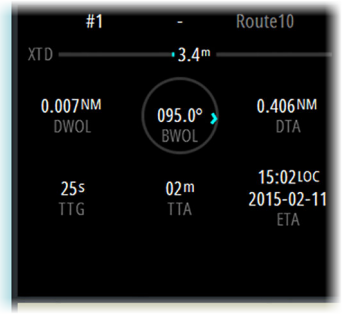
- The route is labelled as Active in the route dialog
- The Navigation panel is displayed, showing route information
- The Stop Route shortcut button becomes available

Stopping the voyage

An active voyage is stopped by selecting the Stop route shortcut button. The voyage can also be stopped from within the Route dialog.

The Navigation panel

The Navigation panel is automatically activated when you start navigating a route.

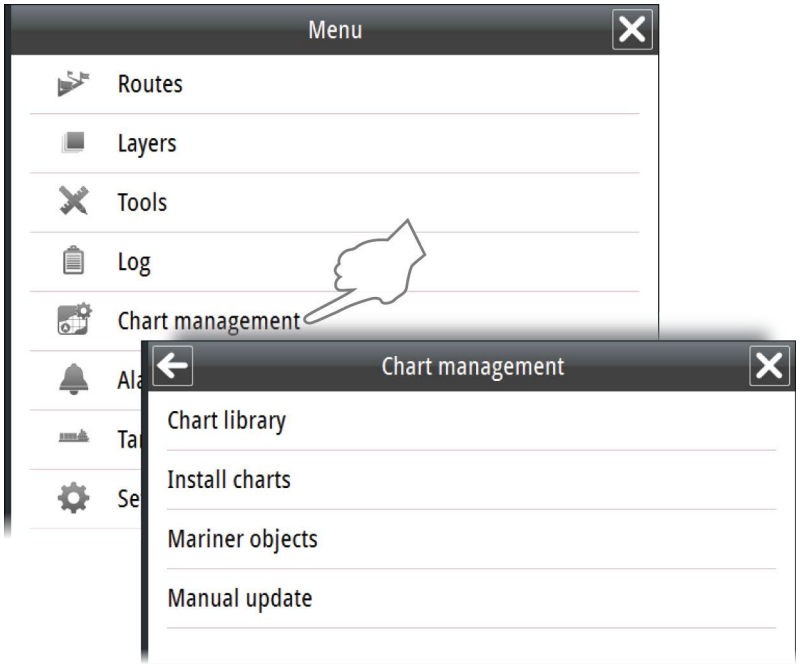


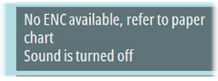
The upper part of the panel displays active waypoint number and route name. The following additional information is available:

- **XTD**: Cross Track Distance. Blue color indicates that the vessel is within the allowed deviation for the active leg. If the vessel's distance from track exceeds the allowed deviation the color indication turns red.
- **DWOL**: Distance from the current position to the next wheel-over line
- **BWOL**: Bearing from the current position to the next wheel-over line
- **DTA**: Distance from the current position to last waypoint in the route
- **TTG**: Time to go from the current position to the next wheel-over line using the vessel's current speed
- **TTA**: Time to go from the current position to the end of the route. The time is calculated by using the vessel's current speed until next wheel over point, then using the route's planned speed for the remaining legs
- **ETA**: Estimated time and date of arrival at the last waypoint

10 Managing the chart database

The charts are managed from the **Chart management** option in the main menu.





→ ***Note:*** The system must use authorized charts to be ECDIS approved. When not using an official chart, this will be indicated with text in the Indication panel.

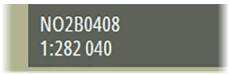
The Chart database

The system is designed for using approved ENC charts in S57 or S63 formats.

A word-wide overview chart is pre-installed in the system. During installation and setup of the system the required and detailed charts must be installed.

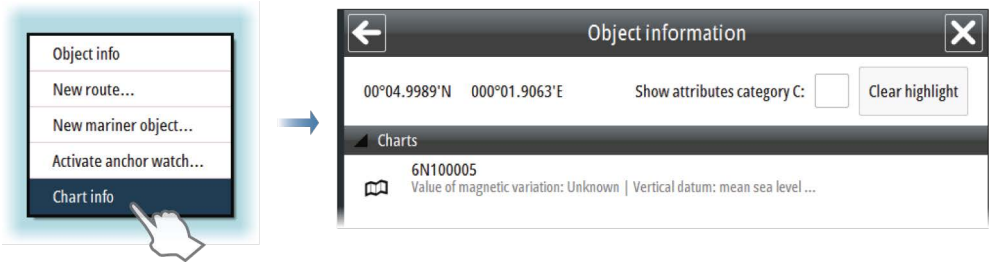
For details about chart installation procedure, refer to *"Installing charts"* on page 20.

Displaying chart information



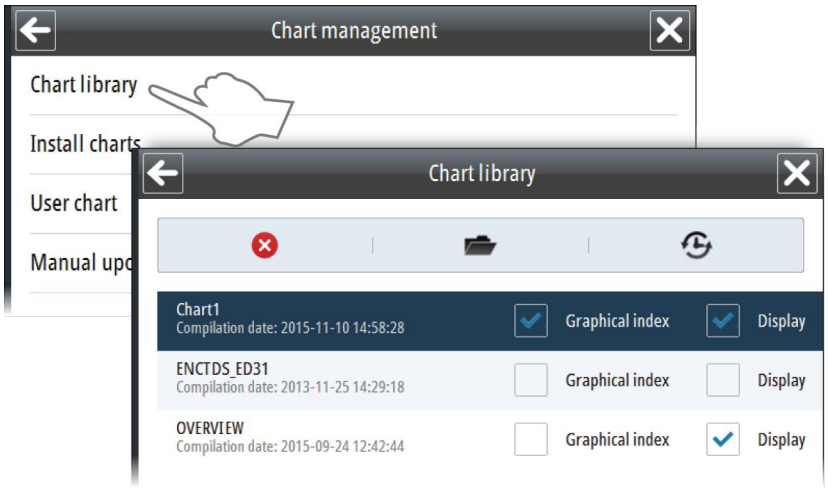
The currently displayed chart cell and scale is displayed in the Chart information panel.

The official authority's summary report for the active chart is displayed from the object information menu, activated by right-clicking anywhere in the chart.



The Chart library

All Chart databases installed in the system are listed in the Chart Library.



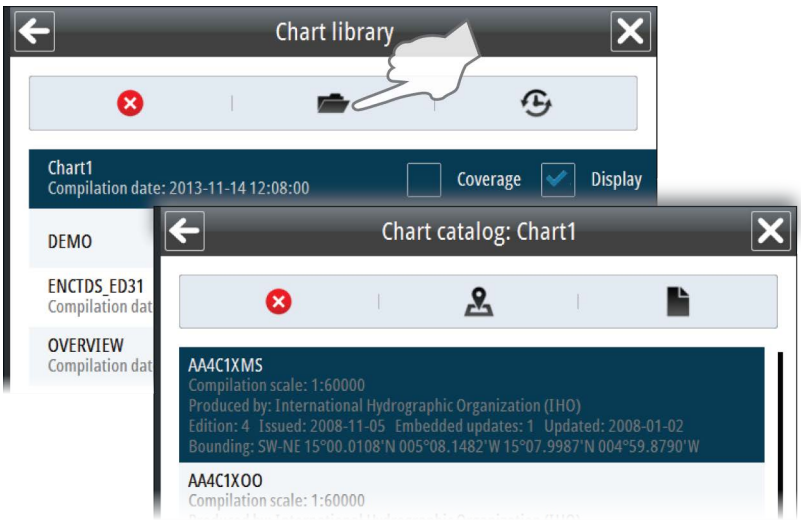
From the chart library you can delete a chart database, access the chart catalog for a selected database, and display the history for a selected chart database.

Chart catalogs

The Chart catalogs lists all datasets included in a chart database with detailed information about the charts.

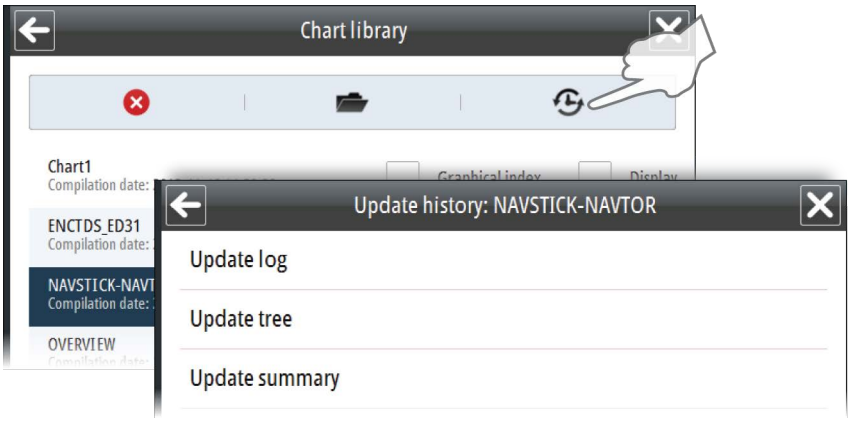
From the list you can delete a dataset, display the dataset, and display a text file with additional information if this is available.

You can also search or filter chart cells by name.



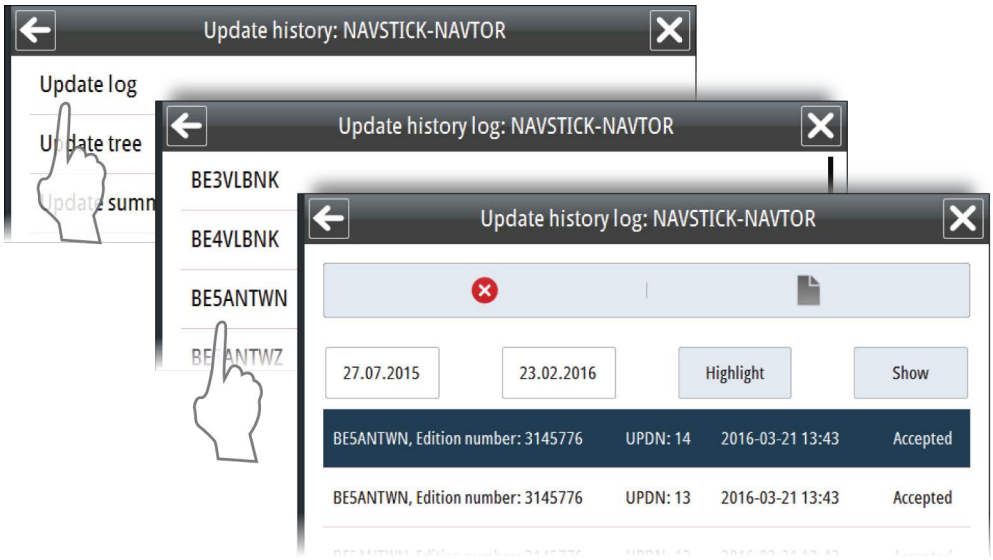
Viewing the chart update history

You can view all updates added to a database. You can show historical updates on the chart panel with highlights. You can also show history as an update tree with detailed information about each updated object sorted by agency or issue date or as a summary with brief information.



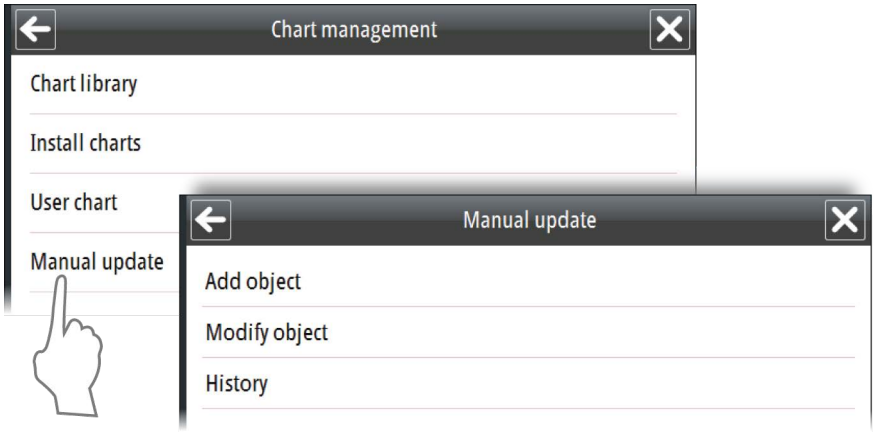
Showing updates on chart panel

Select a log and then the Show button to display the log on the chart panel. Select Highlight to highlight changes on the chart.



Manual chart updates

You can manually edit a dataset by adding new objects and modify existing objects by using the **Manual update** function.



→ ***Note:*** The Manual update option is only to be used for official chart updates. Other chart information can be added to the chart by using the **User chart** function. Refer to *"User chart objects"* on page 58.

Adding a Manual update

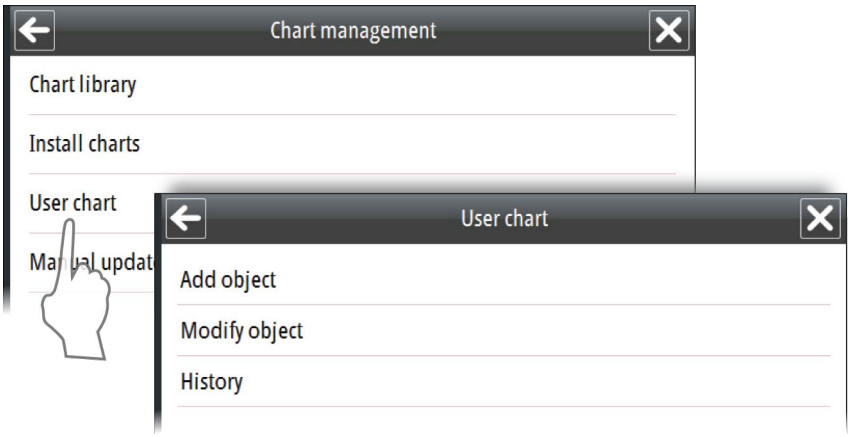
1. Move the chart to show the area where you want to position the new object
2. Right-click on the chart and select Chart info to display the name of the chart cell where you want to add the new object
3. Select the Add object in the Manual update menu
   - A list of chart cells available for the current chart view is displayed. This list includes all chart cells for the shown area, also those not displayed
4. Select the chart cell to which you want to add the new object
   - The chart view is moved and scaled to show the selected chart cell and the coverage for this
   - A list of object categories is displayed in the menu area
5. Select a category and then the type of object you want to add
   - The selected object type is displayed in the menu area
6. Select the geometry icon to display option for shape and position
7. Position the object by either entering the coordinates manually or by positioning the cursor in the chart
8. Continue entering new positions if the object shape is an area or a line
9. Select the Apply button to confirm the object shape and position
10. Edit details for the object if required by using the Settings icon, eventually add child objects by using the Child icon
11. Select the Save button to save the object

The object is now saved to the selected chart cell.

→ ***Note:*** When selecting a chart cell, the chart view is moved and scaled to display the selected chart cell and it's coverage. It is not allowed to plot or edit an object outside the selected chart cell.

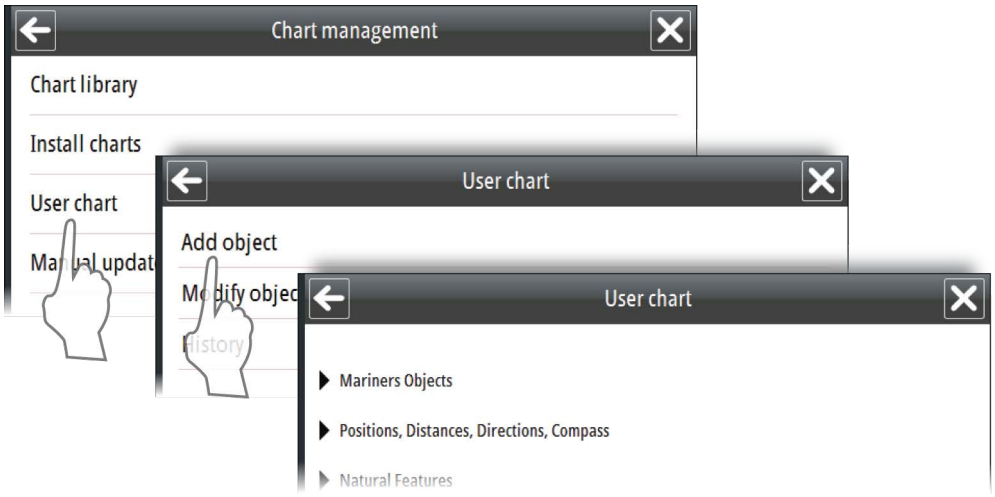
User chart objects

You can plot your own markers or areas to identify events, hazards, mariner objects, etc. in the chart. User chart objects are not saved to a specific chart dataset, but to a separate layer that can be turned on and off.



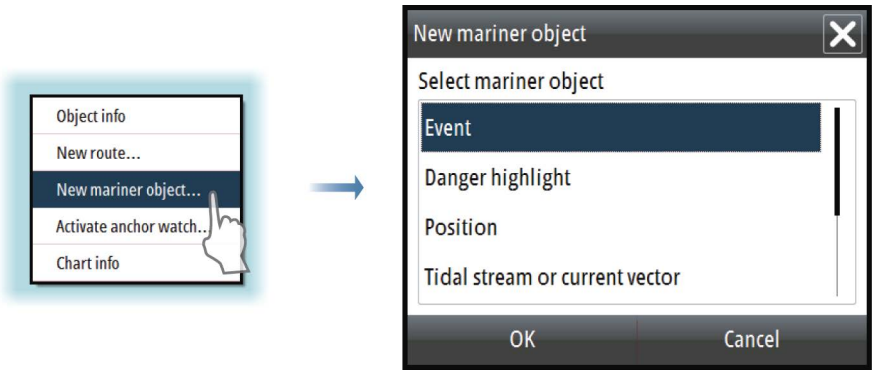
Adding user chart objects

User chart objects are added by using the **User chart** option in the Chart management menu.



1. Select the Add object in the User chart menu
   - A list of object categories is displayed in the menu area
2. Select a category and then the type of object you want to add
   - The selected object type is displayed in the menu area
3. Select the geometry icon to display option for shape and position
4. Position the object by either entering the coordinates manually or by positioning the cursor in the chart
5. Continue entering new positions if the object shape is an area or a line
6. Select the Apply button to confirm the object shape and position
7. Edit details for the object if required by using the Settings icon, eventually add child objects by using the Child icon
8. Select the Save button to save the object

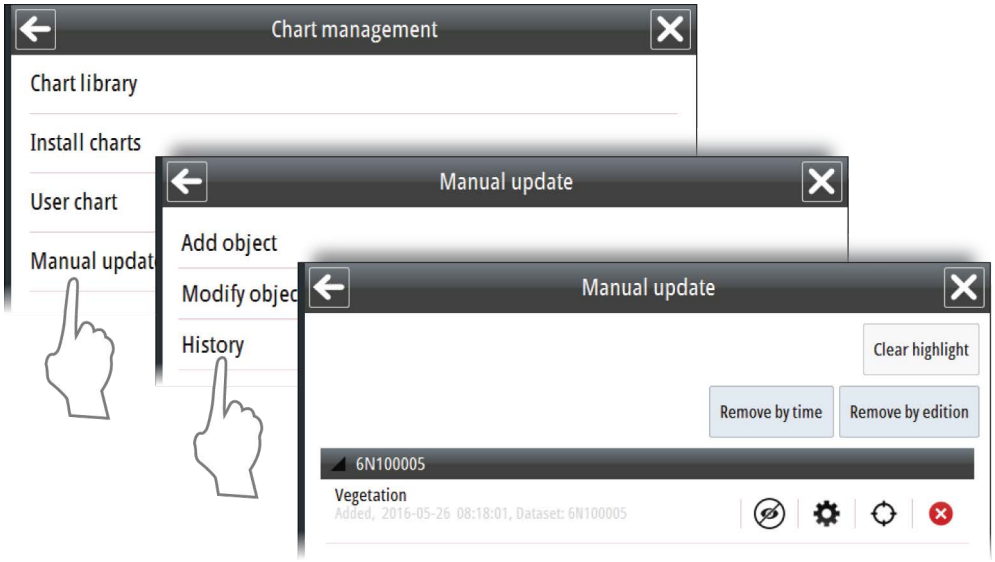
You can quickly place Mariner objects from the Panel menu. This option has only a few Mariner object categories available. You also need to use the geometry dialog to position the object, as you do when you add mariner objects from the main menu.



Manual updates and User chart objects update history

The History option for Manual updates and User chart (including Mariner objects) in the Chart management menu includes a list of all changes. The history options also allows for editing item details.

The example shows the Manual update history menu.



The following options are available:

- Hide item
- Show item
- Edit item details
- Move chart to display item in center of the chart panel
- Refresh the list of items

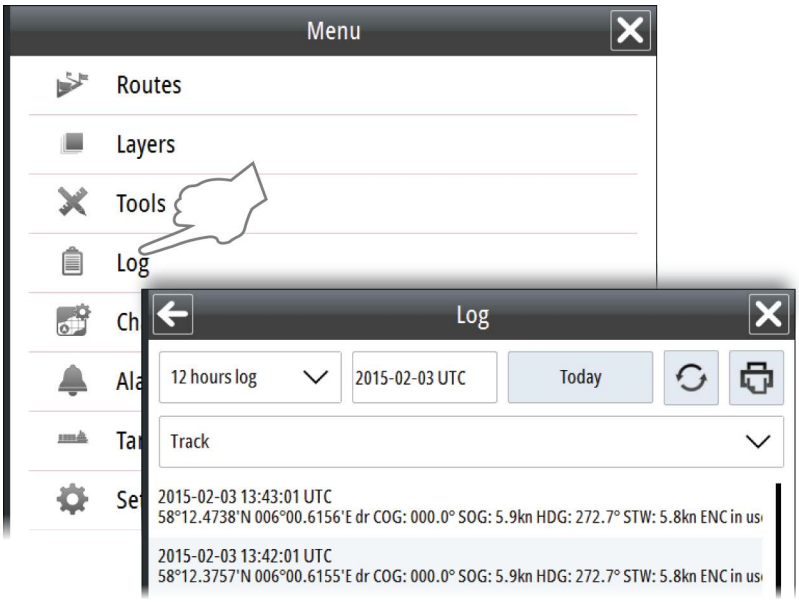
11 The Log book

System information and vessel movements are automatically logged and saved to an internal database in the system.

Two log books are recorded at the same time: the 12-hour log book where records are done at 1 minute intervals, and the 3-month log book where records are done at 15 minute intervals.

→ ***Note:*** Records of the 12-hour log book are available two days back from the current date. Records of the 3-month log book are available 90 days back from the current date.

The Log book is accessed from the Main menu.



The following options are available:

12 hours log	Drop-down list for switching between the 12-hours log book and the 3-months log book.
2015-02-03 UTC	Field for entering a specific date for the log
Today	Displays today's log
	Refreshes the log
	Opens the logs to be converted to pdf format and copied to a removable media.
Track	Drop-down list for selecting log type

12 PLECDIS systems

A Simrad PLECDIS™ system consists of two identical type approved E5024 or E5027 ECDIS systems via the Ethernet ports on the E5000 processor. When type approved charts are used in the system, a PLECDIS system allows the ship to operate without paper charts onboard.

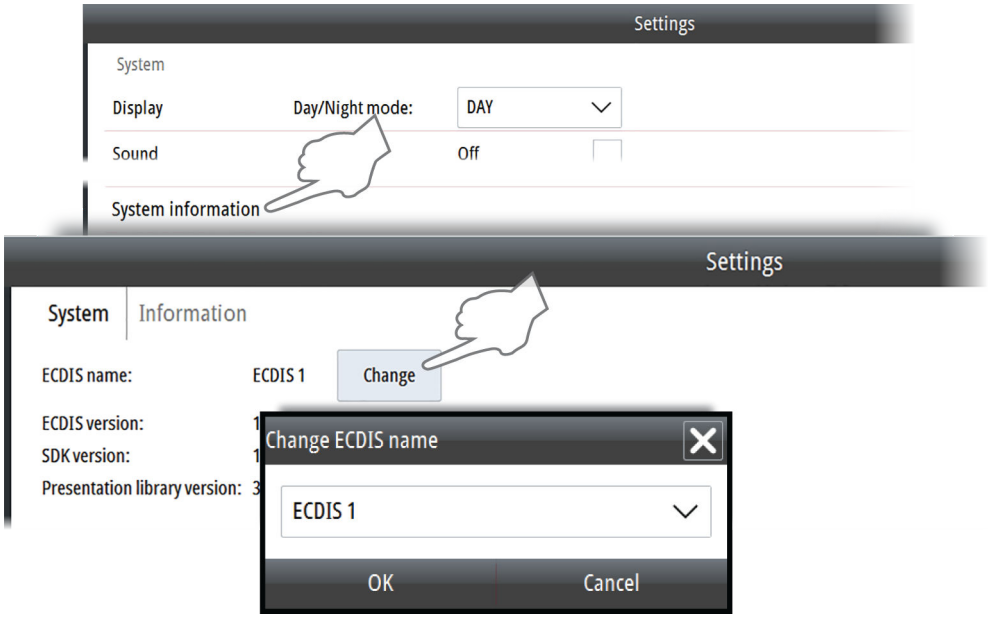
A PLECDIS system can be set up to automatically synchronize chart database, mariner objects, routes, permits and configuration between all connected E5000 processors. The backup system ensures that a system failure does not result in a critical situation, and provides safe navigation for the remaining part of the voyage in case of failure in the primary ECDIS system.

Defining main and backup ECDIS systems

Main and back-up systems are recognized by the systems' name and IP address.

The main system has to be labeled **ECDIS 1.** This is the default settings for all E5024 and E5027 systems when delivered from factory. The second system can have any number to identify it as backup system.

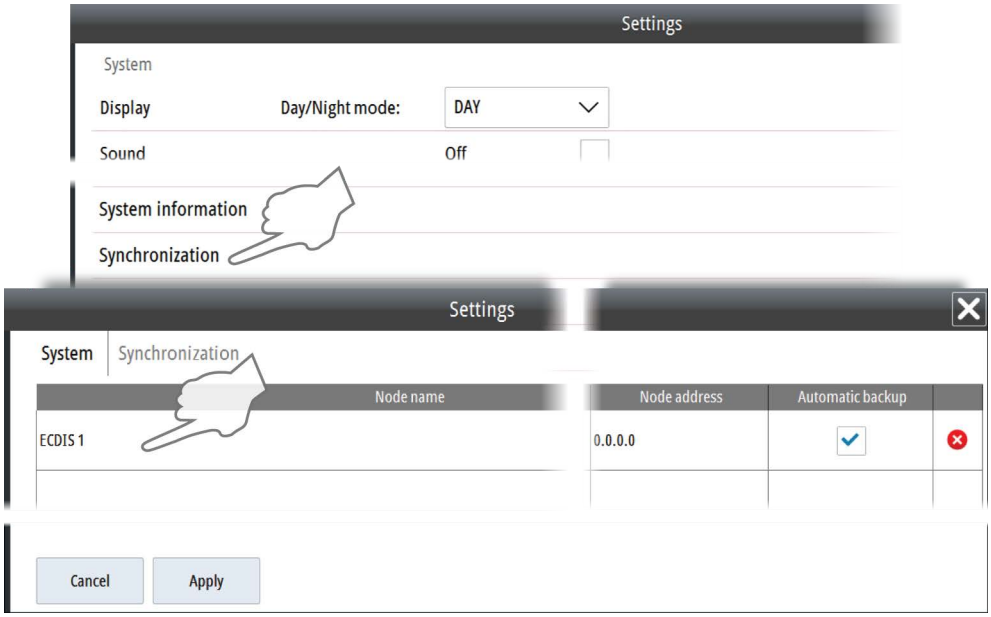
You change the name of the system from the System Information dialog.



Automatic data synchronization

When two systems are interconnected, the system can be set up to automatically synchronize data between the systems.

This setting is done in the System Synchronization dialog.

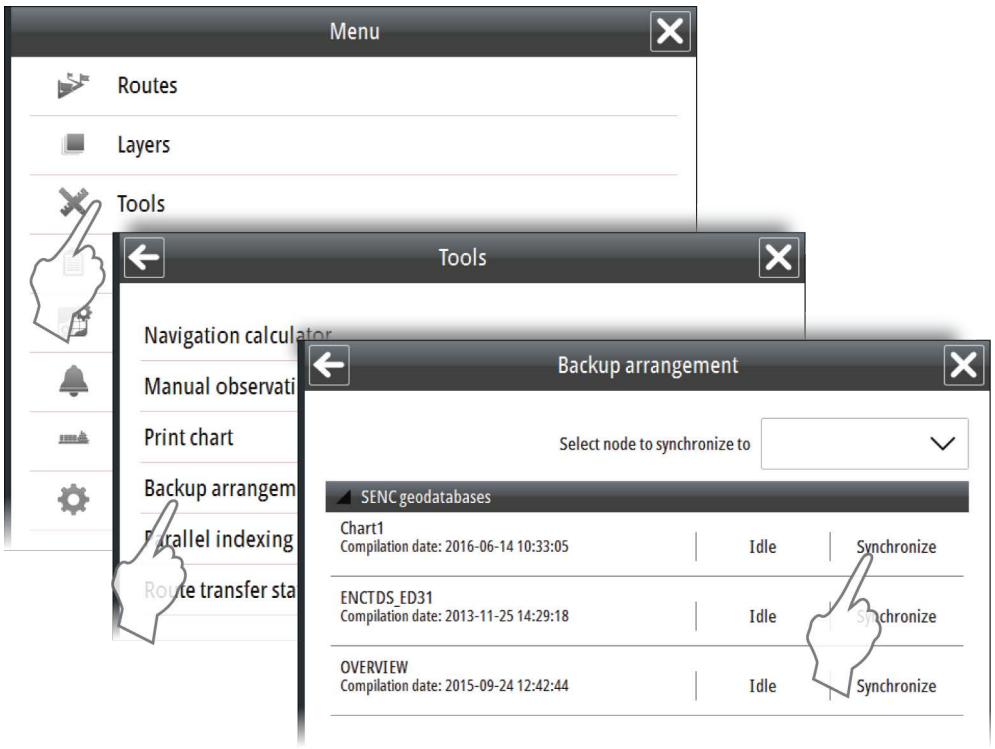


1. Double-click the Node name field
   - The system will automatically assume a name for the first ECDIS that are to be included in the synchronization setup
2. Re-name the node's system name if required
3. Enter the node's IP address
4. Tick the Automatic backup field if the system should be included in the automatic backup
5. Confirm and save the configuration by selecting the **Apply** button.

Any changes to manual updates, mariner objects, routes, data permits, and configuration files will now automatically be synchronized between the ECDIS systems included in the synchronization setup.

Manual data synchronization

You can manually back up data on one ECDIS system with other interconnected ECDIS systems. The back up can include the chart database with manual updates, mariner objects, routes, data permits, and configuration files. The manual update is started from the Backup arrangement dialog.



Select the Synchronize option to start the backup process. The status indication will change from Idle to Uploading on the ECDIS sending the data, and to Downloading on the receiving ECDIS.

→ ***Note:*** During backup both the sending and the receiving ECDIS system must be running. Data that are being updated on the receiving ECDIS are not available for use.

13 Maintenance

Maintenance philosophy

All units in the system are “repair by replacement” units, and the operator is therefore required to perform only a very limited amount of preventive maintenance.

Checking the connectors

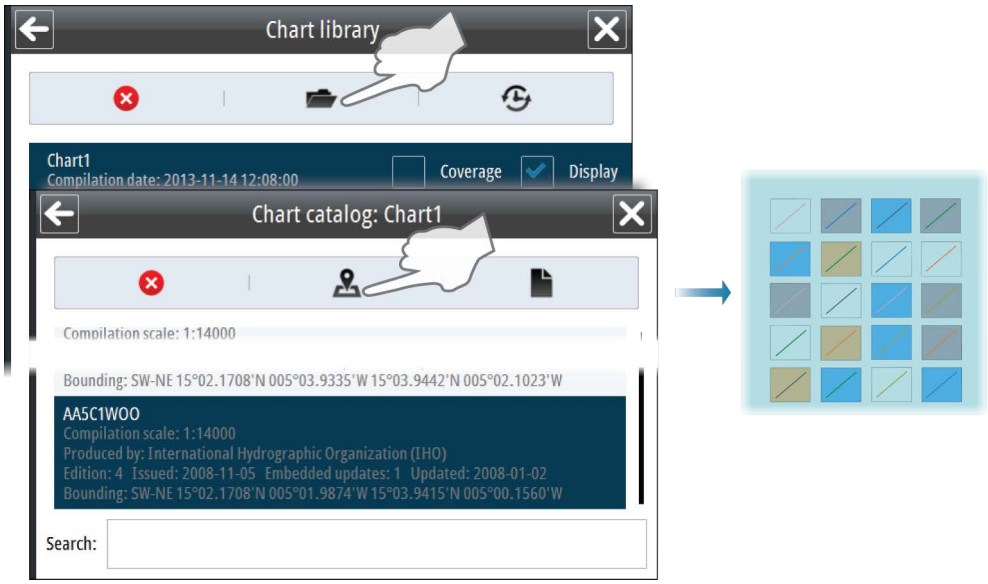
The connectors should be checked by visual inspection only.

Push the connector plugs into the connector. If the connector plugs are equipped with a lock, ensure that it is in the correct position.

Verifying the display color

The system includes a color test area to enable the user to detect the stage at which the display can no longer be used to discriminate important features by color.

1. Open the Chart library panel
2. Open the chart catalog for the **Chart1** database
3. Select the Display Object icon for the **AA5C1WOO** dataset
   - The display moves and scales the chart to 1:14 000. This scale should not be changed
4. Verify that the color for the diagonal lines can be clearly distinguished from the background. If not, the monitor has to be sent to Simrad for recalibration
5. Return to the Chart library panel and select your preferred chart database to go back to normal operation



Backup and restore of system data

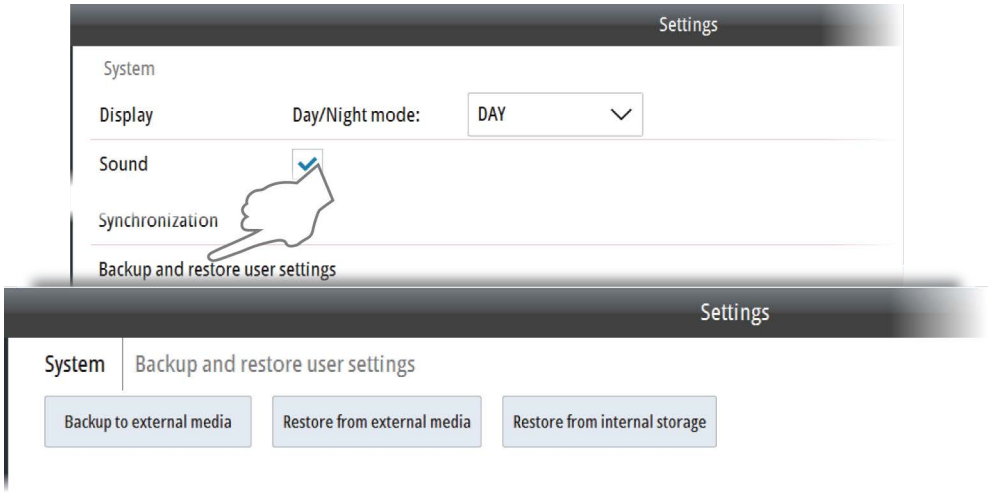
The system includes a backup and restore function, making it possible to back-up and restore local system data.

→ ***Note:*** This is not a backup of the full system image, merely the configuration and settings. For route back-up, each route has to be exported to external storage or another ECDIS.

It is recommended to have backup routines that are carried out regularly.

→ ***Note:*** It is strongly recommended to make a complete system backup when the system is installed and configured.

Backup and restore are initiated from the System Backup and restore user settings dialog.



Select **Backup to external media** to save your system data to an external memory device located in the USB reader or in the SD-card reader on the E5000 unit.

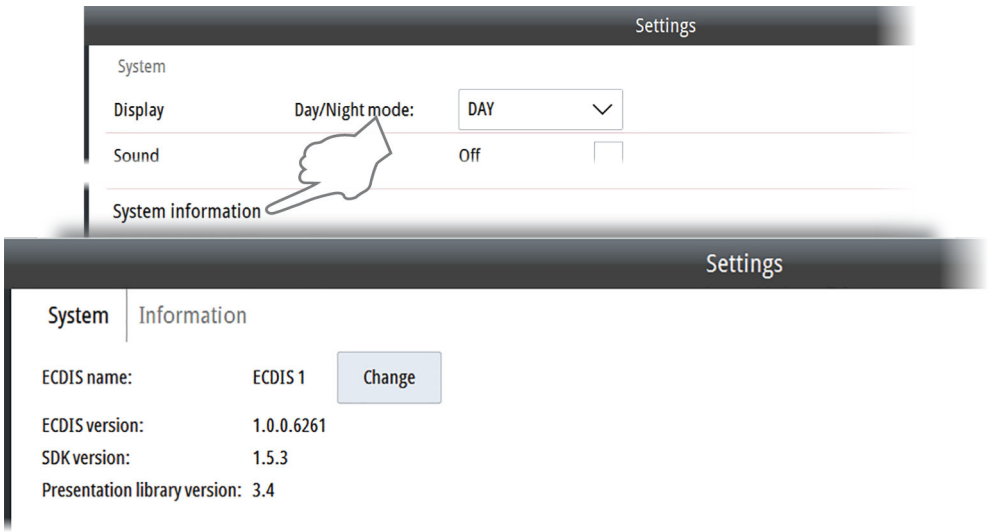
Select **Restore from external media** to restore files from an external memory device.

Select **Restore from internal storage** to restore to factory settings.

→ ***Note:*** For back-up and synchronization between multiple ECDIS systems, refer to *"PLECDIS systems"* on page 62.

Software upgrades

Software version, the SDK version and the Presentation library version are listed in the System Information dialog.



The latest software is available for download from our website, www.navico.com/commercial.

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

14 System messages

The ECDIS message system

The system will continuously check for danger situations and system faults while the system is running.

In the system, the alert escalation is set to 60 seconds and users are not able to change the alert escalation time.

There are 3 types of messages displayed in the Alerts panel:

- **Alarms**: This is the system's highest priority alert, activated when situation occurs that might result in collision with other vessels, when you enter shallow water area, or for conditions that critically effect the capability or performance of the system. You must critically examine all alarm messages to determine their cause and effect.
  Alarms are followed by an acoustic alarms. The alarm icon is flashing until the alarm is acknowledged.
- **Warnings**: This is alerts of lower priority, announcing conditions that could result in unwanted system response or eventual failure if no action is taken
  - Warnings are sounded with two beeps every minute while active.
  - All warnings are repeated as warnings except the following which are repeated as alarms:
    - Early course change (timeout = 30 sec.)
    - Actual course change (timeout = 30 sec.)
    - Outside the anchor watch swing circle (timeout = 2 min.) which are repeated as alarms.
- **Navigational cautions**: Information about danger and caution objects within the guard zone defined for your vessel. See *"Setting a guard zone around the vessel"* on page 31.

Alert notifications

When an alert is triggered, the alert icon appears in the alert panel. The alerts are also added to the Alerts list, displayed from the main menu.

Alarms trigger an audible signal unless the sound is turned off in the System Settings dialog.

Alarms and Warnings have different states:

- Active - not acknowledged
- Active - acknowledged
- Rectified - not acknowledged

When a rectified alert is acknowledged it will disappear from the alerts panel and from the Alerts list.

Cautions are not acknowledged, and they disappear from the system when they are no longer present. Cautions have therefore only an active state.

The table below shows alert icon and behavior depending on if the alert is active, acknowledged or rectified.

Type	Icon	State	Sound
Alarm		Active - not acknowledged	Single short sound repeated every 7 second
		Active - acknowledged	None
		Rectified - not acknowledged	None

Type	Icon	State	Sound
Warning		Active - not acknowledged	None
		Active - acknowledged	None
		Rectified - not acknowledged	None
Caution		Active	None

Acknowledging alerts

You acknowledge an alarm or a warning by right-clicking the relevant alert in the Alert panel. If several alerts are active they must be acknowledged separately in the Alert panel. All un-acknowledged alerts can be acknowledged at the same time from the Alarms list. Refer *"Alarms list"* on page 70.

When an Alarm or Warning is acknowledged, the alert icon stops flashing. For alarms the sound is also muted.

All Alarms remain in the Alerts panel and in the Alarms list until the reason for the alarm is removed.

Warnings are removed from the alert panel when they are acknowledged.

Indications

Indication messages inform you of conditions that are noteworthy, but that have no serious effect on the performance of the system. No sound is triggered for indications.

All indication messages are displayed in the Indications panel. They will remain in the panel as long as the condition remains.

Power failure alarm

By a power failure an acoustic alarm will be activated and the visual alarm on the E0102 Alarm panel will be lit.

The power failure alarm is muted by pressing the Alarm reset key on the E0102 Alarm panel. The visual alarm in the Alarm reset key will remain lit as long as the alarm condition is present.

If not muted, the sound and the light indication will remain until the ECDIS application is restored to normal operation.

External bridge alert systems

The system supports Bridge Alert Management (BAM) and Bridge Navigational Watch Alarm Systems (BNWAS).

Bridge Alert Management (BAM)

All system alerts are transferred to the bridge alert system if this is connected to the system.

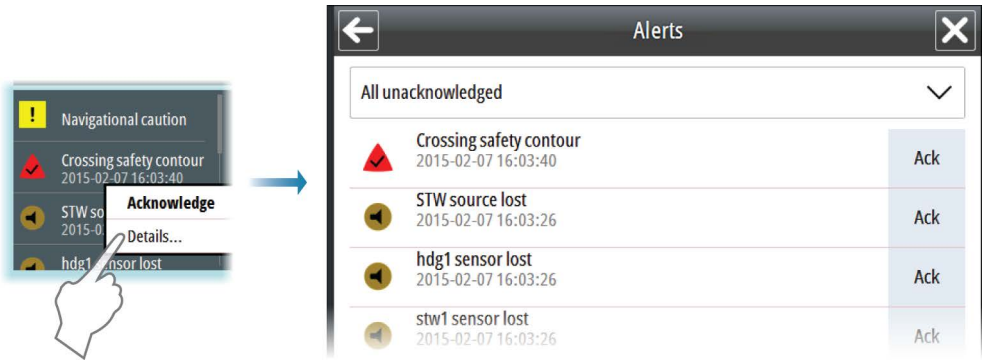
An alert generated by the system - e.g. Danger target alarm - can only be acknowledged from the system itself. Global alarms - e.g. Position timeout or Gyro failure - can be acknowledged on both the system control unit and on the bridge alert system.

Bridge Navigational Watch Alarm Systems (BNWAS)

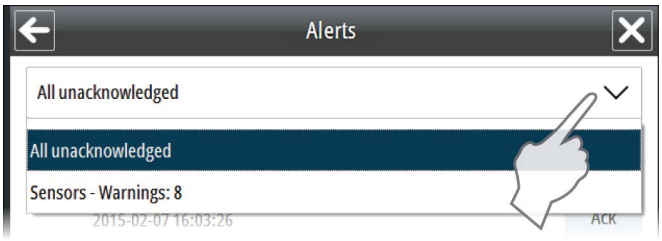
If a BNWAS is connected to the system, the system outputs an 'EVE' sentence to the BNWAS when an user interaction with the system occurs. The 'EVE' sentence remotely resets the BNWAS timer to confirm wheelhouse crew activity.

The Alerts list

You display a list of all active alarms and warnings by right-clicking an alarm or warning icon in the Alert panel. You can also display the Alerts list from the menu.



You can list all active alerts, or you can list them by group selected from the drop-down list.



From the Alerts list you can acknowledge alerts individually or all at the same time.

15 Fault finding

If an error situation has occurred, the fault is normally identified from the symptoms observed. It is therefore important to record all these observations to help the maintenance person or service engineer. All error messages shown on the screen should be logged for this purpose. If you are not able to correct the error situation yourself, you should contact your nearest Simrad service office for advice or to request service on board.

Fault identification

The fault-finding table below assumes that the problem is caused by the units included in the system or the connected sensors, and that no other external factors are involved.

Observation	Potential causes	Possible solutions
Device not on – no LED	Power not plugged in or switched on	• Check power cable is properly seated and retaining nut locked • Ensure power source is on and capable of providing power • Check fuses
Application not loading – error screen, SIMRAD logo or black screen	Corrupt file system or other system malfunction	• Simrad technician required
Monitor not on – black screen and control panel icons not lit	Power not plugged in or switched on	• Check power cable is properly seated and retaining nut locked • Ensure power source is on and capable of providing power • Check fuses
Monitor on but no image – red LED on	HDMI not plugged in properly	• Check HDMI plugged in • Check HDMI cable not working
Application loaded but no charts displayed	Charts not loaded/activated or display not switched on	• Refer to operation manual to ensure charts are loaded and display activated
No sensor data – sensors indicated yellow	Sensors not switched on	• Ensure sensors are powered on and plugged in the CAN bus network or the appropriate NMEA0183 ports
No sensor data – sensors indicated yellow	Sensors not configured properly	• Refer to installation manual for sensor configuration • Ensure baud rates are correct where applicable • Ensure CAN bus sensors configured and activated as per installation manual

Observation	Potential causes	Possible solutions
No audible alarms	Audio off or E0102 Alarm panel not functioning	• Ensure Audio is switched on in settings (refer operational manual) • Ensure E0102 Alarm panel installed as per installation manual
Trackball not working	Trackball not switched on or battery depleted	• Ensure receiver plugged into USB port on E5000 processor • Ensure trackball unit is switched on • Ensure that the battery in the trackball is not depleted
PLECDIS not synchronizing	Ethernet cable not plugged in or configuration	• Ensure Ethernet cable is plugged in properly • Refer to installation manual and operational manual for PLECDIS configuration
Smoke coming out of E5000 processor unit	Unit no longer serviceable	• Unplug all cables from unit • Simrad technician required

16 Terms and abbreviations

AIS
Automatic Identification System. System where vessel information (location, course, speed, etc.) is broadcast by VHF radio, for use by other vessels in navigation and collision avoidance.

ARGUS
Simrad professional X-band radar.

ARPA
Automatic Radar Plotting Aid.

ATON
Aids To Navigation.

BTW
Bearing To Waypoint. Bearing to a specified waypoint from present position. The correct acronym for the more commonly used BPW (Bearing Position Waypoint).

BWOL
Bearing from the current position to the next wheel-over line.

CAN bus
Controller Area Network, a bus standard designed to allow microcontrollers and devices to communicate with each other.

COG
Course Over Ground. The actual direction of progress of a vessel between two points, with respect to the surface of the earth. The vessel's heading may differ from the course over ground due to the effects of wind, tide and currents.

Chart permit code
Code required to install charts on the system. The code is generated by the chart supplier when they have received the User permit code.

CPA
Distance in Nautical miles to Closest Point of Approach for the ARPA target.

CPR
Common Reference Point.

CPU
Central Processor Unit.

DR
Dead Reckoning.

DTA
Distance from the current position to last waypoint in the route.

DWOL
Distance from the current position to the next wheel-over line.

EBL
Electronic Bearing Line.

ECDIS
Electronic Chart Display and Information System, type approved ECS system according the ECDIS regulations.

ENC
Electronic Navigational Chart. An official database created by a national hydrographic office for use with an Electronic Chart Display and Information System (ECDIS).

EP
Estimated Position.

EPFS
Electronic position-fixing system.

ETA
Estimated time of arrival at the last waypoint.

GPS
Global Positioning System. A satellite based navigation tool. This system is based on satellites in fixed orbits, circling the earth at an altitude of approximately 20,200 km. The system will provide the user with 24 hour a day all weather position coverage, with an accuracy of 5 to 30 meters.

HDG
Heading.

IHO
International Hydrographic Organization.

IMO
International Maritime Organization.

Leg
The straight segments of a route between waypoints. A route with four waypoints has three legs.

LOP
Line Of Position.

MFD
Multi-Function Display.

MOB
Man Over Board.

NavStick
USB drive from NAVTOR included in the system. Used for chart updates, and acts as the bridge between the E5000 Processor and a computer with internet access.

NAVTOR
Supplier of product and services portfolio for international maritime operation. Web site: www.navtor.com

NavTracker
A customized web interface from NAVTOR giving the navigator and ship management full overview of chart usage, chart update history and chart management.

NavSync
PC program from NAVTOR used for receiving and updating the content on the NavStick.

NMEA
National Marine Electronics Association.

NMEA 0183
A format (language) designed to permit communication between various types of marine electronic equipment. In essence this is a two-wire shielded, serial data link, permitting one device to talk while other devices listen. Numerous different sentences are available, permitting communication between various different devices.

NSO
Product name for a Simrad Multi-Function Display.

PLECDIS™
Paperless ECDIS system.

Route
A stored sequence of waypoints. These waypoints will be listed in the order in which you desire to follow them.

S57
The standard vector format for official ENC charts, stated in the International Hydrographic Organization (IHO) Special Publication S-57.

S63
The International Hydrographic Organization standard for encrypting and securing electronic navigational chart data.

S64
The International Hydrographic Organization test data set for chart data presentation.

SART
Search And Rescue Radar Transponder.

SI80
Signal Interface unit used for expanding the number of interface channels to the system.

Sleeping targets
Reported targets provided by the AIS can be filtered according to user-defined settings based on range from own vessel. Targets may be sleeping, or may be activated. An AIS "sleeping target" symbol can be visible or hidden to reduce chart clutter. Additional information is presented when the target is activated.

SOG
Speed Over Ground. The actual speed of the vessel relative to the ocean floor.

SOLAS
SOLAS is the IMO convention to ensure Safety Of Life At Sea.

SPD
Speed.

STW
Speed Through Water

TCPA
Time in minutes to Closest Point of Approach for the ARPA target before an alarm is activated.

TTA
Time to go from the current position to the end of the route using the route's planned speed.

TTG
Time to go from the current position to the next wheel-over line using the route's planned speed.

USB
Universal Serial Bus.

User permit code
A code automatically generated in the E5000 computer. This code is specific for each E5000 computer.

VRM
Variable Range Marker.

XTD
Cross Track Distance.

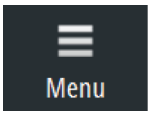
17 Icons

This section includes all icons used in the E50xx system.

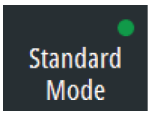
If a function or an option not is available, the icon appears greyed.

Shortcut buttons

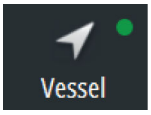
→ ***Note:*** Some of the shortcut buttons have a light indicator that can be green or yellow. Green indicates standard ECDIS mode, while yellow indicates non-ECDIS mode. One-click on a shortcut button with a yellow indicator reverts to ECDIS mode.



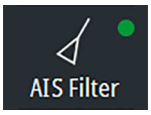
Menu
- Click to open the main menu



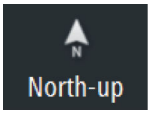
Display mode
- Click to return to Standard mode
- Right-click to show display mode options



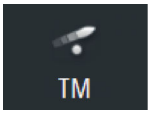
Follow own vessel
- Click to move the chart view to the vessel position and then follow the vessel. Vessel position in the chart depends on user settings



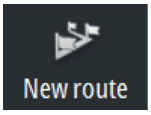
AIS Filter
- Click to turn OFF AIS filter
- Right-click to display options



Orientation
- Click to loop through chart orientation options
- Right-click to display options

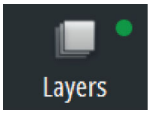


Motion
- Click to toggle vessel motion options
- Right-click to display options

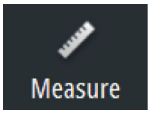


New route
- Click to start creating a new route

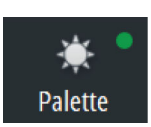
Stop route
- Click to stop navigating an active route



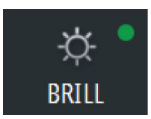
Layers
- Click to turn OFF all layer options
- Right-click to display options



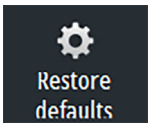
Measure
- Click to toggle measure function on/off



Palette
- Click to return to Night palette when Red and Black palette is selected
- Right-click to display palette options



Brilliance
- Click to return to calibrated brightness for the selected palette



Restore defaults

- Resets settings to defaults set by the IEC standard.

Man Over Board (MOB)

- Click to create a MOB waypoint at the vessel's position
- Right-click to remove single or all MOB waypoints

Chart panel icons

	Increases the chart scale
	Zooms the chart to best available scale
	Decreases the chart scale

General interface icons

	Returns to the previous menu/dialog
	Closes the menu/dialog
	Deletes a selected item
	Refreshes data in the opened menu/dialog
	Prints data in the opened menu/dialog
	Opens settings configuration for a selected item

Main menu icons

	Opens the Routes menu.
	Opens the Layers menu.
	Opens the Tools menu.
	Opens the Log book.
	Opens the Chart management menu.

	Opens the Alerts menu.
	Opens the Targets menu.
	Opens the Settings dialogs.

Route icons

	Transfers the route to another unit
	Indicates a waypoint in the route menu
	Indicates a leg in the route menu
	Deletes a selected waypoint/event mark
	Moves a selected waypoint up in the list of waypoints
	Moves a selected waypoint down in the list of waypoints
	Opens the waypoint/event mark edit menu

Chart management icons

Chart library

	Deletes a selected database
	Opens the chart catalog of a selected database
	Searches for updates for a selected database

Chart catalog

	Deletes a selected dataset
	Highlights the dataset in the chart, and moves chart center to the selected dataset
	Opens additional information for a selected dataset

Icons in Manual update menus

	Refreshes the list of datasets currently displayed in the chart view

Add Manual update object

	Opens the child editing menu
	Opens the attribute editing menu
	Opens the geometry editing menu

Modify Manual update objects

	Opens the child editing menu
	Opens the object editing menu
	Opens the geometry editing menu
	Highlights the object in the chart, and moves chart center to the selected object
	Deletes the selected object

Manual update history

	Displays/hides the object in the chart
	Opens the object editing menu
	Highlights the object in the chart, and moves chart center to the selected object
	Deletes the selected object

User chart objects menu icons

Add User chart object

	Opens the child editing menu
	Opens the attribute editing menu
	Opens the geometry editing menu

Modify User chart object

	Opens the child editing menu
	Opens the object editing menu
	Opens the geometry editing menu
	Highlights the object in the chart, and moves chart center to the selected object
	Deletes the selected object

User chart objects, icons in history menus

 	Displays/hides the object in the chart
	Opens the object editing menu
	Highlights the object in the chart, and moves chart center to the selected object
	Deletes the selected object

System settings icons

SA certificates

	Refreshes the SA certificates list
	Removes the SA certificate
	Installs the SA certificate

Grounding check

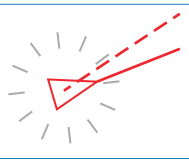
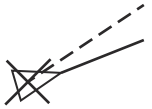
	Increases the value of a setting
	Decreases the value of a setting

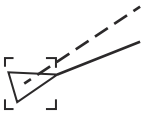
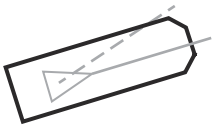
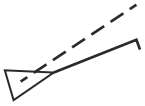
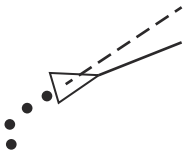
Object information icons

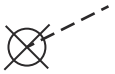
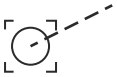
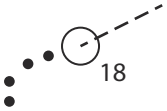
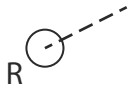
	Highlights the object in the chart, and moves chart center to the selected object
	Displays an image file related to the selected object
	Displays a txt file with additional object information in a separate window

Target symbols

This section lists the target symbols used in this system.

Symbol	Description
	AIS Base station
	AIS SAR aircraft
	AIS SAR vessel
	AIS SART (AIS Search And Rescue Transmitter)
	**AIS target - Dangerous**, indicated with bold line and with red color. The symbol flashes until the target alarm is acknowledged by the operator
	**AIS target - Lost**, indicated with crossed lines centered on the target symbol. The symbol is located at the last received position from the target

Symbol	Description
	**AIS target - Selected**, indicated with a square (dotted line) around the target symbol
	AIS target - **Sleeping**, aligned with received heading information or with COG information if heading is not available
	**AIS target, activated - True scaled outlines**
	**AIS target** with heading line and SOG/COG (dotted line), and with indicated turn direction
	**AIS target** with heading line, SOG/COG (dotted line) and past track
	Associated target - using AIS data
	Physical AIS AtoN, basic shape (AIS aids to navigation)
	Physical AIS AtoN - East cardinal mark
	Physical AIS AtoN - Emergency wreck mark
	Physical AIS AtoN - Isolated danger
	Physical AIS AtoN - North cardinal mark
	Physical AIS AtoN - Off position
	Physical AIS AtoN - Port hand mark
	Physical AIS AtoN - Racon failure
	Physical AIS AtoN - Racon
	Physical AIS AtoN - Safe water
	Physical AIS AtoN - South cardinal mark

Symbol	Description
	Physical AIS AtoN - Special mark
	Physical AIS AtoN - Starboard hand mark
	Physical AIS AtoN - Unlit (failure of lights)
	Physical AIS AtoN - West cardinal mark
	Radar target - **Dangerous**, indicated with bold line and with red color. The symbol flashes until the target alarm is acknowledged by the operator. It remains red until the system no longer defines it as a dangerous target
	Radar target - in acquisition state, indicated as a broken circle centered at the position of target acquisition
	**Radar target** - **Lost**, indicated with crossed lines centered on the target symbol. The symbol is located at the last received position from the target
	**Radar target - Selected**, indicated with a square (dotted line) around the target symbol
	Radar target - Tracked, with velocity vector
	**Radar target** with past position and velocity vector
	**Reference target**
	Signal station
	Virtual AIS AtoN, basic shape
	Virtual AIS AtoN - East cardinal mark
	Virtual AIS AtoN - Emergency wreck mark
	Virtual AIS AtoN - Isolated danger
	Virtual AIS AtoN - North cardinal mark
	Virtual AIS AtoN - Port hand mark

Symbol	Description
	Virtual AIS AtoN - Safe water
	Virtual AIS AtoN - South cardinal mark
	Virtual AIS AtoN - Special mark
	Virtual AIS AtoN - Starboard hand mark
	Virtual AIS AtoN - West cardinal mark
	Virtual AIS AtoN Missing

Index

A

Abbreviations 73
Acknowledging alerts 69
Activating
  Anchor watch 37
AIS 38
  Communicating with other vessels 40
  Create messages 41
  Filters, enabling 40
  Own ship AIS status 41
  Setting own vessel status 40
  Target filter settings 40
  View sent or received AIS messages 41
AIS Filter 11, 76
AIS targets 38
  Configuring 39
  Display settings 39
  Heading line 39
  Hide AIS targets 39
  Past track 39
  Path predictor 39
  Range circles 39
  Show associated as AIS 39
  Symbols 38
  Target label 39
  True scale outline 39
  Velocity vector 39
Alarm panel
  E0102 Alarm panel 9
Alarms
  Power failure 69
Alert graphics
  Filtering visible alert items 32
Alert notifications 68
Alerts list 70
Anchor watch 36
  activating 37
  Deactivating 37
  Setup 36
Area 28
ARPA radar 38
ARPA targets 38

B

Backup
  User data 66
Best scale 19, 28
Brightness 18
Brilliance 11, 18, 76

C

Chart center 19
  Moving 19
  Panning 19
Chart library 24
Chart objects 27
  Adding mariner objects 59
  Adding user chart objects 59
Chart orientation 11, 28, 76
  Course-up 28
  Head-up 28
  North-up 28
  Track-up 28
Chart permit code 20, 22
Chart permits 23
  Installing 23
Chart scale 19
  Selecting 19
  Zooming 19
Chart scale: scrolling 19
Chart settings 25
  Portrayal settings 25
Chart subscription 21
Chart symbol size 26
Chart symbols 30
Chart viewing date 27
Charts
  Catalogs 56
  Chart library 56
  Database 9, 55
  Display 24
  Displaying information about 55
  Highlight chart updates 57
  Management 55
  Manual update history 60
  Manual updates 58
  Mariner objects 58
  Mariner objects history 60
  Show update history on chart 57
  Update history 57
  User chart objects 58
  User chart objects update history 60
Color calibration 18
Color mode 26
Course-up 28
Create AIS messages 41
Create new route 11, 76

D

Danger objects 51
Danger symbols 26
Date
  Chart view date 27
Datum transformation 35
Deactivating
  Anchor watch 37
Dead Reckoning 36
  Enable correction 36
Deep contour 26
Depth display settings 26
  Color mode 26
  Deep contour 26
  Safety contour 26
  Safety depth 26
  Shallow contour 26
  Shallow pattern 26
Display brightness 18

Brilliance 18
Display mode 11, 27, 76
Base 27
Custom 27
Full 27
Standard 27
Display palettes 19
Display
Verifying color 65
Distance from leg 26

E

E0102 Alarm panel 69
E5000 Processor 8
EBL 33
ECDIS Requirement 8
Economic speed 47
Electronic Bearing Lines 33
Enable correction 36
Enable light character 26
EPFS 14
Estimated position 36
Event marks 50
Adding 50
Exporting routes 52

F

Fault finding 71
Filter settings option
AIS 40
Filter
Alert items on chart 32
Filters
Enabling AIS filters 40
Fixed position 28
Follow own vessel 11, 76
Full light lines 26

G

Geodesic calculation 34
Great circle approximation 34
Grounding check 31
Guard zone 31
Cardioid 31
Defining 31
Sector 31

H

Head-up 28
Heading line
Display AIS targets 39
Hide AIS targets 39

I

Icons 76
Chart management 78
Chart panel 77
General interface 77
Main menu 77
Manual updates 79
Object information 81
Route menus 78
System settings 81
User chart objects 80
IMO 8
Importing routes 52
Indications 69
Installing charts 20
NavStick 20
Other suppliers 23
Instrument bar 14

K

Keep best scale 28
Keyboard 16

L

Layers 11, 14, 38, 76
Leg activation scale 26
Light distance 26
Light indicator 11, 76
Lines Of Position 35
Log book 61
Logitech 9
LOP 35
LTSX50 9

M

M570 Trackball 9
Main menu 11, 12, 76
Main panel 10
Maintenance 65
Connectors 65
Man Over Board 12, 31, 77
Manual observation 35
Manual
About 4
Version 4
Mariner objects 15
Adding 59
Maximum speed 47
Measure 11, 76
Measuring 33
Bearing 33
Distance 33
Messages 68
Acknowledging 69
AIS 41
Alarms 68
Alert notifications 68
Indications 69
Navigational cautions 68
Warnings 68
MOB 12, 31, 77
Displaying 31
Removing 31
Saving 31

Monitor 9
Move chart center 16

N

Navigation panel 14, 54
Navigational area 28
  Area 28
  Fixed position 28
Navigational calculations 34
  Datum transformation 35
  Geodesic calculation 34
  Great circle approximation 34
Navigational cautions 32
  Displaying information about 32
Navigational settings 28
Navigations 54
NavStick 9, 20
  Copy content 22
  Updating 22
NavSync 20
NAVTOR 9
NavTracker 20, 21
North-up 28

O

Object information 15
On-screen keyboard 16
Other vessels 38
Overview map 14
Own ship AIS status 41
Own vessel's display settings 29
  Past track 29
  Path predictor 29
  Radar antenna position 29
  Track 29
  True scale outline 29
  Velocity vectors 29

P

Palette 11, 76
Palettes 19
Panel menu 12
Panning 19
Paper chart symbols 26
Parallel index lines 33
Parallel indexing 32
Past track 29
  Display AIS targets 39
Path predictor 29
  Display AIS targets 39
Permits
  Chart permits 23
PLECDIS 9, 62
  Automatic data synchronization 63
  Defining main and backup systems 62
  Manual data synchronization 64
Portrayal settings 25
  Chart symbol size 26
  Danger symbols 26
  Distance from leg 26
  Enable light character 26
  Full light lines 26
  Leg activation scale 26
  Light distance 26
  Paper chart symbols 26
  Scale min 26
  Symbolized boundaries 26
Portrayal style 26
  INT1 26
  S52 26
Power failure alarm 69
Power off 18

R

Radar 15
Radar antenna position 29
Radar overlay 15
Radar targets 42
  Configuring 43
  Display settings 42
  Symbols 42
Range circles
  Display AIS targets 39
Range rings 33
Regulatory statements 3
Restore defaults 11, 77
Restore
  To factory settings 66
  User settings 66
Routes 46
  Adding an event mark 50
  Adding and moving waypoints 49
  Copying 51
  Create new 48
  Danger objects 51
  Deleting a waypoint 50
  Deviation 47
  Displaying 48
  Economic speed 47
  Exporting 52
  Importing 52
  Maximum speed 47
  Menus 46
  Modifying 49
  Navigating 54
  Planning 46
  Route details 46
  Route edit menu 46
  Route list 46
  Settings 47
  Transfer to another unit 53
  Turn radius 47

S

S57 9, 20, 55
S63 9, 20, 55
Safety contour 26
Safety depth 26

Scale min 26
Scale-dependent objects 26
SCAMIN 26
Scrolling 19
Send
  AIS message 41
  Route to another unit 53
Sensors 14
  Invalid 14
  Missing 14
  Valid 14
Settings dialogs 13
Shallow contour 26
Shallow pattern 26
Shortcut buttons 11, 76
Show associated targets as AIS 39
SI80 Signal Interface unit 9
Signal Interface unit 9
Software upgrades 66
SOLAS 8
Start-up 18
Stop route 11, 76
Sub dialog 13
Submenus 12
Symbolized boundaries 26
System start-up 18

T

Target information 43
Target label
  Display AIS targets 39
Targets
  Finding 44
  Lost 45
  Update frequency 45
Terms 73
Track 29
Track-up 28
Trackball 9, 18
Transfer
  Route to another unit 53
True scale outline 29
  Display AIS targets 39
Turn off
  Anchor watch 37
Turning the system off 18

U

User chart objects 58
  adding 59
  Update history 60
User permit code 20

V

Variable Range Marker 33
Velocity vector 29
  Display AIS targets 39
Vessel motion 11, 76
Vessel position 35
  Calculating 35
View sent or received AIS messages 41
Voyage
  Starting 54
  Stopping 54
VRM 33

W

Warnings
  Lost targets 45
Warranty 3
Wheelmark 3

Z

Zoom buttons 19
Zooming 19

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