

SIMRAD

S2009-S2016 Fish Finder

User Manual

ENGLISH



www.navico-commercial.com

Preface

Disclaimer

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

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

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Governing Language

This statement, any instruction manuals, user guides and other information relating to the product (Documentation) may be translated to, or has been translated from, another language (Translation). In the event of any conflict between any Translation of the Documentation, the English language version of the Documentation will be the official version of the Documentation.

Copyright

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Warranty

The warranty card is supplied as a separate document at: www.navico-commercial.com

Regulatory statements

This equipment is intended for use in international waters as well as coastal sea areas administrated by member states pursuant to international conventions. This equipment complies with:

This equipment complies with:

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

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

About this manual

This manual is a reference guide for operating and the software setup for the S2009 and S2016 Fish finder systems.

Separate installation instructions for transducers are included with the transducer package.

The manual will continuously be updated to match new software releases. The latest available manual version can be downloaded from the website:

www.navico-commercial.com.

Viewing the manual on the screen

The PDF viewer included in the unit makes it possible to read the manuals and other PDF files on the screen. The manuals can be read from a card inserted in the card reader or copied to the unit's internal memory.

The PDF file is opened from the File manager, refer to "*Files*" on page 22.

Manuals can be downloaded at: navico-commercial.com/

Use the keys to maneuver in the PDF file as described below:

- Scroll pages
Use the rotary knob.
- Zoom in/out
Use the **+** and **-** keys.
- Maneuver on a page that is larger than the display area
Use the arrow keys.
- Exit the PDF viewer
Use the **Exit** key.

Safety precautions

The accuracy of the depth displayed can be affected by many factors, including the type and location of the transducer and water conditions.

The choice, location, and installation of transducers and other components of the system are critical to the performance of the system as intended. If in doubt, consult your Simrad dealer.

To reduce the risk of misusing or misinterpreting this instrument, you must read and understand all aspects of the Installation and Operation manuals. We also recommend that you practice all operations using the built-in simulator before using this instrument on the water.

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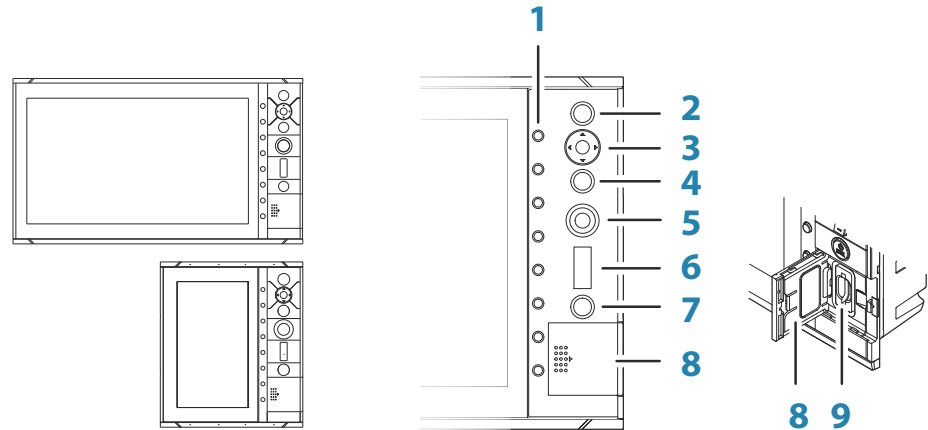
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1

The user interface

Front panel and keys

→ **Note:** The S2009 Fish finder unit has a 9" display in portrait orientation. The S2016 Fish finder unit has a 16" display in landscape orientation. The keypad and card reader on portrait and landscape units are the same. The diagrams and screenshots in this manual are taken from the S2016.



1 Softkeys

Press a key once to access options for the corresponding function.

2 Enter key

Press to select an option or to save settings.

3 Arrow keys

Press to activate the cursor and to move the cursor on the image.
Menu operation: press to navigate through menu items and to adjust a value.

4 Exit key

Press to return to previous menu level or to exit a dialog.

5 Rotary knob

Rotate to scroll through menu items and to adjust values. Press to select or save settings.

6 Range keys

Press the + or the - key to increase or decrease the range.

7 Power key

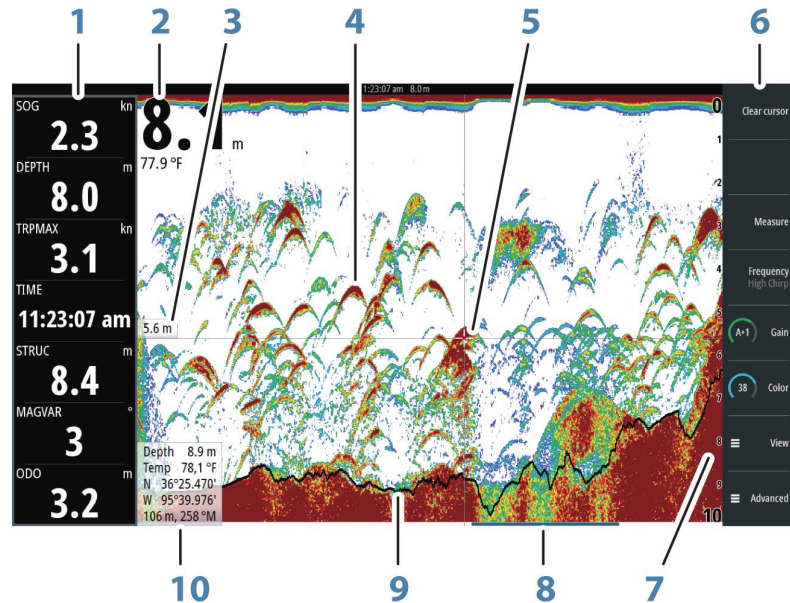
Press once to turn ON the unit.
Press and hold to turn OFF the unit.
Short press when the unit is ON opens the System Controls dialog.

8 Card reader door

9 SD card reader

The main panel

The main panel is divided into predefined areas:



- 1 Instrument bar
- 2 Depth
- 3 Depth at cursor position
- 4 Fish arch
- 5 Cursor
- 6 Softkey bar
- 7 Range
- 8 History bar
- 9 Bottom line
- 10 Cursor information panel

Using the cursor on the image

The cursor can be used to measure the distance between two points, to mark a position, and to navigate the history view.

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

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

You activate the cursor by pressing any arrow key. Use the arrow keys to maneuver the cursor on the image.

To remove the cursor and cursor elements from the panel, press the **Clear cursor** softkey or the **Exit** key.

Measuring distance

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

1. Position the cursor on the point from where you want to measure the distance
2. Start the measuring function by pressing the measure softkey
3. Position the cursor on the second measuring point

- A line is drawn between the measuring points, and the distance is listed in the Cursor Information panel

4. Continue selecting new measuring points if required

Press the **Finished Measurement** softkey to exit the measurement feature. The **Clear cursor** softkey removes the cursor from the image.

Viewing history

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

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

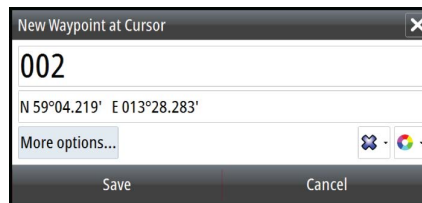
You can view echosounder history by panning the image.

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

Saving waypoints

You can save a waypoint at a selected location by positioning the cursor on the panel, and then pressing the **New waypoint** softkey.

Pressing the **New waypoint** softkey creates a temporary waypoint on the image and sends it over NMEA 2000 so that the waypoint can be created on an MFD. In order to do this, the "Send waypoint on NMEA2000" setting must be enabled. Refer to "*NMEA 2000*" on page 44.



Softkeys

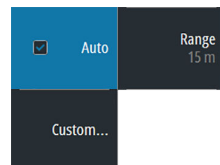
The softkeys are always accessible. By default, the softkey bar is displayed on the panel. You can hide the softkey bar so that more of the image is displayed. Refer to "*Show or hide the softkey bar*" on page 13. When a softkey is pressed, the function for the selected softkey becomes available.

The arrow keys, the rotary knob and the **Enter** key have different functions depending on which softkey is selected.

More details about the softkey functionality are available in the separate section describing the functions later in this manual.

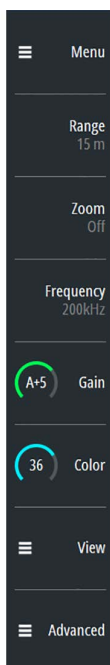
Softkey pop-ups

If you press the **Range**, **Frequency** or **Gain** softkey twice, their corresponding pop-up is displayed.



If a pop-up has more than one option, you select the options by using the arrow keys.

You remove the pop-up and revert to the softkey's main function by re-pressing the softkey or by pressing the **Exit** key.



Slide bars

Some options display a slide bar.

Press the **Enter** key, the right arrow key or the rotary knob to activate the slide bar.

When active the slide bar changes from blue to orange and you can adjust the value. Turn the rotary knob or press the up/down arrow keys to move the slide bar up or down to adjust the value.

Press the **Exit** key, the left arrow key or the rotary knob to de-activate the slide bar.

The menu system

The Menu, View and Advanced softkeys display menus. Depending on the menu item, selecting an item can display sub menus, select options or open dialogs.

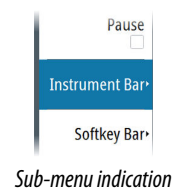
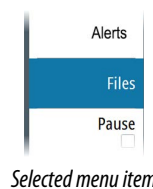
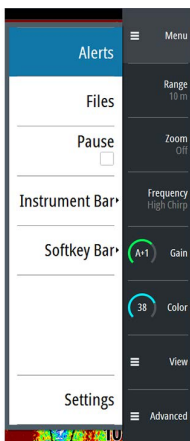
A Settings dialog will remain open until it is manually closed.

Main menu and sub menus

You access the Main menu by pressing the **Menu** softkey.

- Use the up and down arrow keys or turn the rotary knob to move up and down in a menu
- Press the **Enter** key, the right arrow key or the rotary knob to access a sub menu, to toggle options and to confirm a selection
- Press the **Exit** key or the left arrow key to return to previous menu level and then exit the menu system

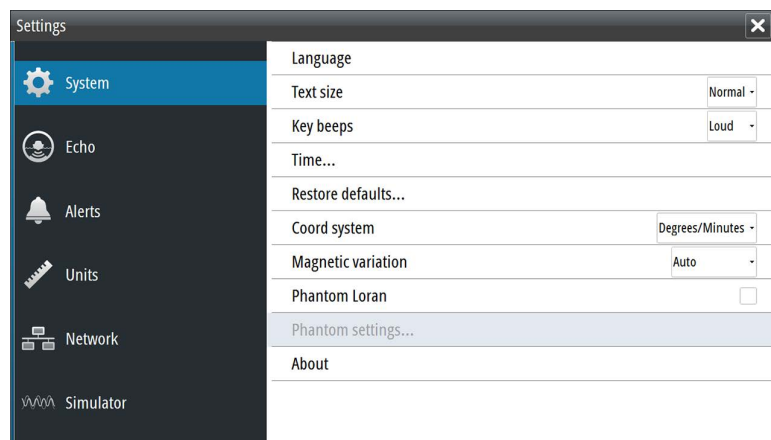
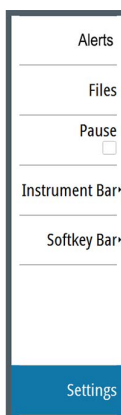
A selected menu item is indicated with a blue background. If a sub-menu is available this is indicated with a right arrow after the text.



Settings dialogs

The various Settings dialogs provide access to system settings.

You access the Settings dialogs from the Main menu and from the System Controls dialog.



- Use the up and down arrow keys or turn the rotary knob to move up and down in a Settings dialog
- Press the **Enter** key, the right arrow key or the rotary knob to access the Settings details and to confirm a selection
- Press the **Exit** key to close a dialog

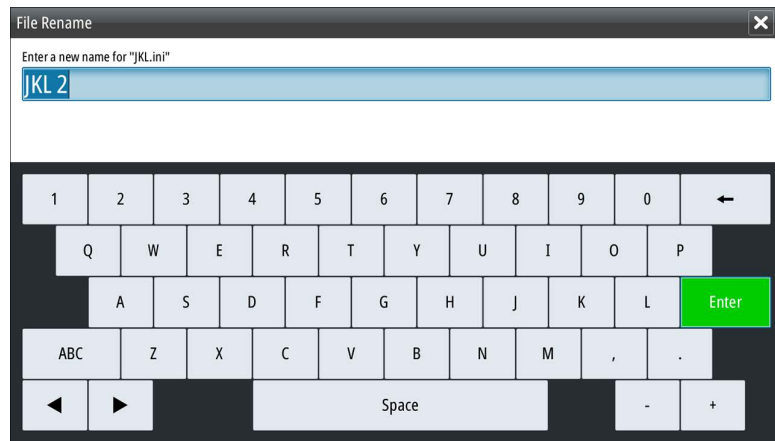
There is no time-out for the Settings dialogs. A dialog remains open until it is manually closed.

For more information about the Settings dialogs, refer to *"Software Setup"* on page 37.

On-screen keyboard

A numeric or alphanumeric virtual keyboard is displayed when required to enter user information in dialogs.

- Select a virtual key by using the arrow keys followed by the **Enter** key to confirm the selection
- Complete the entry and close the dialog by selecting the **Enter** virtual key



You remove the virtual keyboard without entering information by pressing the **Exit** key.

2

Basic operation

System Controls dialog

The System Controls dialog provides quick access to basic system settings. You display the dialog by making a short press on the **Power** key.



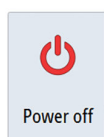
Activating functions

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

Turning the system on and off

You turn the system on and off by pressing and holding the **Power** key. You can also turn the unit off from the **System Controls** dialog.

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



First time startup

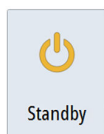
When the unit is started for the first time, or after a factory default, the unit displays a setup wizard. Respond to the setup wizard prompts to select some fundamental setup options.

You can perform further setup using the system settings option and later change settings made with the setup wizard. Refer to "*Software Setup*" on page 37.

Standby mode

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

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



Display illumination

Brightness

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

Night mode

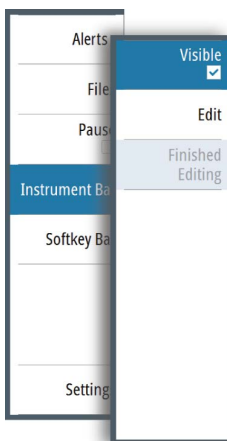
The night mode option optimizes the color palette and backlight for low light conditions.



Setting the appearance of the Instrument bar

By default, the Instrument bar is shown on the panel. You can turn the Instrument bar off.

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



You can specify the information displayed in the instrument bars. Use the Instrument bar sub-menu to set the appearance of the Instrument bar.

Turning the Instrument bar on/off

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

You can also turn the instrument bar on/off from the instrument bar menu option.

Edit the content of the Instrument bar

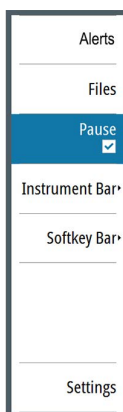
1. Press the **Menu** softkey, activate the instrument bar menu option and press the **Enter** key.
2. Activate the edit option, and press the **Enter** key. The top instrument gauge is highlighted.
3. Press the up/down arrow keys or turn the rotary knob to activate the instrument gauge you want to change.
4. Press the **Enter** key or the rotary knob to open the Choose data dialog.
5. Press the up/down arrow keys or turn the rotary knob to activate a category, and then press the **Enter** key to expand it.
6. Press the up/down arrow keys or turn the rotary knob to activate a gauge, and then press the **Enter** key to select it.
7. Press the up/down arrow keys or turn the rotary knob to select the finished editing menu option and then press the **Enter** key to save your changes.

Pausing the image

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

Toggle on/off pause using the pause option in the main menu.

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



Screen capture

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

To manage screen capture files, refer to *"Managing files"* on page 22.

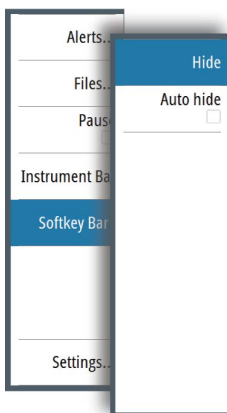
Show or hide the softkey bar

By default, the softkey bar is displayed on the panel. Hiding the softkey bar allows you to show more of the image.

Select the hide menu option to immediately hide the softkey bar. Pressing any softkey re-displays the softkey bar.

Auto hide the softkey bar

Selecting the auto hide option will hide the softkey bar after a few seconds of no softkey activity. Pressing any softkey re-displays the softkey bar.



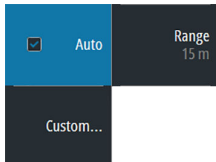
3

Setting up the image

You can improve the image by adjusting the range, gain, color, and by filtering out noise. Some functions include both a manual and an automatic mode. It is recommended to use the manual mode only if the automatic tuning fails.

The image is controlled by dedicated softkeys as described in the next sections.

When the cursor is active, some options on the menu are replaced with cursor mode features. Press the **Clear cursor** softkey or press the **Exit** key to return to the non-cursor related softkey options.



The range

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

Press the **Range** softkey twice to display the range pop-up.

Preset range levels

Allows for the selection of a specific depth range that is not tied to the depth of the water.

To select a preset range level, press the **Range** softkey and then turn the rotary knob to adjust the range to a preset level or use the **+/-** keys.

Auto range

By default, the range is set to Auto. In auto range, the system automatically displays the whole range from the water surface to the bottom. Auto is the preferred setting for fish finding.

Expand the Range pop-up and select Auto gain or press-and-hold the **Range** softkey to toggle Auto gain on/off.

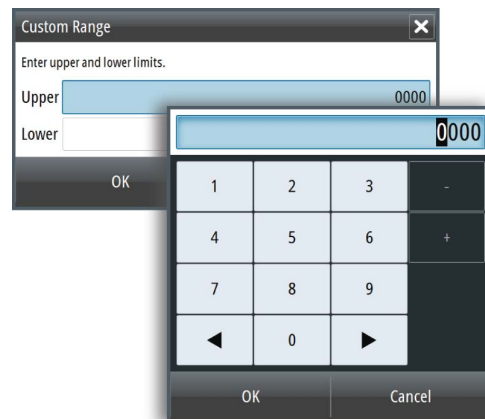
Custom range

This option allows you to manually set both upper and lower range limits.

→ **Note:** Setting a custom range puts the system in manual mode. If the bottom is well beyond the lower range set, you may lose digital depth.

When selected, the Custom Range dialog is displayed where you set the upper and lower range limits.

Selecting the Upper or Lower fields displays the keypad. Use the up/down arrow keys to move around the keypad and press the **Enter** key to select values. Select the **OK** button to set the values selected.

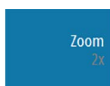


Zooming the image

You can zoom the image by:

- Pressing the **Zoom** softkey and turning the rotary knob

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



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

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

You can also zoom the image as a split screen and display zoom bars. Refer to split screen "Zoom" on page 17.

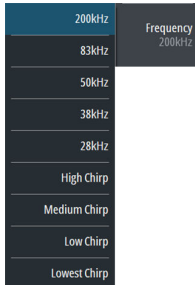
Frequency

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

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

To set the frequency, you have two options:

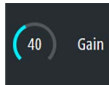
- Press the **Frequency** softkey once to activate it and then turn the rotary knob to activate and select a frequency.
- Press the **Frequency** softkey twice to display the pop-up. Turn the rotary knob to activate a frequency in the pop-up and then press **Enter** or the rotary knob to select it.



Gain

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

To set the Gain, press the **Gain** softkey once and turn the rotary knob to adjust the gain value.

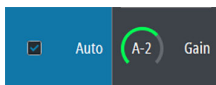


Auto gain

The Auto gain option keeps the sensitivity at a level that works well under most conditions. With the gain in auto mode, you can set a positive or negative offset that gets applied to the auto gain.

To set the Gain to auto, press the **Gain** softkey twice to display the pop-up. Turn the rotary knob to activate the Auto pop-up and press the **Enter** key or rotary knob to select it. A check-mark is displayed in the check-box when it is selected. Or press-and-hold the **Gain** softkey to toggle Auto gain on/off.

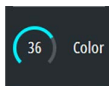
To set a positive or negative offset to auto gain with auto selected, turn the rotary knob to adjust the auto value.



Color

Strong and weak signals have different colors to indicate the different signal strengths. The colors used depend on which palette you select. The more you increase the Color setting, the more echoes are displayed in the color at the strong return end of the scale.

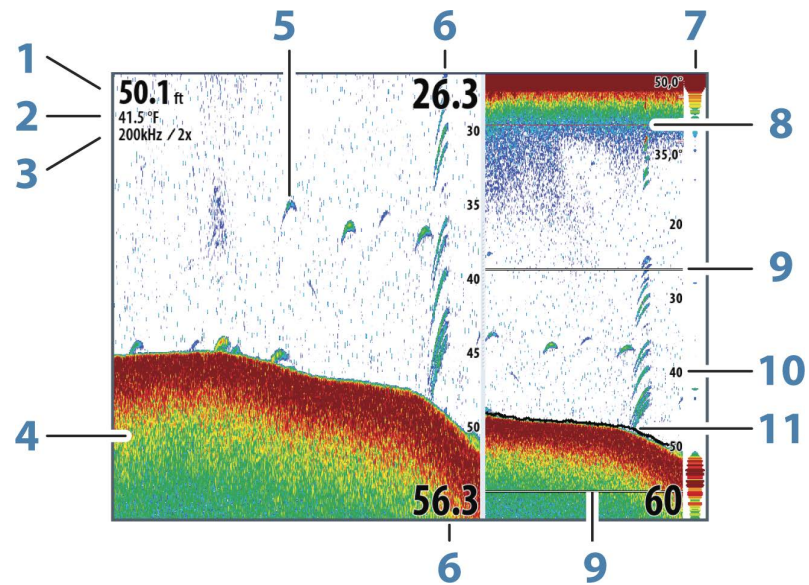
To set the Color, press the Color softkey once and turn the rotary knob to adjust the value.



4

View options

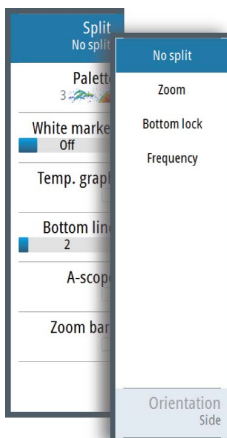
The View menu allows you to display a split image, choose a predefined palette, to change a specific color on the image to white, to illustrate changes in water temperature, to show a bottom line, amplitude scope and zoom bar.



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

* Optional image items.

→ **Note:** You can turn the optional image items on/off individually as described in the following sections.



Split screen options

Split screen options are available on the split screen sub-menu.

Zoom

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

You can select up to 8x zoom using the rotary knob.

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

Activate the zoom bar option on the **View** menu to display the zoom bars. Activate and move the cursor to pan history and view different depths of the water column. Refer to "**Zoom bars**" on page 18.

Bottom lock

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

Frequency

The frequency split screen option is only available if multiple frequencies are available.

The frequency mode is useful when you want to view higher and lower frequencies at the same time.

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

On a frequency split screen image, press the rotary knob to toggle between the left-side and right-side images. The active image has an orange frame around it. Press the frequency **Softkey** and turn the rotary knob to adjust the frequency on the split screen image that is active. You can use most softkey options to change the range, gain, color, etc. to the split screen image that is active.

Orientation

Orientation is only available if the Frequency split screen option is used.

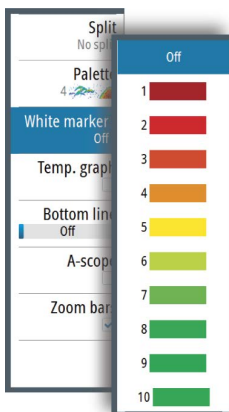
You can specify to show the split screens on top of each other or side-by-side.

No split

To revert to a single image select **No split** in the Split sub-menu.

Palettes

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



White marker

Use this option to change a specific color on the image to white. This effectively highlights (or hides) the selected color.

Temperature graph

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

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

Bottom line

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

Toggle enable/disable the Bottom line from the bottom line sub-menu. Turning the rotary knob or pressing the up/down arrow keys moves the slide bar up/down and specifies the thickness of the bottom line.

A-Scope

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

Zoom bars

The zoom bars are displayed when you activate a split zoom image and activate the zoom bar on the **View** menu. Refer to "Zoom" on page 17.

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

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

- You activate the cursor and display the cursor icon by pressing the left or right arrow keys
- You deactivate the cursor and remove the cursor icon from the image by pressing the **Clear cursor** softbar key or the **Exit** key
- You move the cursor within the image by pressing the arrow keys. Move the cursor left/right to pan history. Move the cursor up/down to view different depths of the water column in the zoom panel.

5

Alerts

The system continuously checks for dangerous situations and system faults while the system is running. When an alert situation occurs, an alert message pops up on the screen, and an alert icon is displayed in the status bar.

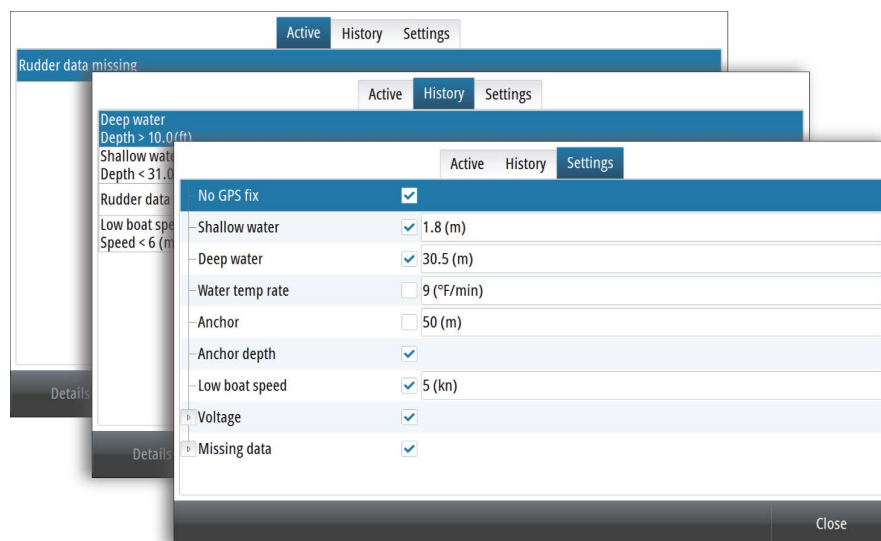


If you have enabled the siren, the alert message is followed by an audible alert.

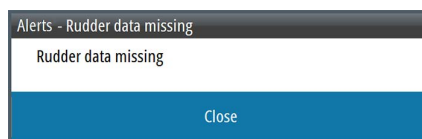
The alert is recorded in the alert listing so that you can see the details and take the appropriate corrective action.

The active, historical and settings dialogs are available from the main menu and from the Alert Settings dialog.

- **Active** - list of active alerts.
- **History** - list of all alerts with time stamp.
- **Settings** - list of all available alert options in the system, with current settings.



The following is an example of an alert message.

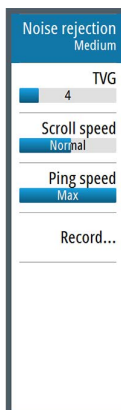


Acknowledging an alert message

The close option is available in the alert dialog for acknowledging a message.

Close sets the alert state to acknowledged, meaning that you are aware of the alert condition. The siren stops and the alert dialog is removed. However, the alert remains active in the alert listing until the reason for the alert has been removed.

6



Advanced options

Noise rejection

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

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

TVG

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

→ **Note:** For optimal image return and clarity in most conditions, the default value is set to a low value.

Scroll speed

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

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

Ping speed

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

Recording log data

Start recording log data

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

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

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

When you select Record in the Advanced menu, the **Record sonar log** dialog is displayed where you specify recording settings. The options are explained in the following topics.

A dialog box titled 'Record sonar log' with a close button (X) in the top right corner. It contains five input fields: 'Filename' with 'Sonar0000', 'File format' with 'sl2 (Sonar & Structure)', 'Save to' with 'Internal', 'Bytes per sounding' with '3200', and 'Time remaining' with '4 days 03:59:59'. At the bottom are two buttons: 'Record' and 'Cancel'.

Filename

Specify the name of the recording (log).

File format

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

Save to

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

Bytes per sounding

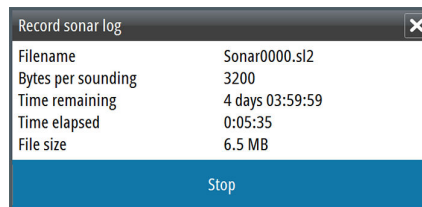
Select how many bytes per seconds that are to be used when saving the log file. More bytes yield better resolution, but cause the record file to increase in size compared to using lower byte settings.

Time remaining

Shows the remaining allocated space available for recordings.

Stop recording log data

Select **Stop** in the Record sonar log dialog to fully stop the recording of all log data. The Record sonar log dialog is activated by selecting the record option in the Advanced menu.

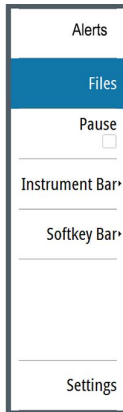


Viewing recorded log data

Use the Simulator to view recorded logs. Both internally and externally stored sounder records may be reviewed when selected in the simulator.

You stop viewing the recorded image by turning off the simulator. Refer to "*Simulator*" on page 23.

7

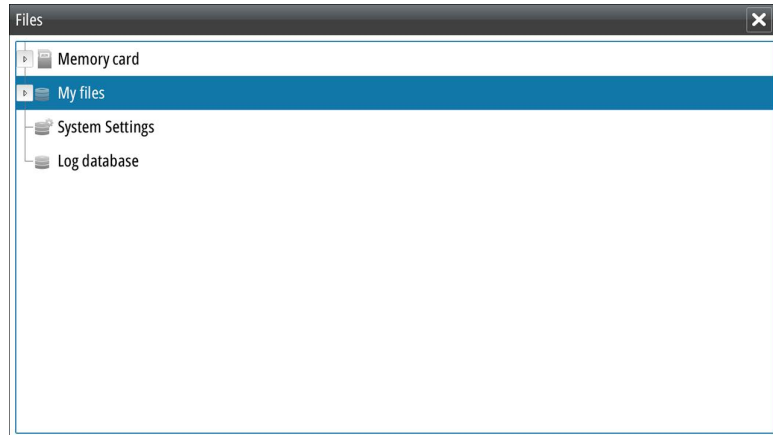


Files

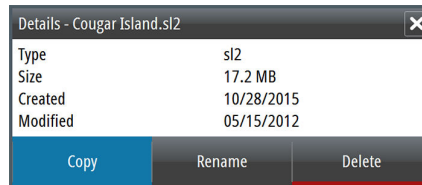
File management system, used to browse the contents of the unit's internal memory and inserted SD card.

Managing files

Select the files option in the Main menu to open the Files dialog.



You can copy, rename, and delete files. You can transfer files (such as log data recordings, screen capture images, system settings, etc.) from the unit to a memory card in the card reader using the copy option and vice-versa.



Exporting the log file

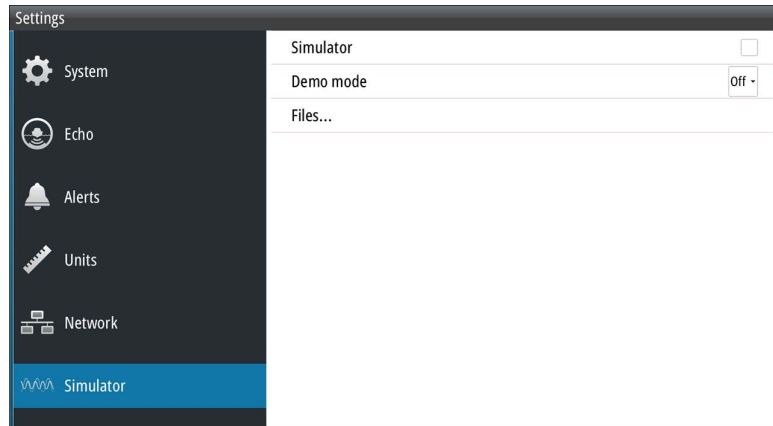
The log file can be exported from the Files dialog to a memory card in the card reader. Refer to "*NMEA Data logging*" on page 46.

8

Simulator

The simulation feature lets you see how the unit works in a stationary position and without being connected to the transducer, or other devices.

Use the simulator to become familiar with your unit before using it on the water.



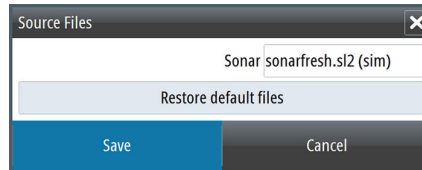
The status bar indicates if the simulator is toggled on.

Turning the simulator on/off

Select the simulator option to toggle the simulator on/off. A check-mark in the check box indicates the simulator is running.

Simulator source files

You can select which data files are used by the simulator. A set of source files is included in your system, and you can import files by using a card inserted into the card reader. You can also use your own recorded log data files in the simulator.



9

Installation

Mounting location

Choose the mounting locations carefully before you drill or cut. The unit should be mounted so that the operator can easily use the controls and clearly see the screen.

Do not mount the S2016 in an outside location exposed to direct sunlight, it is intended for pilothouse installation only. The S2009 may be mounted both inside, or outside in direct sunlight due to its high brightness screen.

Ensure that any holes cut are in a safe position and will not weaken the boat's structure. If in doubt, consult a qualified boat builder, or marine electronics installer.

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

Check that it is possible to route cables to the intended mounting location.

Leave sufficient clearance to connect all relevant cables.

Do not mount any part where it can be used as a hand hold, where it might be submerged, or where it will interfere with the operation, launching, or retrieving of the boat.

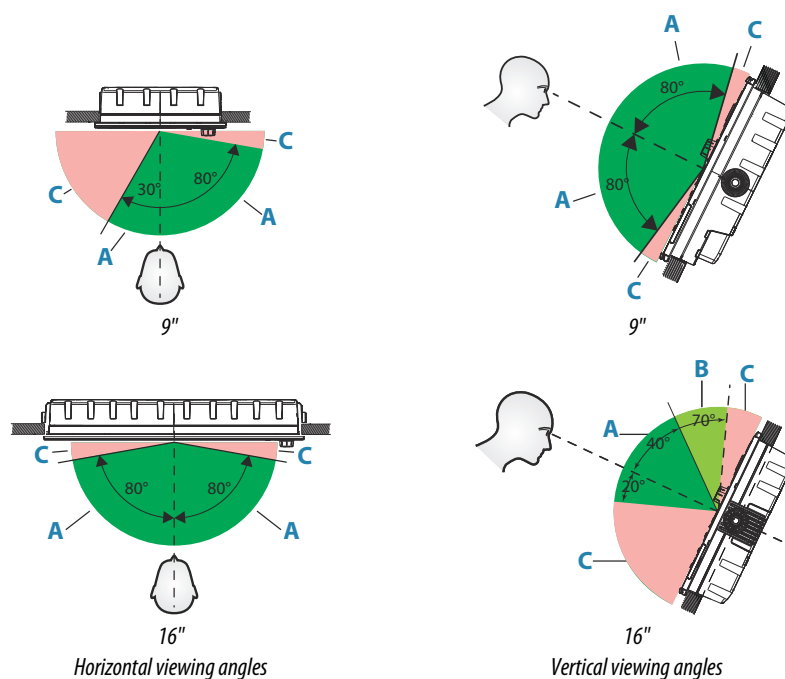
For overall width and height requirements, refer to "*Dimensional drawings*" on page 50.

Good ventilation is required. Choose a location that will not expose the unit to conditions that exceed the specifications - refer to "*Technical specifications*" on page 48.

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

Viewing angle

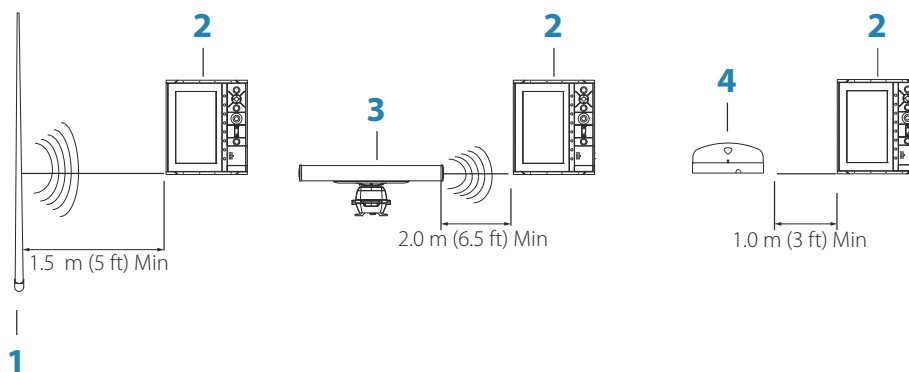
The viewing angle influences the viewability of the monitor. The recommended viewing angles relative to perpendicular are shown in the illustrations below.



→ **Note:** Installations requiring better left hand visibility on the 9" unit can optimize the display for viewing from the left. Refer to *"Optimize for left-hand view"* on page 38.

Safe distance

Ensure unit is not installed too close to devices that may emit harmful interference, or devices that may be sensitive to any electromagnetic field disruption caused by the unit. Typical minimum safe distances are indicated below.

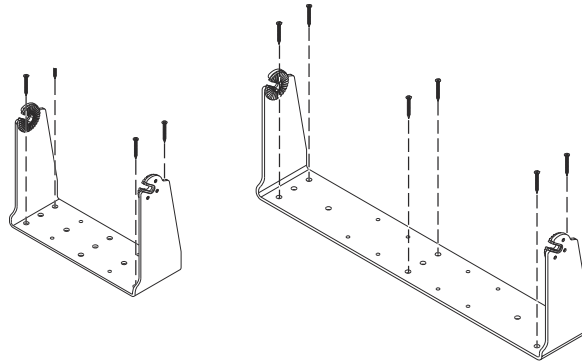


- 1 Radio or AIS transmitter
- 2 Control unit

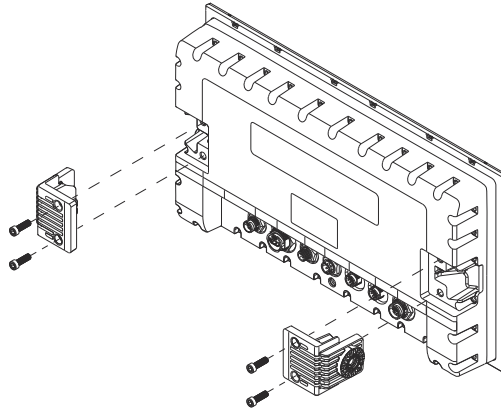
- 3 Radar
- 4 Compass

U-bracket mounting

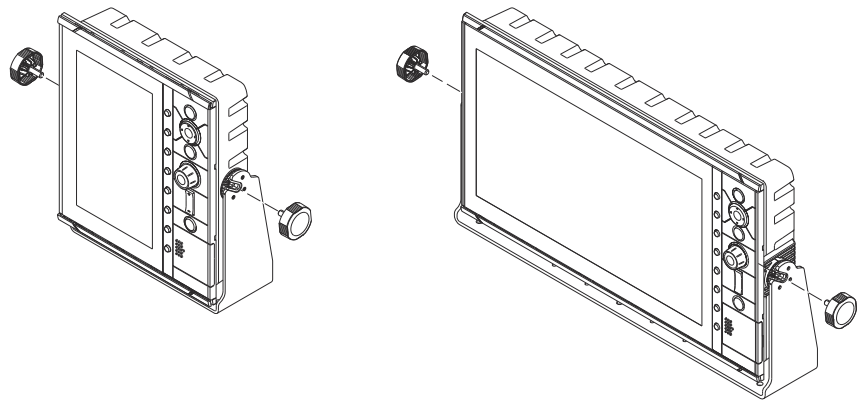
1. Place the bracket in the desired mounting location. Ensure that the chosen location has enough height to accommodate the unit fitted in the bracket, and allows tilting of the unit. Also adequate space is required on both sides to allow tightening and loosening of the knobs.
2. Mark the screw locations using the bracket as a template, and drill pilot holes. Use fasteners suited to the mounting surface material. If the material is too thin for self-tappers, reinforce it, or mount the bracket with machine screws and large washers. Use only 304 or 316 stainless steel fasteners.
3. Screw down the bracket.



4. (16" units only) Using the screws provided in the gimbal kit, fasten the gimbals to the unit.



5. Mount the unit to the bracket using the knobs. Hand tighten only. The ratchet teeth in the bracket and unit case ensure a positive grip and prevent the unit from changing from the desired angle.



Panel mounting

The screws and gasket used for panel mounting are included in the box. For mounting instructions, refer to the Panel mounting template.

Wiring

Guidelines

Don't:

- make sharp bends in the cables
- run cables in a way that allows water to flow down into the connectors
- run the data cables adjacent to radar, transmitter, or large/high current carrying cables or high frequency signal cables.
- run cables so they interfere with mechanical systems

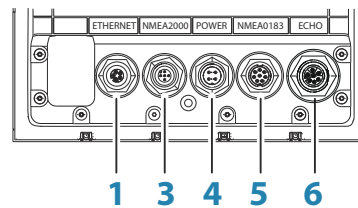
Do this:

- make drip and service loops
- use cable-tie on all cables to keep them secure
- solder/crimp and insulate all wiring connections if extending or shortening the cables. Extending cables should be done with suitable crimp connectors or solder and heat shrink. Keep joins as high as possible to minimize possibility of water immersion.
- leave room adjacent to connectors to ease plugging and unplugging of cables

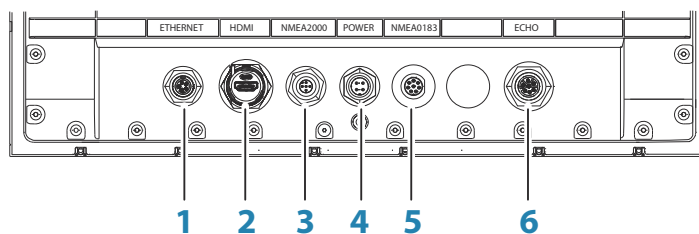
⚠ Warning: Before starting the installation, be sure to turn electrical power off. If power is left on or turned on during the installation, fire, electrical shock, or other serious injury may occur. Be sure that the voltage of the power supply is compatible with the unit.

⚠ Warning: The positive supply wire (red) should always be connected to (+) DC with the supplied fuse or a circuit breaker (closest available to fuse rating).

Rear connections



S2009 Rear connections

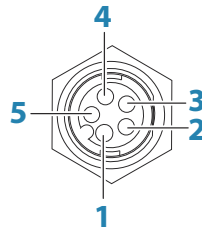


S2016 Rear connections

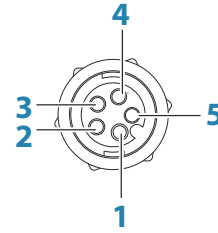
- 1 Ethernet, 5-pin
- 2 HDMI (available on S2016 only)
- 3 NMEA 2000, 5-pin
- 4 Power, 4-pin
- 5 NMEA 0183, 8-pin
- 6 ECHO, 7-pin

Ethernet connector

The unit is equipped with an Ethernet port, which allows connecting the unit to your network using the 5 pin Ethernet connector.



Unit socket (female)

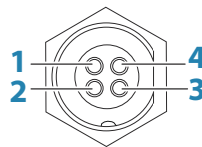


Cable plug (male)

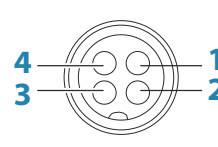
Key	Purpose	Color
1	Transmit positive TX+	Blue/White
2	Transmit negative TX-	Blue
3	Receive positive RX+	Orange/White
4	Receive negative RX-	Orange
5	Shield	Bare

Power connection

The unit is designed to be powered by a 12 or 24 VDC system. It is protected against reverse polarity, under voltage and over voltage (for a limited duration). A fuse should be fitted to the positive supply; 2 A for the 9" model and 5 A for the 16" model.



Unit socket (male)



Cable plug (female)

Key	Purpose	Color
1	-12/24 VDC	Black
2	External alarm	Blue
3	Power control	Yellow
4	+12/24 VDC	Red

Power Control connection

The yellow Power Control wire in the power cable is an input that will turn on the unit when power is applied.

Power Control unconnected

Device will turn on and off when the power button on the front of the unit is pressed. Leave the yellow Power Control wire disconnected and tape or heat-shrink the end to prevent shorting.

Power Control to supply positive (auto on)

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

→ **Note:** The unit cannot be powered down by power button, but can be put in to standby mode. (The screen backlight turns off.)

Echo connector

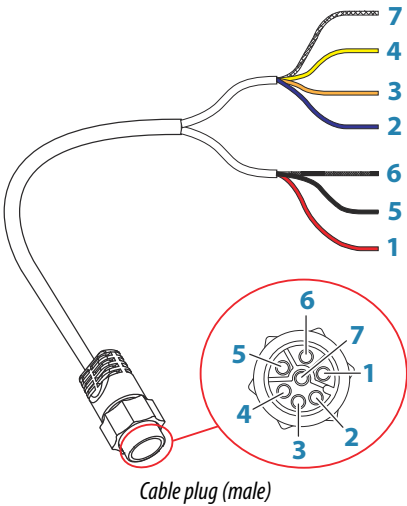
The unit is equipped with an Echo (transducer) port for a 7-pin transducer connector.



Key	Purpose	Color
1	Depth +	Red
2	Speed signal	Blue
3	Speed volts	Orange
4	Temp +	Yellow
5	Depth -	Black
6	Depth Gnd (shield)	Bare
7	Temp - (shield)	Bare

Transducer adapter cables

For transducers that do not have Navico blue 7 Pin connector that require the connector to be removed. Use the part no. 000-10046-001, 7-pin to bare wire adapter cable.



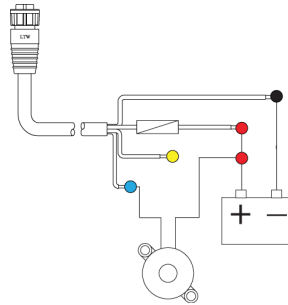
Key	Purpose	Color
1	Depth +	Red
2	Speed signal	Blue
3	Speed volts	Orange
4	Temp +	Yellow
5	Depth -	Black

Key	Purpose	Color
6	Depth Gnd (shield)	Bare
7	Temp - (shield)	Bare

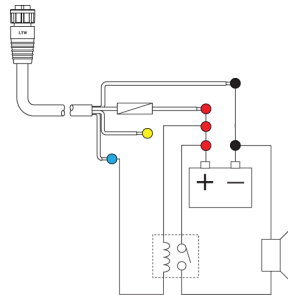
External alarm

The external alarm can be a small piezo buzzer connected directly, or a horn siren connected through a relay.

Alarms are configured globally in the system. That is, they can be configured on any one networked multifunction device or instrument, and be seen, heard, and acknowledged from all devices. Individual devices can also be configured to not sound their internal buzzer, but still display the alarm information. For information about configuring alarms, refer to the Alarms section in the Operator Manual.



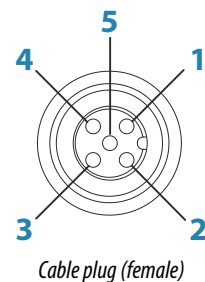
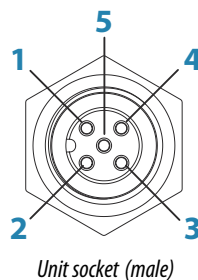
For sirens that draw more than 1 Amp, use a relay.



NMEA 2000 backbone

NMEA 2000 Device connection

The NMEA 2000 data port allows the receiving and sharing of a multitude of data from various sources.



Key	Purpose	Color
1	Shield	Drain

Key	Purpose	Color
2	NET-S (+12 VDC)	Red
3	NET-C (- 12 VDC)	Black
4	NET-H	White
5	NET-L	Blue

Planning and installing a network backbone

The backbone needs to run between the locations of all products to be installed - typically in a bow to stern layout - and be no further than 6 m from a device to be connected.

Choose from the following components to make up the backbone:

- Micro-C cables: 0.6 m (2 ft), 1.8 m (6 ft), 4.5 m (15 ft), and 7.6 m (25 ft) cables.
- T-connector or 4-way connector. Used to connect a drop cable to the backbone.
- Micro-C power cable. Connect to the backbone at a position that is central to the network load using a T-connector or 4-way connector.

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

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

Power the network

The network requires its own 12 V DC power supply protected by a 3 amp fuse or breaker.

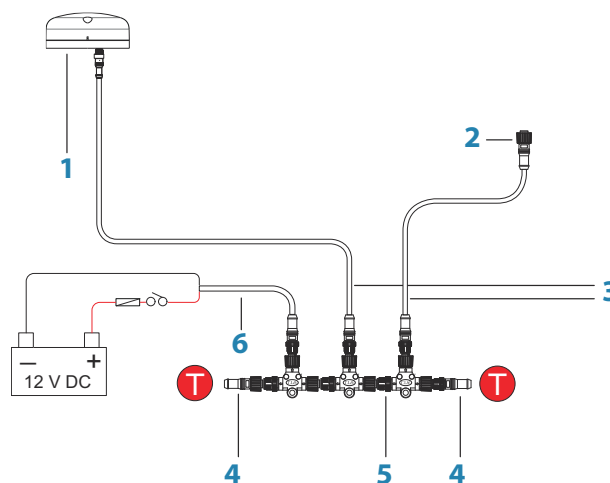
Connect power at any location in the backbone for smaller systems.

For larger systems introduce power at central point in the backbone to “balance” the voltage drop of the network.

→ **Note:** If joining to an existing NMEA 2000 network that already has its own power supply, do not make another power connection elsewhere in the network, and ensure the existing network is not powered by 24 V DC.

→ **Note:** Do not connect the NMEA 2000 power cable to the same terminals as the engine start batteries, autopilot computer, bow thruster or other high current devices.

The following drawing demonstrates a typical small network. The backbone is made up of directly interconnected T-connectors.



- 1 NMEA 2000 device
- 2 Connector to unit
- 3 Drop-cable, should not exceed 6 m (20 ft)

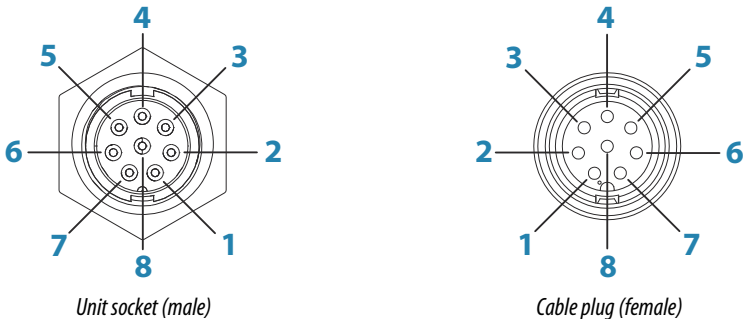
- 4 Terminators
- 5 Backbone
- 6 Power cable

NMEA 0183 device connection

The unit has an NMEA 0183 serial port, providing both an input and an output. The port uses the NMEA 0183 (serial balanced) standard, and can be configured in the software for different baud rates up to 38,400 baud.

NMEA 0183 serial cable

Cable labelled: 032-0080-08. Spare part number: 000-11247-001.



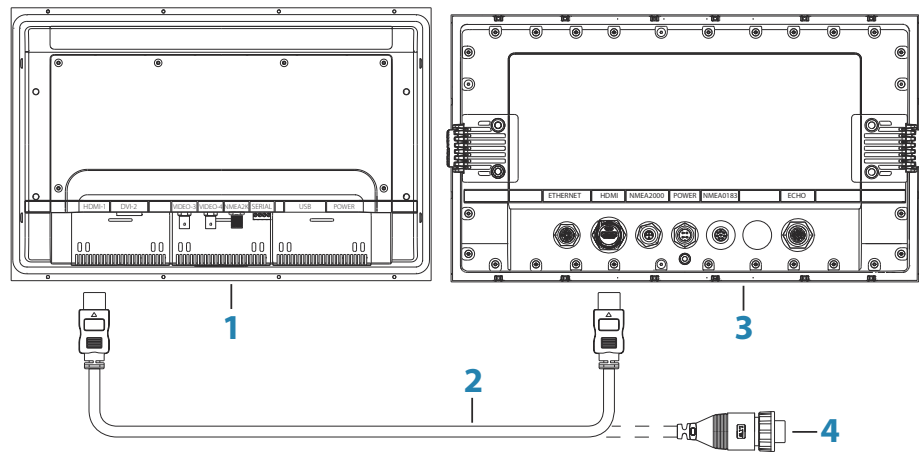
Key	Port	Purpose	Color
1	Port 2	Listener B (Rx+)	Brown/White
2	Port 2	Listener A (Rx-)	Brown
3	Port 2	Talker B (Tx+)	Green/White
4	Port 2	Talker A (Tx-)	Green
5	Port 1	Talker B (Tx+)	Orange/White
6	Port 1	Talker A (Tx-)	Orange
7	Port 1	Listener A (Rx-)	Blue/White
8	Port 1	Listener B (Rx+)	Blue

Talkers and Listeners

Do not connect multiple devices outputting data (Talkers) on to any serial input (RX) of the unit. The RS422 protocol is not intended for this type of connection, and data will be corrupted if more than one device transmits simultaneously. The output (TX) however may drive multiple receivers (Listeners). The number of receivers is finite, and depends on the receiving hardware. Typically three devices is possible.

Connect an external monitor

The S2016 incorporates HDMI technology and has a HDMI output which can be connected to an external monitor to replicate video at a remote location. Video is at a resolution of 1366 x 768, a connected monitor should support same resolution or be able to scale.

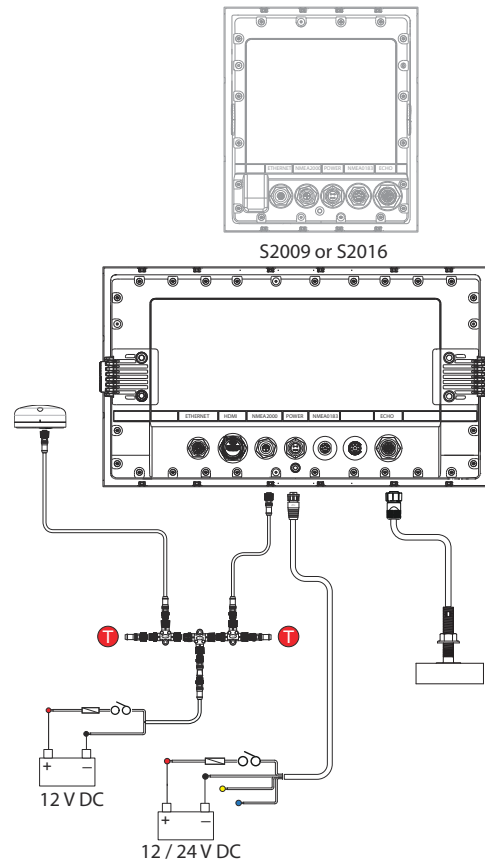


- 1 MO series monitor
- 2 HDMI cable
- 3 S2016
- 4 HDMI cable - waterproof connector (use in exposed installations)

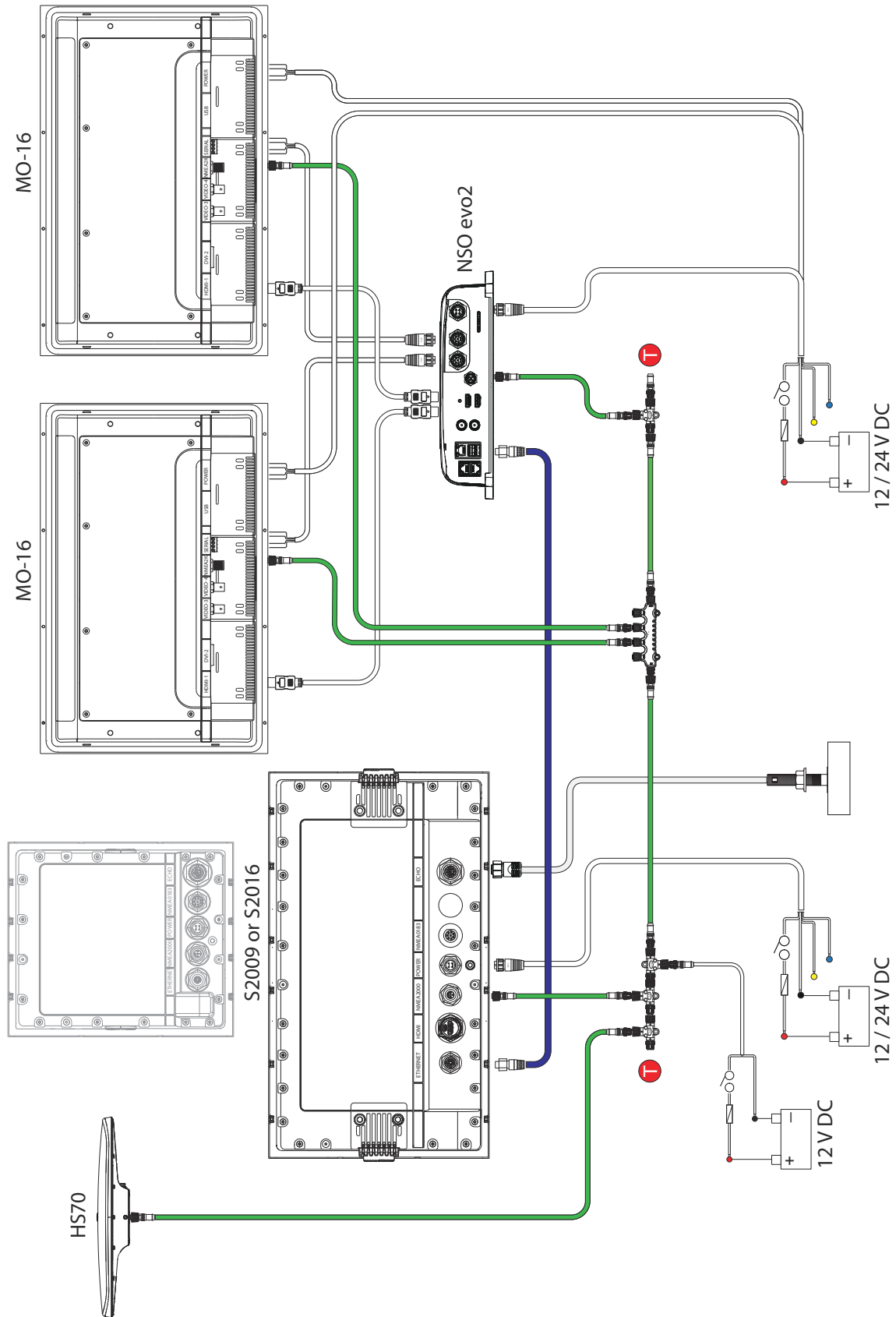
- **Note:** While the HDMI standard does not state maximum cable length, signal may be compromised on long runs. Only use Navico or other high quality HDMI certified cables. 3rd party cables should be tested before installation. On runs over 10m it may be required to add an HDMI amplifier or use HDMI-CAT6 adaptors.
- **Note:** Some HDMI TV displays may apply over-scan, which will in effect crop the image possibly causing loss of important content. Check the display manual for an option to disable over-scan or adjust scaling

System diagrams

Basic system setup example



Large system setup example



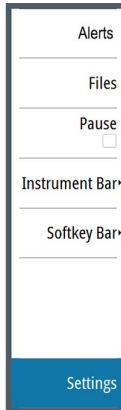
10

Software Setup

The system requires some initial configuration before use and in order to get the most out of the product. You can change the settings later, as conditions change and as you become more familiar with the product.

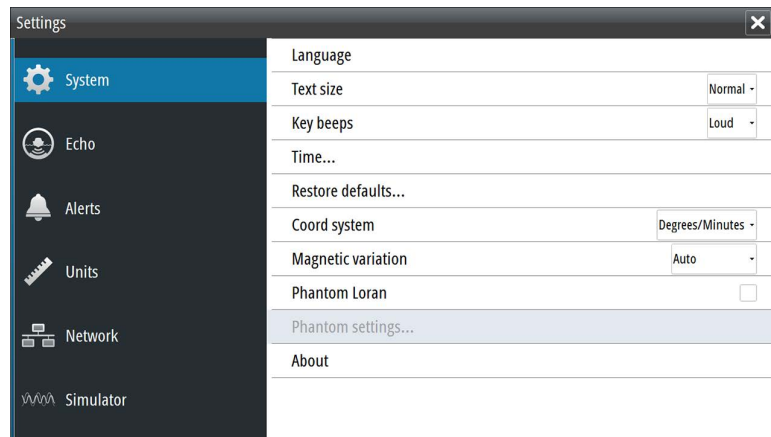
Select the settings menu option to access configurable items described in the following sections.

Wiring and mounting information are provided in the separate installation instructions for the unit.



System settings

Use the system settings dialog to set basic settings as described below. Some settings can require a reboot of the system.



Language

Controls the language used on this unit for panels, menus, and dialogs. Changing the language causes the unit to restart.

Text size

Used for setting the text size in menus and dialogs.

Default setting: Normal

Key beeps

Controls the loudness of the beep sound when a key is pressed.

Default setting: Loud

Time

Controls the local time zone offset, and the format of the time and date.

Restore defaults

Allows you to select which settings are to be restored to their original factory settings.

Coordinate system

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

Magnetic variation

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

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

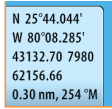
Phantom Loran

Enables use of Phantom Loran positioning system.

Loran settings

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

The graphic example shows a cursor position window with Loran position information. For more information refer to your Loran system documentation.



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

Optimize for left-hand view

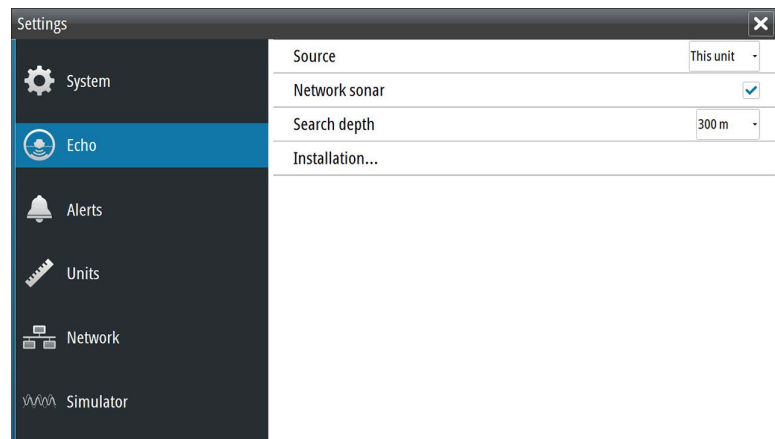
This option is available for the S2009 only. To access the option select Advanced and then the User Interface option in the Settings dialog.

Select this option to optimize the display for viewing from the left.

About

Displays copyright information, software version, and technical information for this unit.

Echo settings



Echosounder source

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

Network Echosounder

You can share the Echosounder images from this unit with other units connected on the Ethernet network.

Heave compensation

Compensates for the wavy appearance of items in the Echosounder image as the vessel heaves with waves.

➔ **Note:** This option is only available if a compatible heading sensor with heave compensation output is available.

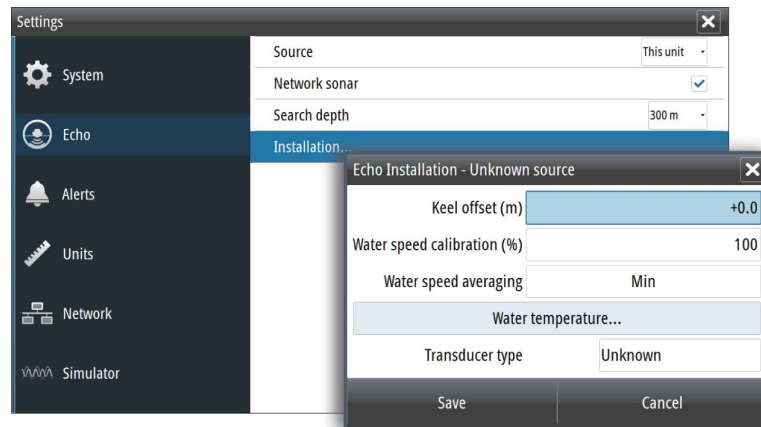
Search depth

Noise may cause the Echosounder to search for unrealistic depths.

By setting the search depth manually the system displays echoes received from objects within the set depth range.

Installation

Use the installation option in the **Echo settings** dialog to setup the echosounder.



Keel offset

All transducers measure water depth from the transducer to the bottom. As a result, water depth readings do not account for the distance from the transducer to the lowest point of the boat (for example; bottom of the keel, rudder, or propeller) in the water or from the transducer to the water surface.

Set the keel offset to the distance from the bottom of the transducer to the lowest point of the boat in the water. If, for example, the distance is 0.3 m (1 ft), it will be input as (minus) - 0.3 m (-1 ft).

Water speed calibration

Water speed calibration is used to adjust the speed value from the paddle wheel to match the actual boat speed through the water. Actual speed can be determined from GPS speed over ground (SOG) or by timing the boat over a known distance. Water speed calibration should be performed in calm conditions, with minimal wind and current movement.

Increase this value above 100 % if the paddle wheel is under reading, and decrease this value if it is over reading. For example, if the average water speed reads 8.5 knots (9.8 MPH) and SOG records 10 knots (11.5 MPH) the calibration value needs to be increased to 117 %. To calculate the adjustment, divide the SOG by the paddlewheel speed, and multiply the product by 100.

Calibration range: 50-200 %. Default is 100 %.

Water speed averaging

Averages water speed by measuring your speed at a selected interval of time. Water speed intervals range from one to thirty seconds. For example if you select five seconds, your displayed water speed will be based on averaging over 5 seconds of sampling.

Calibration range: 1-30 seconds. Default is 1 second.

Water temperature calibration

Temperature calibration is used to adjust the water temperature value from the sonar transducer to match the data from another temperature sensor. It may be required to correct for localized influences to the measured temperature.

Calibration range: -9.9° - +9.9°. Default is 0°.

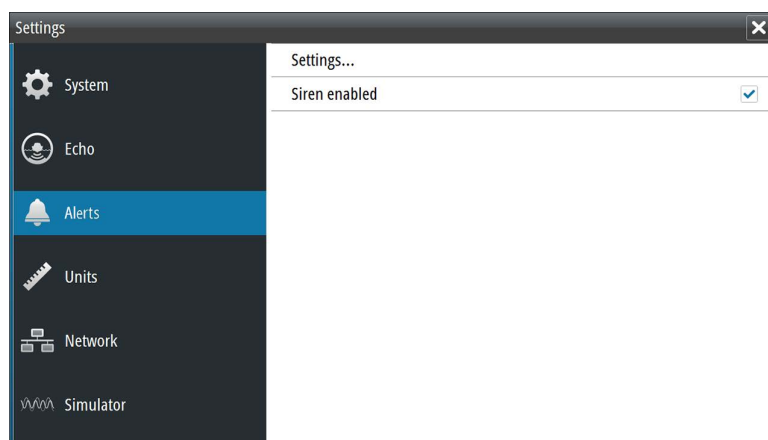
→ **Note:** Water temperature calibration only appears if the transducer is temperature capable. Check transducer type selection if this option should be available.

Transducer type

Transducer type is used for selecting the transducer model connected to the sonar module. The transducer selected will determine what frequencies the user can select during sonar operation. In some transducers with built-in temperature sensors, the temperature reading may be inaccurate or not available at all if the wrong transducer is selected. Transducer temperature sensors are one of two impedances - 5k or 10k. Where both options are given for the same model transducer, refer to paperwork supplied with transducer to determine impedance.

Alerts settings

You can access the Alerts settings dialog from the Alerts option in the Main menu and from the Settings option in the Main menu.

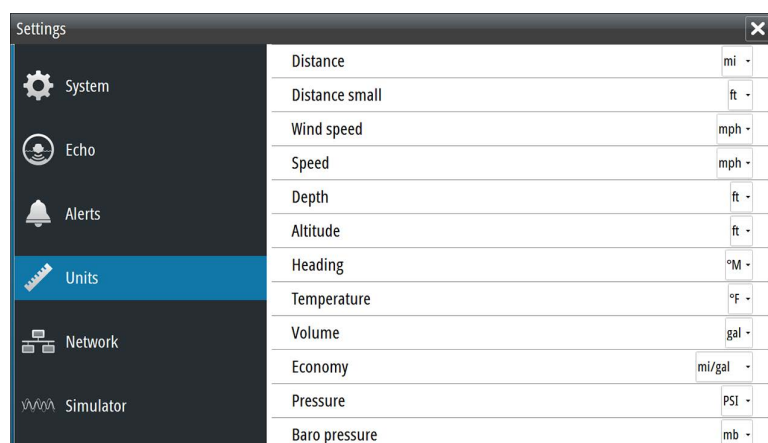


Use the Alerts settings dialog to turn on/off alerts and set conditional values. You can also enable the internal siren.

For more information about the alert message pop-up, and active and historical alert messages, refer to *"Alerts"* on page 19.

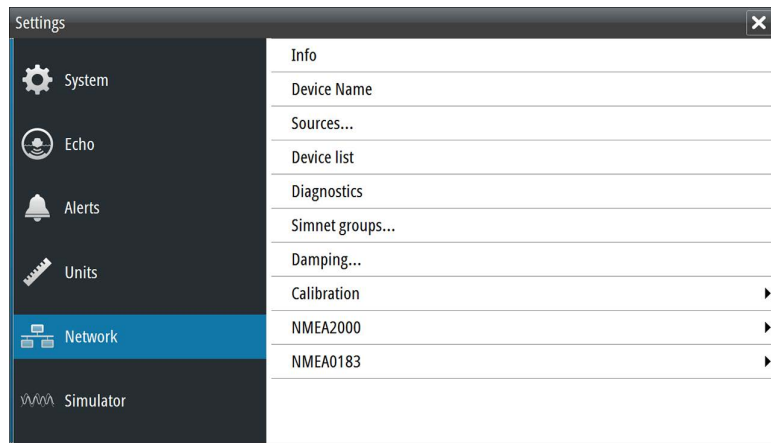
Units settings

Use the units settings dialog to specify the units of measure displayed.



Network settings

The unit has Ethernet, NMEA 0183 and NMEA 2000 port connections on the back allowing you to connect the unit to your network. Use the Network settings dialog to setup networks and connect to network devices.



Info

Displays the Ethernet connection status, the unit's IP and MAC addresses.

Device name

Assigning a name is useful in systems using more than one device of the same type and size. When viewing data sources or the device list, the assigned name will append the default product name + virtual device function for easy identification.

Data source selection

→ **Note:** If NMEA 0183 is used, complete the NMEA 0183 setup prior to doing source selection. Refer to "*NMEA 0183 setup*" on page 44.

Data sources provide live data to the system.

The data may originate from modules internal to the unit (for example internal GPS or sonar), or external modules connected to the NMEA 2000 or via NMEA 0183 if available on the unit.

When a device is connected to more than one source providing the same data, the user can choose the preferred source. Before commencing with source selection make sure all external devices and the NMEA 2000 backbone are connected and are turned on.

Auto select data sources

The Auto select option looks for all sources connected to the unit. If more than one source is available for each data type, selection is made from an internal priority list. This option is suitable for the majority of installations.

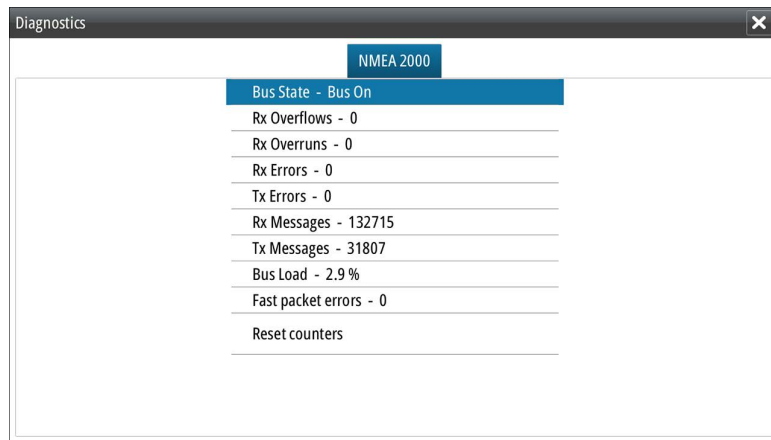
→ **Note:** Auto data source selection may already have been selected at first time startup. However, it should be redone if any new devices have been added to the network since.

Advanced data source selection

The advanced option allows for you to manually select or unselect data sources. Manual selection is generally only required where there is more than one source for the same data, and the 'Auto select' selected source is not the one desired.

Device list

The Device list shows the devices that provide data. This may include a module inside the unit, or any external NMEA 2000 device.



Bus state

Simply indicates whether the bus is powered, but not necessarily connected to any data sources. However, if bus shows as 'off', but power is present along with an increasing error count, it is possible that termination or cable topology is incorrect.

Rx Overflows

The unit received too many messages for its buffer before the application could read them.

Rx Overruns

The unit contained too many messages for its buffer before the driver could read them.

Rx/Tx Errors

These two numbers increase when there are error messages, and decrease when messages are received successfully. These (unlike the other values) are not a cumulative count. Under normal operation these should be at 0. Values around 96 upwards indicate a heavily error prone network. If these numbers go too high for a given device, it will automatically drop off the bus.

Rx/Tx Messages

Shows actual traffic in and out of device.

Bus Load

A high value here indicates network is near full capacity. Some devices automatically adjust rate of transmission, if network traffic is heavy.

Fast Packet Errors

Cumulative counter of any fast packet error. This could be a missed frame, or a frame out of sequence etc. NMEA 2000 PGNs are made of up to 32 frames. The entire message will be discarded when a frame is missed.

→ **Note:** Rx and Tx Errors often indicate an issue with the physical network, which may be resolved by correcting termination, reducing backbone or drop lengths, or reducing the number of network nodes (devices).

Reset counters

Resets all counters in the NMEA 2000 tab of the Diagnostics dialog to zero. The counters start recounting immediately.

SimNet Groups

The SimNet Group function is used to control parameter settings, either globally or in groups of units. The function is used on larger vessels where several SimNet units are connected to the network. By assigning several units to the same group, a parameter update on one unit will have the same effect on the rest of the group members.

Damping

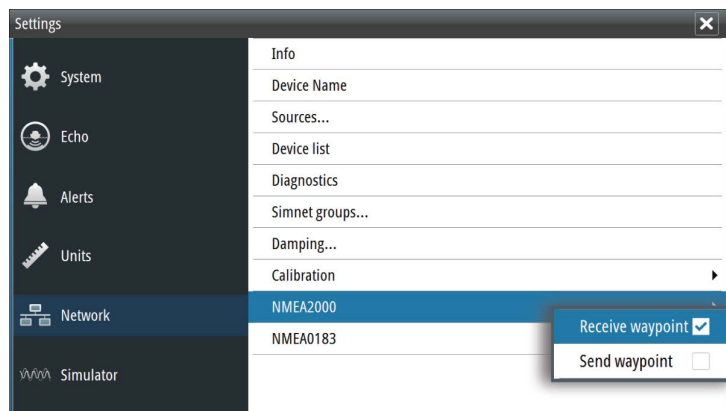
If data appears erratic or too sensitive, damping may be applied to make the information appear more stable. With damping set at MIN, the data is presented in raw form with no damping applied. This is available for heading, course over ground, speed over ground, apparent wind, true wind, boat speed, depth, and tide sourced from NMEA 2000.

Calibration

An offset (positive or negative) can be applied to correct inaccuracies in boat speed, sea temp, air temp, barometric pressure, and depth sourced from NMEA 2000 devices.

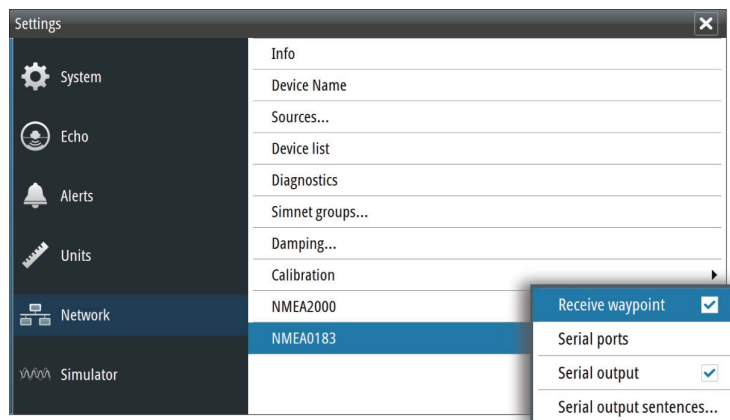
NMEA 2000

Use the NMEA 2000 network settings option to receive and send waypoints from or to NMEA 2000 devices.



NMEA 0183 setup

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



Receive waypoint

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

Serial ports

Specify the baud rate for port for the devices connected to the NMEA 0183. The baud rate should be set to correspond with devices connected to the NMEA 0183 input and output. The input and output (Tx, Rx) use the same baud rate setting.

Serial Output

Selection determines whether the data is output via Tx lines, and will enable editing of the output sentences list.

Serial Output Sentences

This list allows control over which sentences need to be transmitted to other devices from the NMEA 0183 port. Due to the limited bandwidth of NMEA 0183 it is desirable to only enable the data that is required. The less sentences that are selected, the higher the output rate of the enabled sentences.

Commonly used sentences are enabled by default.

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Maintenance

Preventive maintenance

The unit does not contain any field serviceable components. Therefore, the operator is required to perform only a very limited amount of preventative maintenance.

It is recommended that you always fit the supplied protective cover when the unit is not in use.

Cleaning the display unit

A proper cleaning cloth should be used to clean the screen, where possible. Use plenty of water to dissolve and take away salt remains. Crystalized salt may scratch the coating if using a damp cloth. Apply minimal pressure to the screen.

Where marks on the screen cannot be removed by the cloth alone, use a 50/50 mixture of warm water and isopropyl alcohol to clean the screen. Avoid any contact with solvents (acetone, mineral turpentine, etc.), or ammonia based cleaning products, as they may damage the anti-glare layer or plastic bezel.

To prevent UV damage to the plastic bezel, it is recommended that the sun cover be fitted when the unit is not in use for an extended period.

Cleaning the media port door

Clean the media port door regularly to avoid salt crystallization on the surface, causing water to leak into the card slot.

Checking the keys

Make sure that no keys are stuck in the down position. If one is stuck, wiggle the key to free it back to normal.

Checking the connectors

The connectors should be checked by visual inspection only.

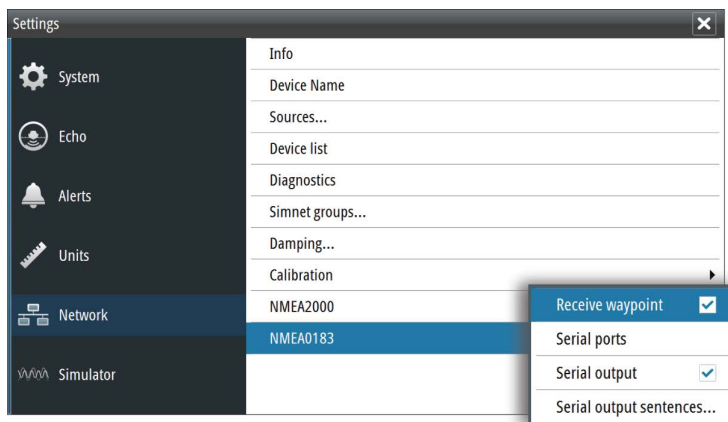
Push the connector plugs into the connector. If the connector plugs are equipped with a lock, ensure that it is in the correct position.

NMEA Data logging

All serial output sentences sent over the NMEA TCP connection are logged to an internal file. You can export and review this file for service and fault finding purposes.

The maximum file size is predefined. If you have added several other files to the system (file recordings, music, pictures, PDF files), this may reduce the allowed file size for the log file.

The system logs as much data as possible within the file size limitation, and then it starts overwriting the oldest data.



Exporting the log file

The log file can be exported from the files dialog.

When you select the Log database you are prompted to select a destination folder and filename. Once accepted, the log file is written to the chosen location.

Software upgrades

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

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

Backing up your system data

It is recommended to regularly copy your system settings files as part of your back-up routine. The files can be copied to a card inserted in the card reader. Refer to *"Files"* on page 22.

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Technical specifications

→ **Note:** The most up-to-date specifications list is available at: navico-commercial.com/

Display

Display type	LED-backlit Color TFT LCD
Display brightness	S2009 = 1200 cd/m ² S2016 = 400 cd/m ²
Display resolution	S2009 = 480 x 800 S2016 = 1366 x 768
Display size	S2009 = 9-inch portrait S2016 = 16-inch landscape
Video integration (S2016 only)	1x HDMI output (Supported resolutions: 1366 x 768)

Overview

Output power	1 kW RMS
Echosounder Max Depths	3,000 m (10,000 ft), transducer-dependent
Echosounder Transducer	Standard Broadband and single-channel CHIRP Transducers
Echosounder Frequencies	CHIRP 28-38 kHz, 40-60 kHz, 85-145 kHz, 130-210kHz Broadband 28kHz, 38kHz, 50kHz, 83kHz, 200kHz

Technical/Environmental

Water Resistance	IPX7
Operating Temperature	- 15°C to +55°C (5°F to 131°F)
Dimensions	Refer to " <i>Dimensional drawings</i> " on page 50
Weight	S2009 = 2 kg (4.4 lb) S2016 = 4 kg (8.8 lb)

Electrical

Power Supply (Supply Voltage)	12-24 V DC
Power Consumption	S2009 = 11 W S2016 = 20 W

Connectors

Power (10.8-31.2 V DC)	1 port, 4-pin
HDMI	1 port (S2016 only)
Echo (for transducer)	1 port, 7-pin
NMEA 2000 (compliant)	1 port, 5-pin

NMEA 0183 (compliant)	1 port, 8-pin. Supports 2x NMEA0183 ports.
Ethernet	1 port, 5 pin

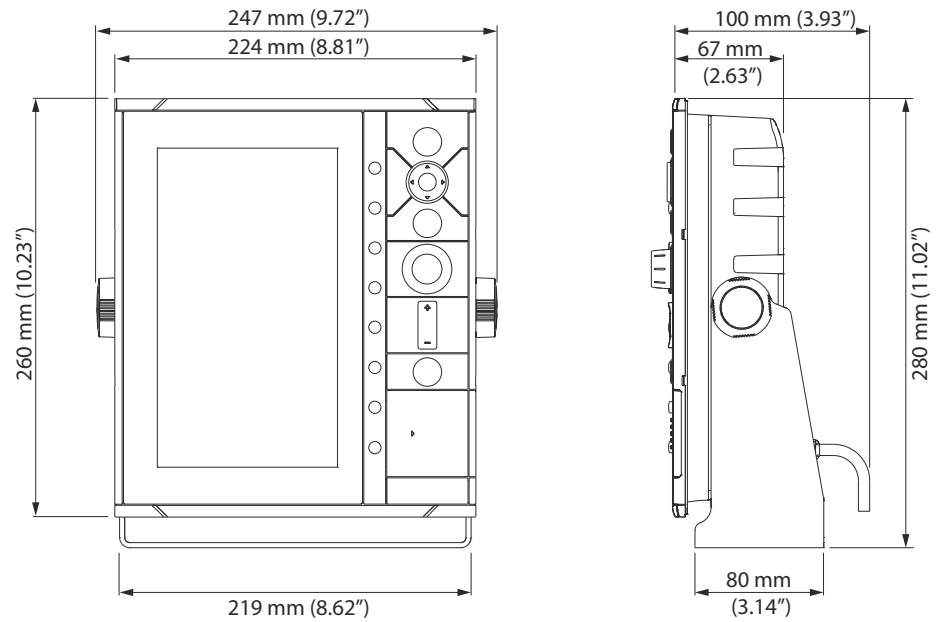
Card reader

Card reader	1 SD card reader
-------------	------------------

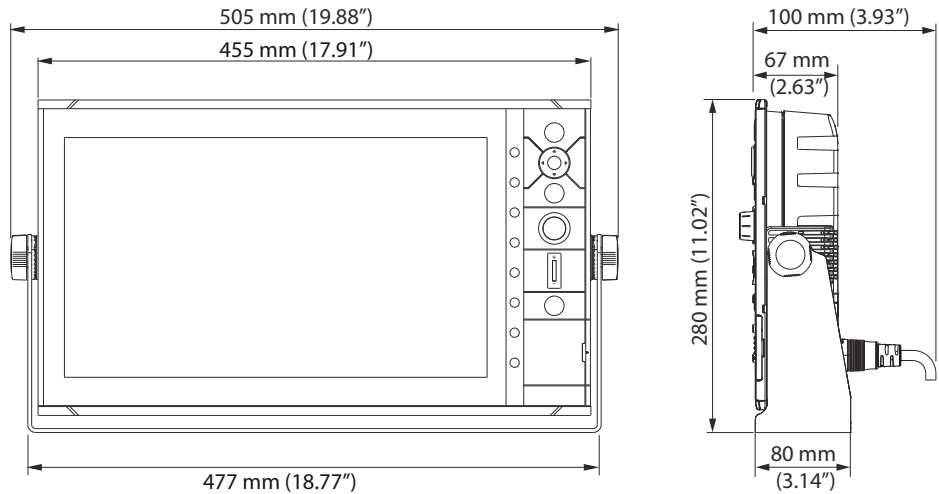
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Dimensional drawings

S2009



S2016



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