

FURUNO



12" MULTI FUNCTION DISPLAY
15" MULTI FUNCTION DISPLAY

Model TZTL12F/TZTL15F



TZTL12F/TZTL15F OPERATOR'S MANUAL

FURUNO ELECTRIC CO., LTD.



(Elemental Chlorine Free)

The paper used in this manual is elemental chlorine free.

FURUNO ELECTRIC CO., LTD.

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FURUNO Authorized Distributor/Dealer

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(DAMI) TZTL12F/TZTL15F



FURUNO ELECTRIC CO., LTD.

www.furuno.com

IMPORTANT NOTICES

General

- This manual has been authored with simplified grammar, to meet the needs of international users.
- The operator of this equipment must read and follow the descriptions in this manual. Wrong operation or maintenance can cancel the warranty or cause injury.
- Do not copy any part of this manual without written permission from FURUNO.
- If this manual is lost or worn, contact your dealer about replacement.
- The contents of this manual and equipment specifications can change without notice.
- The example screens (or illustrations) shown in this manual can be different from the screens you see on your display. The screens you see depend on your system configuration and equipment settings.
- Save this manual for future reference.
- Any modification of the equipment (including software) by persons not authorized by FURUNO will cancel the warranty.
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How to discard this product

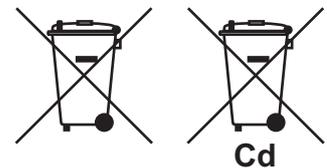
Discard this product according to local regulations for the disposal of industrial waste. For disposal in the USA, see the homepage of the Electronics Industries Alliance (<http://www.eiae.org/>) for the correct method of disposal.

How to discard a used battery

Some FURUNO products have a battery(ies). To see if your product has a battery, see the chapter on Maintenance. Follow the instructions below if a battery is used. Tape the + and - terminals of battery before disposal to prevent fire, heat generation caused by short circuit.

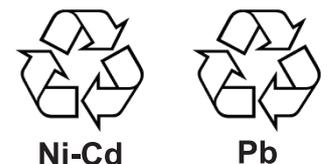
In the European Union

The crossed-out trash can symbol indicates that all types of batteries must not be discarded in standard trash, or at a trash site. Take the used batteries to a battery collection site according to your national legislation and the Batteries Directive Batteries Directive 2006/66/EU.



In the USA

The Mobius loop symbol (three chasing arrows) indicates that Ni-Cd and lead-acid rechargeable batteries must be recycled. Take the finished batteries to a battery collection site according to local laws.



In the other countries

There are no international standards for the battery recycle symbol. The number of symbols can increase when the other countries make their own recycle symbols in the future.



SAFETY INSTRUCTIONS

Please review these safety instructions before you operate the equipment.



WARNING

Indicates a condition that can cause death or serious injury if not avoided.



CAUTION

Indicates a condition that can cause minor or moderate injury if not avoided.



Warning, Caution



Prohibitive Action



Mandatory Action



WARNING



The radar antenna emits electromagnetic radio frequency (RF) energy. This energy can be dangerous to you, especially your eyes. Do not look at the radiator or near the antenna when the antenna is rotating.

The distances at which RF radiation levels of 100 W/m² and 10 W/m² exist are shown in the table.

Antenna Model	Distance to 100 W/m ² point	Distance to 10 W/m ² point
DRS2D	N/A	0.4 m
DRS4A	N/A	1.2 m
DRS4D	0.1 m	1.4 m
DRS4DL	N/A	1.1 m
DRS6A	N/A	1.2 m
DRS12A w/XN12A	0.2 m	2.4 m
DRS12A w/XN13A	0.2 m	1.9 m
DRS25A w/XN12A	0.5 m	5.3 m
DRS25A w/XN13A	0.4 m	4.4 m



WARNING



Check that no person is near the radar antenna before you turn on the radar.

Serious injury or death can occur if a person is hit by a rotating radar antenna.



Turn off the power immediately at the switchboard if water leaks into the equipment or smoke or fire is coming from the equipment.

Failure to turn off the equipment can cause fire or electrical shock.



The front panel of the display unit is made of glass. Handle it with care.

Injury can result if the glass breaks.



Do not open the equipment.

Only qualified persons can work inside the equipment.

 WARNING	
	<p>Keep units other than the radar antenna away from rain and water.</p> <p>Fire or electrical shock can occur if water gets inside the equipment.</p>
	<p>Do not disassemble or modify the equipment.</p> <p>Fire or electrical shock can occur if the equipment is disassembled or modified.</p>
	<p>Do not operate the equipment with wet hands.</p> <p>Electrical shock can occur.</p>

Safety Labels

A safety label is attached to the display unit. Do not remove the label. If the label is missing or damaged, contact a FURUNO agent or dealer about replacement.

 WARNING 
<small>To avoid electrical shock, do not remove cover. No user-serviceable parts inside.</small>
 警告 
<small>感電の恐れあり。 サービスマン以外の方はカバーを開けないで下さい。内部には高電圧部分が多いので、万ざわると危険です。</small>

Name: Warning Label (1)
Type: 86-003-1011-3
Code No.: 100-236-233-10

 WARNING	
	<p>Do not depend on one navigation device for the navigation of the vessel.</p> <p>Always check your position against all available aids to navigation, for the safety of vessel and crew.</p>
	<p>A radar is an excellent anti-collision aid, but remember to keep watch for possible collision conditions.</p> <p>Always keep a watch while underway.</p>
	<p>Do not leave any objects near the radar antenna.</p> <p>Fire, electrical shock or injury can result if something gets caught in the radar antenna.</p>
	<p>Use the correct fuse.</p> <p>A wrong fuse can cause fire or serious damage to the equipment.</p>
	<p>Do not maneuver the vessel based on the depth indication alone.</p> <p>Grounding can occur.</p>

About the TFT LCD

The TFT LCD is constructed using the latest LCD techniques, and displays 99.99% of its pixels. The remaining 0.01% of the pixels may drop out or blink, however this is not an indication of malfunction.

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FOREWORD

A Word to the Owner of the TZTL12F, TZTL15F

Congratulations on your choice of the TZTL12F, TZTL15F Multi Function Display, members of the NavNet TZtouch2 family of multi-function displays. We are confident you will see why the FURUNO name has become synonymous with quality and reliability.

Since 1948, FURUNO Electric Company has enjoyed an enviable reputation for innovative and dependable marine electronics equipment. This dedication to excellence is furthered by our extensive global network of agents and dealers.

Your equipment is designed and constructed to meet the rigorous demands of the marine environment. However, no machine can perform its intended function unless properly installed and maintained. Please carefully read and follow the operation and maintenance procedures set forth in this manual.

We would appreciate feedback from you, the end-user, about whether we are achieving our purposes.

Thank you for considering and purchasing FURUNO.

Features

The NavNet TZtouch2, equipped with a touch screen with multi touch capacity, is a networked navigation system that gives you functions such as radar, plotter, fish finder and AIS. Information is transferred between NavNet TZtouch2 units through Ethernet or NMEA 2000. The plug-and-play format allows expansion and you can connect a maximum of four NavNet TZtouch2 units. Also, you can control the NavNet TZtouch2 units and display their data on an iOS or Android™ device.

Main features

- Intuitive touch control operation.
- Remote control, monitoring from smartphone, tablet. The NavNet TZtouch2 units can be controlled and monitored from the following applications*.

Application*	Capability	iOS	Android™
NavNet Remote	Operate, monitor NavNet TZtouch2.	Operation: iPad only Monitor: Other iOS devices	Yes Operation: 4 inch or larger Monitor: 3.9 or smaller
NavNet Viewer	Display nav data, sounder picture.	Yes	Yes
NavNet Controller	Remote control of NavNet TZtouch2.	No	Yes

* Free applications from the App Store™ (iOS), Google Play™ (Android™).

- Instrument display provides comprehensive navigation data with connection of appropriate sensors.
- Built in wireless LAN to update program and download weather data via the internet. (NavNet TZtouch2 units sold in China do not have wireless LAN capability.)
- Points, routes, tracks, etc. are transferred and shared between NavNet TZtouch2 units via Ethernet.

FOREWORD

- Large memory stores 30,000 track points, 30,000 points, and 200 routes (500 points per route).
- Optional Card Unit SDU-001 writes and reads data (points, routes, etc.) on Micro SD cards.
- Built in GPS receiver and antenna
- Built in fish finder
- AIS function (requires connection of AIS transponder) receives AIS data from AIS equipped vessels, shore stations and navigational aids and displays relevant data.
- ACCU-FISH™ provides at-a-glance estimation of length and depth of individual fish.
- Bottom discrimination display helps identify probable bottom composition with graphics and colors.
- RezBoost™ raises echo resolution to see fish echoes clearly. (Requires RezBoost™ capable transducer. Not available when the transducer is installed with the inside hull installation method.)
- Dual-range radar display for watch on short and long distances at the same time.
- DSC (Digital Selective Calling) message information feature provides the MMSI no. and position of vessels that have transmitted a DSC message to you. (Requires DSC capable radiotelephone.)
- Camera (FLIR™) monitors area around the vessel.
- Control audio of FUSION-Link™ equipment.
- HDMI output (type A receptacle)

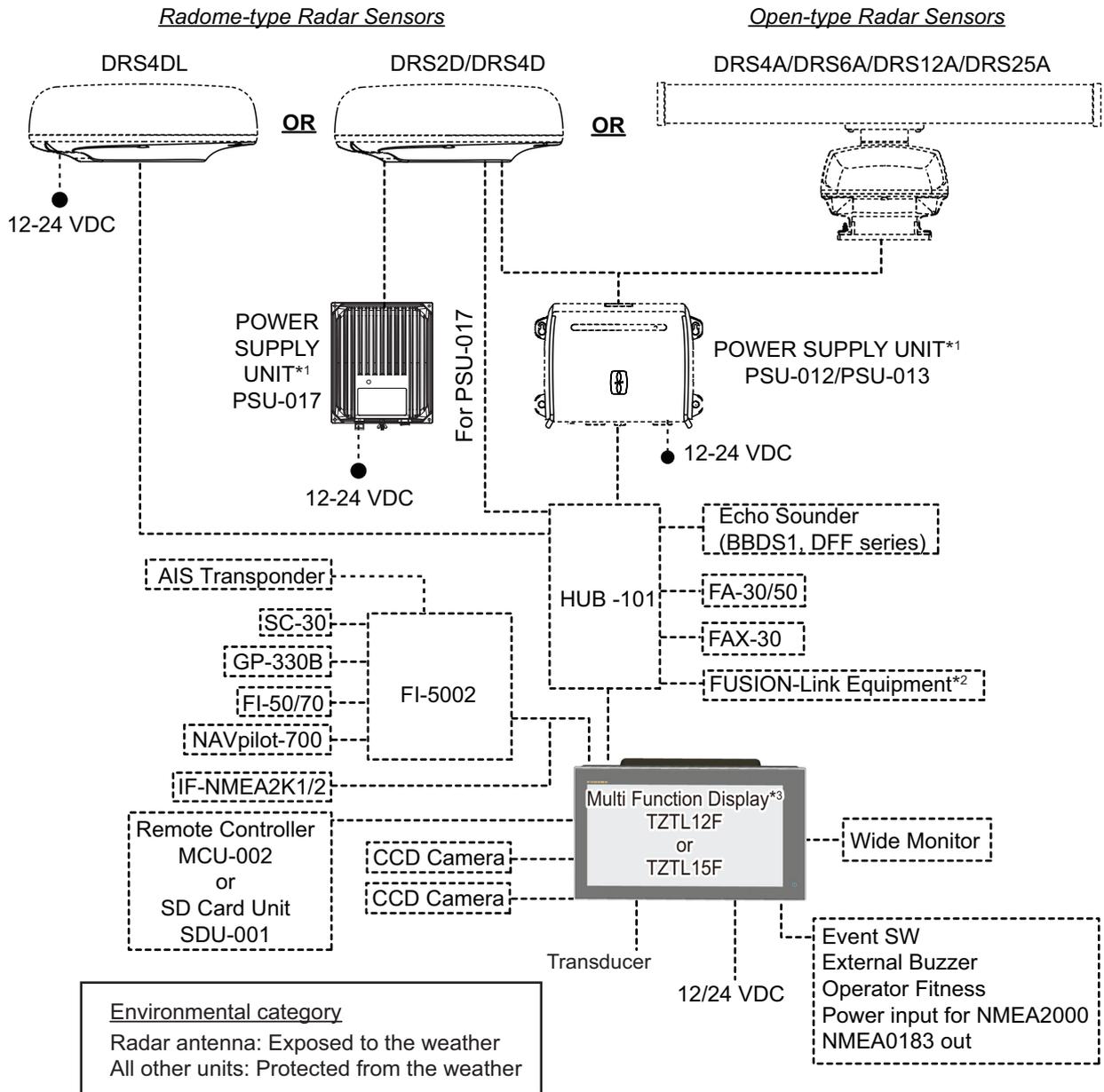
Software used in this product

This equipment uses the following open source software.

- Ubiquitous QuickBoot Copyright© 2015 Ubiquitous Corp. All rights reserved.
- This product includes software to be licensed under the GNU General Public License (GPL) version 2.0, GNU Lesser General Public Software License (LGPL) version 2.0, Apache, BSD and others. The program(s) is/are free software(s), and you can copy it and/or redistribute it and/or modify it under the terms of the GPL version 2.0 or LGPL version 2.0 as published by the Free Software Foundation. Please access to the following URL if you need source codes: https://www.fuuno.co.jp/cgi/cnt_oss_e01.cgi.

SYSTEM CONFIGURATION

Basic configuration is shown with solid lines. Optional equipment is denoted with dashed lines.



*1 Radar sensor other than the DRS4DL requires a power supply unit.

*2 FUSION Electronics MS-700 series only (as of 12/2014).

*3 Max. 4 NavNet TZtouch2 units (connected via Ethernet hub).

Note: When connecting an external monitor to the multi function display, use a monitor whose aspect ratio is the same as that of the multi function display (16:9). The pictures may be stretched or shrunk with a different aspect ratio. Output to an HPD (Hot Plug Detect) monitor is not possible.

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1. SYSTEM INTRODUCTION

This chapter provides the information necessary to get you started using your system.

Standards used in this manual

- Key names are shown in boldface type. For example, **ENT** key (on the MCU-002).
- Menu items, on-screen indications, and pop-up menus and pop-up windows names are shown in brackets. For example, the [Settings] menu.
- Messages shown on the screen (including the Status bar) are enclosed in quotations. For example, "No Network Connected".
- The [Settings] menu is comprised of several sub menus. When you are asked to select one of its sub menus, "[Settings]" is followed by a hyphen and the sub menu name. For example, "Tap [Settings] - [General]".
- The colors mentioned in this manual are the default colors. Your colors may be different.
- Most of the screenshots in this manual are taken from the TZTL12F. Layouts may be slightly different on the TZTL15F.

1.1 Controls

The TZTL12F and TZTL15F are operated by a power switch and touch controls.

You operate the plotter, radar, fish finder, etc. with

- Touch control
- Menus, where you select options
- pop-up menus and hidden functions, where you select options
- Lists, where you can edit items

Your unit has one key on its front panel, a power/brilliance controlling button. The micro SD card slot, which is used for chart data, is on the rear panel.



TZTL15F



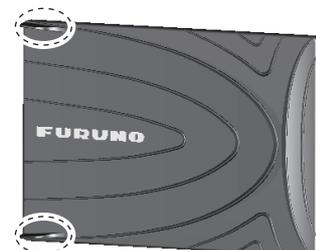
TZTL12F

TZTL multi function display units (shown in optional hanger)

No.	Item	Function
1	 (Power switch)	<ul style="list-style-type: none"> • Turns the power on. • Adjust the brilliance and hue of the display. • Turns the power off (device or network). • Locks, unlocks the touch screen.
2	Micro SD card slot	Slot for chart micro SD chart cards.

About the soft cover

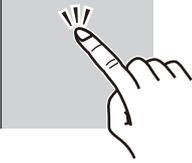
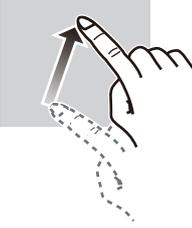
The supplied soft cover protects the LCD when the display unit is not in use. To remove the cover, grasp the cover at the locations circled in the right figure and pull forward.



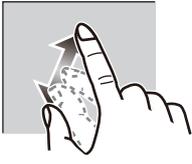
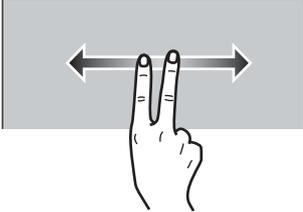
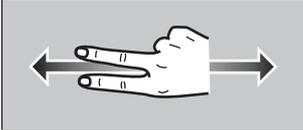
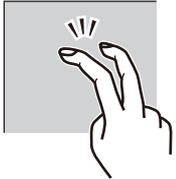
Touchscreen operations

The tables which follow outline the touchscreen operations.

Operation with a finger

Operation with a finger		Function
Tap		<p><u>Short tap</u></p> <ul style="list-style-type: none"> • Select a menu item. • Select an object or position to display the corresponding pop-up menu. <p><u>Long tap</u></p> <ul style="list-style-type: none"> • Edit display icon (on home screen).
Drag		<ul style="list-style-type: none"> • Pan the charts. • Scroll the menu.

Operation with two fingers

Operation with two fingers		Function
Pinch	  <p>Zoom in Zoom out</p>	<ul style="list-style-type: none"> • Zoom in or out the display range in the 2D/3D modes or weather display. • Select radar range on the radar display.
Drag	 <p>or</p> 	Change 3D viewing point.
Tap		Do the function assigned to [Function Gesture], which is in the ([Settings] - [General] menu. See section 1.15.

1. SYSTEM INTRODUCTION

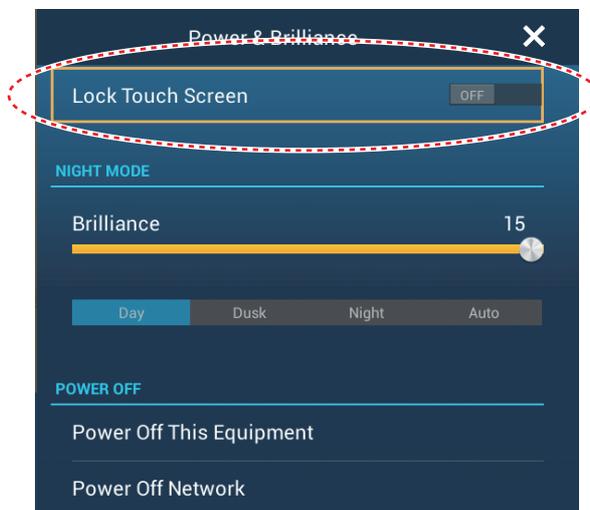
Notes on touch control operations

- Waterdrops on the screen can cause mis-operation and slow touch response. Wipe the screen with a dry cloth to remove the water.
- This equipment uses a capacitive touch screen. Tap the screen with your fingertips directly. Do not use sharp objects (needle, pen, nail) or a stylus pen. Be careful not to scratch the screen.
- The touchscreen cannot be operated while wearing gloves.
- Do not put objects (adhesive-backed paper, etc.) on the screen. Mis-operation can result.
- Keep the equipment away from a radio antenna, fluorescent light, solenoid valve and electronic devices to prevent unintended operation by noise.
- The front panel is made of glass. If the front panel is damaged, do not try to repair it yourself. Unauthorized repair will void the warranty. Contact your dealer about repair or replacement.
- The touch screen can be locked to prevent operation of the equipment. See the procedure below.

How to lock the touch screen

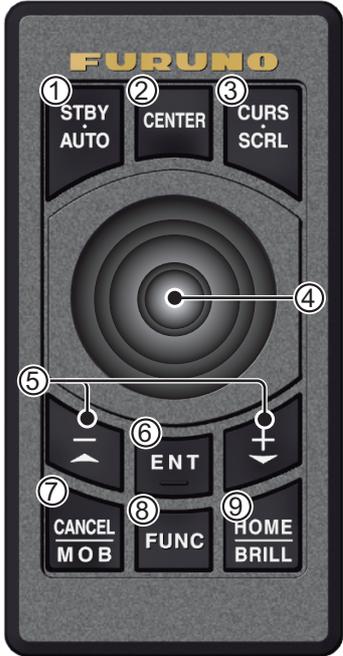
The touch screen can be locked to prevent unintentional operation.

With the power applied, press  to show the [Power & Brilliance] window. Set the flip-switch for [Lock Touch Screen] to the [ON] position to lock the touch screen, or the [OFF] position to unlock the touch screen.



1.2 Remote Control Unit MCU-002 (option)

The Remote Control Unit MCU-002 lets you operate the system without touching the screen.

	No.	Key	Function
	1	STBY•AUTO key	Switches the steering mode of the FURUNO NAVpilot-700 series Autopilot between the STBY and AUTO modes*.
	2	CENTER key	<ul style="list-style-type: none"> Returns own ship to the center of the screen (Plotter/Weather/Radar display). Cancels the echo history (Fish finder display).
	3	CURS•CRL key	Switches the joystick gesture between the cursor mode and scroll mode.
	4	Joystick	<p><u>Short press:</u> Works same as tap gesture.</p> <ul style="list-style-type: none"> Opens the pop-up menu. Activates the item selected by the cursor. <p><u>Long press:</u> Works same as long tap gesture.</p> <ul style="list-style-type: none"> Opens the detail pop-up menu. <p><u>Operate the joystick:</u></p> <p>Cursor mode operation:</p> <ul style="list-style-type: none"> Moves the cursor. <p>Scroll mode operation:</p> <ul style="list-style-type: none"> Pans the display (Plotter/Weather/Radar display). Shifts the range and scrolls back the picture (Fish finder display).
	5	+, - key	<ul style="list-style-type: none"> Selects an item from the slide-out/main/pop-up menu. Zooms in (+) and out (-). Raises (+) and lowers (-) the brilliance on the [Power & Brilliance] window.
	6	ENT key	<ul style="list-style-type: none"> Activates a selected item. Opens the slide-out menu.
	7	CANCEL/MOB key	<p><u>Short press:</u></p> <ul style="list-style-type: none"> Closes the menu or dialog box. Stops the aural alarm. Ends the tool mode (End Route, End Move, etc.). <p><u>Long press:</u></p> <ul style="list-style-type: none"> Enters the MOB mark (at the own ship's position).
	8	FUNC key	Does the function set at [Function Gesture].
	9	HOME/BRILL key	<p><u>Short press:</u></p> <ul style="list-style-type: none"> Opens the home screen. <p><u>Long press:</u></p> <ul style="list-style-type: none"> Opens the [Power & Brilliance] window.

* When you switch the steering mode with the STBY.AUTO key, a beep sounds and then one of the messages shown below appears. The message does not appear on the home screen.

- STBY mode→AUTO mode: "NAVpilot is engaged."

- AUTO mode→STBY mode: "NAVpilot is disengaged."

1.3 How to Turn the Power On or Off

The power switch (⏻) on the front panel controls the power.



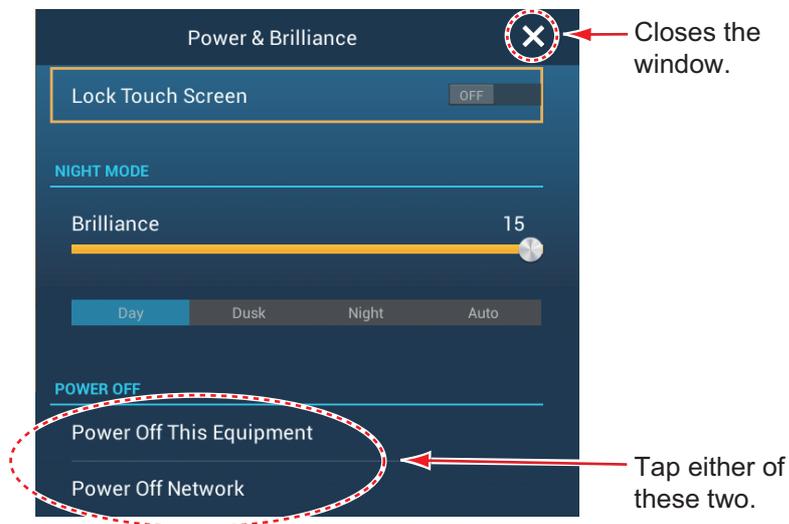
When you turn on the power, the equipment beeps twice and the start-up screen appears. After the startup process is completed, the [NAVIGATION WARNING] screen appears. Read the warning, then tap [OK]. Then, the last-used display appears.

The color of the lamp in the power switch changes according to equipment state.

Green: Equipment is powered.

Orange: Equipment is not powered but power is flowing to the equipment.

To turn off the power, tap the power switch to show the [Power & Brilliance] window.



Tap [Power Off This Equipment] or [Power Off Network], then tap [OK]. 15 seconds after the screen goes blank, the power turns off. (The power is on for this 15 seconds.)

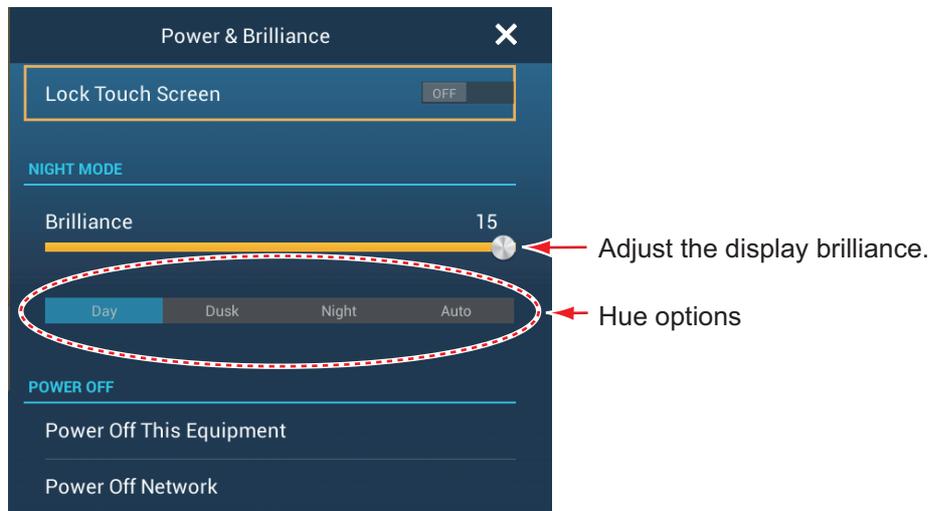
Note 1: If you cannot turn off the power as shown above or the display freezes, long push the power switch until the screen goes blank.

Note 2: Do not turn off the power during the start-up. Wait until the start-up is completed before you turn off the power.

Note 3: The screen refreshes slower in low ambient temperature.

1.4 How to Adjust the Brilliance of the Display and Power Switch and Hue

With the power applied, press  to show the [Power & Brilliance] window.

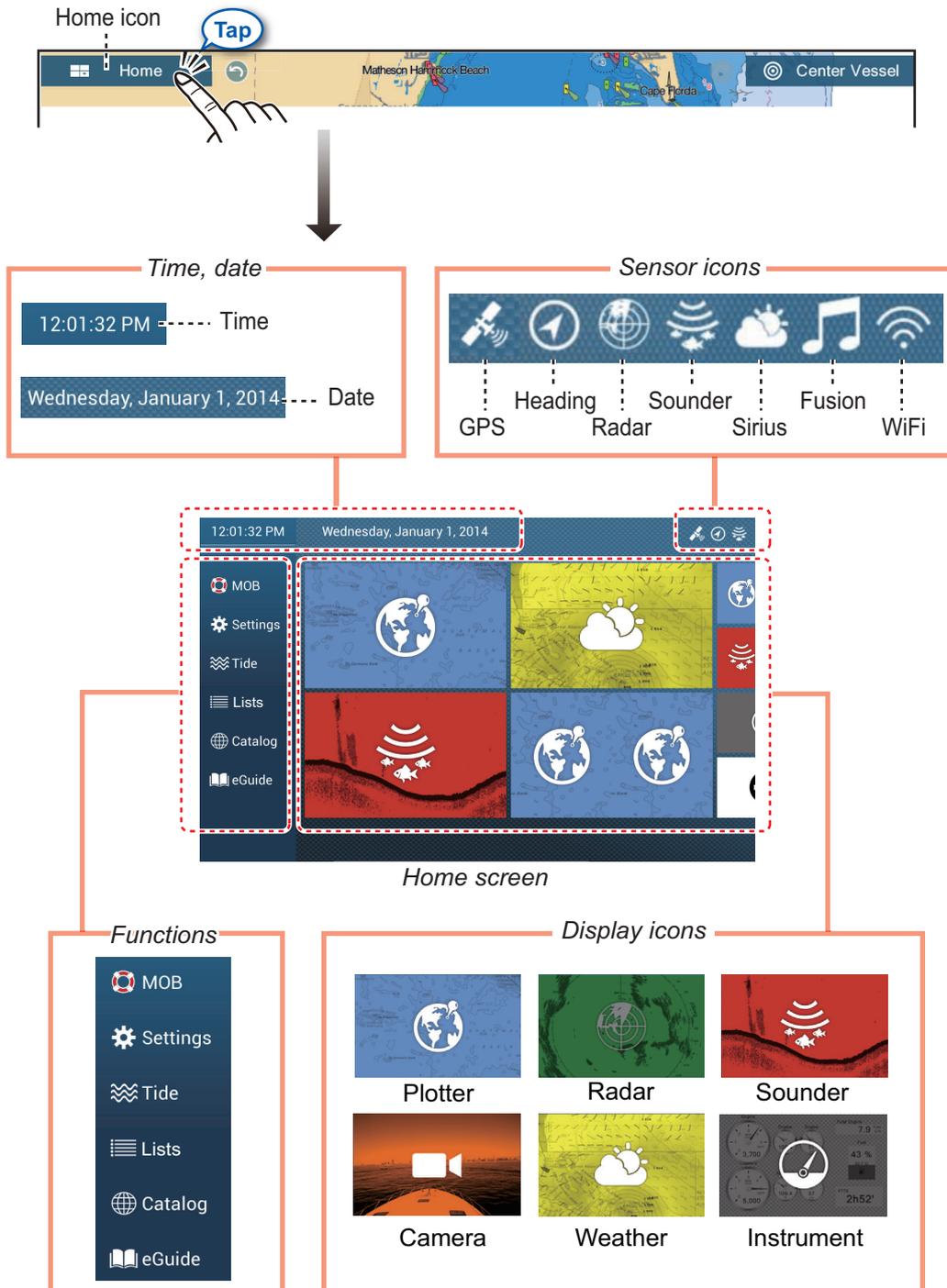


Drag the slider or tap the slider bar to adjust the brilliance of both the display and the power indicator.

The [Day], [Dusk], [Night] and [Auto] options (below the slider bar) set the hue according to selection. The [Auto] option automatically sets the hue according to time of day.

1.5 Home Screen

The home screen is where you access functions and menus, select displays and check sensor status. Tap the [Home] icon at the top left corner to show the home screen. The home screen is automatically closed, and the previous operation display restored, when no operation is detected for approx. one minute.



The **Sensor icons** show the sensors connected in the system and their status, by color.

White: Sensor normal

Red: Sensor error

Gray: Sensor inactive (stopped)

The **Functions** section provide the following features:

[MOB]: Enters a MOB mark (to mark man overboard location on the plotter and radar displays). See section 1.17.

[Settings]: Menus (general, plotter, radar, sounder, etc.) for customization of the system. See section 1.14.

[Tide]: Opens the tide graph.

[Lists]: Accesses the lists (points, routes, AIS, DSC, ARPA, Alarms).

[Catalog]: Opens the list of charts installed in your system.

[eGuide]: Opens the abbreviated operator's manual. You can get the latest version of the operator's manual by accessing the quick response code provided in the introduction section of the guide.

The **Display icons** select corresponding displays. See the next section for details.

1.6 How to Select a Display

You have two methods from which to select a display, the home screen and the quick page.

1.6.1 How to select a display from the home screen

Tap the [Home] icon to show the home screen. Tap the applicable display icon. (It may be necessary to swipe the screen if you have programmed a number of display icons.)



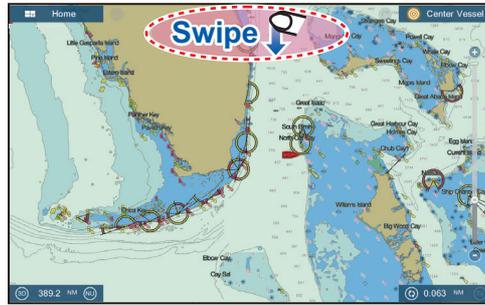
Display icons

1. SYSTEM INTRODUCTION

1.6.2 How to select a display from the quick page

The quick page, which carries all the display icons set for large size on the home screen, lets you change the display from the current display.

To show the quick page, swipe the top of the screen downward. Tap desired display icon to change the display. (It may be necessary to scroll the display icons if you have there are several icons.)



Quick page

1.7 How to Edit the Display Icons

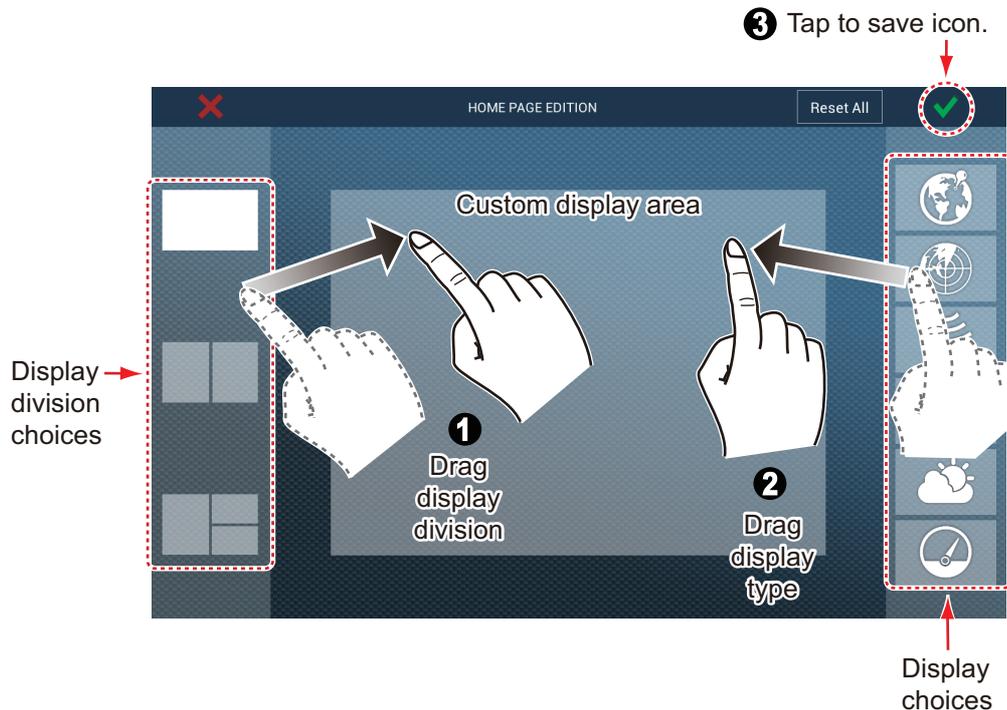
The default home screen arrangement provides seven displays (icons) in configurations according to the equipment that you have in your network. If the arrangement does not meet your requirements, you can change the display icons to suit your needs. You can have a maximum of 10 display icons, in full screen, 2-way or 3-way split screens. For example, you can show the radar and sounder (fish finder) displays in a two-way split screen.

The displays available depend on the display division selected and your system configuration. The table below outlines the display divisions and available displays.

Display division	Available displays
Full screen	Plotter, weather, radar, sounder, instrument, camera
Two-way split	Plotter, radar, sounder
Three-way split	Plotter, radar, sounder, instrument, camera

1.7.1 How to add a new display icon

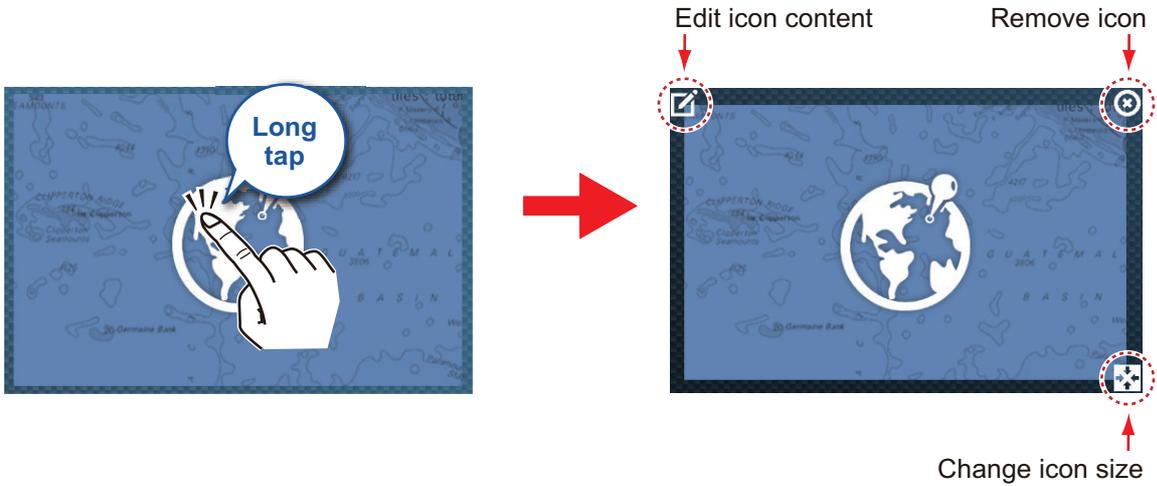
1. Tap the [Home] icon to show the home screen.
2. Tap the + icon, shown right. (If the icon is not shown, this means that all available display icons have been used. Erase an unnecessary icon to make room. See paragraph 1.7.2.)
3. Follow the instructions below to create a display icon.



Your arrangement is then opened on the screen and the home screen is updated according to your arrangement.

1.7.2 How to edit a display icon

Long tap the display icon to edit to show the editing icons on the display icon. Tap the applicable editing icon. Refer to the figure and instructions below.



Edit icon content: Tap the icon at the upper left corner. See the illustration in paragraph 1.7.1 for how to set the icon.

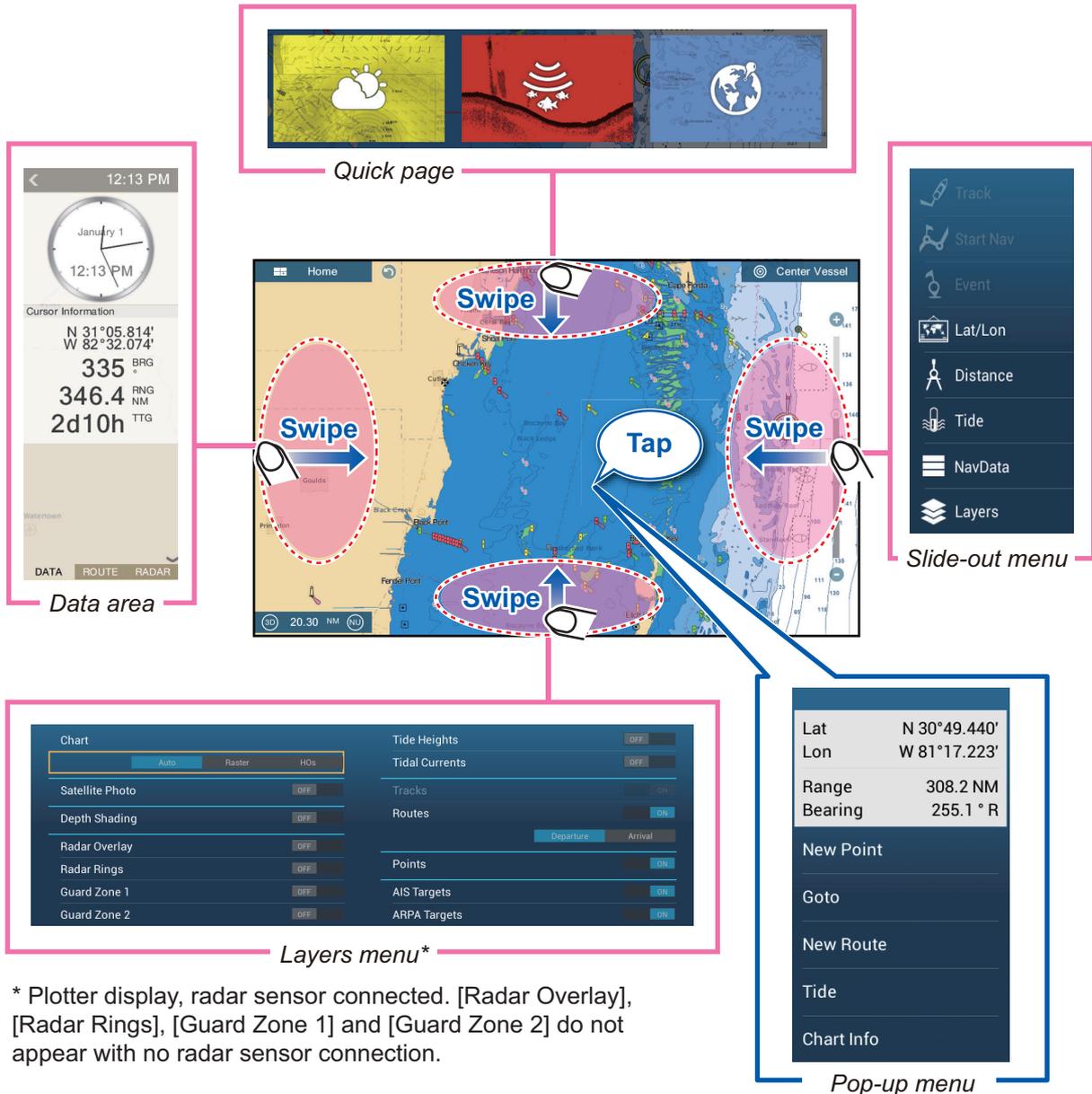
Remove icon: Tap the icon at the upper right corner to remove the icon from the home screen (and quick page if the icon size is selected to “large”).

Change icon size: Tap the icon at the lower right corner to switch the size between large and small. (Icons set for large size appear on the quick page.)

1.8 Hidden Functions

This equipment has five functions that are normally hidden from view: quick page, slide-out menu, pop-up menu, [Layers] menu, and data area (navdata). Swipe or tap the screen at the locations shown below to access the hidden functions.

A function window is automatically erased from the screen when it is not operated within the time specified with [User Interface Auto-Hide] in the [General] - [Settings] menu. You can erase the window at any time by tapping the screen.



* Plotter display, radar sensor connected. [Radar Overlay], [Radar Rings], [Guard Zone 1] and [Guard Zone 2] do not appear with no radar sensor connection.

Function description

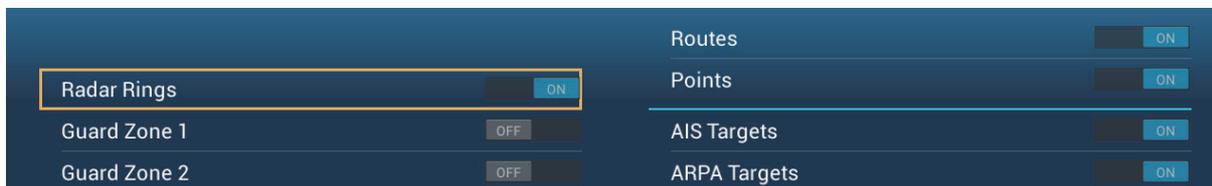
The **quick page** selects displays. The display icons set to large size appear on the quick page. (See paragraph 1.6.2.)

The **slide-out menu** provides quick access to often-used functions in the active display. The color of the function name changes according to function status. Unavailable functions are grayed out.

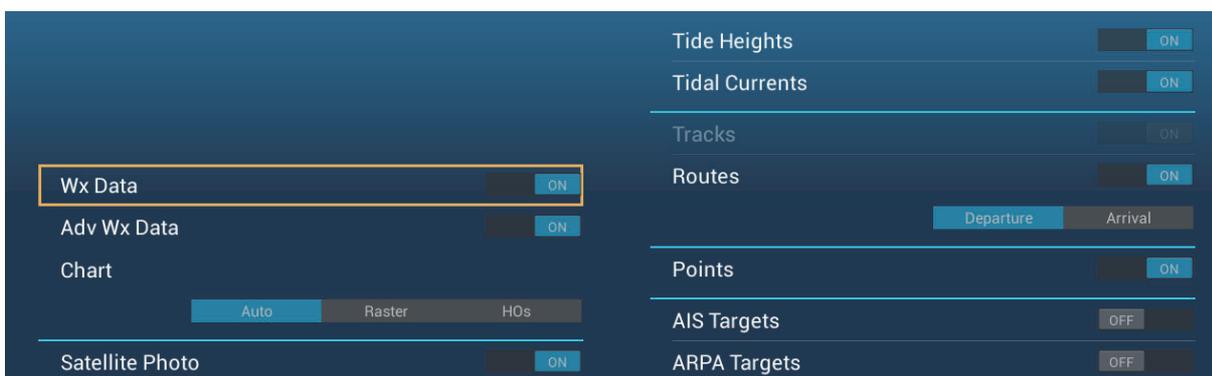
1. SYSTEM INTRODUCTION

The **pop-up menu** provide a subset of functions that are relevant to the object or location tapped. Unavailable functions are greyed out.

The **[Layers] menu** controls the items that are displayed on the top layer of the active display. Unavailable functions are greyed out. (This menu can also be accessed from the slide-out menu in some modes. The figure below shows the [Layers] menu for the radar and weather displays.



Layers menu for radar display



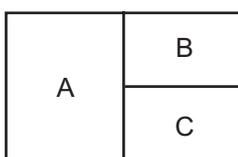
Layers menu for weather display

The **data area** shows navigation data. See the next section for details.

Hidden function availability and screen division

Full screen displays and hidden function availability

	Display					
	Camera	Instrument	Plotter	Radar	Sounder	Weather
[Layers] menu	No	No	Yes	Yes	No	Yes
Pop-up menu	Yes	Yes	Yes	Yes	Yes	Yes
Data area	Yes	Yes	Yes	Yes	Yes	Yes
Quick page	Yes	Yes	Yes	Yes	Yes	Yes
Slide-out menu	Yes	Yes	Yes	Yes	Yes	Yes

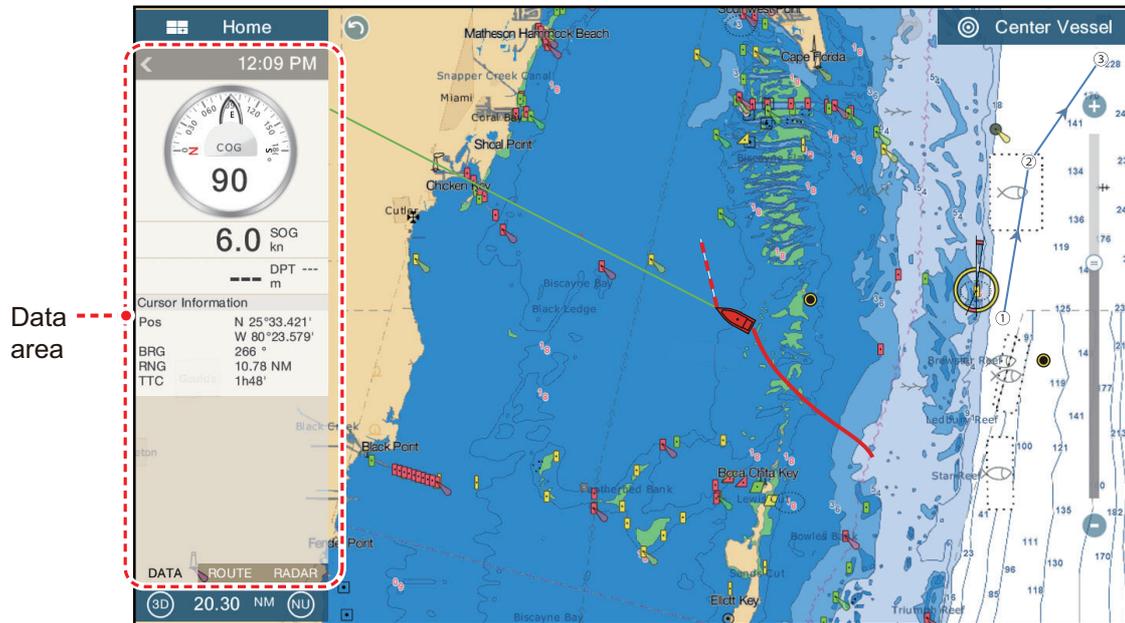


A: Data area, [Layers] menu, pop-up menu, quick page
 B: [Layers] menu, pop-up menu, quick page, slide-out menu
 C: Pop-up menu, slide-out menu

Three-way split-screen and hidden function availability

1.9 Data Area

The data area at the left side of the screen shows various navigation data, in movable and editable data boxes. You can select the data to display, select format (analog or digital) for data and change the order of the data. Data availability depends on your system configuration.



Note: The data display is also available in the two- and three-way split screens, on the left screen.

Two types of data sets* are available, navigation data, route data, and radar. Select the desired set with [DATA], [ROUTE] or [RADAR]* at the bottom of the data area.

* With connection of radar sensor.

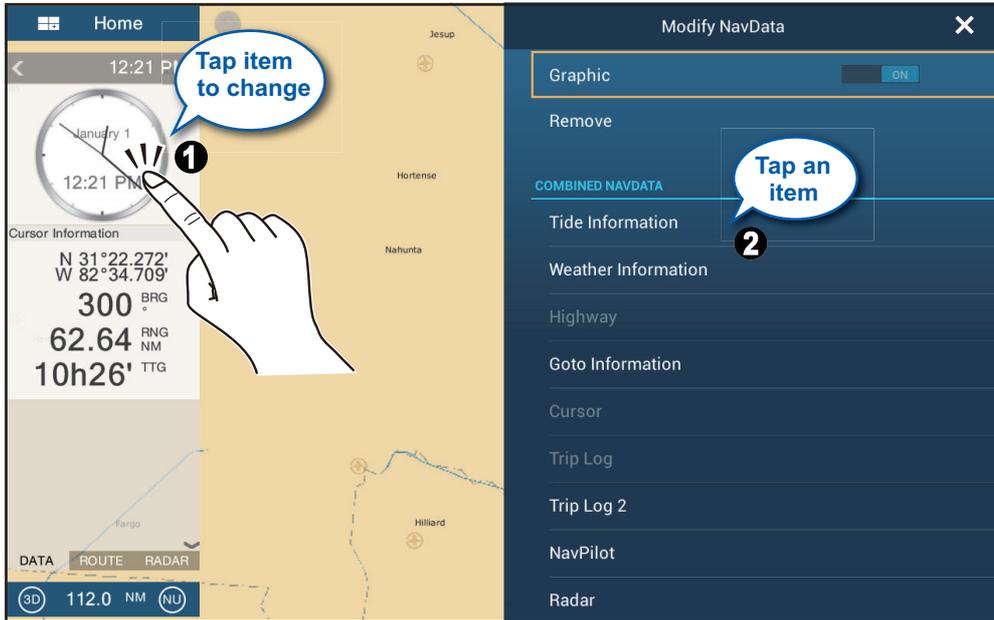
1.9.1 How to change the order of the data

Drag and drop the data boxes to change their order.

1. SYSTEM INTRODUCTION

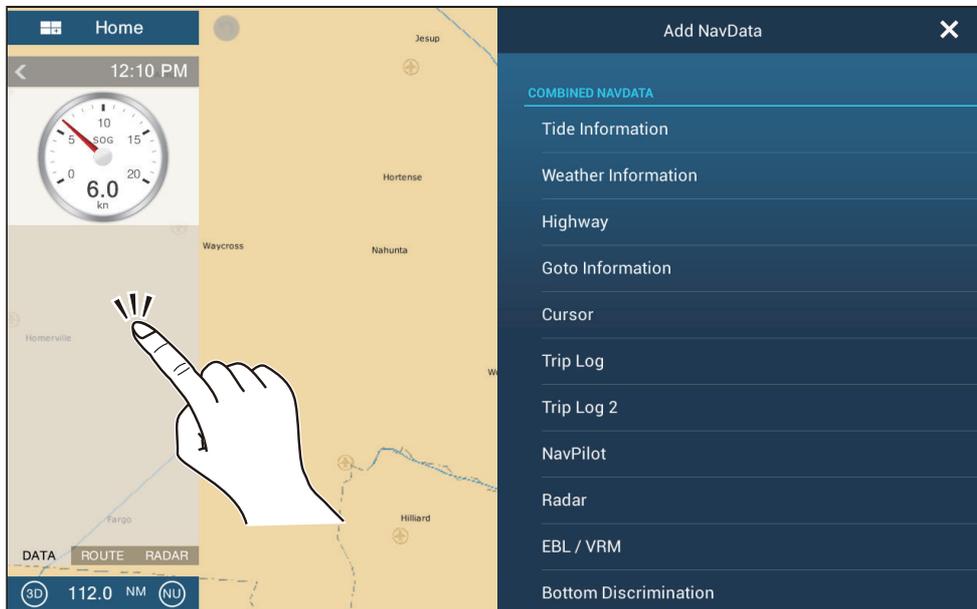
1.9.2 How to change the contents of a data box

Tap the data box to change, and the [Modify NavData] pop-up menu appears. Tap the data to use, on the pop-up menu.

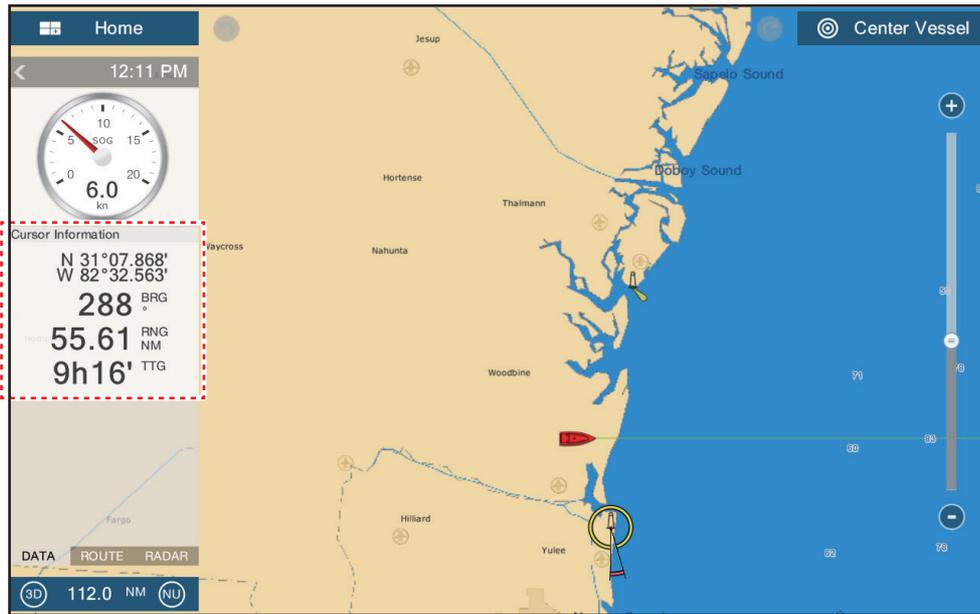


1.9.3 How to add data to a data area

1. Tap an unoccupied area in the data area to display the [Add NavData] pop-up menu.



2. Tap the data to add, on the pop-up menu. For example, tap [Cursor]. The added data appears in the data area.

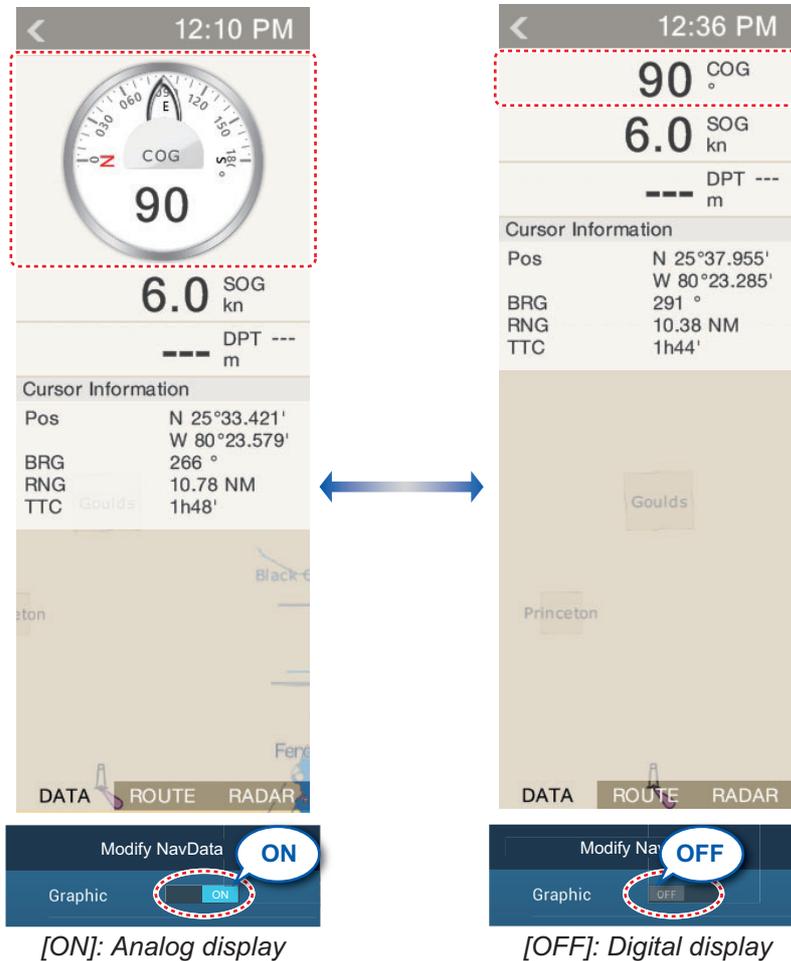


1.9.4 How to delete a data box

Tap the data box to delete, then tap [Remove] on the [Modify NavData] pop-up menu.

1.9.5 How to switch an indication between analog (graphic) and digital

Tap the data box for which to switch the indication, and the [Modify NavData] pop-up menu appears. Use the [Graphic] flipswitch to switch between analog and digital indications. [ON] for analog, or [OFF] for digital.



[ON]: Analog display

[OFF]: Digital display

1.9.6 How to adjust the transparency of the data area

You can adjust the degree of transparency for the data box with [NavData Transparency] in the [Settings] - [Plotter] menu. The available degree of transparency is 0 - 80(%)

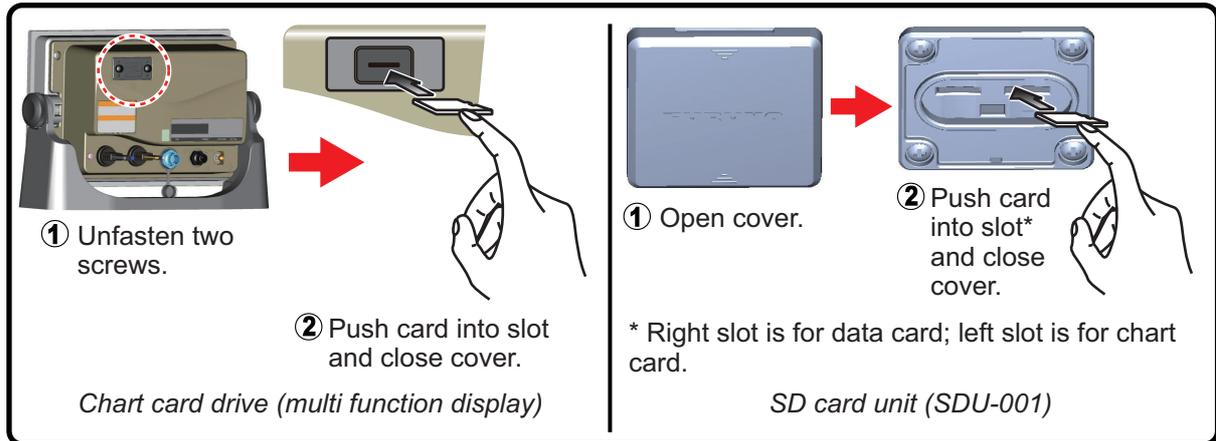
Note: Alpha blending technology is used for transparency effects.

1.10 Micro SD Cards

This equipment uses two types of micro SD cards, chart and data. The chart cards contain charts and the data micro SD card stores plotter-related data such as tracks, routes, points and generic data such as menu settings. Set and remove the card as shown below. The Secure Digital Extended Capacity (SDXC) cards can also be used.

How to insert a micro SD card

Before inserting a chart card in the multi function display, turn off the power.



How to format a micro SD card

You do not normally need to format a data micro SD card. If the card becomes unreadable, format the card with a formatting program that is compatible with the specifications of the card.

How to remove a micro SD card

- 1) Open the card drive cover.
- 2) Push the card to release the card from the card drive.
- 3) Remove the card with your fingers then close the lid (cover).

About the micro SD cards

- Handle the cards carefully. Improper use can damage the card and destroy its contents.
- Make sure the slot lid (cover) is closed at all times.
- Remove a card with only your fingers. Do not use metal instruments (like tweezers) to remove the card.
- Do not remove a card during the reading of or writing to the card.

Note: Use a micro SD card class 6 or higher for storing chart data.



1. SYSTEM INTRODUCTION

Compatible micro SD cards

The table below lists the micro SD cards that have been verified for use with this equipment.

Maker	Model	Capacity (GB)	Class
KINGMAX	KM-MCSDXC10X64GUHS1P	64	10
	KM-MCSDHC10X32GUHS1P	32	10
	KM-MCSDHC4X32G		4
	KM-MCSDHC10X16GUHS1P	16	10
	KM-MCSDHC4X16G		4
Kingston	SDCX10/64GB	64	10
	SDC10/32GB	32	10
	SDC4/32GBS		4
	SDC10/16GB	16	10
	SDC4/16GB		4
	SDC10/8GB	8	10
	SDC4/8GB		4
Lexar Media	LSDMI64GABJPC10	64	10
	LSDMI32GABJP	32	10
	LSDMI16GABJPC6	16	6
	LSDMI8GBABJPC6	8	6
SANDISK	SDSDQX-064G-U46A	64	10
	SDSDQ-032G-J35A	32	4
	SDSDQ-016G-J35A	16	4
	SDSDQU-008G-J35A	8	10
	SDSDQ-008G-J35A		4
Silicon Power	SP064GBSTXBU1V10-SP	64	10
	SP032GBSTHDU1V10-SP	32	10
	SP032GBSTH004V10-SP		4
	SP016GBSTHDU1V10-SP	16	10
	SP016GBSTH004V10-SP		4
	SP008GBSTHBU1V10-SP	8	10
	SP008GBSTH010V10-SP		4
Transcend	TS64GUSDU1	64	10
	TS32GUSDU1	32	10
	TS32GUSDC4		4
	TS16GUSDHC10U1	16	10
	TS16GUSDC4		4
	TS8GUSDHC10U1	8	10
	TS8GUSDC4		4

1.11 Plotter Introduction

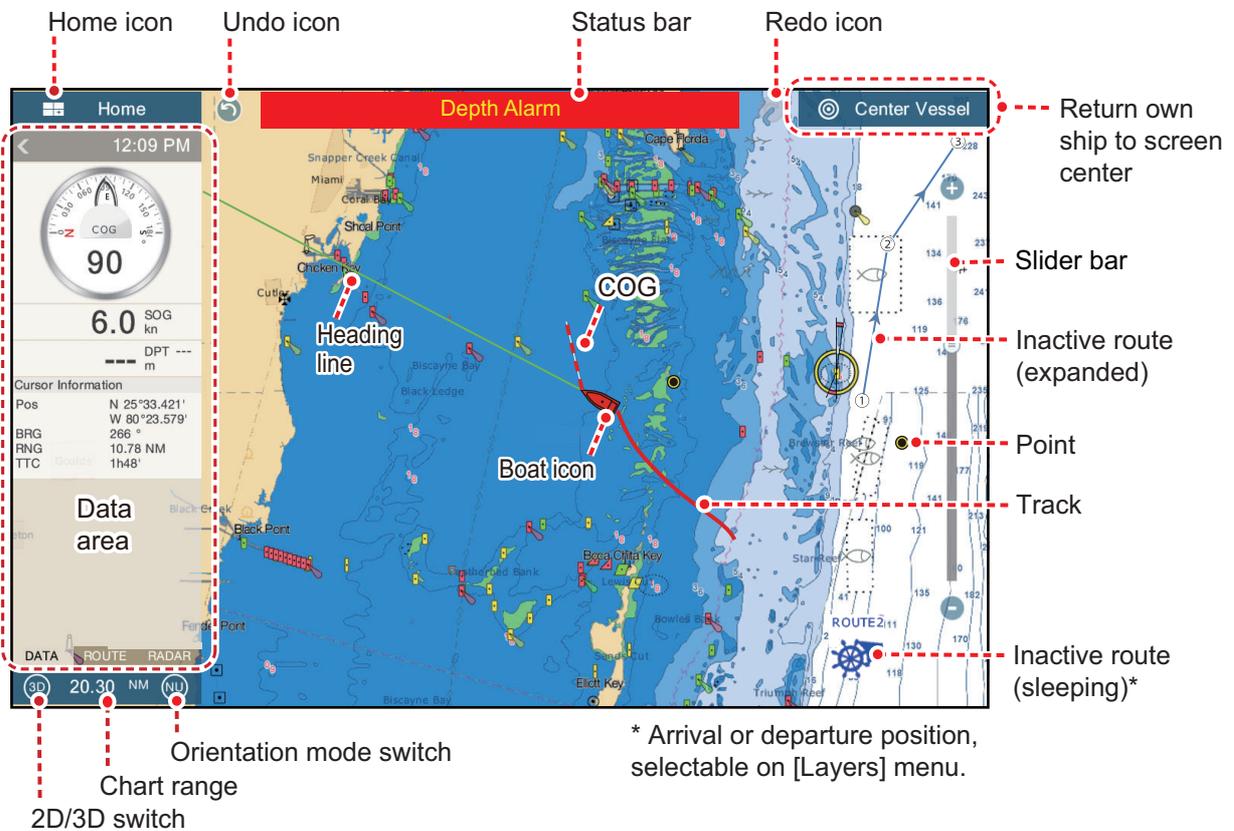
The plotter provides a small world map in raster format. A vector chart for the US coastline (with Alaska and Hawaii) is provided also. The plotter section has functions to enter points, and create and plan routes.

The plotter receives position data fed from the built in GPS receiver. Your position is marked on the screen with the boat icon.

The points and routes you have entered are shown on the screen. You can move, delete and edit the points and routes from a pop-up menu.

The plotter also

- Plots the track of your ship
- Measures distances and bearings
- Marks man overboard (MOB) position
- Controls alarm functions
- Follows routes



The **status bar**, common to all modes, alerts you to equipment status. The color of both the bar and the status message change according to message category.

- Red bar, yellow characters: warning (alarm violation, equipment error, etc.)
- Yellow bar, black characters: caution (system message, etc.)

When an alert condition occurs, the equipment beeps (if enabled), the name of the alert appears in the bar, and the bar flashes. You can stop the flashing and silence the beep by tapping the bar. The alert indication remains in the status bar until the cause for the alert is removed.

The **undo** and **redo** icons are available for point and route operations.

Undo: Reverse the last action.

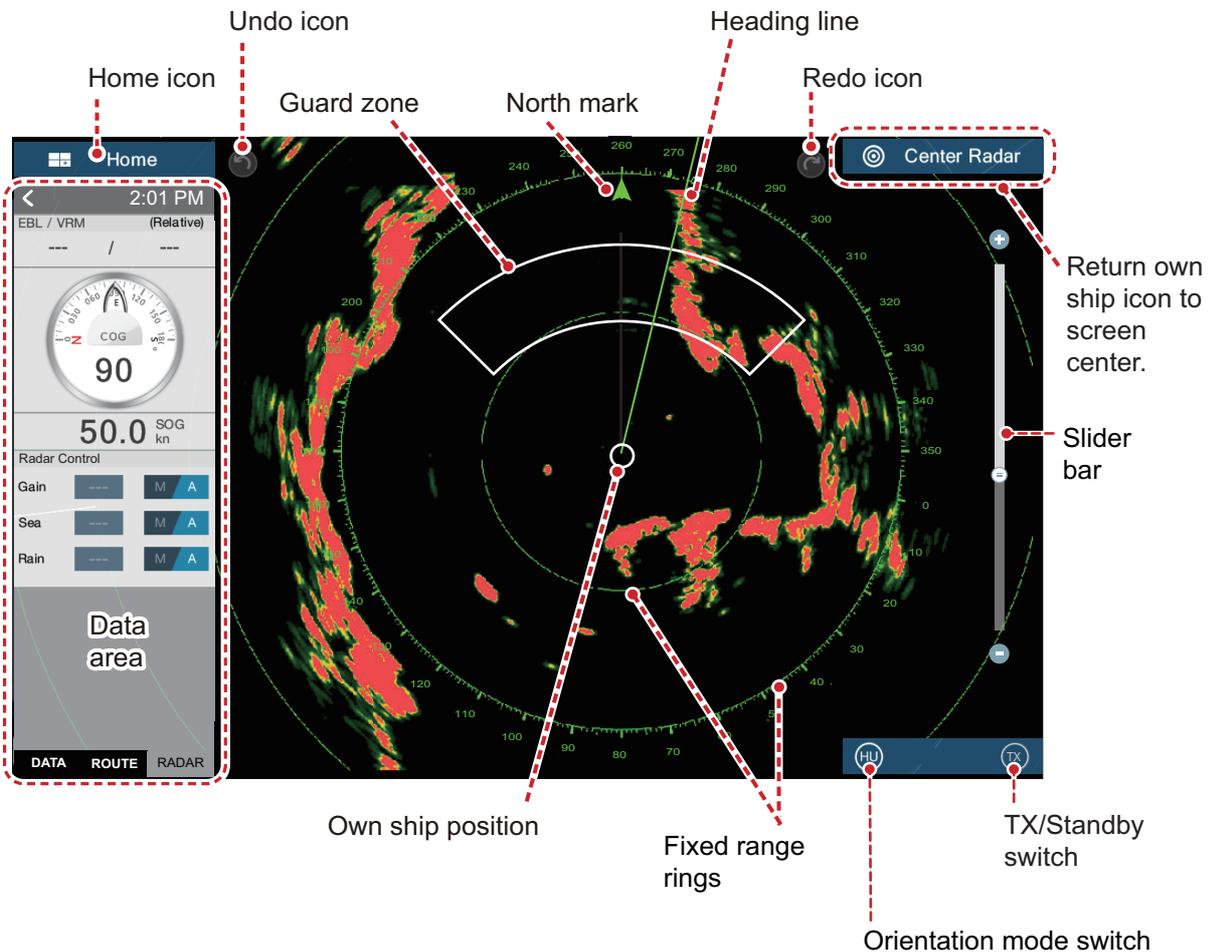
Redo: Repeat the last action.

1.12 Radar Introduction

A radar system operates in the microwave part of the radio frequency (RF) range. The radar detects the position and movement of objects. Objects are shown on the radar display at their measured distances and bearings in intensities according to echo strength.

The radar display is available in head-up and north-up modes and orientation in true and relative motion. The relative motion display shows other ships movement relative to your ship. The true motion display shows your ship and other objects in motion according to their true courses and speeds.

A guard zone tells you when the radar targets are in the area you indicate. The trail of targets can be shown in afterglow to monitor their movements.



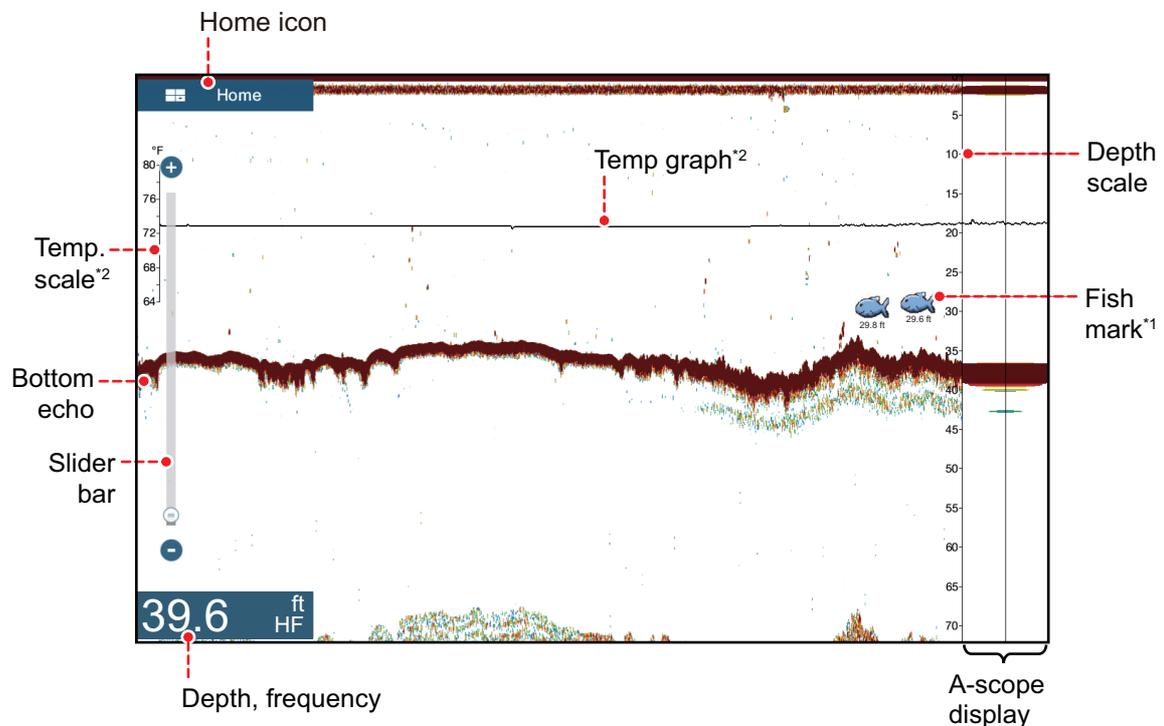
1.13 Sounder (Fish Finder) Introduction

The sounder display provides a picture of the echoes found by the fish finder. Echoes are scrolled across the screen from the right position to the left position.

The echoes at the right position are the current echoes. These echoes can be from separate fish, a school of fish, or the bottom. Depth to the bottom is indicated always, provided the gain is set correctly. You can scroll the echoes backward.

Both low and high TX frequencies are provided. (Frequencies depend on the transducer connected.) The low frequency has a wide detection area, which is for general detection and understanding bottom conditions. The high frequency has a narrow beam that helps you inspect fish.

The range, gain, clutter and TVG can be adjusted automatically according to your purpose (cruising or fishing) to let you do other tasks.



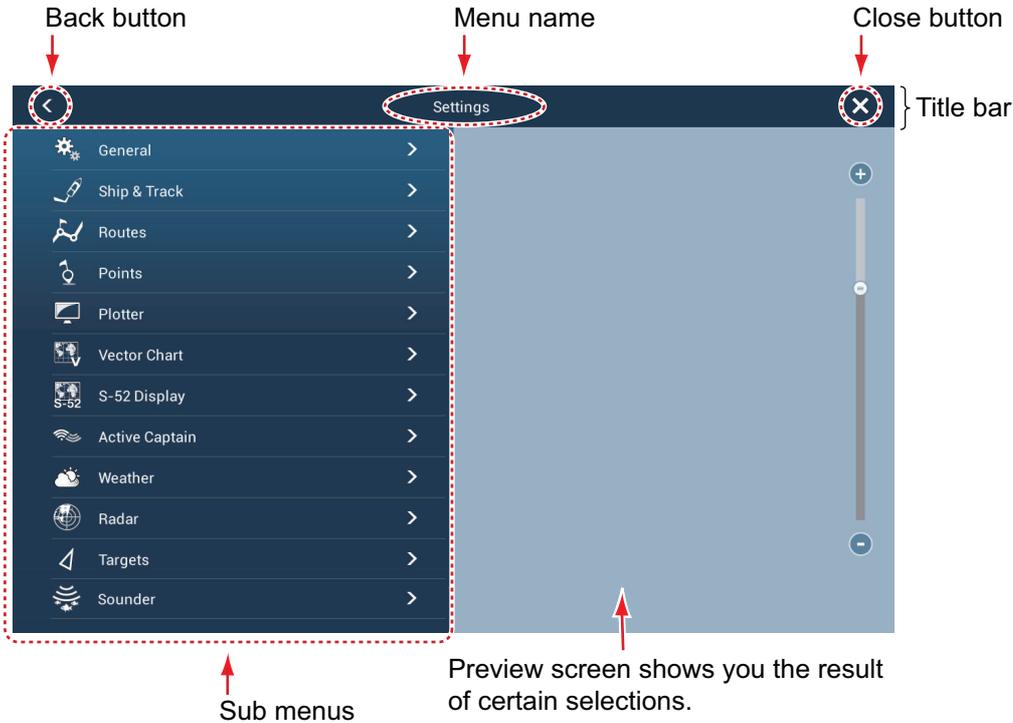
*¹ Requires appropriate transducer.

*² Requires water temperature sensor.

1.14 Settings Menu

The [Settings] menu provides the options for customizing your system. The [Settings] menu, as well as all other items on the home screen, is automatically closed, and the previous operation display restored, when no operation is detected for approx. one minute.

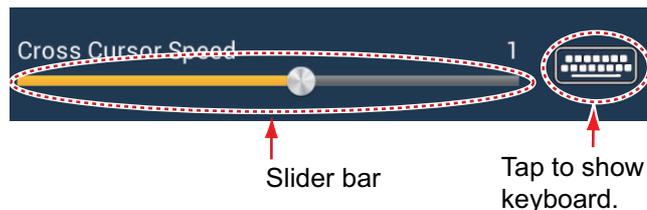
1. Tap the [Home] icon to go to the home screen.
2. Tap [Settings].



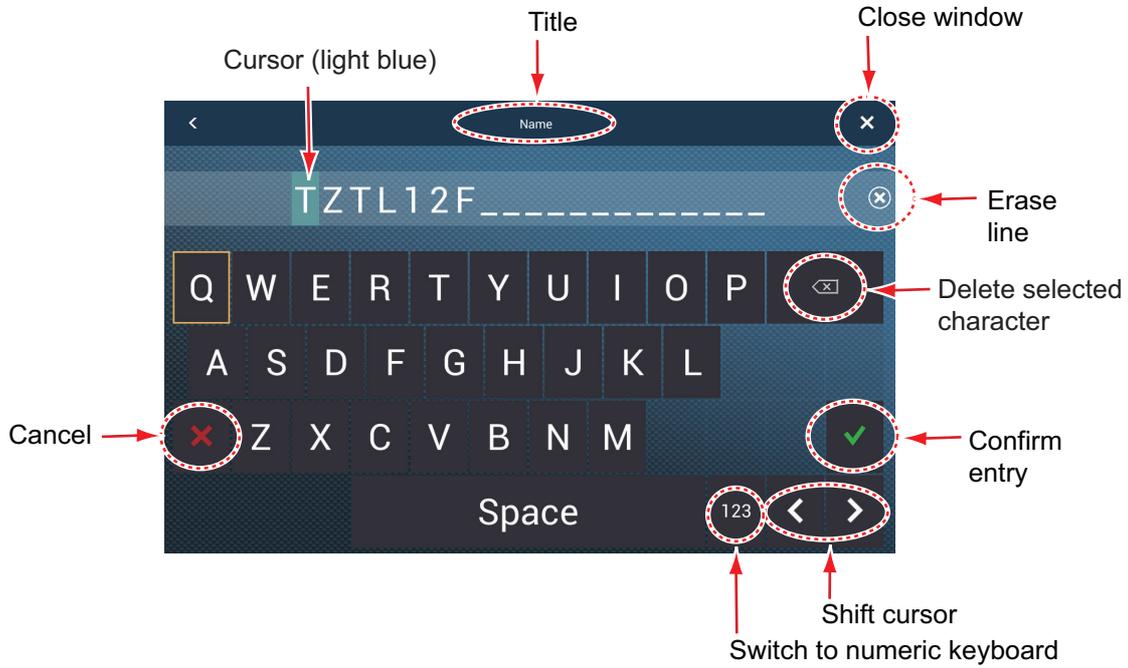
3. Tap a sub menu. For example, tap the [General] sub menu.
4. Do one of the following according to the menu item:
 - **ON/OFF flipswitch:** Tap the flipswitch to switch between [ON] and [OFF].



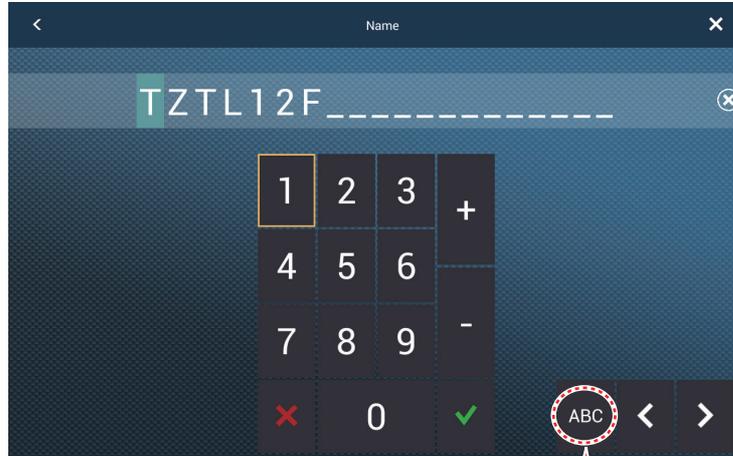
- **Slider bar, keyboard:** Set level by dragging the slider, or tapping the keyboard icon () to enter the level with the numeric software keyboard. (See the next page for the appearance of the numeric keyboard.)



- **Alphabet, numerical data entry:** A menu item that requires entry of alphabet and/or numerical data has a keyboard icon (📄). Tap the keyboard icon to show the keyboard. (The keyboard displayed depends on the item selected. Some items provide only the numeric keyboard.) Enter data, then tap ✓ to confirm.



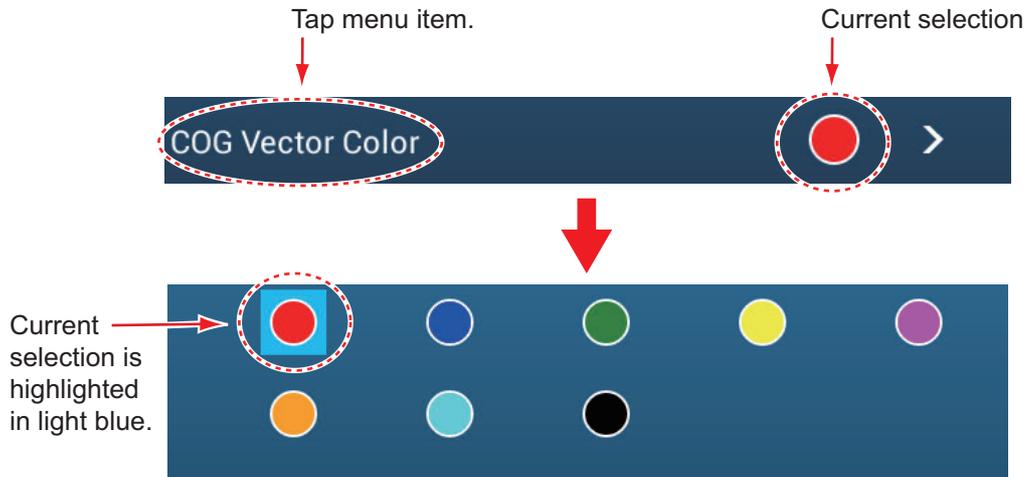
Alphabet keyboard



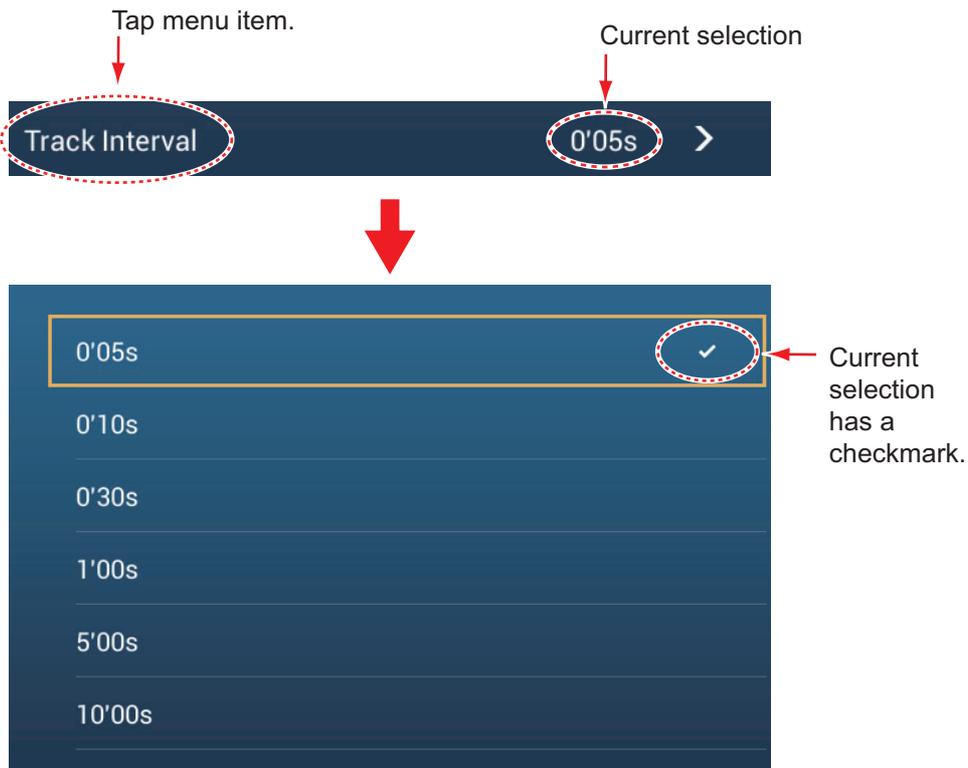
Numeric keyboard

1. SYSTEM INTRODUCTION

- **Color selection:** A menu item that requires selection of color shows the current color selection to the right of the name of the menu item. Tap the menu item to show the color options. Tap color option desired. Current selection is highlighted with a light blue square.



- **Option selection:** A menu item that requires selection of an option shows the current selection on the menu. Tap the option desired. The current selection has a checkmark.



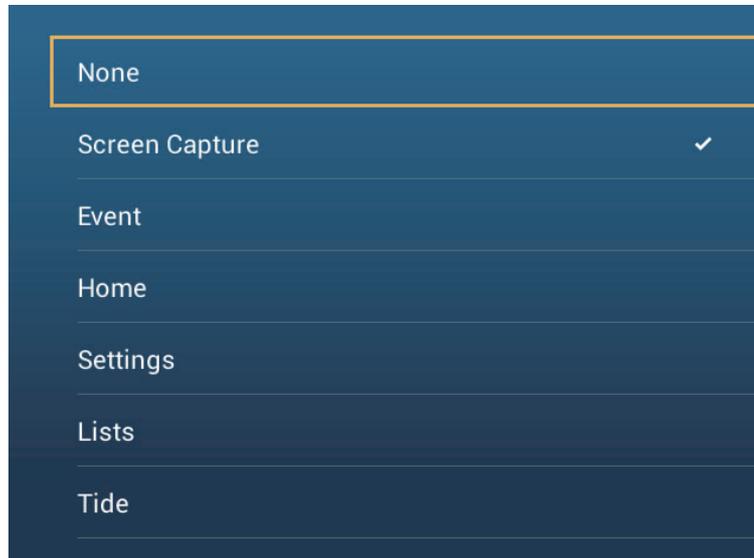
5. Tap the close button to finish.

Note: The title bar (top of menus) does not appear in menu illustrations hereafter unless its inclusion is necessary in a description.

1.15 Function Gesture

The function gesture controls what occurs when you tap the screen with two fingers. Select the function as below.

1. Open the home screen, then select [Settings] - [General].
2. Tap [Function Gesture].



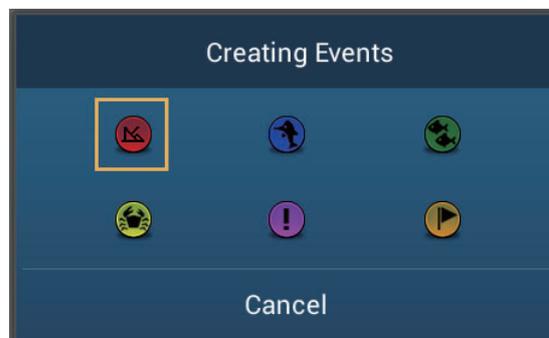
3. Tap a function among the following:

[None]: Nothing happens.

[Screen Capture]: Capture the screen and save it to a micro SD card (or USB memory). The message shown below appears. Tap [OK] to save the screen capture. The information following "TZT2SCREENSHOT" is the year, month, day, hour, minute and second the screenshot was captured.



[Event]: Record an event. Select a mark from the pop-up menu, and the mark is put at the position at the time the screen was tapped (see paragraph 4.2.2). The position, etc. is saved to the points list.



[Home]: Open the home screen (see section 1.6).

[Settings]: Open the [Settings] menu (see section 1.14).

1. SYSTEM INTRODUCTION

[Lists]: Open the lists menu (see section 1.14 and section 4.9).

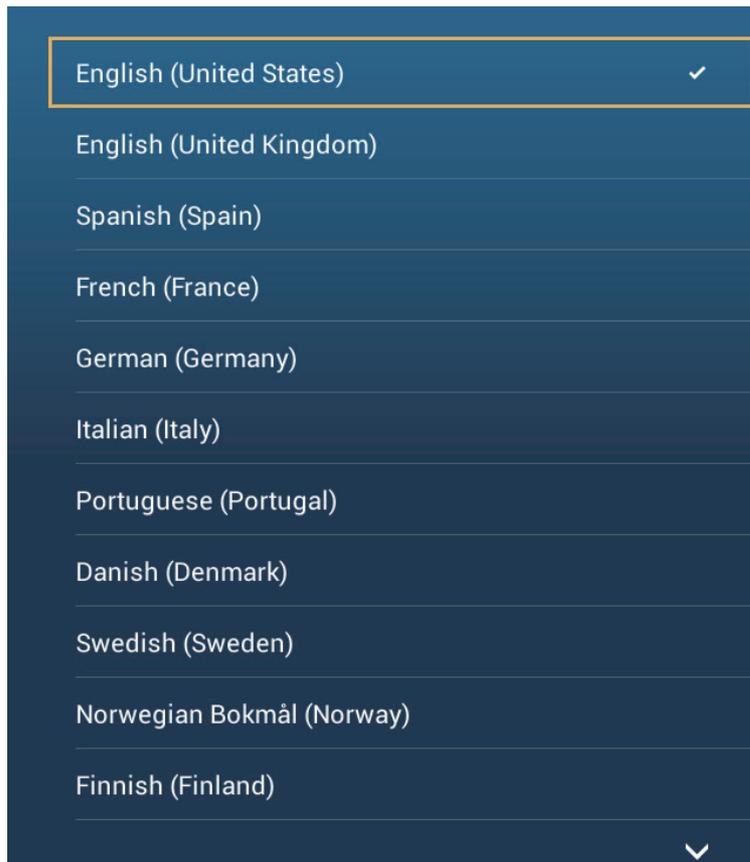
[Tide]: Open the tide graph (see section 1.14 and paragraph 3.2.4).

4. Tap the close button to finish.

1.16 Language

The default interface language is English (United States). To change the language, do as follows:

1. Open the home screen, then tap [Settings] - [General].
2. Tap [Language].



3. Tap the language to use. The message "APPLICATION HAS TO RESTART NOW! DO YOU WANT TO RESTART APPLICATION?" appears.
4. Tap [OK].

This process takes approximately five minutes to optimize the system for the new language setting. When the process is completed, the power switch will change color to orange. Press the power switch to start the system.

1.17 Man Overboard (MOB)

The MOB function is used to mark the location of man overboard, from the plotter and radar displays. At the moment the MOB function is activated, the MOB mark is put at the current position, on both the plotter and radar displays.

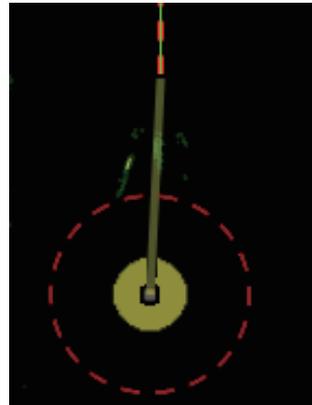
How to mark the MOB position

Tap [MOB] on the home screen. The plotter display opens, the MOB mark () is at the location at the moment MOB was activated, and the MOB location is automatically set as destination. At the moment of activation the following occurs.

- The message "MOB" flashes in the status bar, with yellow characters on a red background. The aural alarm sounds if it is enabled. Tap the status bar to stop the flashing indication and silence the aural alarm.
- The MOB mark is highlighted.
- A yellow line connects between the MOB mark and current location. This line shows the straightest course between own ship and the MOB mark.



MOB mark on the plotter display



MOB mark on the radar display

MOB information

Tap a MOB mark to display the name, comment and depth (plotter display only).

How to delete a MOB mark

Inactive MOB mark: Tap a MOB mark to display the pop-up menu. Tap [Delete].

Active MOB mark: Before you can erase an active MOB mark, you must stop navigation (to the MOB). Tap the active MOB mark to display the pop-up menu then select [Stop Nav]. Tap the MOB mark to display the pop-up menu, then tap [Delete].

1.18 Wireless LAN Settings

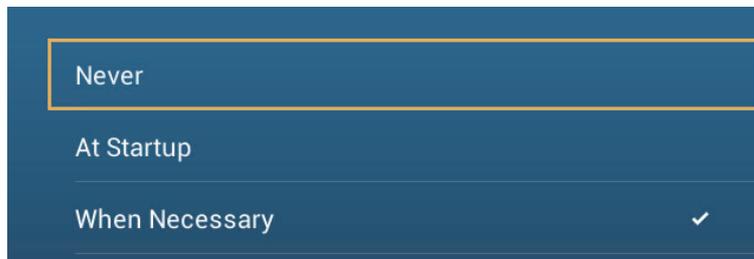
You can connect to the internet with the wireless LAN signal to download weather information (see chapter 11) and to connect to an iOS or Android™ device. To download weather information, connect the existing LAN network. To connect to an iOS or Android™ device, create a local wireless network.

About the wireless LAN

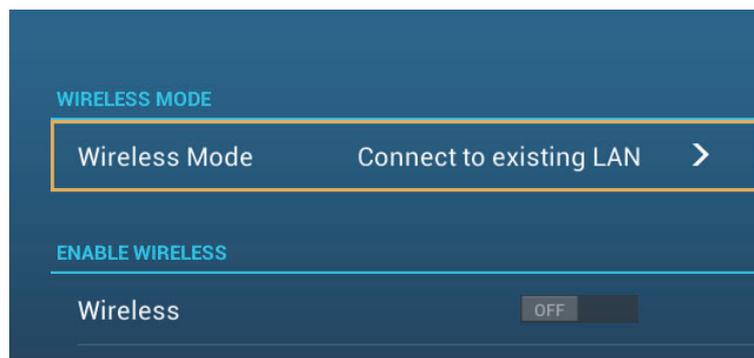
- The wireless LAN function is available only in the countries which have acquired radio wave certification. Turn this function off in countries which do not have radio wave certification. Ocean-going vessels that have radio wave certification can use the wireless LAN function in any country that has acquired radio wave certification. Vessels with radio wave certification that enter a country that does not have radio wave certification may use the wireless LAN function only onboard the vessel. Available countries (as of 12/2014): USA, Canada, New Zealand, Australia, and Japan.
- The communication rate and effective range for the wireless LAN can be affected by the electromagnetic wave, interfering object, or access point location.
- We strongly recommend using the wireless LAN with encrypted connection. Otherwise unauthorized access by a third party can occur, which can cause loss of data or system crash.
- We recommend changing the initial password when using a local wireless network.

1.18.1 How to connect the existing LAN

1. Open the home screen, then tap [Settings] - [General].
2. Tap [Connect to the Internet].

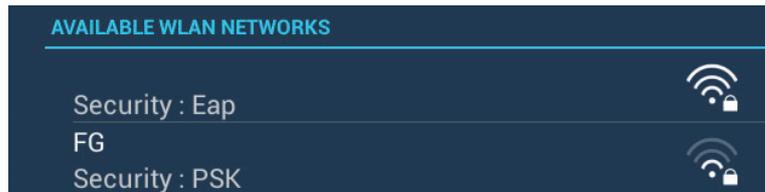


3. Tap [When Necessary]. Tap “<” to go back one layer.
4. Tap [Wireless LAN Settings].
5. Tap [Wireless Mode].

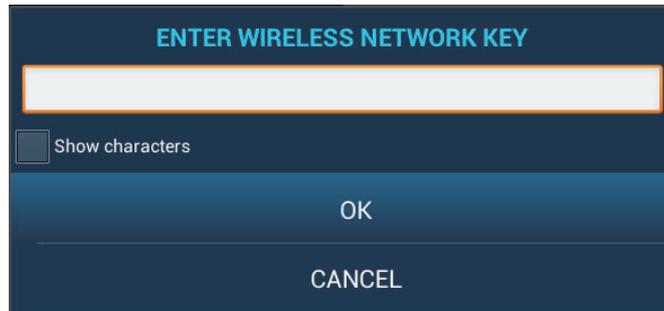


6. Tap [Connect to existing LAN]. Tap “<” to go back one layer.

- Turn on [Wireless] to see the available WLAN networks at the bottom of the screen.



- Tap the desired network to show the network key (password) entry screen.



- Enter the network key, then tap [OK]. The IP address, security type and signal strength of the WLAN are shown.

1.18.2 How to create a local wireless network

Note 1: Do the procedure with [Local Network] in [Wireless LAN Settings] turned off.

Note 2: It may not be possible to connect to a local network if the network is unstable. In this case, turn [Wireless] off and on. Connect via existing LAN network.

Note 3: Confirm that [When Necessary] is selected in [Connect to the Internet] before doing the procedure.

- Open the home screen, then tap [Settings] - [General].
- Tap [Wireless LAN Settings].
- Tap [Wireless Mode].
- Tap [Create Local Network], then tap "<" to go back one layer.
- Tap [Name].
- Enter the name of the network, then tap [OK].
- Tap [Password].
- Enter the password, then tap ✓. (If the password is wrong, an error message appears. Tap the [OK] button then reenter the password.)
- Turn on [Local Network] in [Wireless LAN Settings] to connect to the network.

1.18.3 How to forget all wireless LAN

- With [Connect to existing LAN] selected in [Wireless Mode] and [Wireless] turned on, select [Forget all Networks].
- Tap [Yes].

1.18.4 Operation by wireless terminal

You can turn on or off the operation by a wireless terminal via wireless LAN (iPhone, iPod, iPad, or Android™ device).

1. Open the home screen, then tap [Settings] - [General].
2. Tap [Allow Remote Control].
[Off]: Cannot operate this equipment by a wireless terminal.
[View Only]: Cannot operate this equipment but can display the data on the screen of the wireless terminal.
[Full Control]: Can fully operate this equipment by a wireless terminal.
3. Tap the close button to finish.

2. PLOTTER

This chapter shows you how to do the following:

- Use and prepare the plotter display
- Set plotter related alarms
- Control the track

2.1 Chart Type

A world map in raster chart format is included in your unit. A vector chart for the US coastline (Alaska and Hawaii included) is provided also. To use this plotter as a navigational aid, have electronic charts (stored in the hard disk) for the area you navigate. Contact your dealer about charts for your area.

There are two types of charts available with this equipment.

[Raster]: Raster charts are digitized scans of NOAA paper charts. Raster charts have information like notes, source diagrams, tidal diamonds, horizontal and vertical datum, etc.

[HO]: HO charts are S-57 format vector charts (digital files) that contain marine features and information created for marine navigation. These charts are made according to the International Hydrographic Organization (IHO). HO charts are available from Jeppesen, Navionics, Mapmedia, and NOAA (National Oceanic and Atmospheric Administration).

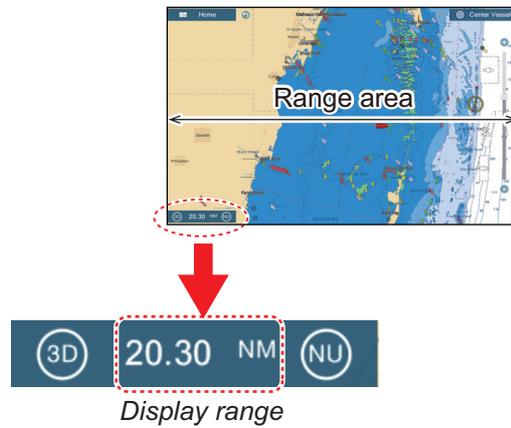
How to select a chart type

1. Select the plotter display.
2. Open the [Layers] menu.
3. Tap the chart type from among [Auto], [Raster] or [HOs].

*: [Auto] automatically switches the chart type according to chart availability and priority.

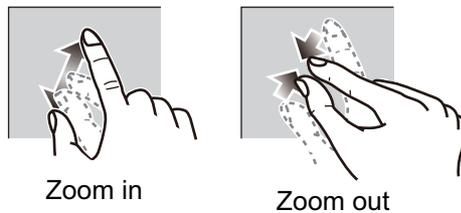
2.2 Display Range

You can change the display range to change the amount of information shown. The selected range appears in the box at the bottom left-hand corner of the screen.

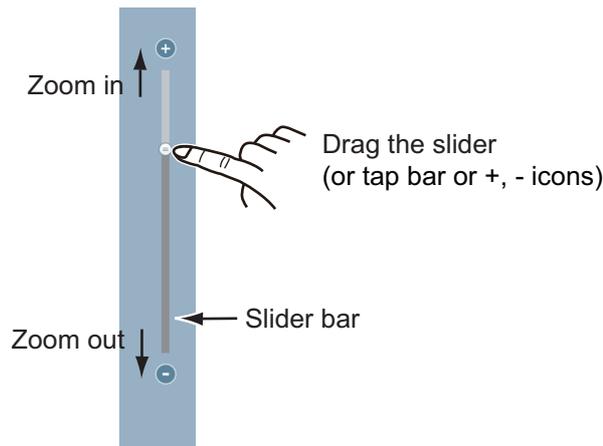


How to zoom in or out the display range

Method 1: Pinch the plotter display.



Method 2: Operate the range slider at the right side of the screen. Drag the slider, tap the bar or tap the “+” or “-” icon (above and below the slider) to set the display range. (The slider bar is shown in the default setting. The slider bar can be shown or hidden with [Show Scale Slider] in the [Settings] - [Plotter] menu.)



Note 1: You can judge the suitability of the range by the color of the range indication.
 White: Range is appropriate; normal chart accuracy.
 Red: Range is inappropriate; unsuitable chart accuracy.

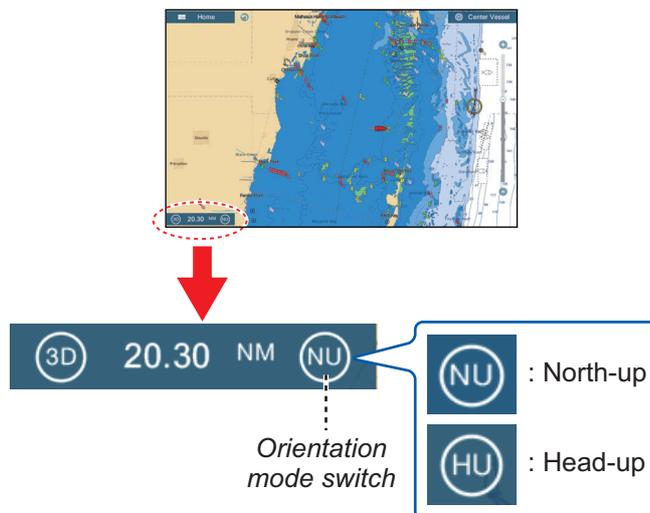
Note 2: You can zoom in or out the display range on the preview screen.

2.3 Orientation Mode

The chart can be shown in head-up or north-up orientation. Tap the orientation mode switch, [HU] or [NU], whichever is shown, at the bottom left corner to change the orientation mode.

North Up: North is at the top of the screen. When your heading changes, the boat icon moves according to heading. This mode is for long-range navigation.

Head Up: Displays the chart with the current compass heading of your ship at the top of the screen. The heading data from a compass is required. When the heading changes, the boat icon remains fixed, and the chart picture rotates according to heading.



2.4 How to Move the Chart

Move the chart in the following conditions.

- Your ship is not in the current area
- Take a look at another area
- Enter a point at another location

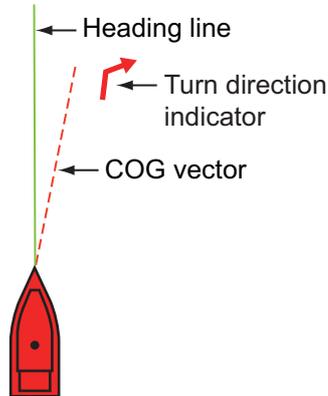
Do the following to move the chart:

- Change the display range (section 2.2).
- Tap [Center Vessel] at the top right-hand corner of the screen to return your ship to the center of the screen.
- Switch to the 3D display by tapping the 3D icon at the bottom left corner.

2.5 The Boat Icon

2.5.1 Description

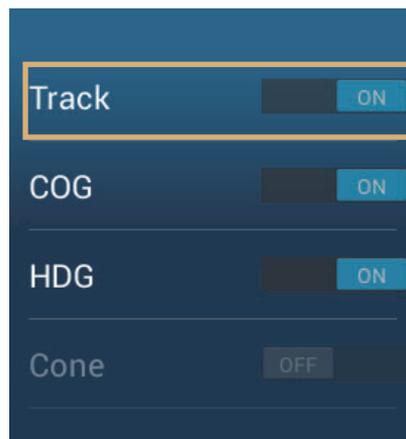
The boat icon (red) marks current position and moves according to your vessel's movement.



- The **heading line** is a straight line that runs from your position and shows the current heading.
- The **COG vector** is a vector line that runs from the boat icon and points in the direction in which your ship is now moving.
- The **turn direction indicator** points in the direction your vessel is turning, starboard or port. In the figure above, the starboard turn indicator is shown.

2.5.2 How to show or hide the COG vector, heading line

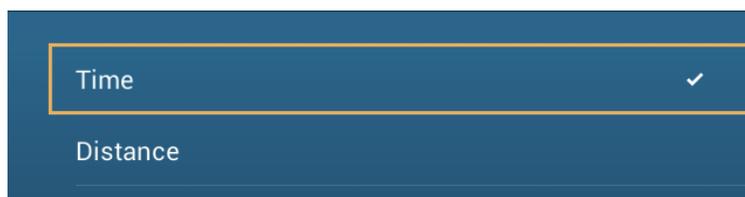
Tap the boat icon to show the pop-up menu. [COG] controls the COG vector; [HDG] the heading line. Note that the turn direction indicator is also turned on or off with [COG].



2.5.3 COG vector length

The **COG vector** shows estimated course and speed of your ship. The tip of the vector is the estimated position of your ship at the end of the selected predictor time or distance (set on the menu). You can increase the length of the predictor to find the estimated position of your ship in the future on the current course and speed. You can set the COG vector as follows. The greater the distance or the time, the longer the COG vector.

1. Open the home screen, then tap [Settings] - [Ship & Track].
2. Tap [COG Vector].



3. Tap [Distance] or [Time]. For [Distance], do steps 1) and 2) below. For [Time], go to step 4.
 - 1) Tap [COG Vector Length] to display the software keyboard.
 - 2) Set the length for the COG vector, then tap ✓. Go to step 5.
4. Tap [COG Vector Time], then tap the time for the COG vector.

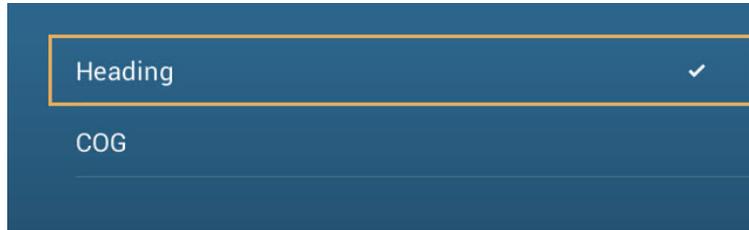


5. Tap the close button to finish.

2.5.4 Boat icon orientation

You can select the orientation of the boat icon to heading or COG.

1. Open the home screen, then tap [Settings] - [Ship & Track].
2. Tap [Vessel Icon Orientation].



3. Tap [Heading] or [COG].
4. Tap the close button to finish.

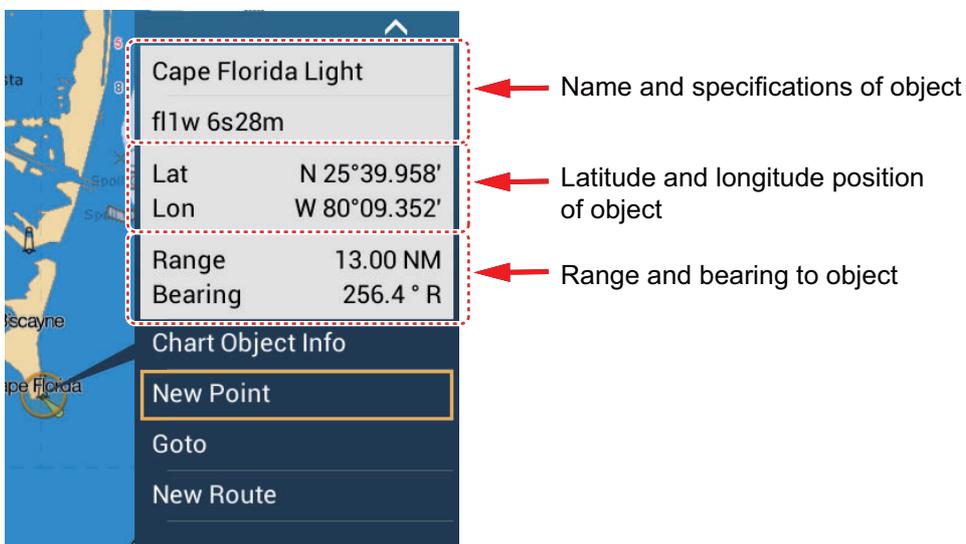
2.6 How to Information About a Chart Object, Chart

You can find chart object and chart information from the pop-up menu.

2.6.1 Chart object information

Simple information

Tap an object to show its name, specifications, position, and range and bearing, in the pop-up menu.



Detailed information

Tap an object to show the pop-up menu. Tap [Chart Object info] on the pop-up menu to show detailed information.

LANDMARK	
Category	tower
Conspicuous	visually conspicuous
Source date	Saturday, October 5, 2002
POINT INFO	
Lat	N 25°43.981'
Lon	W 80°09.634'
Bearing	163 °
Range	21.34 NM

2.6.2 Chart information

Tap a location on the chart not occupied by a chart object, then tap [Chart Info] on the pop-up menu.

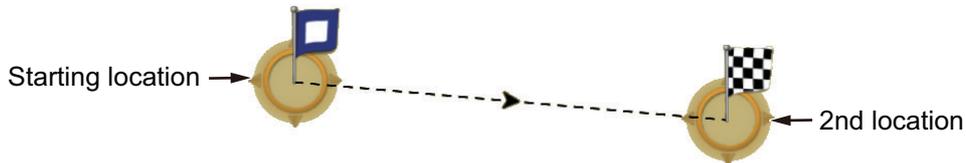
CHART INFO	
Chart type	Vector charts
Chart manufacturer	N.O.A.A.
File name	SDUS00VS57MAP10.DBV
Chart name	US5FL22M
Chart Number	US5FL22M
Edition #	26
Revision Date	4/4/2011
Revision #	3
Chart Scale	10,000
POINT INFO	
Lat	N 25°44.384'

2.7 How to Find the Range and Bearing Between Two Locations

The [Distance] item in the slide-out menu measures the range and bearing between any two locations on your chart. Range and bearing between the two locations are digitally indicated on the screen.

1. Open the slide-out menu.
2. Tap [Distance].

A dashed line runs between the start location and the 2nd location. The range, bearing, SOG, and TTG to the 2nd location is shown at the top of the screen.



3. To change the location of either point, drag and drop.
4. To quit the distance measurement, tap [Cancel Ruler] at the top right-hand corner of the screen.

2.8 Multiple Plotter Displays

Three plotter displays can be shown on one screen. With three plotter displays, you can see the conditions around your ship on both short and long ranges. Also, you can see how your ship moves toward your destination from more than one angle. For example, you can show one display in 3D and the other two in 2D.

The following features can be adjusted individually.

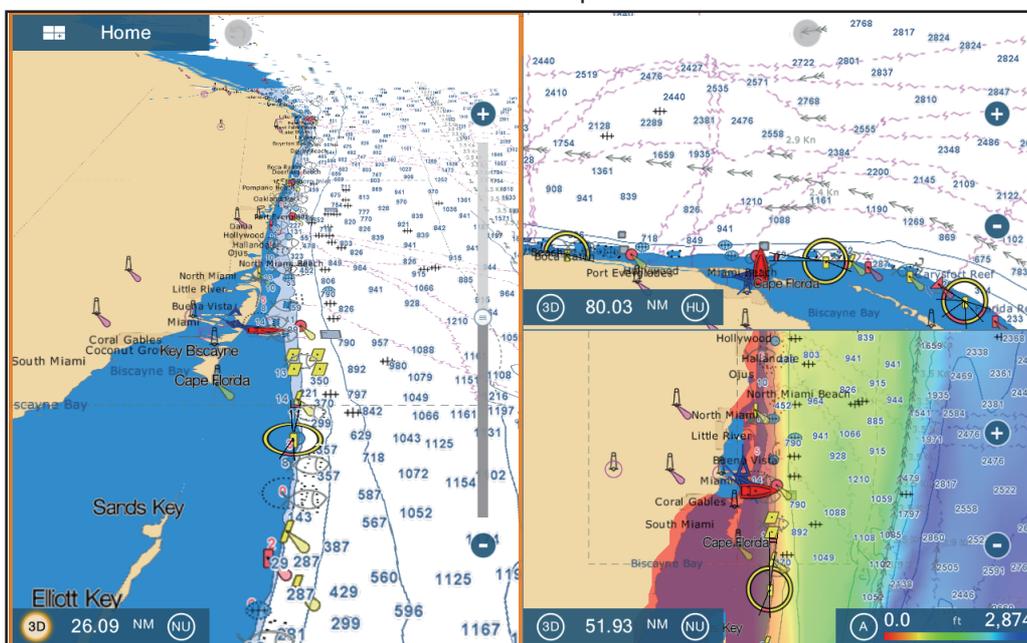
- AIS
- ARPA
- Display range
- Chart orientation
- Chart type
- Scroll the chart
- Overlays (radar, sat photo, depth shading, tide icon, tidal current, ACCU-FISH™ (see section 7.11), points, routes, tracks)
- 2D and 3D: Independent orientation (2D, 3D) and view point (3D) are possible.

Plotter display 2

Display range: 80.03 NM

Orientation: Head-up

Perspective: 2D



Plotter display 1

Display range: 26.09 NM

Orientation: North-up

Perspective: 3D

Plotter display 3

Display range: 51.93 NM

Orientation: North-up

Perspective: 2D

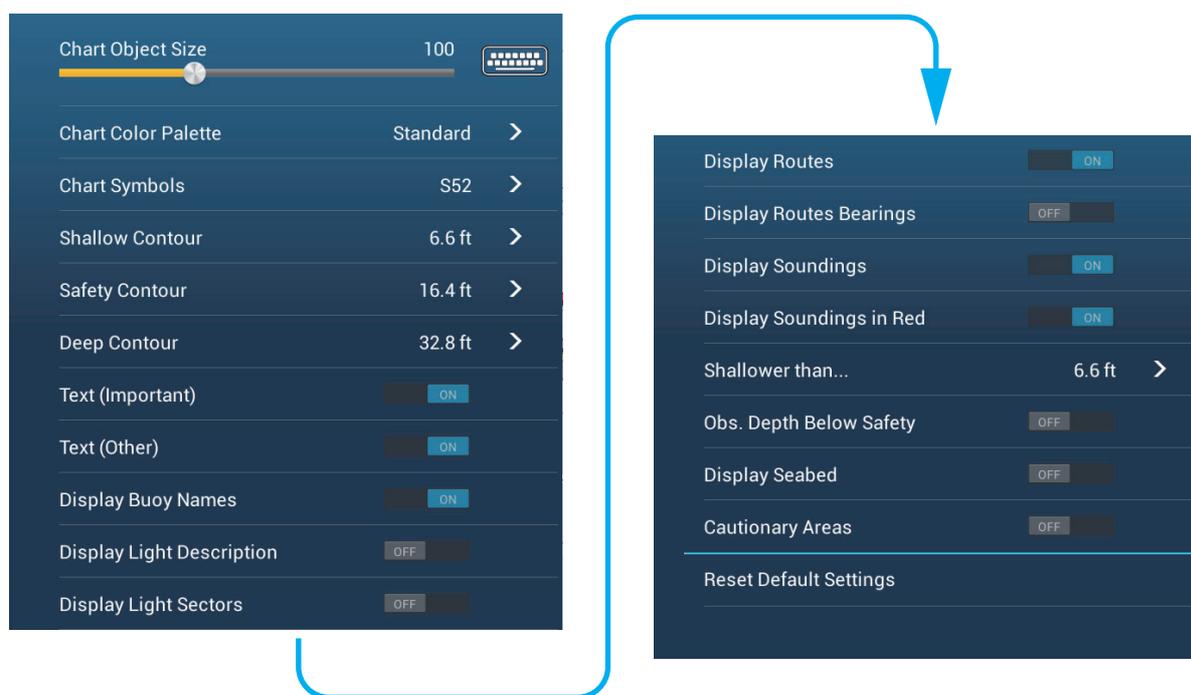
Overlay: Depth shading

2.9 Cartographic Text and Objects on Vector Charts

This section shows you how to show or hide the cartographic objects and text information that appear on the vector charts.

2.9.1 Control visibility of text and object information in vector charts

The [Settings] - [Vector Chart] menu controls the visibility of text and object information, for example, buoy names and light description.



[Chart Object Size]: Drag the slider to set the chart object size (setting value: 50 to 200%).

[Chart Color Palette]: Set the chart color pattern. [Standard] is this equipment's original color palette, [S-52] complies with the official S-52 charts, and [Sunlight] provides a high contrast palette.

[Chart Symbols]: Select the chart symbol type. [S-52] are the official IMO symbols (also referred to as simplified symbols) library for ECDIS. [International] symbols are the copy of paper chart symbols of IALA symbols library (US symbols library).

[Shallow Contour]: Set the shallow depth (setting range: 0.0, 3.3, 6.6, 9.8, 13.1, 16.4, 19.7, 23.0, 26.2, 29.50, 32.8 ft). Show shallow depth contours in dark blue.

[Safety Contour]: Set the safety depth (setting range: 0.0, 3.3, 6.6, 9.8, 13.1, 16.4, 19.7, 23.0, 26.2, 29.50, 32.8, 49.2, 65.6, 98.4, 164 ft). Show safety depth contours in medium blue.

[Deep Contour]: Set the deep depth (setting range: 0.0, 3.3, 6.6, 9.8, 13.1, 16.4, 19.7, 23.0, 26.2, 29.50, 32.8, 49.2, 65.6, 98.4, 164, 328, 656, 984, 1,640 ft). Show deep-depth contours in light blue. Depths greater than set here are shown in white.

[Text (Important)]: Show or hide the important text information.

[Text (Other)]: Show or hide the other text information.

[Display Buoy Names]: Show or hide the buoy names.

[Display Light Description]: Show or hide the light descriptions.

[Display Light Sectors]: Show or hide light sectors for fixed beacons.

[Display Routes]: Show or hide routes.

[Display Routes Bearings]: Show or hide route bearings.

[Display Soundings]: Show or hide depth soundings.

[Display Soundings in Red]: Spot soundings whose depths are lower than the value selected on the [Shallower than...] menu are shown in red.

[Shallower than ...]: Select the value for the [Display Soundings in Red] menu (setting range: 0.0, 3.3, 6.6, 9.8, 13.1, 16.4, 19.7, 23.0, 26.2, 29.50, 32.8, 49.2, 65.6, 98.4 ft).

[Obst. Depth Below Safety]: Show or hide obstruction depths under the safety depths.

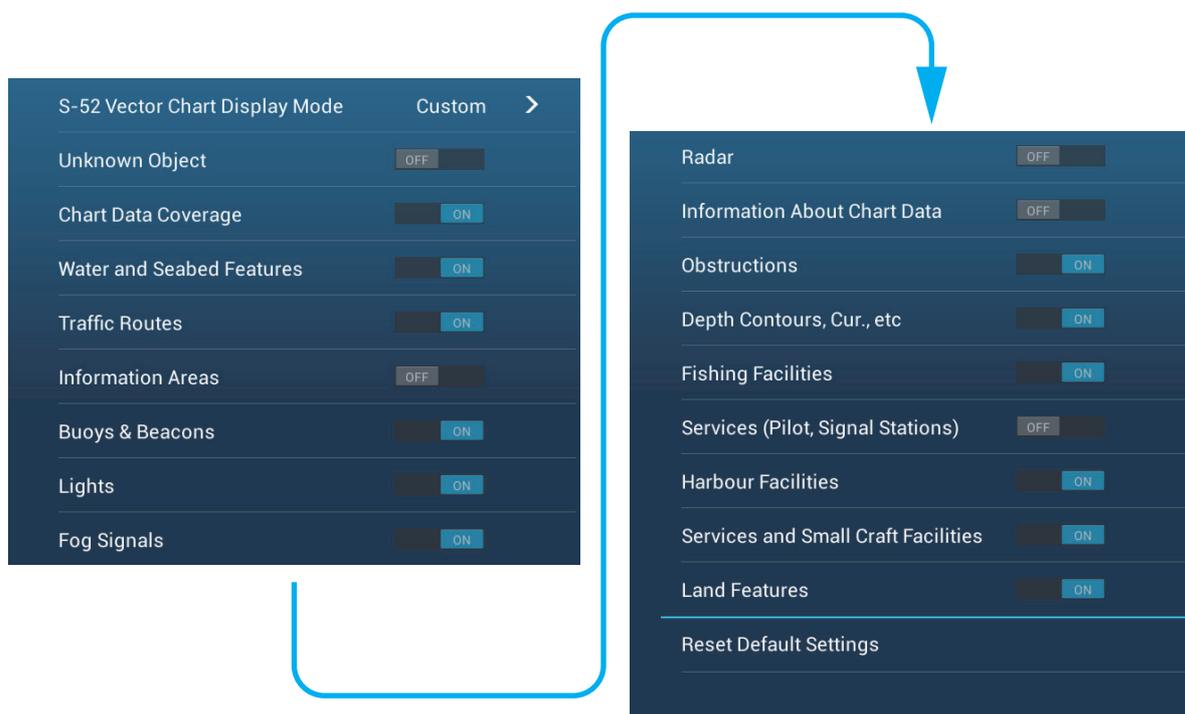
[Display Seabed]: Show or hide seabed composition indication, for example, mud, sand, rock.

[Cautionary Areas]: Show or hide the cautionary areas that appear on the chart.

[Reset Default Settings]: Select this menu item to restore default settings for the [Vector Chart] menu.

2.9.2 Control visibility of cartographic objects in S-52 charts

The [Settings] - [S-52 Display] menu controls the visibility of S-52 cartographic objects, for example, lights and fog signals.



2. PLOTTER

[S-52 Vector Chart Display Mode]: Set the level of information to show on the chart. The selections are [Custom], [Base], [Standard], [Other], and [Fishing]. The chart features are turned on or off according to setting.

Note: The following menu items except [Reset Default Settings] are unavailable when you select the mode other than [Custom]

[Unknown Object]: Show or hide unknown objects that appear on the chart.

[Chart Data Coverage]: Show or hide the geographic names and geographic objects.

[Water and Seabed Features]: Show or hide the water and seabed presentation.

[Traffic Routes]: Show or hide the marine traffic routes.

[Information Areas]: Show or hide the information areas that appear on the chart.

[Buoys & Beacons]: Show or hide the buoys and beacons.

[Lights]: Show or hide the sector of light that a fixed beacon shines.

[Fog Signals]: Show or hide the structure that sends a fog signal.

[Radar]: Show or hide the radar buoy.

[Information About Chart Data]: Show or hide the chart data information.

[Obstructions]: Show or hide obstructions (wrecks, etc.)

[Depth Contours, Cur., etc]: Show or hide the depth contours, tidal currents and magnetics.

[Fishing Facilities]: Show or hide the location of fishing facilities.

[Services (Pilot, Signal Stations)]: Show or hide the location of pilots and signal stations.

[Harbour Facilities]: Show or hide the location of harbour facilities.

[Services and Small Craft Facilities]: Show or hide the services for ship and small craft.

[Land Features]: Show or hide the cartographic features that are shown on land.

[Reset Default Settings]: Select this menu item to restore default settings for the [S-52 Display] menu.

2.10 Alarms

The various plotter alarms alert you (with audiovisual alarms) when the conditions specified are met. These alarms are:

- Anchor watch alarm
- Depth alarm
- Sea surface temperature alarm
- Speed alarm
- XTE alarm

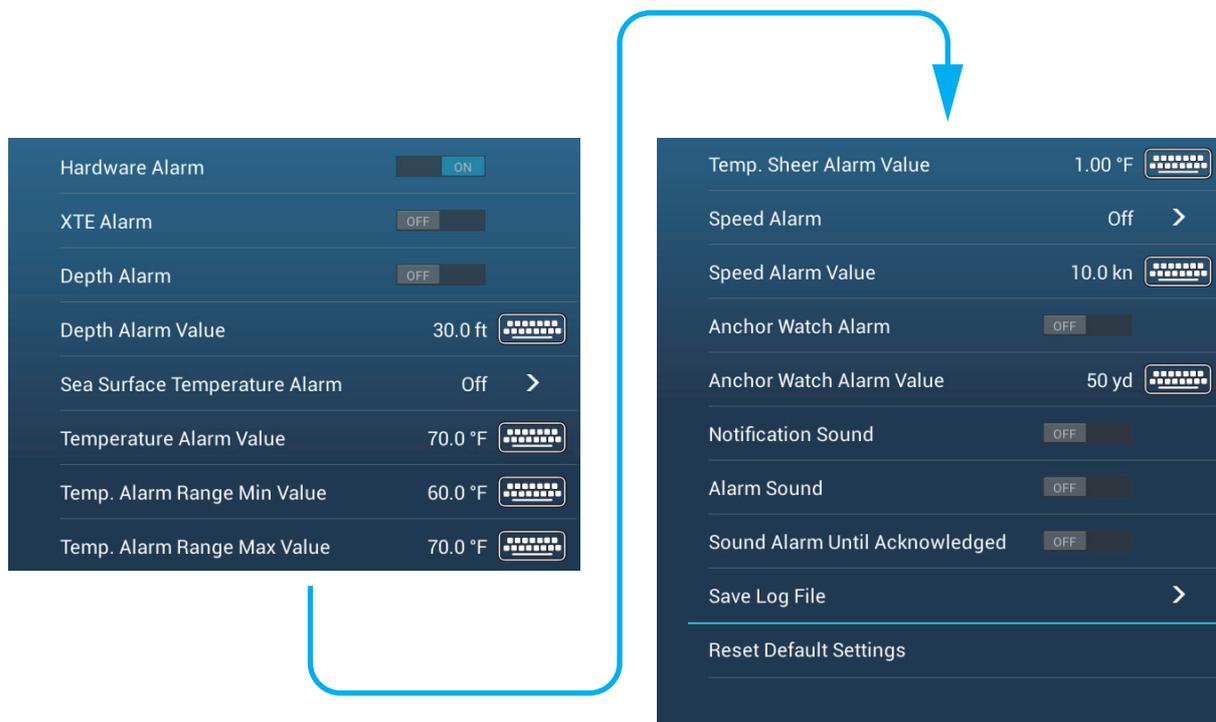
When an alarm is generated, the name of the offending alarm appears in the status bar at the top of the screen and flashes. If [Alarm Sound] ([Alarm] menu) is active, the unit beeps. To stop the flashing and silence the audio alarm, tap the status bar. The indication remains on the screen until the cause of the alarm is removed or the alarm itself is disabled.



Note: If [Sound Alarm Until Acknowledged] is set for [OFF], the unit continues to beep until the cause of the alarm is removed.

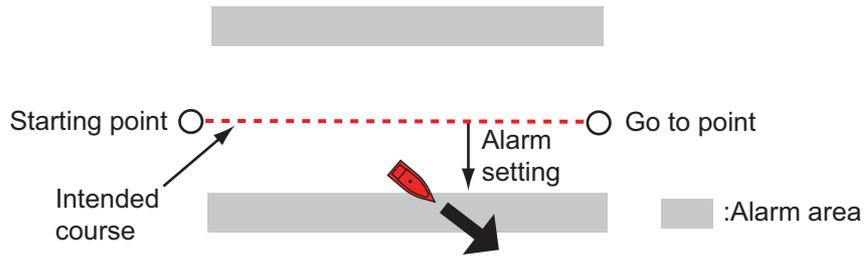
How to open the [Alarm] menu

1. Open the home screen, then tap [Settings] - [Alarm].



2.10.1 XTE alarm

The XTE alarm tells you when your ship goes off course by more than the limit set (XTE alarm boundaries).



1. Turn on [XTE Alarm] in the [Alarm] menu.
2. Tap [XTE Alarm Value] to display the software keyboard.
3. Set the value, then tap ✓.
4. Tap the close button to finish.

2.10.2 Depth alarm

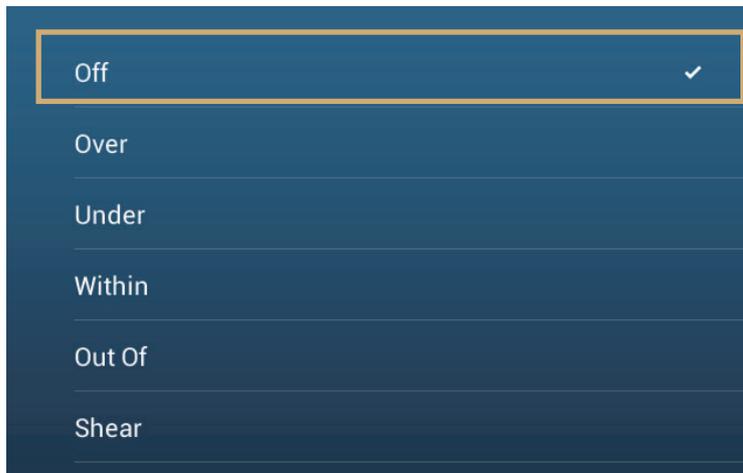
The depth alarm tells you when the depth to the bottom is shallower than the value you set. Requires depth data.

1. Turn on [Depth Alarm] in the [Alarm] menu.
2. Tap [Depth Alarm Value] to display the software keyboard.
3. Set the value, then tap ✓.
4. Tap the close button to finish.

2.10.3 SST alarm

The sea surface temperature alarms tells you when the sea surface temperature is over, under, within, or out of range of the temperature you set. Requires a temperature sensor.

1. Tap [Sea Surface Temperature Alarm] on the [Alarm] menu.



2. Tap [Over], [Under], [Within], [Out of] or [Shear]. Follow the appropriate procedure below.

[Over] or [Under]

The [Over] or [Under] alarm sounds when the temperature is over or under the set value, respectively.

- 1) Tap [Temperature Alarm Value] to display the software keyboard.
- 2) Set the value, then tap ✓. Go to step 3.

[Within] or [Out of]

The [Within] or [Out of] alarm sounds when the temperature is within or out of the temperature range set, respectively.

- 1) Tap [Temp. Alarm Range Min Value] to display the software keyboard.
- 2) Set the minimum value, then tap ✓.
- 3) Tap [Temp. Alarm Range Max Value] to display the software keyboard.
- 4) Set the minimum value, then tap ✓. Go to step 3.

[Shear]

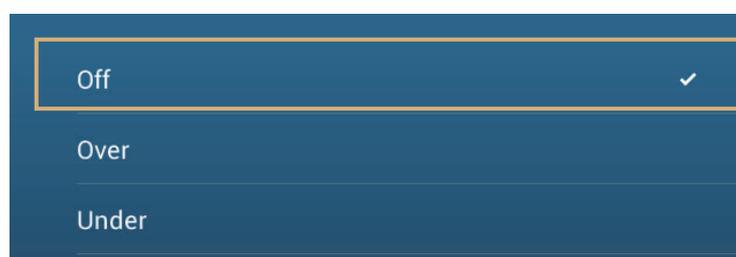
The shear alarm sounds when the temperature exceeds the alarm setting for one minute.

- 1) Tap [Temp. Shear Alarm Value] to display the software keyboard.
- 2) Set the value, then tap ✓. Go to step 3.
3. Tap the close button to finish.

2.10.4 Speed alarm

The speed alarm tells you when the speed of your ship is over or under the limit set. Set the value at [Speed Alarm Value].

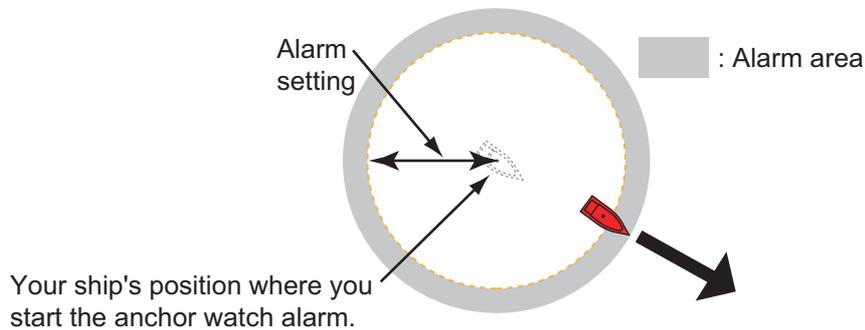
1. Tap [Speed Alarm] on the [Alarm] menu.



2. Tap [Over] or [Under].
3. Tap [Speed Alarm Value] to display the software keyboard.
4. Set the value for [Over] or [Under] then tap ✓.
5. Tap the close button to finish.

2.10.5 Anchor watch alarm

The anchor watch alarm tells you that your ship has moved a distance greater than the set value when the ship must not be moving.



1. Turn on [Anchor Watch Alarm] in the [Alarm] menu.
2. Tap [Anchor Watch Alarm Value] to display the software keyboard.
3. Set the value, then tap ✓.
4. Tap the close button to finish.

2.10.6 Other Alarm menu items

The followings are the alarm menu items not previously mentioned.

[Hardware Alarm]: This alarm alerts you when something is wrong with the hardware.

[Notification Sound]: Activate or deactivate the notification sound (for "Waypoint Crossing" (see section 5.8), "End of Route" (section 4.12) or fish finder alarms (section 7.10)).

[Alarm Sound]: Disable or enable the buzzer.

[Sound Alarm Until Acknowledged]: Turn this item on to sound the aural alarm until an alarm is acknowledged (see paragraph 2.10.7).

[Save Log File]: Save alert list to micro SD card.

[Reset Default Settings]: Select this menu item to restore default settings for the [Alarm] menu.

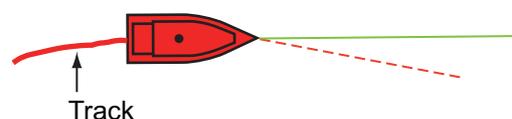
2.10.7 Alarms list

When an alarm is violated, you can see the name of the offending alarm on the [Alarms] list. The list stores both warning and system messages. Open the home screen, then tap [Lists] followed by [Alarms]. Active alarms are flashing and have a red vertical bar at the left margin. Tap an active alarm to acknowledge it and stop the flashing. Acknowledged alarms appear in the [HISTORIC] section. Tap the close button to close the list.

ACTIVE		
Speed Alarm	1/1/2014	12:10:48 PM
Anchor Alarm	1/1/2014	12:10:18 PM
HISTORIC		
Depth Alarm	1/1/2014	12:04:32 PM

2.11 Track

The track (or movement) of your ship is plotted on the screen with position data fed from the internal GPS navigator. Your track lets you see how your ship has moved over time.



The track is saved to the hard disk if track recording is activated. A line runs between each track point. The hard disk stores a maximum of 30,000 track points.

Your track remains on the screen when the power is turned off. You can delete all or a part of the track from the pop-up menu. All tracks can also be deleted from [Ship & Track] menu.

2.11.1 How to start, stop recording the track

Start recording

Open the slide-out menu or tap the boat icon, then turn [Track] on.

Stop recording

Method 1: Tap the track, then tap [Stop Track].

Method 2: Open the slide-out menu or tap the boat icon, then turn [Track] off.

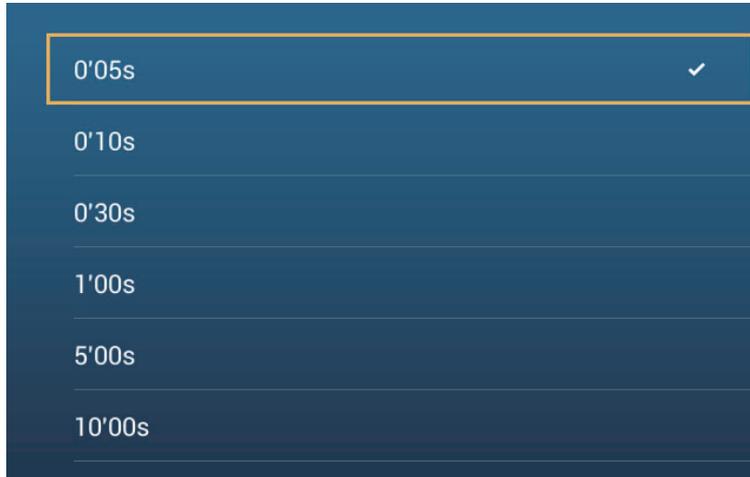
2.11.2 How to show or hide the track display

Open the [Layers] menu and turn [Tracks] on or off.

2.11.3 Track recording interval

In drawing the track, the position of your ship is stored into the memory of this unit at an interval of time. A shorter interval provides better reconstruction of the track, but the storage time of the track is reduced.

1. Open the home screen, then tap [Settings] - [Ship & Track].
2. Tap [Track Interval].



3. Tap a time interval.
4. Tap the close button to finish.

2.11.4 Track color

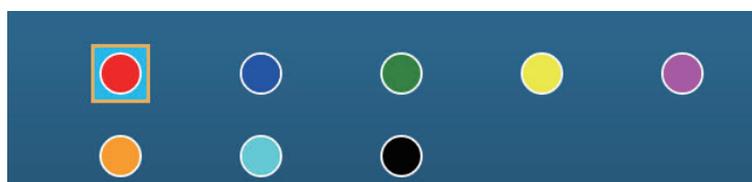
Track can be displayed in a single color or multiple colors. For multiple colors, you can display the track according to one of the conditions shown below.

- Depth
- SST Range
- SST Variation
- Speed
- Bottom Discrimination

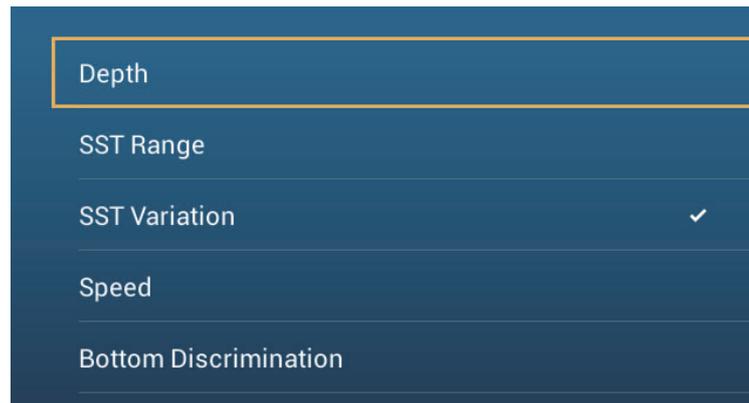
Note: The bottom discrimination method requires a bottom discrimination capable transducer - bottom discrimination sounder BBDS1, or network sounder DFF1-UHD.

From the home screen

1. Open the home screen, then tap [Settings] - [Ship & Track].
2. Tap [Track Color].
3. Tap [Fixed] or [Variable]. Tap “>” to go back one layer. For [Fixed], go to the next step. For [Variable], go to step 5.
4. Tap [Fixed Color Setup] then tap a color. Go to step 10.



5. Tap [Variable Color] then tap an option.



[Depth]: Change the color of the track with depth.

[SST Range]: Change the color of the track with change in sea surface temperature.

[SST Variation]: Change the color of the track according to variation in sea surface temperature. The following is an example.

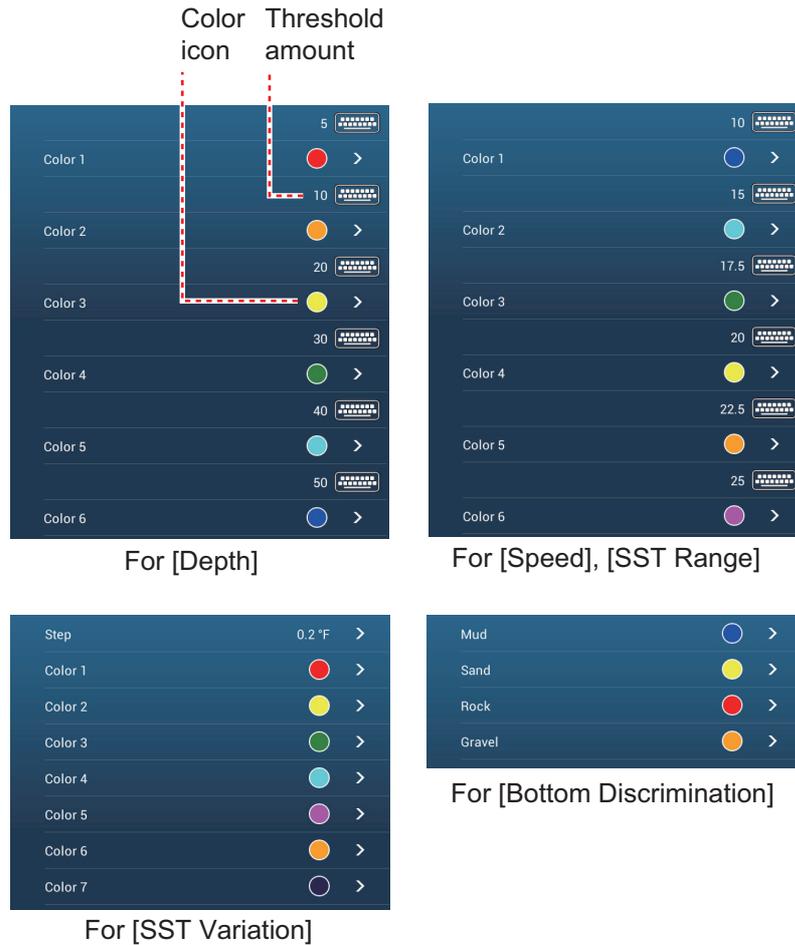
<u>Temperature range (°F)</u>	<u>Color</u>
16.60 - 16.80	Red
16.81 - 17.00	Yellow
17.01 - 17.20	Green
17.21 - 17.40	Light-blue
17.41 - 17.60	Purple
17.61 - 17.80	Orange
17.81 - 18.00	Blue
18.01 - 18.20	Red
18.21 - 18.40	Yellow
18.41 - 18.60	Green

[Speed]: Change the color of the track with speed.

[Bottom Discrimination]: Change the color of the track with bottom sediment.

2. PLOTTER

6. Tap [Variable Color Setup].



- For [Bottom Discrimination], tap [Mud], [Sand], [Rock] or [Gravel]. For others, tap a color (seven choices).
- Tap a color for each menu item.

[Depth]: Set the color for each depth range. For example, when the red icon is selected in [Color 1], the track is red for depths from 5 to 10 ft.

[SST Range]: Set the color for each range of sea surface temperature. For example, when the blue icon is selected in [Color 1] (temperature range: 10 to 15°F), the track is blue for temperatures from 10 to 15°F.

[SST Variation]: Set the color for each temperature variation. Tap [Step 0.2°F], then set each color. Do the same for [Step 2.0°F].

[Speed]: Set the color for each speed range. For example, when the blue icon is selected in [Color 1], the track is blue for speed from 0 to 5 kn.

[Bottom Discrimination]: Set the color for each bottom sediment. For example, when the blue icon is selected in [Mud], the track where mud is found is blue.

For [Depth], [SST Range], [SST Variation] and [Speed], you can change the threshold amount for each color. Tap a threshold amount to display the software keyboard. Set the value, then tap ✓.
- Tap [Close].
- Tap the close button to finish.

On the screen

1. Tap a section of track to display the pop-up menu.
2. Tap [Color].
3. Tap a color.

2.11.5 Track thickness

You can set the thickness of the track. If you are following the same track many times, you can show the track in the thinnest width to prevent overlapping of track.

1. Open the home screen, then tap [Settings] - [Ship & Track].
2. Drag the slider at [Track Thickness] to set the level. (The thickness can also be set with the software keyboard. Tap the keyboard in the [Track Thickness] field then enter desired thickness.)
3. Tap the close button to finish.

2.11.6 How to delete tracks

If the screen becomes full of track, you can not know which is the newer track. Delete the track you do not need.

How to delete a specific part of a track

You can delete a track partially. Tap the part of a track to delete. Tap [Del From Here] or [Delete Up to Here].

How to delete all tracks

1. Open the home screen, then tap [Settings] - [Ship & Track].
2. Tap [Delete All Tracks] on the [TRACK] window. The message "THIS ACTION WILL PERMANENTLY DELETE ALL TRACK..." appears.
3. Tap [OK].
4. Tap the close button to finish.

Automatic deleting of tracks

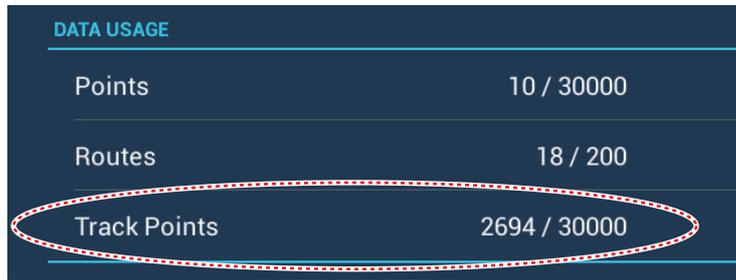
The hard disk stores a maximum of 30,000 track points. When the memory for track points becomes full, the equipment can automatically delete the oldest track points to get space for new track points. To get automatic deletion of track do as follows:

1. Open the home screen, then tap [Settings] - [Ship & Track].
2. Turn [Automatic Track Deleting] on or off.
3. Tap the close button to finish.

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2.11.7 How to find the number of track points used

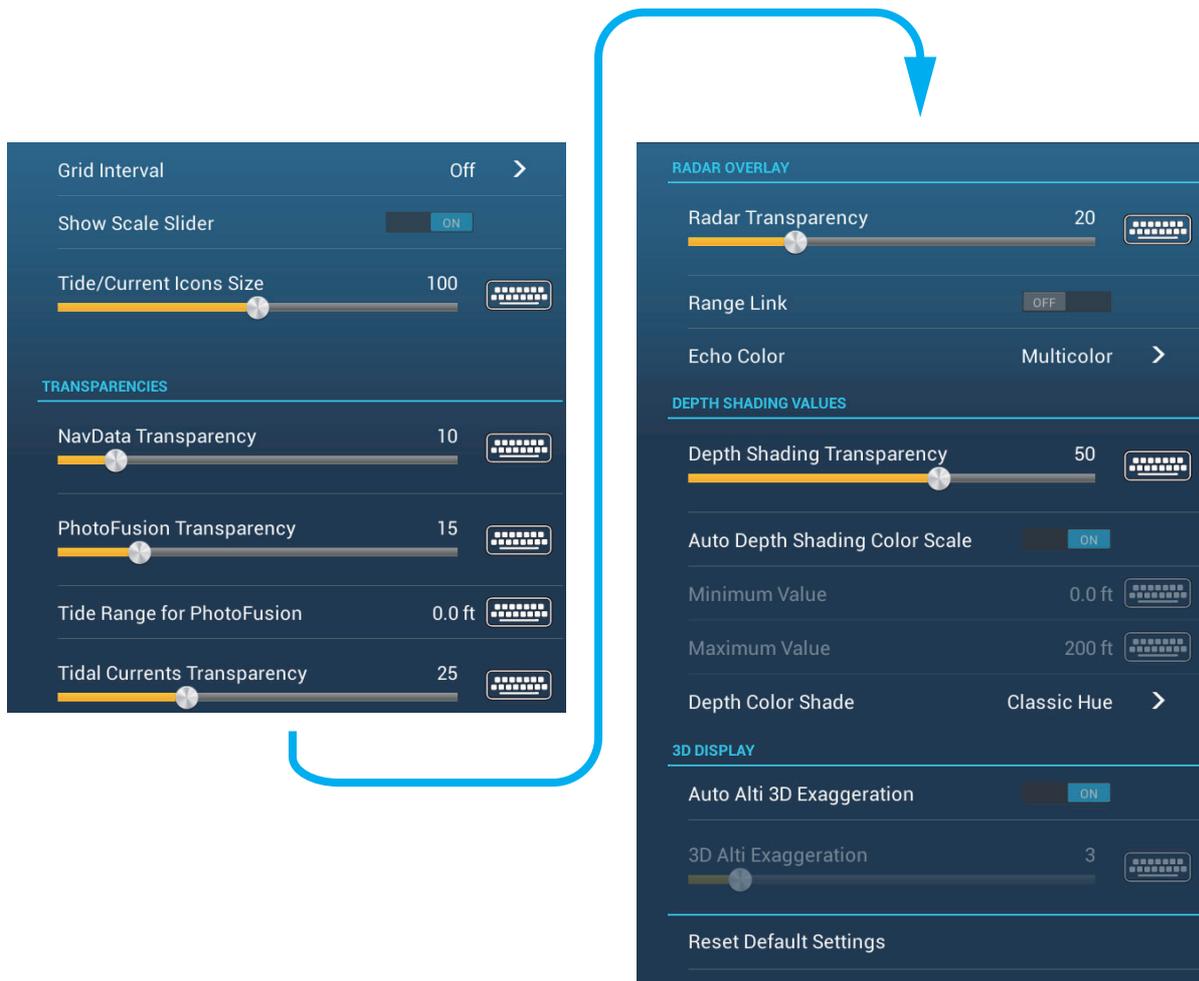
On the home screen, tap [Settings] - [General]. Find [Track points] in the [DATA USAGE] section. In the example below, 2,694 track points out of 30,000 have been used.



DATA USAGE	
Points	10 / 30000
Routes	18 / 200
Track Points	2694 / 30000

2.12 Plotter Menu

This section describes the [Plotter] menu items, which are in the [Settings] - [Plotter] menu.



[Grid Interval]: Set the distance between grid lines. The options are [Off] (no lines), [Very Small], [Small], [Medium], [Large], and [Very Large].

[Show Scale Slider]: Show or hide the scale slider.

[Tide/Current Icons Size]: Set the size of the icon for tide and current.

[Transparencies]

[NavData Transparency]: Set the degree of transparency for the navdata display.

[PhotoFusion Transparency]: Set the degree of transparency for the satellite photo overlay.

[Tide Range for PhotoFusion]: Set the degree of transparency for the tide range in the satellite photo overlay.

[Tidal Currents Transparency]: Set the degree of transparency for the tidal currents display.

[Radar Overlay]

[Radar Transparency]: Set the degree of transparency for the radar echo.

[Range Link]: Activate or deactivate matching the overlay with radar ranges.

[Echo Color]: Tap the color for the radar echo.

Depth Shading Values

[Depth Shading Transparency]: Set the degree of transparency for the depth shading overlay.

For the menu items shown in the table, see the mentioned section.

Menu item	Reference
<u>[3D Display]</u> <ul style="list-style-type: none"> • [Auto 3D Alti Exaggeration] • [3D Alti Exaggeration] 	See paragraph 3.1.2.
<u>[Depth Shading Values]</u> <ul style="list-style-type: none"> • [Auto Depth Shading Color Scale] • [Minimum Value] • [Maximum Value] • [Depth Color Shade] 	See paragraph 3.2.1.

[Reset Default Settings]: Tap this menu item to restore default settings for the [Plotter Display] menu.

2.13 NAVpilot-700 Series Auto Pilot

This section shows you to how to enable use of the NAVpilot with your system. For how to use the NAVpilot to steer to a point, see paragraph 4.12.4.

The FURUNO NAVpilot-700 Series Auto Pilot installs in the NavNet TZtouch2 network to get automatic steering when going to a point or a route. The following NAVpilot functions can be controlled from a NavNet TZtouch2 display:

- Control operation of the NAVpilot from this equipment.
- Select the NAVpilot steering mode (Auto or Nav).

Note: When an alarm message for the NAVpilot appears, check the control unit of the NAVpilot.

2.13.1 How to enable use of the NAVpilot

Open the [Settings] - [Routes] menu, then turn on [Navigate with AutoPilot]. When you set a route or point as destination, the message "Do you want to navigate using the NAVpilot?" appears.

2.13.2 How to show the NAVpilot control box in the data area

1. Tap [DATA] or [ROUTE] on the data area to select where to show the NAVpilot-control box.
2. Tap a data box or an unoccupied area to select where to show the NAVpilot control box. A pop-up menu appears.
3. Tap [NavPilot] to show the NAVpilot control box in the area selected.



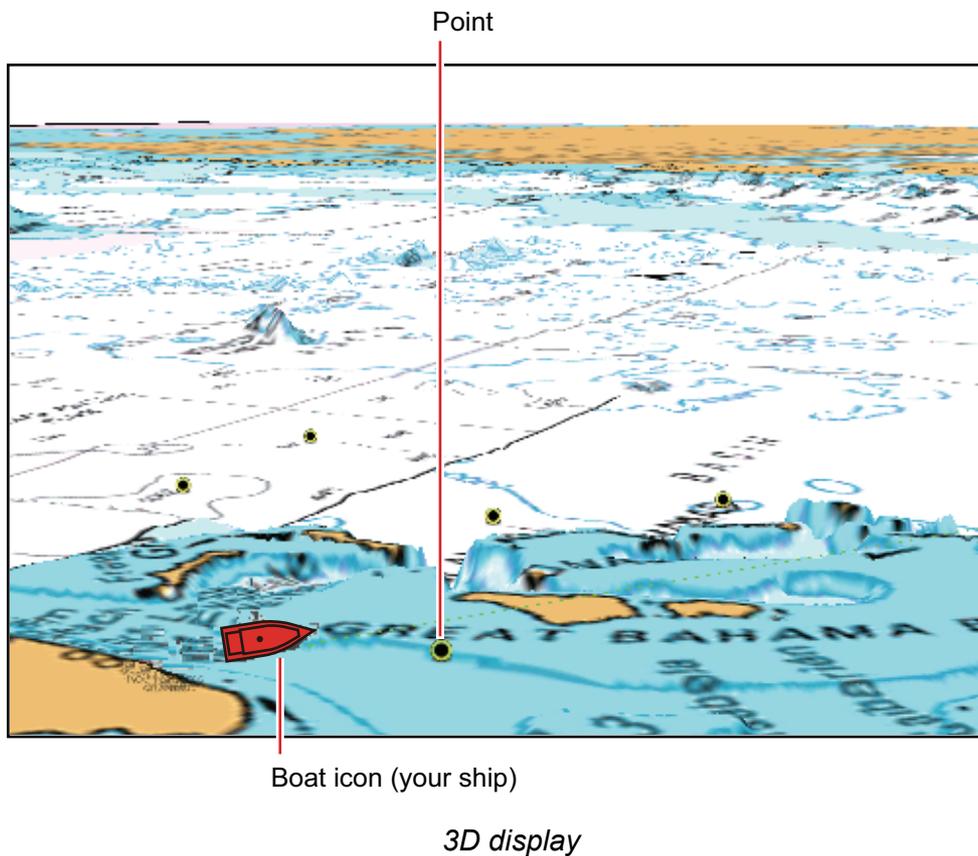
3. 3D DISPLAY, OVERLAYS

3.1 3D Display

The 3D display has native 3D chart design that allows full time 3D presentation. This true 3D environment gives you all of the information you require with no restrictions on the information you can see. You can plan your routes, enter points, etc. like on the 2D chart.

The 3D display provides a 3D view of land and sea around your ship. The 3D display has most of the same information as the 2D display. With both presentations available you can see the conditions around your ship from different angles. The 3D display helps you navigate when you are in waters that you do not know. Also, most functions of the 2D display, for example, destination setting, are available in the 3D display.

For best results make sure you have accurate position and heading data.

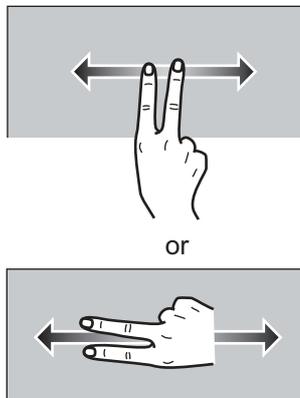


3.1.1 How to activate the 3D display

1. To switch between the 2D and 3D displays, tap the 2D/3D switch at the bottom left corner on the screen or drag upward as shown below. The icon is filled in white when the 3D display is active.

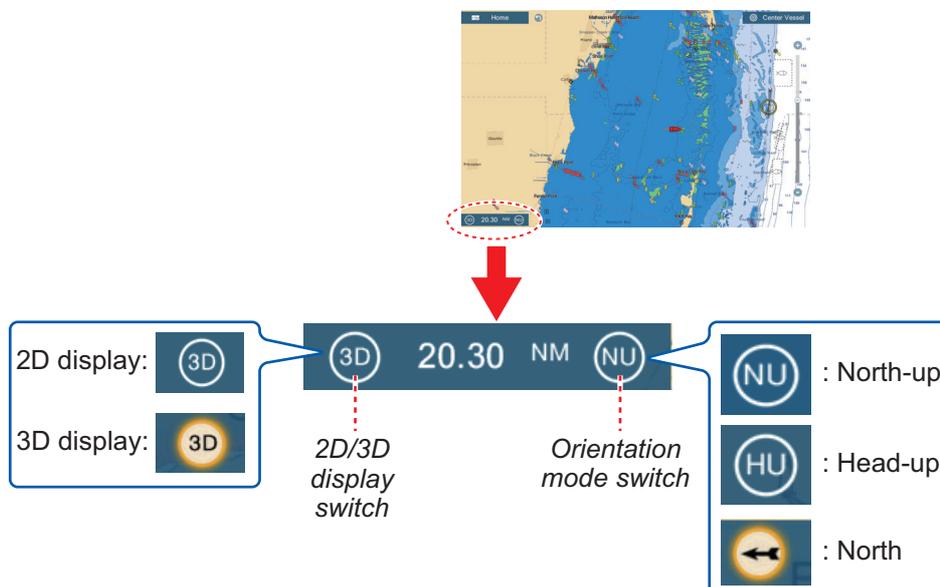


2. Tap the orientation mode switch to select an orientation mode.
3. Orientate the 3D display by dragging leftward or rightward with two fingers.



The 2D/3D display switch, orientation mode switch

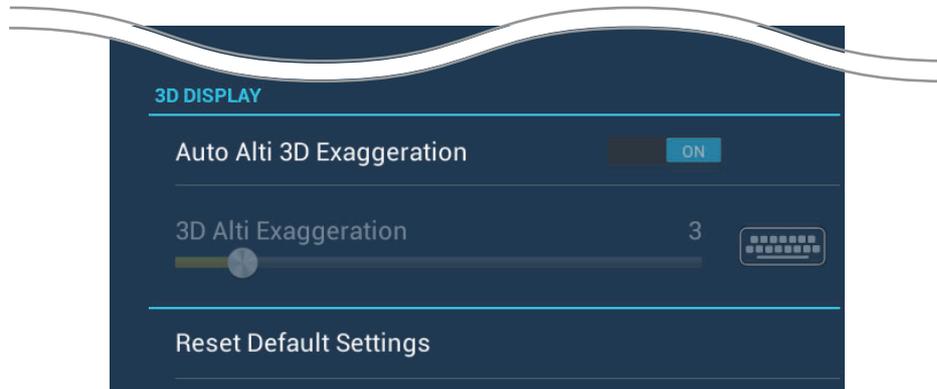
The 2D/3D display switch alternates the 2D and 3D displays. The orientation mode switch selects the orientation, North up or Head up. In the North up mode, North is at 0°. When you change the viewpoint on the 3D display, the orientation mode switch shows the “North” icon. The arrow on the icon points toward North. To switch to North-up orientation, tap the switch.



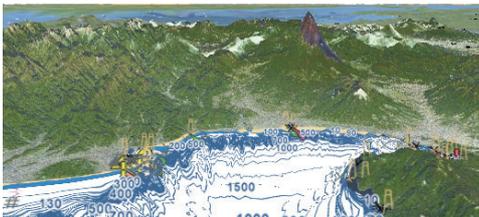
3.1.2 How to make the 3D view clearer

In the 3D display, some topographical features are easier to see if you use the 3D exaggeration feature. This feature expands both objects on the chart and the underwater vertically so that you can easily see the shape of the objects and position. There are two methods for 3D exaggeration: automatic and manual.

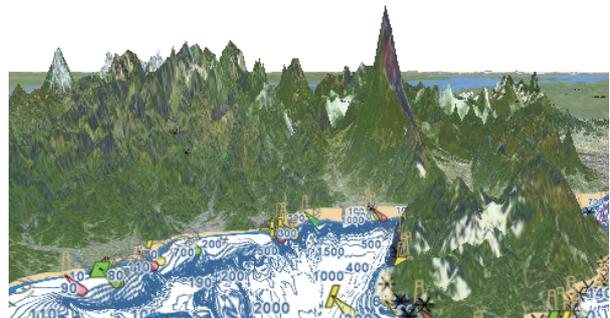
1. Open the home screen, then tap [Settings] - [Plotter].
2. Find the [3D DISPLAY] section.



3. Automatic method:
Turn on [Auto Alti 3D Exaggeration].
Manual method:
Turn off [Auto Alti 3D Exaggeration]. Use the slider or software keyboard at [3D Alti Exaggeration] to set the exaggeration level.
High gives the highest level of exaggeration. The example below compares the same picture in low and high exaggerations.



Low exaggeration



High exaggeration

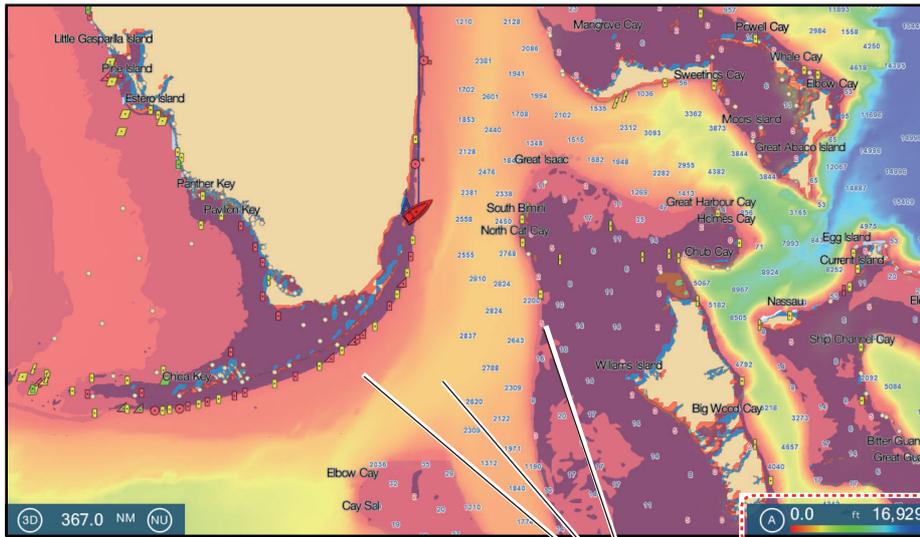
4. Tap the close button to finish.

3.2 Overlays

Five overlays are available for the plotter display: depth shading, satellite, radar, tide information, and tidal current.

3.2.1 Depth shading overlay

The depth shading overlay shows the depths in different color (the default settings are red (shallow), yellow (medium) and blue (deep)). This overlay is available in both 2D and 3D presentations. Use this overlay to find depths. To show the depth shading overlay, open the [Layers] menu then turn [Depth Shading] on or off.



Depth shading

OFF



ON



Minimum value Maximum value



0.0 ft 2,874

You can turn the automatic depth shading color scale adjustment on or off by tapping the "A".

OFF: Depth shading can be adjusted manually, with the range sliders.

ON: Depth shading set according to the depth shading values set in the menu.

Depth shading settings

The depth shading settings are in the [Plotter] menu.

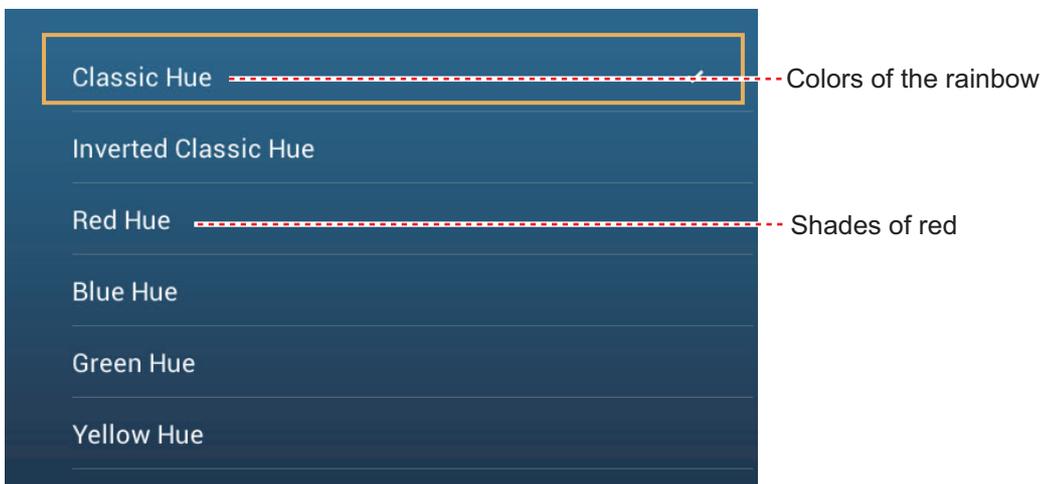


[Auto Depth Shading Color Scale]: Turn automatic depth shading color scale selection on or off.

[Minimum Value]: Set the minimum depth range for which to show depth shading, with the software keyboard. This is available when [Auto Depth Shading Color Scale] is set to [OFF].

[Maximum Value]: Set the maximum depth range for which to show depth shading, with the software keyboard. This is available when [Auto Depth Shading Color Scale] is set to [OFF].

[Depth Color Shade]: Select how to display the depth colors among [Classic Hue], [Inverted Classic Hue], [Red Hue], [Blue Hue], [Green Hue] and [Yellow Hue].

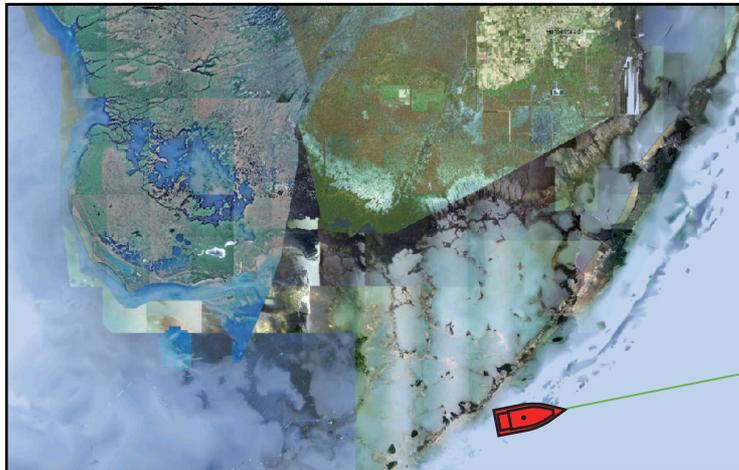


[Depth Shading Transparency]: Adjust the degree of transparency of the depth shading overlay.

3.2.2 Satellite photo overlay

You can put the satellite photo for your area on the 2D and 3D displays. Open the [Layers] menu then turn [Satellite Photo] on or off.

High resolution satellite images for the USA coastline are not provided standard, but are available at no cost (except shipping and handling). Users can install multiple satellite photos on the hard disk of the NavNet TZtouch2. The illustration below shows the vector chart with the satellite photo overlay.



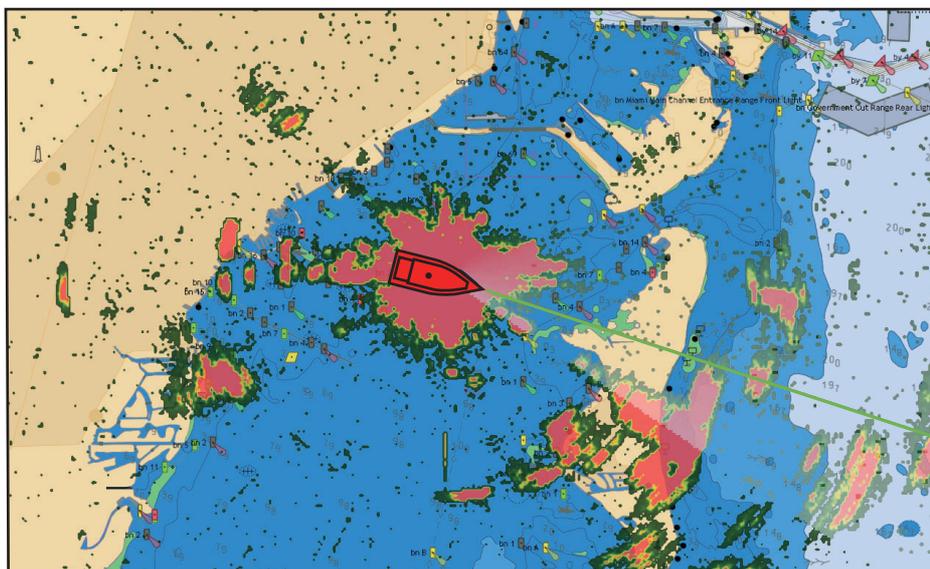
How to set satellite photo transparency on water

You can set the degree of transparency for the satellite photo on the water.

1. Open the home screen, then tap [Settings] - [Plotter].
2. Drag the slider at [PhotoFusion Transparency] to set the level (setting range: 0% to 80%).
3. Tap the close button to finish.

3.2.3 Radar overlay

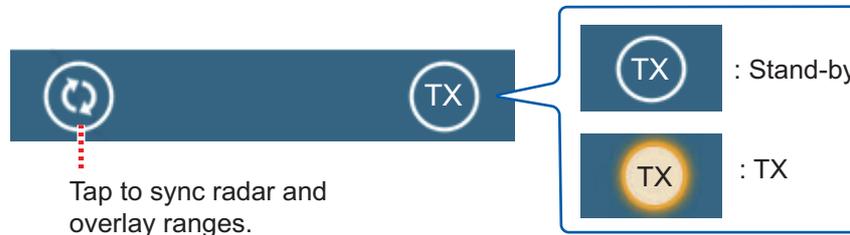
The radar overlay display puts the radar picture on the top of the navigation chart. To display the radar overlay, open the [Layers] menu, then turn on [Radar Overlay].



How to switch between stand-by and TX; match overlay and radar ranges

Tap the [TX] icon at the bottom right corner to set the radar in transmit or stand-by state. The icon is filled in white when the radar is transmitting; blue in stand-by.

To match overlay and radar ranges, open the home screen, tap [Settings] - [Plotter], then turn on [Range Link]. You can sync the ranges with the Sync icon (at the lower right corner) when [Range Link] is turned off.

**How to set the level of the radar echo transparency**

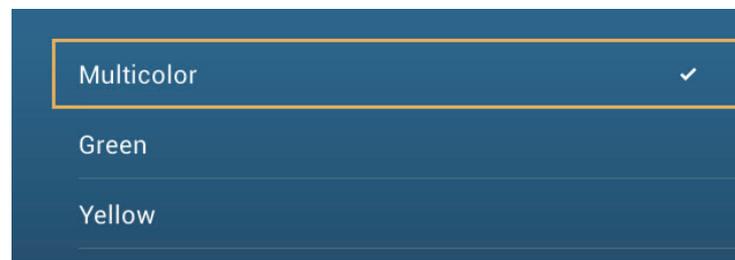
Open the home screen, then tap [Settings] - [Plotter]. Drag the slider at [Radar Transparency] to set the transparency level.

How to adjust radar gain, sea, rain

The gain and sea and rain clutters can be adjusted from the navigation data display. See sections 6.2, 6.3, 6.4, respectively.

How to select the echo color

Open the home screen, then tap Settings - [Plotter] - [Echo Color]. Tap [Multicolor], [Green] or [Yellow].

**How to acquire a target for ARPA**

A target can be acquired for ARPA. See paragraph 6.23.2.

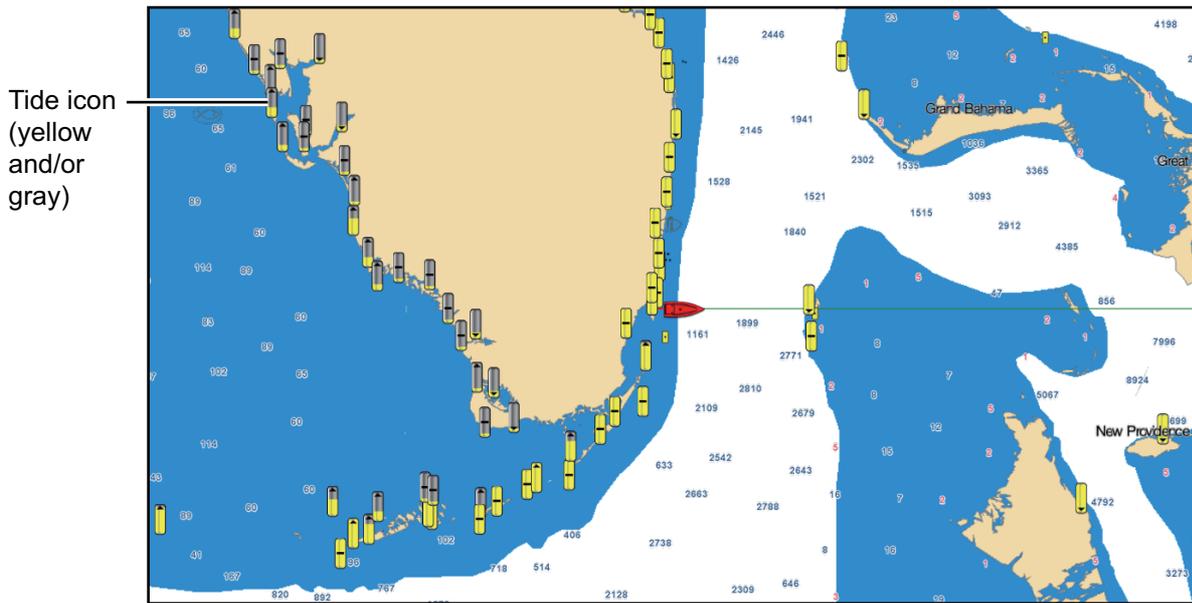
3.2.4 Tide info overlay

Your system carries worldwide tide information, shown with tide icons, which you can overlay on the plotter display. The tide icon () appears at the locations of tidal recording stations.

How to display the tide info overlay

Open the [Layers] menu, then tap [Tide Heights].

The arrow on the tide icon is up when the tide is high; down when the tide is low. The tide icon is gray and yellow according to the tide state. The tide icon is all yellow when the tide is high completely and all gray when the tide is low completely.



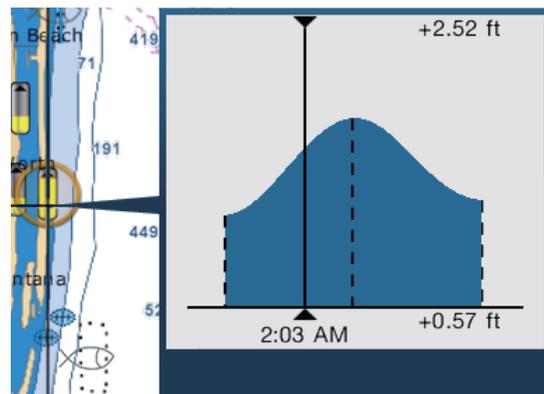
-  : Up arrow indicates the tide is going high.  : Down arrow indicates the tide is going low.
-   : No arrow indicates no change in tide.

How to change the size of the tide icon

1. Open the home screen, then tap [Settings] - [Plotter].
2. Drag the slider at [Tide/Current Icons Size] to set size (setting range: 50% to 150%).
3. Tap the close button to finish.

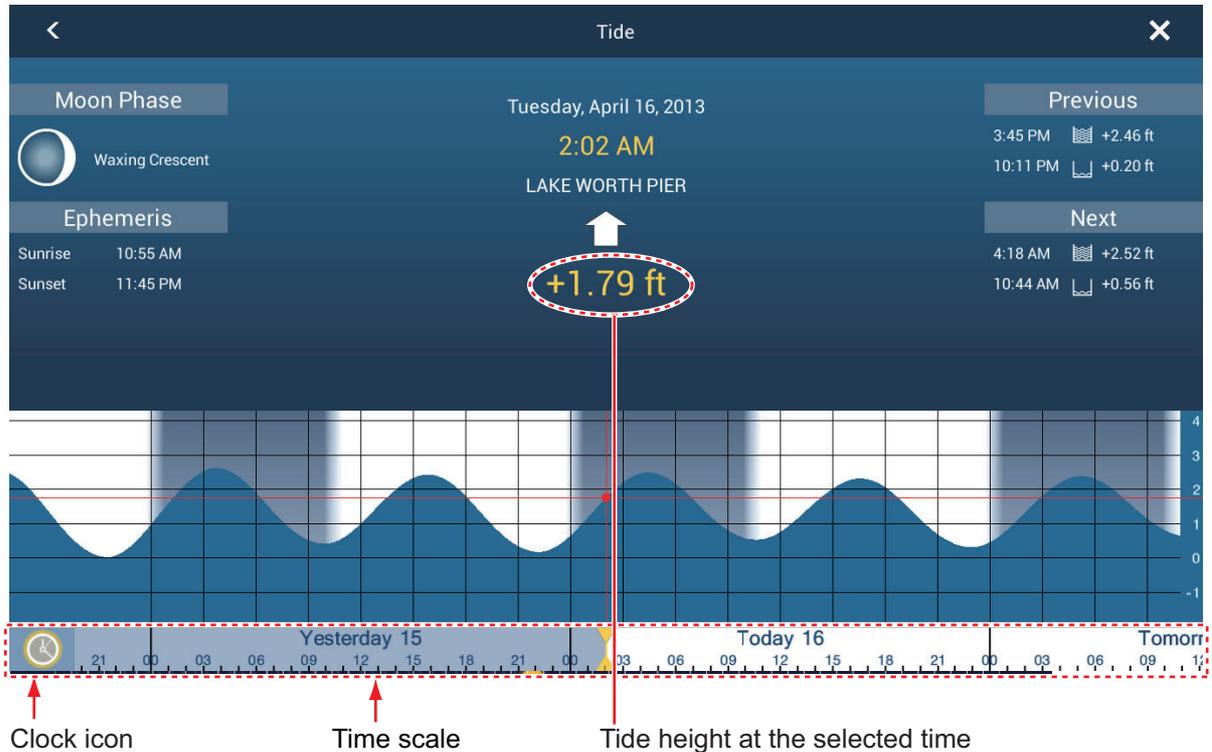
How to show the tide information

Tap a tide icon to display the tide height graphic in a pop-up window, an example of which is shown in the right figure.



How to display the tide graph

- Display tide graph for a tide station: Tap a tide icon then tap the pop-up window.
- Display tide graph for the tide station nearest the selected position: Tap the desired position on the chart, then tap [Info]. If a tide station is not within 35 NM of the location tapped, the tide graph does not appear.
- Display tide graph for the tide station nearest current position: Open the slide-out menu or the Home screen, then tap [Tide].



How to read the tide graph

- Vertical axis: Height, Horizontal axis: Time
- The information is mostly accurate under moderate weather conditions. However, storms and weather fronts can influence forecasted tide times and heights.
- Drag the time scale at the bottom of the screen sideways then read the tide height at the selected time (drag to the left to display the future information, right for the past information).
- To set the time scale to the current time, tap the clock icon at the bottom left-hand corner of the screen. The color of the clock mark turns gold.



Clock icon for the current time



Clock icon other than the current time

- To exit the screen, tap the close button.

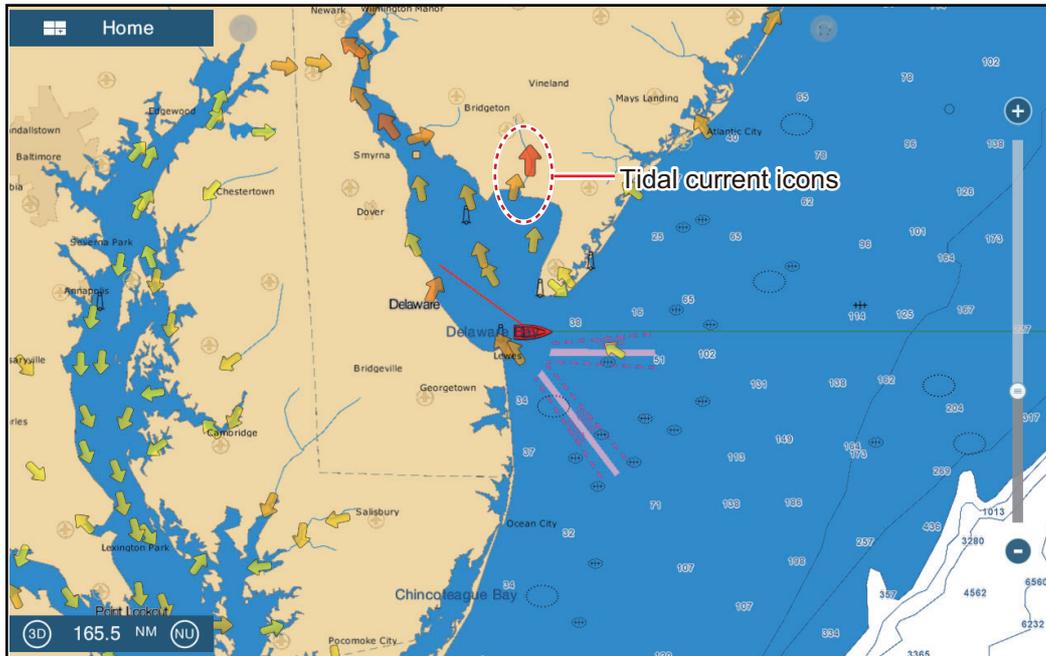
3. 3D DISPLAY, OVERLAYS

3.2.5 Tidal current overlay

The tidal current overlay is made from the tidal current data received from NOAA satellites, available in North America.

How to display the tidal current overlay

Open the [Layers] menu, then turn [Tidal Currents] on. Arrows of more than one color and size appear on the screen and are pointing in different directions.



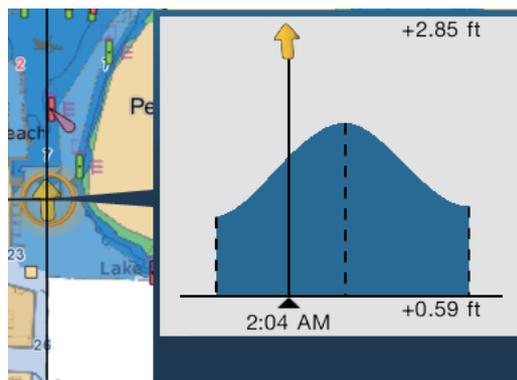
The arrows point in the direction of tidal current movement. The size and color of the arrows indicates the tidal current speed - yellow, slow; orange, medium; red, fast).

How to change the tidal current icon size

1. Open the home screen, then tap [Settings] - [Plotter].
2. Drag the slider at [Tide/Current Icons Size] to set size (setting range: 50% to 150%).
3. Tap the close button to finish.

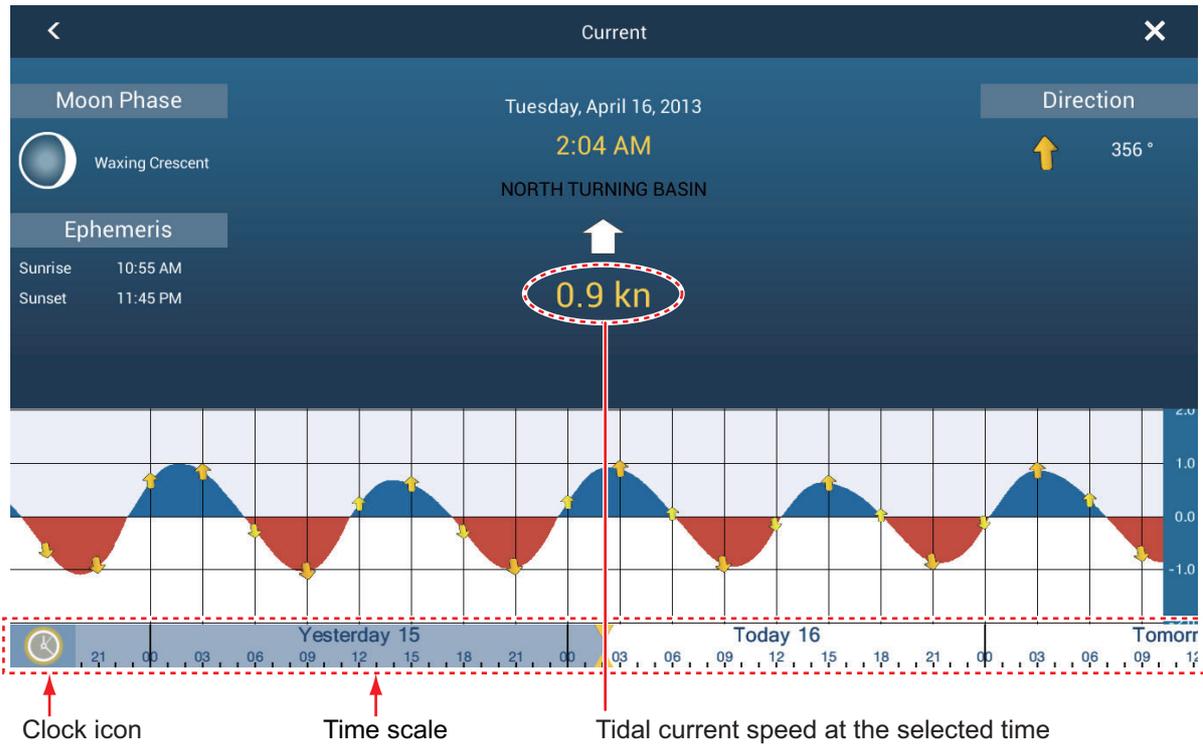
How to show the tidal current information

Tap a tidal current icon to display the tidal current information for the position selected. An example is shown below.



How to display the tidal current graph

Tap a tidal current icon to display the pop-up window. Tap the pop-up window to show the [Current] graph window



How to read the tidal current graph

- Vertical axis: Speed, Horizontal axis: Time
- The information is mostly accurate under moderate weather conditions. However, storms and weather fronts can influence forecasted tidal current directions and speeds.
- Drag the time scale at the bottom of the screen sideways then read the tidal current speed at the selected time (drag to the left to display the future information, right for the past information).
- To set the time scale to the current time, tap the clock icon at the bottom left-hand corner of the screen to show the clock mark in yellow-white.



Clock icon for the current time



Clock icon other than the current time

- To return to the plotter display, tap the Close icon at the top right-hand corner of the screen.

3. 3D DISPLAY, OVERLAYS

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4. POINTS, EVENT MARKS

4.1 About Points, Event Marks

In navigation terminology, a point is any location you mark on the plotter or radar display. A point can be a fishing spot, reference point and other important locations. You can use a point you have entered to set as a destination.

This unit has 30,000 points (including event marks) into which you can enter position information.

When you enter a point, on the plotter or radar display, the point is put on the screen with the point symbol selected as the default point symbol. The position of the point, symbol and color information are saved to the points list. You can show or hide the points, and the default setting shows all points.

Default point symbol (black circle in yellow circle) 

An event mark is used to mark current position on the plotter, radar and sounder displays. When you enter an event mark, it is entered on all of the above-mentioned displays, with the event mark icon selected. The default event marks are shown in the right figure. You can change them with the “default event symbol” items in the [Points] menu.



You can edit points and event marks on the screen from the points list.

Note 1: Event marks are handled the same as points.

Note 2: Points can be shared with other NavNet TZtouch2 units via LAN. Data is shared automatically; no operation is required.

4.2 How to Enter a Point, Event Mark

4.2.1 How to enter a point (plotter and radar displays only)

Method 1: Selected position

1. Tap the position on the screen where to put a point.
2. Tap [New Point] on the pop-up menu.

The default point symbol is put at the position selected. The point is saved to the points list.

Method 2: At own ship position

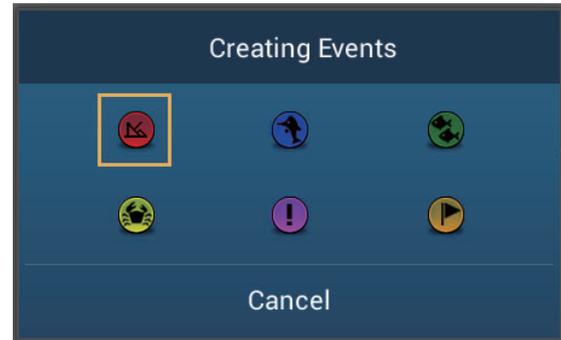
Open the slide-out menu, then tap [Lat/Lon]. The position shown is your current position. Edit the position if necessary. Tap ✓ to enter the point and close the keyboard.

4.2.2 How to enter an event mark

Method 1: Function gesture

This function is available by touch control when you tap [Event] in [Settings] - [General] - [Function Gesture] (see section 1.15).

1. Tap the screen with two fingers to show the [Creating Events] pop-up menu.
2. Tap required event mark.



The following occurs.

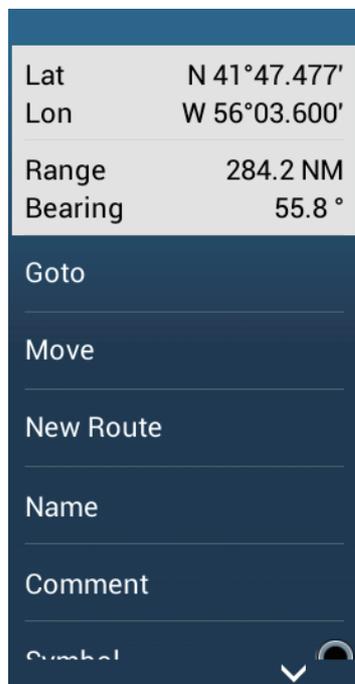
- The selected mark is put at the own ship position, on the plotter, radar and sounder displays, at the moment the mark was selected.
- The event mark is saved to the points list.

Method 2: Slide-out menu

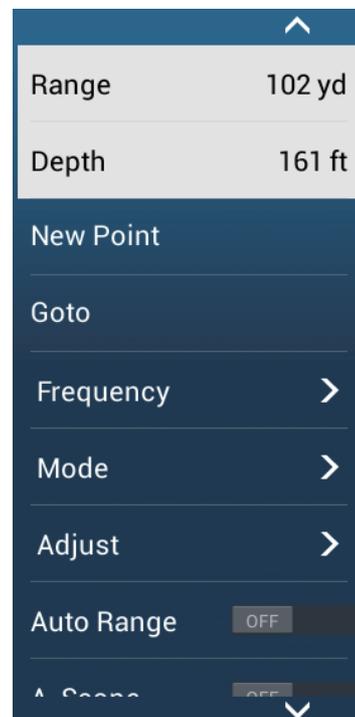
Open the slide-out menu, then tap [Event]. Tap required event mark in the [Creating Events] pop-up menu.

4.3 How to Display Point, Event Mark Information

Tap a point or event mark to display its information. The information shown depends on the display in use and the object tapped.



*Point, event mark information
(Plotter and radar displays)*

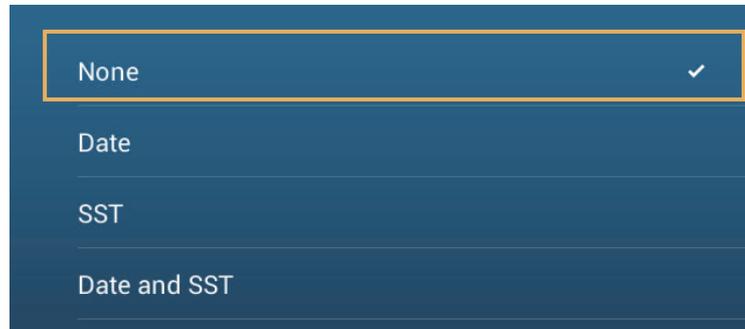


*Event mark information
(Sounder display)*

4.4 Event Mark Comment

You can automatically attach a comment to an event mark. The comment is saved to the points list, and the default comment is [None] (no comment). To apply a comment, do as follows:

1. Open the home screen, then tap [Settings] - [Points].
2. Tap [Data to Be Recorded in Event Comment].

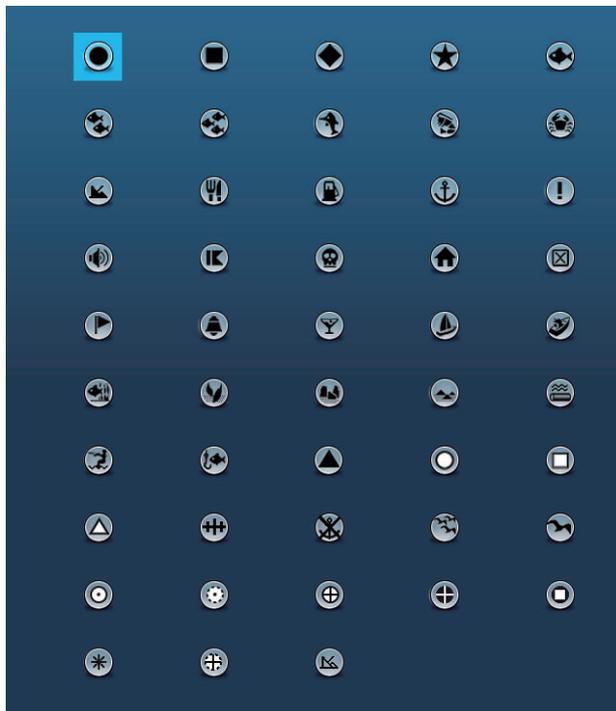


3. Tap an option.
[None]: No comment
[Date]: Date
[SST]: Sea surface temperature
[Date And SST]: Date and sea surface temperature
4. Tap the close button to finish.

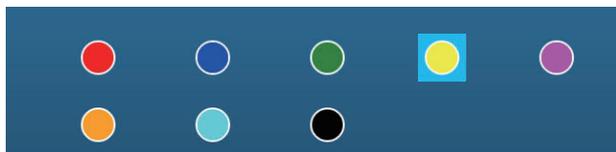
4.5 Default Point Settings

The equipment saves a point under the shape, color, size and type set on the [Settings] - [Points] menu. If you want to change the default settings for a point, do as follows:

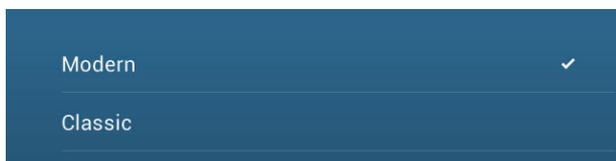
1. Open the home screen, then tap [Settings] - [Points].
2. Tap [Default Point Symbol], [Default Point Color], or [Icons Set].



[Default Point Symbol]



[Default Point Color]



[Icons Set]

3. Tap required option.
To change the point size, operate the slider bar (or software keyboard) for [Points Size].
4. Tap the close button to finish.

4.6 How to Find Number of Points Used

Open the home screen, then tap [Settings] - [General]. Find [Points] in the [DATA USAGE] section. In the example below, 10 of 30,000 points have been used.

DATA USAGE	
Points	10 / 30000
Routes	18 / 200
Track Points	2694 / 30000

4.7 How to Move a Point

You can move a point by two methods, on the screen and from the points list.

4.7.1 How to move a point on the screen

1. Tap the point to move, then select [Move] from the pop-up menu. The icon shown right is put on the point.
2. Drag and drop the point to its new location.
3. Tap [End Move] at the top right-hand corner of the screen to finish.



Note: A point can be moved to the position you specify. Tap the point and [Edit Pos], then enter the position from the keyboard.

4.7.2 How to move a point from the points list

1. Open the home screen, then tap [Lists]
2. Tap [Points] to open the points list.
3. Tap [Name], [Icon], [Color] or [Range] at the top of the list.
 - [Name]:** Points sorted in alphanumeric order
 - [Icon]:** Points sorted by symbol shape order
 - [Color]:** Points sorted by color in order of red, green, blue, cyan, magenta, black & white, yellow, orange
 - [Range]:** Points sorted by range in ascending order
4. Tap the point to move to show the editing window. You can also edit the position of a point from the screen. Tap the point then tap [Edit Pos] on the pop-up menu.
5. Tap [Lat Lon] to display the numeric keyboard.
6. Enter the position then tap ✓ to confirm.
7. Tap the close button to finish.

4.8 How to Delete a Point

You can delete points by two methods, on the screen and from the points list. The point currently set as a go to point cannot be deleted.

4.8.1 How to delete a point on the screen

Tap the point to delete then tap [Delete] on the pop-up menu.

4.8.2 How to delete a point from the points list

1. Open the home screen, then tap [Lists]
2. Tap [Points] to open the points list.
3. Tap [Name], [Icon], [Color] or [Range] at the top of the list.
[Name]: Points sorted in alphanumeric order
[Icon]: Points sorted by symbol shape order
[Color]: Points sorted by color in order of red, green, blue, cyan, magenta, black & white, yellow, orange
[Range]: Points sorted by range in ascending order
4. Tap the point to delete then tap [Delete]. The point disappears from both the screen and the points list.
5. Tap the close button to finish.

4.8.3 How to delete all points

You can delete all points (and routes) collectively. When there is an active route, this function is not available.

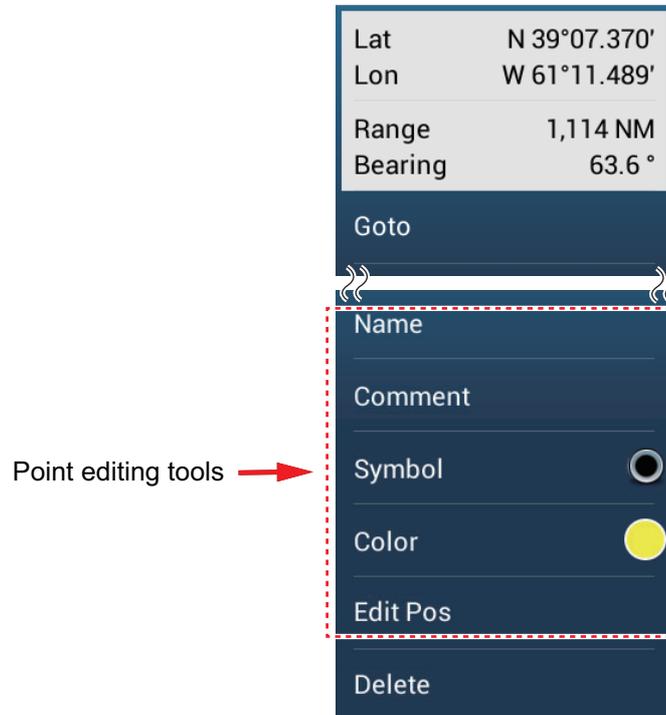
1. Open the home screen, then tap [Settings] - [Points].
2. Tap [Delete All Points & Routes].
3. You are asked if you are sure to delete all points and routes. Tap [OK].
4. Tap the close button to finish.

4.9 How to Edit a Point

You can edit the points which you have entered by two methods, on the screen and from the points list.

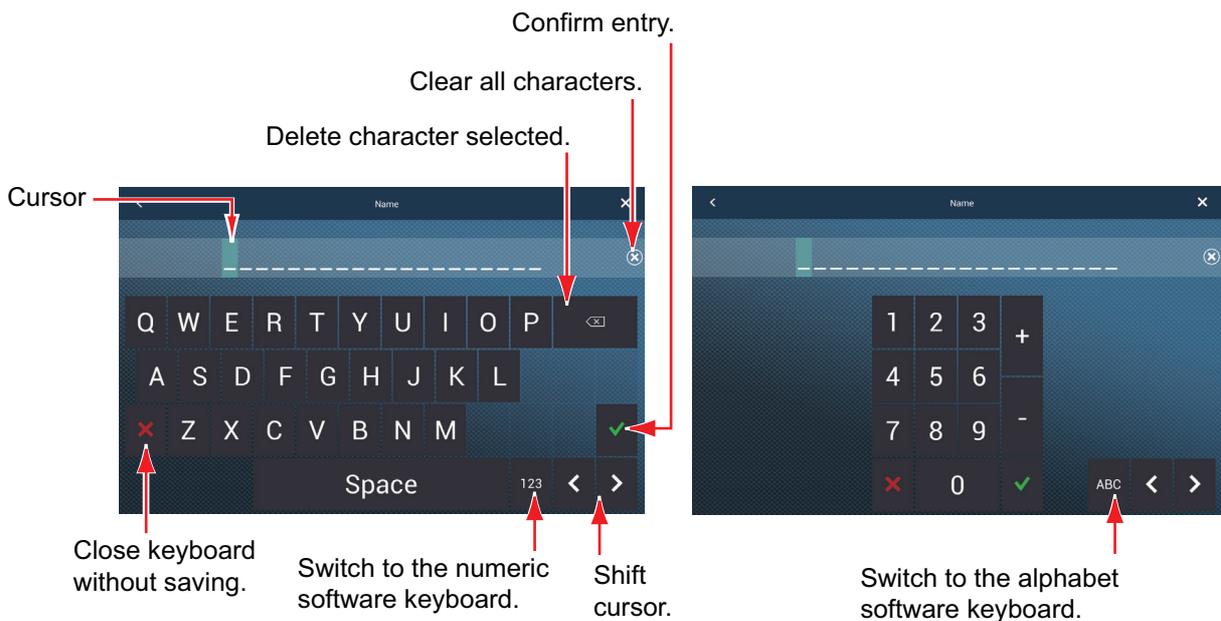
4.9.1 How to edit a point on the screen

1. Tap the point to edit to show the pop-up menu.



2. To change the name of the point, tap [Name] to display the software keyboard. Change the name as follows:

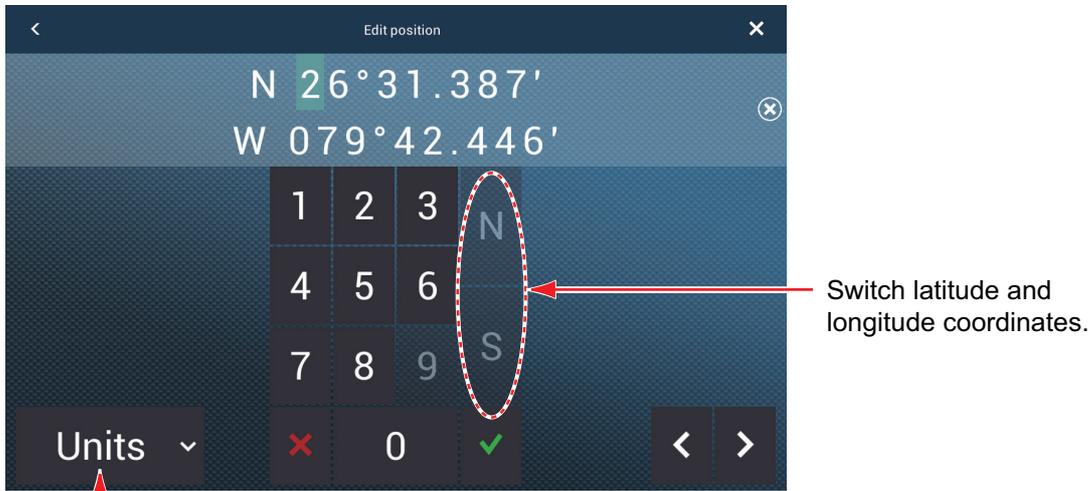
- 1) Tap the character to edit.



- 2) Tap an alphanumeric character on the software keyboard.

4. POINTS, EVENT MARKS

- 3) Repeat steps 1) and 2) to complete the name. The maximum length of the name is 20 alphanumeric characters.
- 4) Tap ✓ to confirm.
3. To change the position, tap [Edit Pos] to display the software keyboard. Set the position referring to the instructions in step 2.



Tap

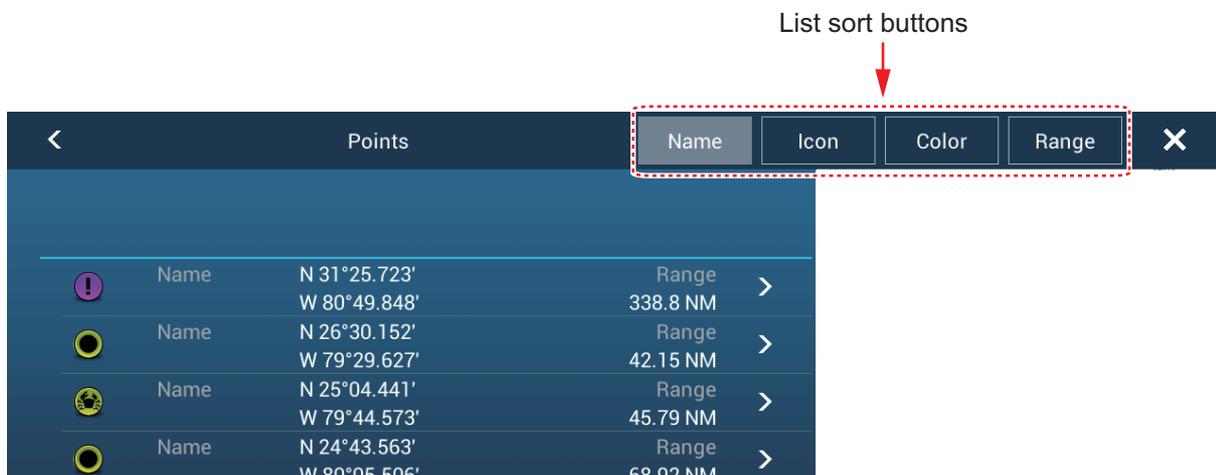
Position format

- DDD°MM.mmmm'
- DDD°MM.mmm'
- DDD°MM.mm'
- DDD°MM'SS.ss''
- DDD.ddddd°

4. Tap [Color] to change the color of the point symbol.
5. Tap [Symbol] to change the point symbol.
6. Tap [Comment] to enter a comment, with the software keyboard.
7. Tap ✓ to confirm.

4.9.2 How to edit a point from the points list

1. Open the home screen, then tap [Lists].
2. Tap [Points] to open the points list.



- The list can be sorted by name, icon, color or range. Tap a corresponding button at the top of the list to sort. The sort method currently selected is highlighted in gray.

[Name]: Points sorted in alphanumeric order.

[Icon]: Points sorted by symbol shape order.

[Color]: Points sorted by color in order of red, green, blue, cyan, magenta, black & white, yellow, orange.

[Range]: Points sorted by range in ascending order.

- Tap the point to edit.



- To change the name of the point, tap [Name] to display the software keyboard. Change the name as shown in step 2 in paragraph 4.9.1.
- To change the position, tap [Lat Lon] to display the software keyboard. Change the position as shown in step 3 in paragraph 4.9.1.
- Tap [Color] to change the color of the point symbol.
- Tap [Icon] to change the point symbol.
- Tap [Comment] to display the software keyboard.
- Tap ✓ to confirm.
- Tap the close button to finish.

4.10 How to Move a Point to the Screen Center

You can easily place a point at the center of the plotter display from the points list.

1. Open the home screen, then tap [Lists].
2. Tap [Points] to open the points list.
3. Tap [Name], [Icon], [Color] or [Range] at the top of the list to sort the list.
4. Tap the point to find then tap [Find On Chart].

The menu closes and the selected point is put at the center of the screen on the plotter display. If a different mode was in use at the time of point selection

4.11 How to Show or Hide All Points or Points Names

Points

Open the [Layers] menu, then turn [Points] on or off.

Points names

Open the home screen, then tap [Settings] - [Points]. Turn [Display Points Names] on or off.

4.12 How to Go to a Point

Tap the point (including MOB mark) to go to among the three methods shown below.

- Select the point on the screen
- Select a position on the screen
- Select the point from the points list

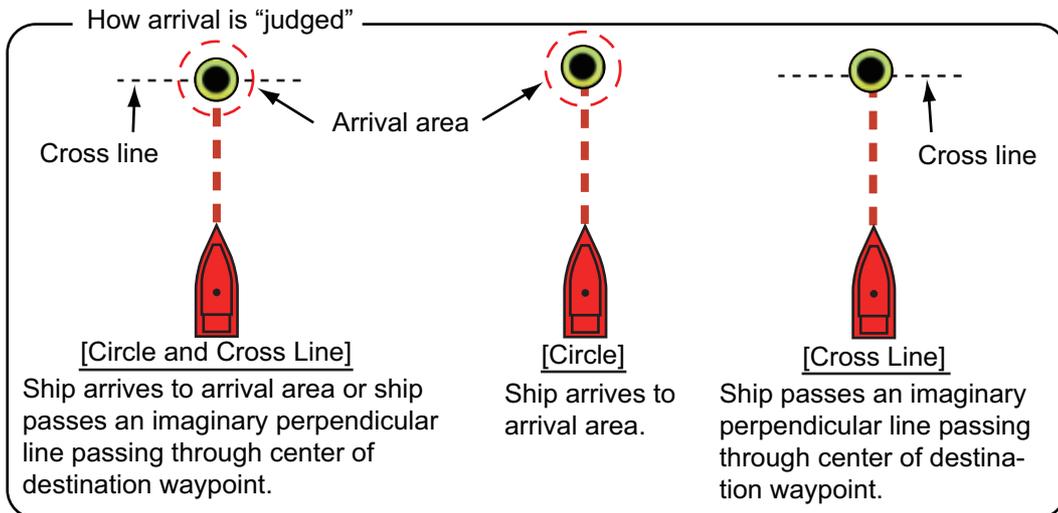
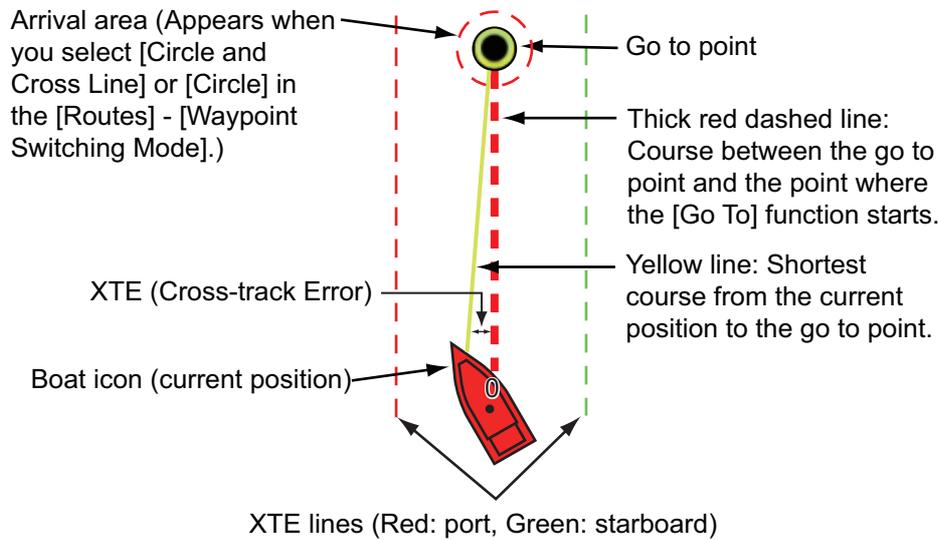
After you have selected a point, you can do the following.

- Restart the cross-track error (XTE) indication.
- Stop and restart Goto. (Tap the boat icon to display the pop-up menu. Tap [Stop Nav] and [Restart Nav] respectively.)

Note: Before you try to go to a point, make sure that the path to the point is clear. Make sure to zoom your chart to check for hazards which appear on a smaller scale.

4.12.1 How to go to an on-screen point

1. Tap the desired point to show the pop-up menu.
2. Tap [Goto].



The following occurs:

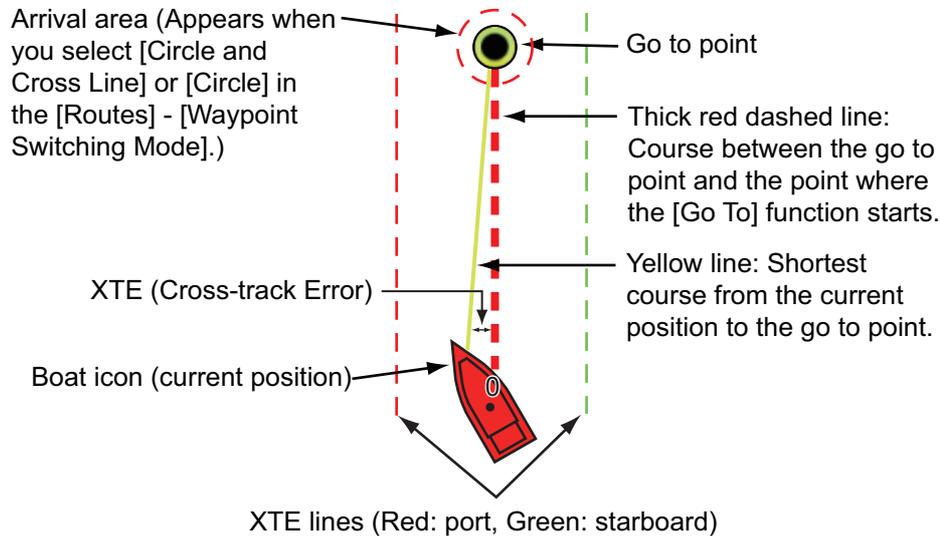
- The go to point is highlighted.
- A thick red dashed line and a yellow line appear. The thick red dashed line is the course to follow to get to the point. The yellow line is the shortest course from the current position to the go to point.
- The arrival area marker appears if activated on the menu (see paragraph 5.9.5).
- The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines with [Display XTE Lines] in the [Settings] - [Routes] menu.
- The route is saved to the routes list.

Note: If you want to be notified when you reach the go to point (the end of a route), turn on [End of Route Notification] in the [Routes] menu (see paragraph 5.9.9). The message "End of Route" appears when you reach the end of a route. For the arrival timing, see paragraph 5.9.5.

4.12.2 How to go to a position selected on screen

You can set a position as a point to go to without saving the point. The point is erased when the navigation is canceled or the power is turned off.

1. Tap the position to set as the go to point to show the pop-up menu.
2. Tap [Goto].



The following occurs:

- The go to point is highlighted.
- A thick red dashed line and a yellow line appear. The thick red dashed line is the course to follow to get to the point. The yellow line is the shortest course from the current position to the go to point.
- The arrival area marker appears if activated on the menu (see paragraph 5.9.5).
- The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines with [Display XTE Lines] in the [Settings] - [Routes] menu.

Note: If you want to be notified when you reach the go to point (the end of a route), turn on [End of Route Notification] in the [Routes] menu (see paragraph 5.9.9). Then the message "End of Route" appears when you reach the end of a route. For the arrival timing, see paragraph 5.9.5.

4.12.3 How to go to a point selected from the points list

1. Open the home screen, then tap [Lists].
2. Tap [Points] to open the points list.
3. Tap [Name], [Icon], [Color] or [Range] at the top of the list to sort the list.
4. Tap the point to go to, then tap [Goto].
5. Tap the close button to close the points list.

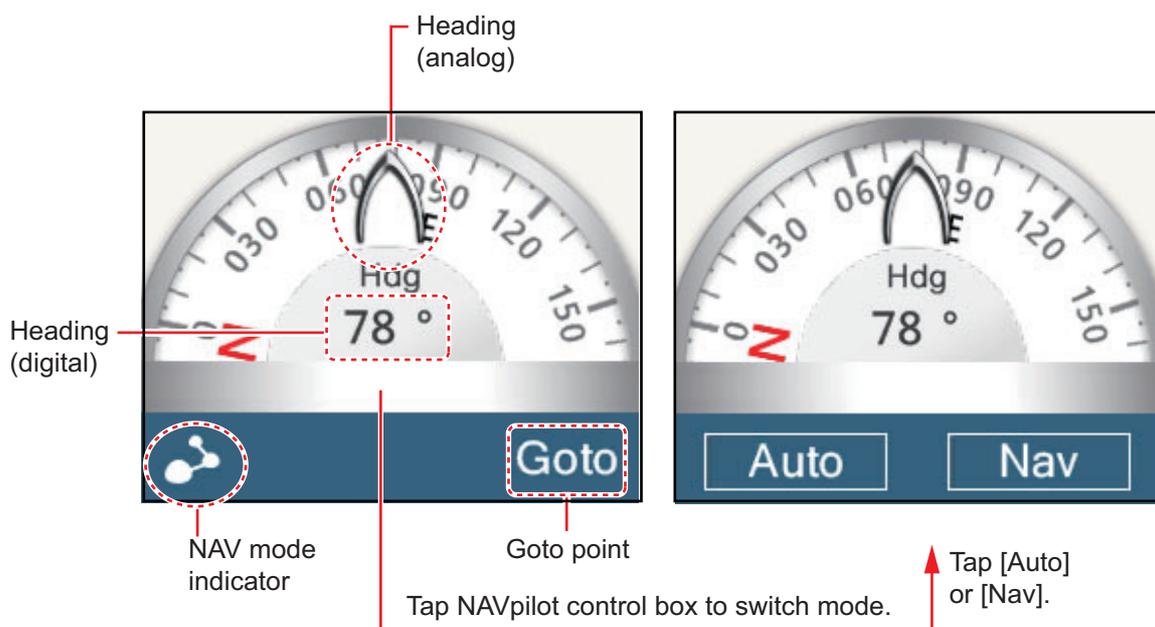
The following occurs:

- The go to point is highlighted.
- A thick red dashed line and a yellow line appear. The thick red dashed line is the course to follow to get to the point. The yellow line is the shortest course from the current position to the go to point.
- The arrival area marker appears if activated on the menu (see paragraph 5.9.5).
- The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines with [Display XTE Lines] in the [Settings] - [Routes] menu.

Note: If you want to be notified when you reach the go to point (the end of a route), turn on [End of Route Notification] in the [Routes] menu (see paragraph 5.9.9). Then the message "End of Route" appears when you reach the end of a route. For the arrival timing, see paragraph 5.9.5.

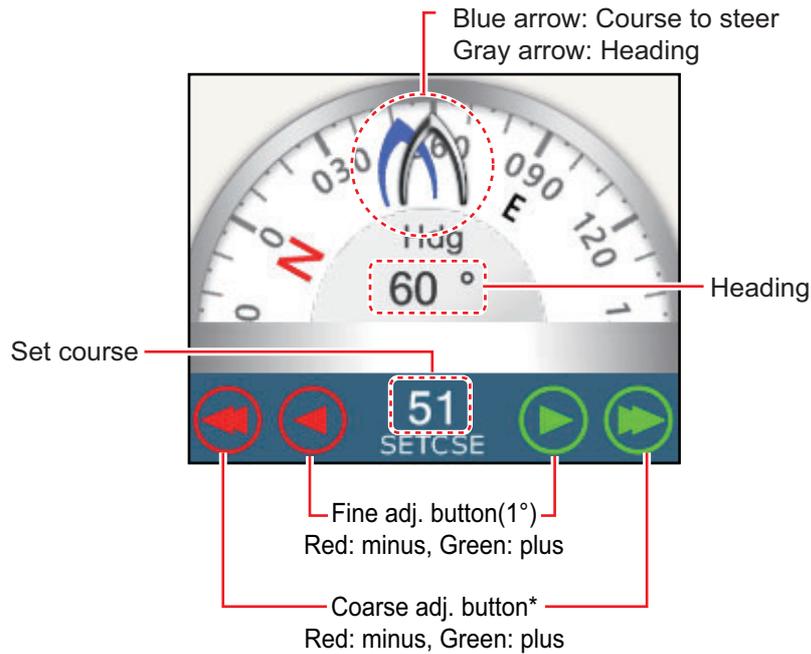
4.12.4 How to use the NAVpilot to steer to a point

When you select a point to follow and the NAVpilot is engaged and activated in the system, the message "DO YOU WANT TO NAVIGATE USING THE NAVPILOT?" appears. Tap [Yes] to have the NAVpilot steer the vessel, then the NAVpilot automatically goes into the Nav mode.



4. POINTS, EVENT MARKS

Auto mode



* Selectable between 2° and 30° with [Autopilot Step] in the [Routes] menu.

Use the course adjustment buttons to set the course to steer. Tap the double arrow for coarse adjustment, and single arrow for adjustment in 1° steps. The course to steer indicator moves with adjustment.

To go to the stand-by mode, tap the NAVpilot control box.

4.12.5 How to display the point information for the active goto point

1. Tap the line between own ship and the goto point to show the pop-up menu.
2. Tap [Detail] to show the [Route Detail] window.

ID	BTW	SPEED	DISTANCE	TOTAL	TTG	TOTAL
Start	0.0°	6.0 kn	0 yd	0 yd	0'00s	0'00s
Goto	124.7°	6.0 kn	4.455 NM	4.455 NM	44'33s	44'33s

3. Tap the close button to finish.

Description of Route Detail window

Colored vertical bars: The bars at the left edge of the screen are colored according to the status of the goto point.

Gray: Starting point

Yellow: Goto point

[ID]: Point no. ([Start] or [Goto])

[BTW]: Bearing to goto point

[SPEED]: Speed to goto point

[DISTANCE]: Distance from starting point

[TOTAL]: Total distance from start to goto point

[TTG]: Time to go to the goto point, using speed shown in [SPEED] column.

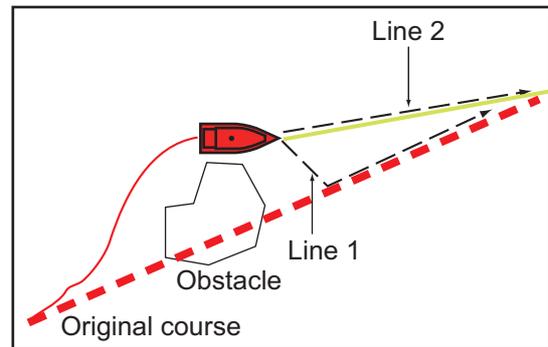
[TOTAL]: The time from start to the goto point.

4.13 How to Restart or Cancel Navigation to a Point

4.13.1 How to restart navigation to a point

When you go to a point, you can restart the navigation to the point from the current location.

When you steer to keep away from an obstruction or the ship drifts, you go off course as shown in Line 1 in the figure. If you do not need to return to the original course, you can go to the point from the current position as shown in Line 2 in the figure.



1. Tap the red dashed line or the yellow line of the route to display the pop-up menu.
2. Tap [Restart]. The route start position for the route moves to the current position.

4.13.2 How to cancel navigation to a point

1. Tap any part of the route to display the pop-up menu.
2. Tap [Stop Nav].

The red dashed line, yellow line, XTE lines and arrival area circle are erased from the screen.

4. POINTS, EVENT MARKS

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5. ROUTES

5.1 What is a Route?

A route is a series of route points leading to a final destination. When you follow a route, the equipment automatically switches route points and provides pertinent navigation data.

The equipment can store a maximum of 200 routes with a maximum of 500 points per route. Inactive routes on the display are shown with the “sleeping route” icon, pictured below, to keep the screen from getting too cluttered.



You create a route by selecting geographical positions on the screen. These positions are marked with numbered circles. A route that is being used for navigation is called the “active route”.

The current leg of the active route is shown as a red dashed line and all preceding legs are shown in light gray.

The routes on the screen can be edited from the pop-up menu. The following editing features are available:

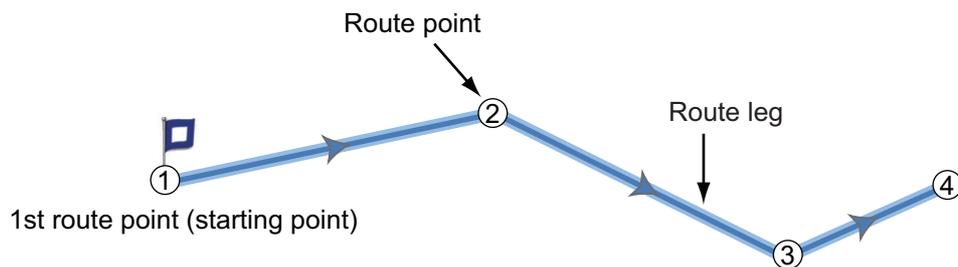
- Insert route points in a route
- Move route points in a route
- Delete route points from a route
- Extend a route
- Split routes
- Find information about a route
- Delete a route
- Set a route as destination
- Follow a route in the reverse direction
- Ignore a route point when following a route

Note: Active routes can be shared with other NavNet TZtouch2 units via LAN. Data is shared automatically; no operation is required.

5.2 How to Create a Route

5.2.1 How to create a new route from the plotter screen

1. Tap a location on the screen for the 1st point in the route to display the pop-up menu.
2. Tap [New Route]. The flag mark appears on the selected position.
3. Tap the next route point in the route. A light-blue line with arrow runs between the previous route point and the next route point. The arrow points in the direction of route flow.
4. Tap the next route point in the route.
Repeat this step to enter all route points. Each route point is numbered.



5. At the last route point, tap [End Route] at the top right-hand corner of the screen to complete the route.
6. The window for entering route name appears. Enter route name, then tap ✓ to confirm.

Note 1: The route created above is called an “inactive route”. When you create a new route or tap another inactive route, that route becomes a “sleeping route”.



Note 2: The route created by the above method cannot be saved to the routes list.

5.2.2 How to create a new route with points

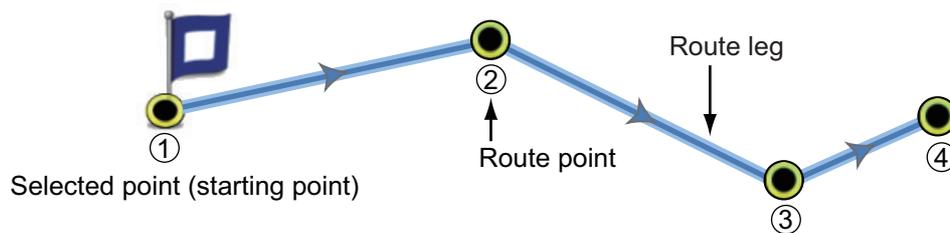
You can create a route with points (including event marks) you have previously entered.

1. Tap a point to display the pop-up menu.
2. Tap [New Route]. The flag mark as below appears on the point.



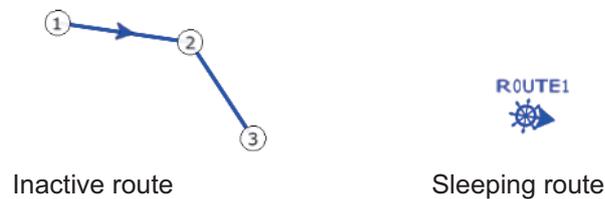
3. Tap the next route point in the route. A light-blue line with arrow runs between the previous point and the next route point. The arrow points in the direction of route flow.

- Tap the next route point in the route.
Repeat this step to enter all route points. Each route point is numbered.



- At the last route point, tap [End Route] at the top right-hand corner of the screen to complete the route.
- The window for entering route name appears. Enter route name then tap ✓ to confirm.

Note: The route created above is called an “inactive route”. When you create a new route or tap another inactive route, that route becomes a “sleeping route”.



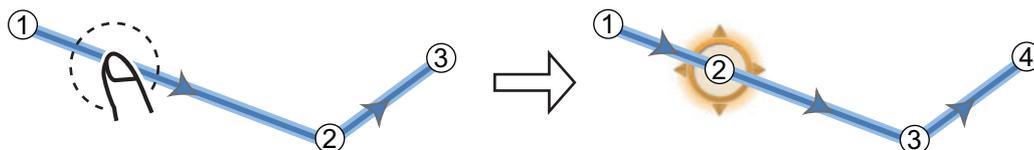
5.2.3 How to create a route from the points list

- Open the points list.
- Tap the point to be the first point in the route then tap [Add to Route]. Repeat to add all required points. The route is drawn on the plotter screen.
- Tap the Close button to close the points list.
- Tap any line on the route, tap [Name] on the pop-up menu, and then enter a name for the route.

5.2.4 How to insert a route point on a route

You can insert a new route point on a route leg as follows.

- Tap a position on a route leg where to insert a route point.
- Tap [Insert] on the pop-up menu. The compass symbol marks the position selected. The route point is numbered according to its position in the route, and the succeeding route points are renumbered.

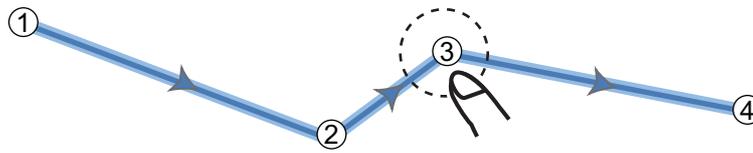


- Tap [End Move] at the top right-hand corner of the screen.

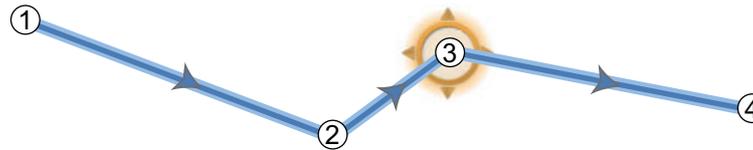
5.2.5 How to move a route point on a route

You can move a route point on a route as follows.

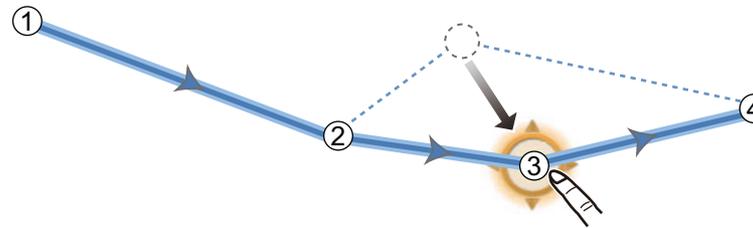
1. Tap a route point on a route to display the pop-up menu.



2. Tap [Move]. The selected route point is highlighted.



3. Move the route point to the new position by dragging the route point or tapping the new position.



4. Tap [End Move] at the top right-hand corner of the screen.

5.2.6 How to delete a point (incl. route point) on a route

You can delete a point on a route.

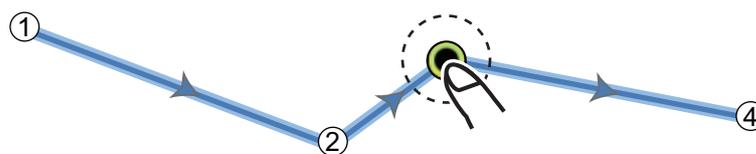
1. Tap the point to show the pop-up menu.
2. Tap [Delete]. The selected point is deleted, and the succeeding route points are renumbered.

Note: If the point tapped at step 1 is a point icon, only the point icon is erased. To erase the route point, do steps 1 and 2 again.

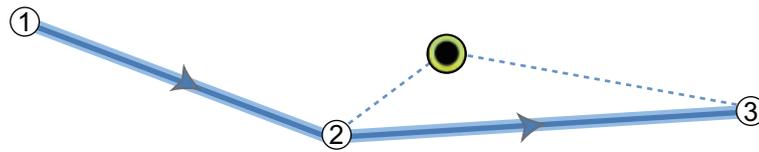
5.2.7 How to remove a point from a route

You can remove a point from a route.

1. Tap the point to remove to show the pop-up menu.



2. Tap [Remove]. The selected point is removed from the route, and the succeeding route points are renumbered.



5.2.8 How to extend a route

You can extend a route from the last route point on the route.

1. Tap a route leg to display the pop-up menu.
2. Tap [Extend].
3. Tap a position. A light-blue line with arrow runs from the last route point to the selected position.
4. Repeat step 3 to enter more route points, if necessary.
5. At the last route point, tap [End Route] at the top right-hand corner of the screen to complete the route and save the route to the routes list.

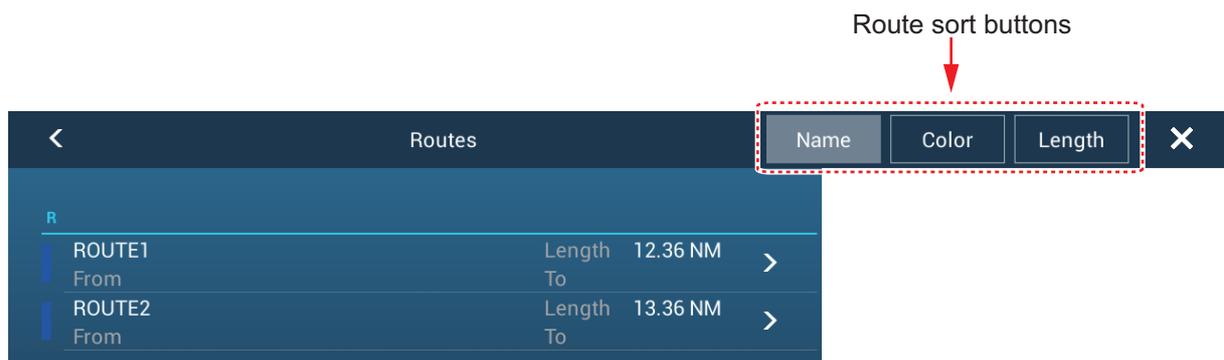
5.3 Routes List

The created routes are stored in the routes list, where you can edit or see the route data. The list stores the following route data for each route:

- Name of route
- Length of route
- Names of starting route point and last route point (Enter them with the software keyboard.)
- Color of route
- Comment for route
- Each number of each route point
- Bearing to steer
- Planning route speed (see section 5.10)
- Distance between legs and total distance
- TTG between legs and total TTG

To open the routes list:

1. Open the home screen, then tap [Lists].
2. Tap [Routes] to open the routes list. You can sort the list with the route sort buttons on the title bar.



5. ROUTES

3. Tap the route to view.

EDITION

Name 1234

Length 5.304 NM

From

To

Color

Comment

ACTIONS

Detail

Goto

Reverse Route

4. From the [EDITION] section, you can edit the name, from point, to point, color and comment for the route.
5. To find details about the route, tap [Detail].

Route speed adjustment button

Departure date adjustment button

Route Detail

Route Speed

Departure Date: 12:05:44 PM Wednesday, January 1, 2014

ID	BTW	SPEED	DISTANCE	TOTAL	TTG	TOTAL	
1	0.0 °	5.0 kn	0 yd	0 yd	---	0'00s	>
2	92.6 °	5.0 kn	1.657 NM	0 yd	---	0'00s	>
3	69.1 °	5.0 kn	2.029 NM	0 yd	---	0'00s	>
4	121.9 °	5.0 kn	1.618 NM	0 yd	---	0'00s	>

[Route Speed] button: Change the route speed to use to follow the route.

[Departure Date] button: Change the date of departure.

The **vertical bar** at the left side of the screen is colored according to the status of the waypoints.

Blue: Inactive

Gray: Starting point

Yellow: Point you are currently heading toward.

Red: Subsequent waypoint

The column labels are as follows:

[ID]: Waypoint number

[BTW]: Bearing to waypoint.

[SPEED]: The speed set with [Default Planning Speed] in the [Routes] menu.

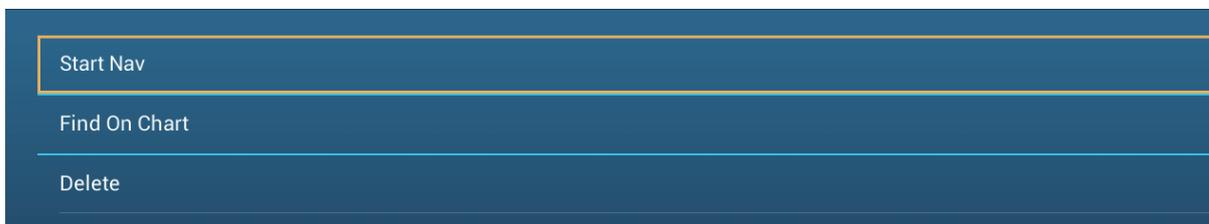
[DISTANCE]: Distance between adjacent waypoints.

[TOTAL]: Cumulative distance.

[TTG]: Time to go between adjacent waypoints.

[TOTAL]: Cumulative time in route.

- To edit the route, tap the point to process to show the [Edit] menu.



[Start Nav]: Starts navigation of the route from the point selected.

[Find on Chart]: Shows the location of the route on plotter display. The list closes and the route is put at the center of the plotter display.

[Delete]: Deletes the point selected. The [Edit] screen closes and the [Routes Detail] screen reappears. The points on the route are renumbered.

5.4 How to Find Number of Routes Created

Open the home screen, then tap [Settings] - [General]. Find [Routes] in the [DATA USAGE] section. In the example below, 18 routes out of 200 have been created.

DATA USAGE	
Points	10 / 30000
Routes	18 / 200
Track Points	2694 / 30000

5.5 How to Find a Route on the Chart

You can easily find the location of a route from the routes list. The selected route is put at the center of the active plotter display.

- Open the home screen, then tap [Lists].
- Tap [Routes] to open the routes list.
- Tap a route then tap [Find On Chart] from the options. The menu closes then the selected route is put at the center of the plotter display.

5.6 How to Delete a Route

You can delete routes individually or collectively. An active route cannot be deleted.

5.6.1 How to delete a route on the screen

Tap a route leg of the route to delete to show the pop-up menu, then tap [Delete].

5.6.2 How to delete a route from the routes list

1. Open the home screen, then tap [Lists] - [Routes].
2. Tap the route to delete then tap [Delete]. The route disappears from both the screen and the routes list.
3. Tap the close button to finish.

5.6.3 How to delete all routes

1. Open the home screen, then tap [Settings] - [Points].
2. Tap [Delete All Points & Routes] menu.
3. You are asked if you are sure to delete all routes (and points). Tap [OK].
4. Tap the close button to finish.

5.7 How to Show or Hide All Routes

All routes can be shown or hidden. An active route cannot be hidden from the screen unless route following is stopped.

Open the [Layers] menu, then turn [Routes] on or off.

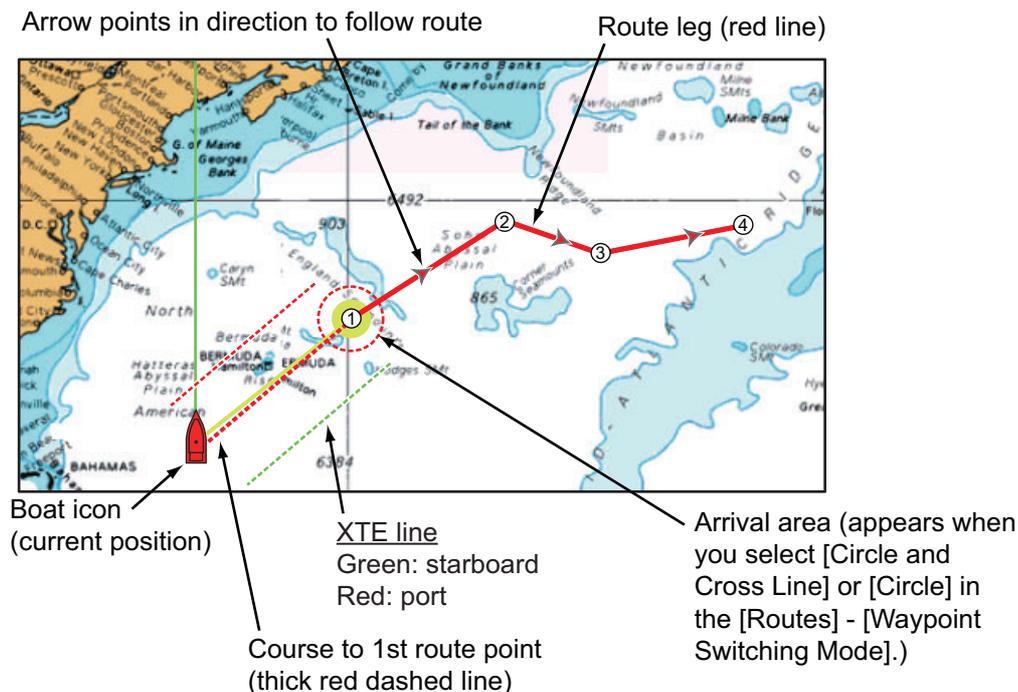
Note: Inactive routes can be placed at either the arrival or departure location. Open the Layers menu, then activate [Departure] or [Arrival] (below the [Routes] flipswitch).

5.8 How to Follow a Route

Before you follow a route, make sure that the path to the route is clear. Make sure to zoom your chart to check for hazards that do not appear on a smaller scale.

5.8.1 How to follow an on-screen route

1. Tap a route leg of the route to follow to show the pop-up menu.
2. Tap [Start Nav].



The following occurs:

- The line for the selected route turns red.
- The go to point (1st route point) is highlighted.
- A thick red dashed line and a yellow line run between the current position and the 1st route point of the selected route. The thick red dashed line is the course to follow to get to the 1st route point. The yellow line is the shortest course from the current position to the go to point.
- The go to point is numbered "1". The starting point is indicated in the pop-up menu item [Details] as [Start].
- The arrival area marker appears if activated on the menu (see paragraph 5.9.5).
- The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines and set their width with [Display XTE Lines] and [XTE Value] respectively in [Routes] menu.

Note: If you want to be notified when you reach a go to point, turn on [Waypoint Crossing Notification] on [Routes] of the menu (see paragraph 5.9.8). Then the message "Waypoint Crossing" appears when you reach a go to point. For the arrival timing, see paragraph 5.9.5.

5.8.2 How to follow a route selected from the routes list

1. Open the home screen, then tap [Lists] - [Routes].
2. Tap the route to follow then tap [Goto].
3. Tap the close button to finish.

The following occurs:

- The line for the selected route turns red.
- The go to point (1st route point) is highlighted.
- A thick red dashed line and a yellow line run between the current position and the 1st route point of the selected route. The thick red dashed line is the course to follow to get to the 1st route point. The yellow line is the shortest course from the current position to the go to point.
- The go to point is numbered "1". The starting point is indicated in the pop-up menu item [Details] as [Start].
- The arrival area marker appears if activated on the menu (see paragraph 5.9.5).
- The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines and set their width with [Display XTE Lines] and [XTE Value] respectively in [Routes] menu.

Note: If you want to be notified when you reach a goto point, turn on [Waypoint Crossing Notification] in the [Routes] menu (see paragraph 5.9.8). Then the message "Waypoint Crossing" appears when you reach a goto point. For the arrival timing, see paragraph 5.9.5.

5.8.3 How to start navigation from a route point

Tap the route point of the route from where to start navigation, then tap [Start Nav] on the pop-up menu.

In the above example, the following occurs:

- The route point "3" is selected to start navigation from, and is highlighted.
- The starting point is indicated in the pop-up menu item [Details] as [Start].
- The line from "3" to the route point "5" for the selected route turns red and the legs for "0" and "1" turn gray.
- A thick red dashed line and a yellow line run between the current position "2" and the "3" route point. The thick red dashed line is the course to follow to get to the route point "3". The yellow line is the shortest course from the current position to the route point "3".
- The arrival area marker appears if activated on the menu (see paragraph 5.9.5).
- The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines with [Display XTE Lines] in the [Routes] menu.

Note: If you want to be notified when you reach a goto point, turn on [Waypoint Crossing Notification] in the [Routes] menu (see paragraph 5.9.8). Then the message "Waypoint Crossing" appears when you reach a goto point. For the arrival timing, see paragraph 5.9.5.

5.8.4 How to show the detailed information about a route

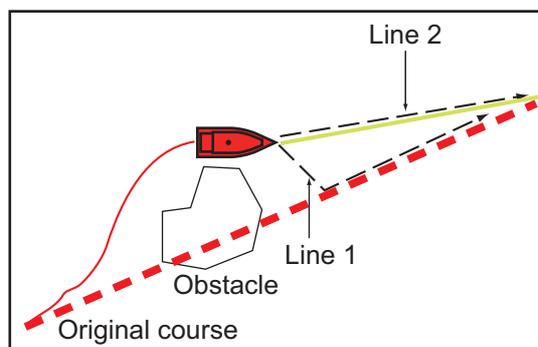
Tap a route leg of the route, then Tap [Detail] to show the [Route Detail] window.

5.9 Operations When You Follow a Route

5.9.1 How to restart navigation

When you follow a route, you can restart the navigation to the next route point on the route from current location.

When you steer to keep away from an obstruction or the ship drifts, you go off course as shown in Line 1 in the figure. If you do not need to return to the original course, you can go to the route point from the current position as shown in Line 2 in the figure.



Tap a route leg, the red dashed line or the yellow line of the route to display the pop-up menu. Tap [Restart]. The route start position for the route moves to the current position.

5.9.2 How to follow a route in the reverse direction

You can follow a route in reverse order. This helps you return along the same path.

Note: This function is not available for an active route.

Tap a route leg to display the pop-up menu, then tap [Reverse]. The arrows on the route legs are in reverse direction and the numbers of the route points are in reverse order.

5.9.3 How to stop following a route

Tap a route leg, a route point or a thick red dashed line on an active route to display the pop-up menu, then tap [Stop Nav]. The arrival area, XTE lines, set course (thick red dashed line) and yellow line are erased from the screen. The red line for the route turns the default color you set.

5.9.4 How to skip a point on a route

There are times when you do not need to follow all legs in an active route. You can skip a point  (highlighted) as shown in the procedure below. After you tap the point to skip, the skipped route leg turns from red to gray.

- **Tap a point on the active route:** Open the slide-out menu, then tap [Routes] and [Skip Wpt]. The selected go to point is skipped then the next route point is marked as the go to point.
- **Tap a route leg of the active route:** Open the slide-out menu, tap [Routes] and [Skip Wpt]. The go to point on the route is skipped then the next route point is marked as the go to point.

5.9.5 Waypoint switching mode

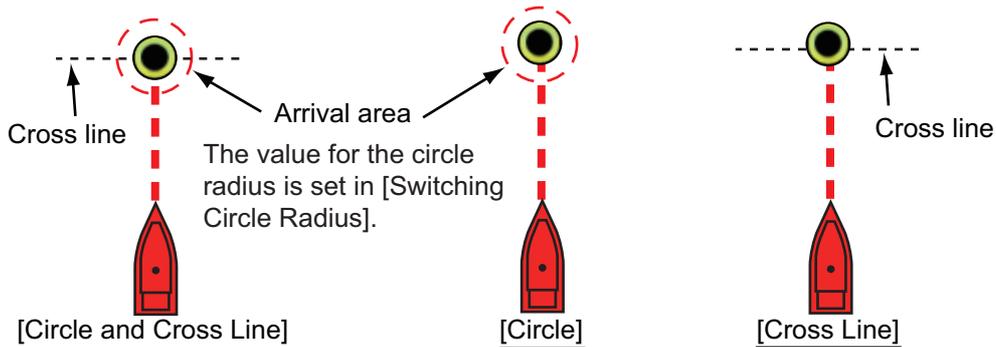
When you arrive to a route point, your unit automatically changes to the next route point according to the waypoint switching mode selected on the menu.

[Cross Line]: Change the waypoint when the ship moves through an imaginary cross line (vertical line) that passes through the center of the destination point.

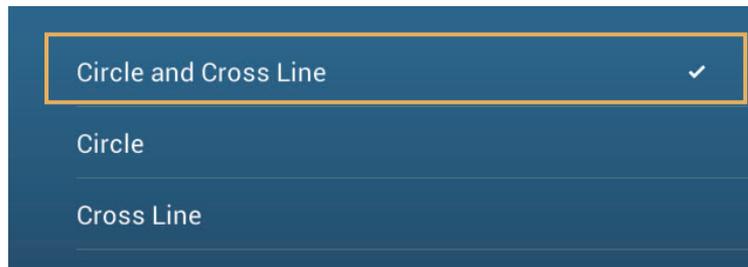
[Circle]: Change the waypoint when the ship comes within the circle.

[Circle and Cross Line]: Change the waypoint when one of the above two conditions is met.

A red dashed circle appears when you tap [Circle and Cross Line] or [Circle].



1. Open the home screen, then tap [Settings] - [Routes].
2. Tap [WPT Switch Mode].



3. Tap [Circle and Cross Line], [Circle] or [Cross Line]. For [Circle and Cross Line] or [Circle], do 1) and 2) below. For [Cross Line], go to step 4.
 - 1) Tap [Switching Circle Radius] to display the software keyboard.
 - 2) Set the arrival area (circle radius) then tap ✓ confirm.
4. Tap the close button to finish.

5.9.6 Route auto zoom

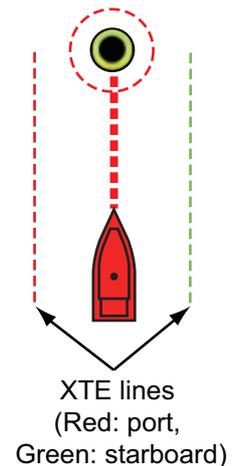
You can get automatic range change after you have moved past the go to point. Use this feature to find the next go to point in the route when the next go to point is not within the current display range.

1. Open the home screen, then tap [Settings] - [Routes].
2. Turn [Route Auto Zoom] on or off.
3. Tap the close button to finish.

5.9.7 XTE lines

The color of the XTE line is red for the port side, green for the starboard side. You can show or hide these lines and set their distance from own ship as follows.

1. Open the home screen, then tap [Settings] - [Routes].
2. Turn [Display XTE Lines] on or off. For [ON], go to the next step. For [OFF], tap the close button to finish.
3. Tap [XTE Value] to display the software keyboard
4. Set the distance of the XTE lines from your ship then tap ✓. The XTE alarm sounds (if active) when your ship veers off course by the amount set here.
5. Tap the close button to finish.



5.9.8 Waypoint arrival notification

The waypoint arrival notification feature releases audio and visual notifications when your ship reaches a go to point. For the arrival timing, see paragraph 5.9.5. The notification message "Waypoint Crossing" appears. Activate or deactivate this feature as follows.

1. Open the home screen, then tap [Settings] - [Routes].
2. Turn [Waypoint Crossing Notification] on or off.
3. Tap the close button to finish.

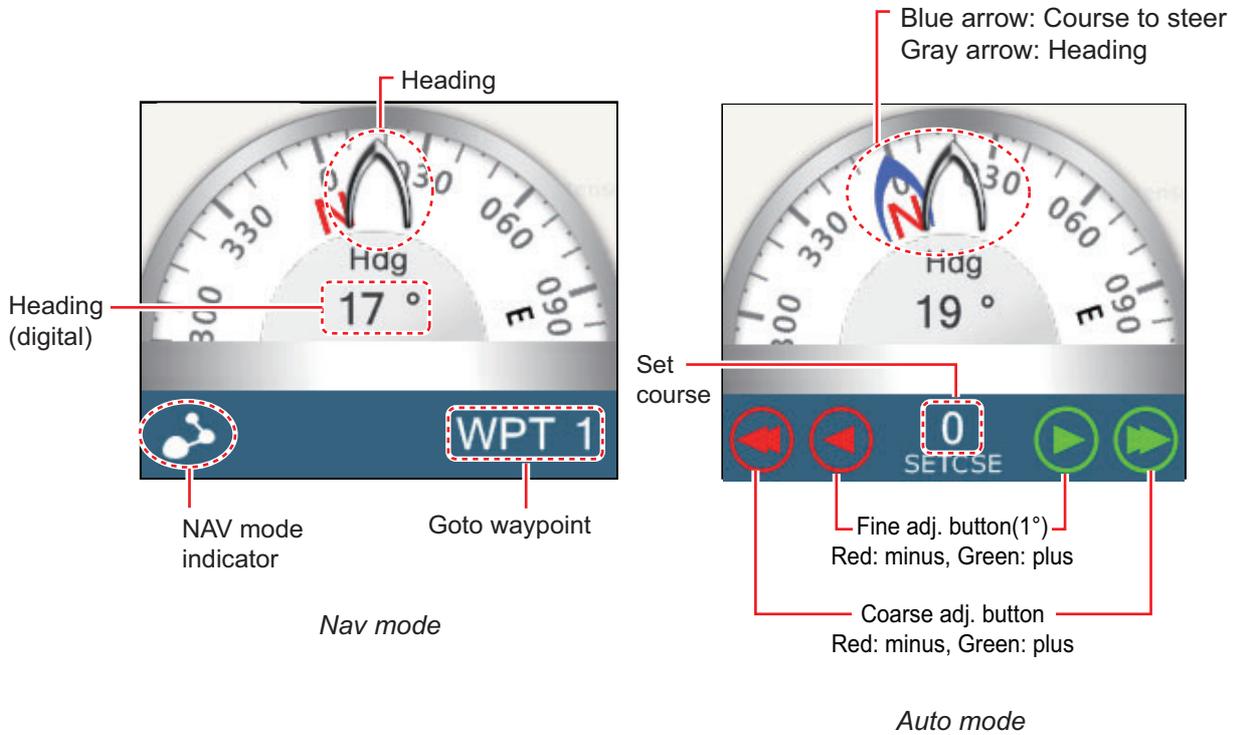
5.9.9 End of route notification

The end of route notification feature releases audio and visual notifications when your ship reaches the end of a route. For the arrival timing, see paragraph 5.9.5. The notification message "End of Route" appears. Activate or deactivate this feature as follows.

1. Open the home screen, then tap [Settings] - [Routes].
2. Turn [End of Route Notification] on or off.
3. Tap the close button to finish.

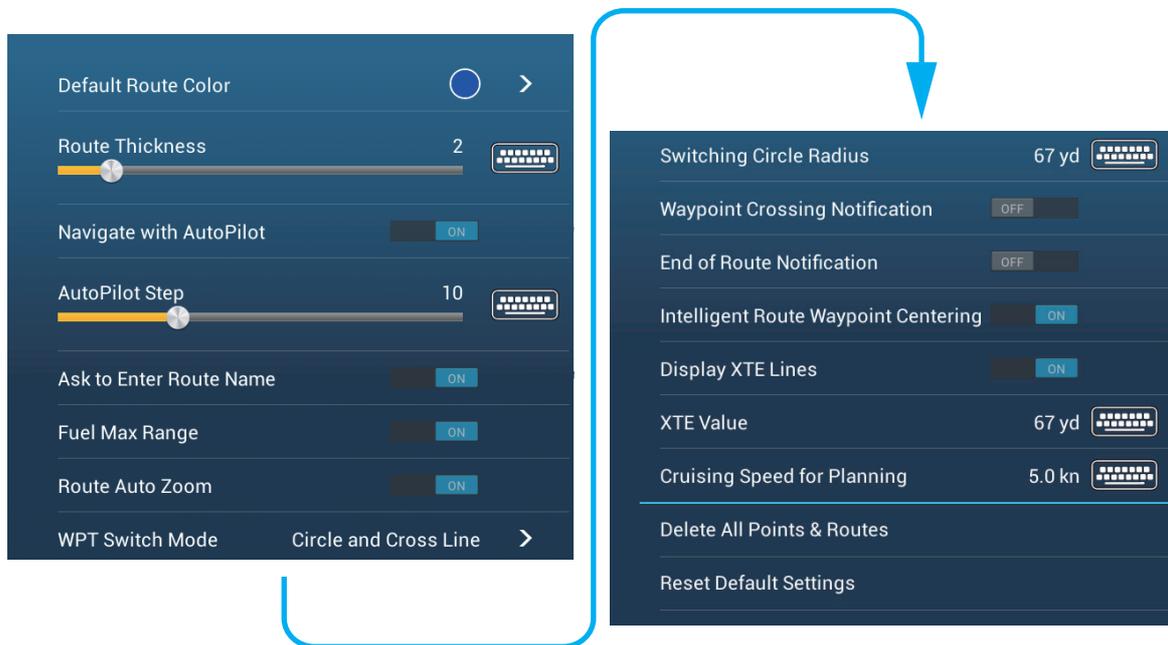
5.9.10 Steering a route with the NAVpilot

The NAVpilot can be used to steer a route, from the NAVpilot control box in the data area. The figure belows shows the NAVpilot control box in the Nav and Auto modes. See paragraph 4.12.4 for details. You can switch between the modes by tapping the NAVpilot control box.



5.10 Routes Menu

This section provides descriptions for the items in the [Routes] menu not previously mentioned.



[Default Route Color]: Select the color of the routes. The options are red, blue, green, yellow, magenta, orange, cyan, or black & white.

[Route Thickness]: Select the thickness of the routes.

[Navigate with Autopilot]: A message asks if you want to navigate with the autopilot, after setting a destination.

[Autopilot Step]: Controls the amount of course change set with the coarse adjustment buttons in the NAVpilot display.



Red: minus, Green: plus

[Ask to Enter Route Name]: Show the software keyboard to enter route name after you create a route. The default setting is “ON”.

[Fuel Max Range]: Provides a visual indication of vessel range based on tank levels and live fuel consumption.

[Intelligent Route Waypoint Centering]: When you create a route, center a route point each time it is selected on the screen.

5. ROUTES

[Cruising Speed for Planning]: Set the default cruising speed for routes (see section 5.3).

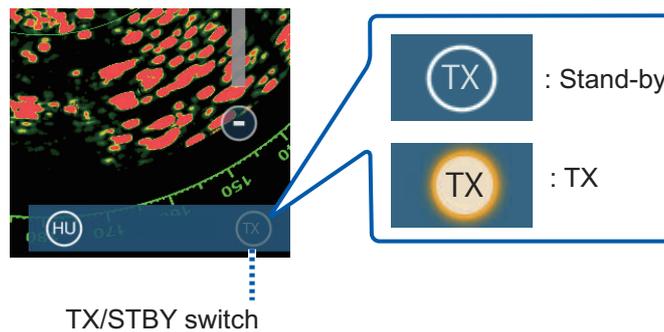
[Reset Default Settings]: Select this menu item to restore default settings for the [Routes] menu.

6. RADAR

This chapter provides the information necessary for radar operation.

6.1 How to Transmit, Set the Radar in Stand-by

Tap the [TX] icon at the bottom right corner of the screen to put the radar in transmit or stand-by state. The icon is filled in white when the radar is in transmit state. (Transmit, stand-by can also be controlled from the pop-up menu with [TX/STBY].)



If you do not require the radar for some time, set the radar in stand-by to save the magnetron from unnecessary use.

6.2 Tuning

By design the radar receiver is tuned automatically after the radar is set to transmit. If you require fine tuning, do the following to tune manually:

1. Open the home screen, then tap [Settings] - [Radar].
2. The default tuning method is automatic. Turn off [Auto Tuning] to enable manual tuning.



3. Drag the slider at [Manual Tuning] to set the value.



4. Tap the close button to finish.

6.3 How to Adjust the Gain

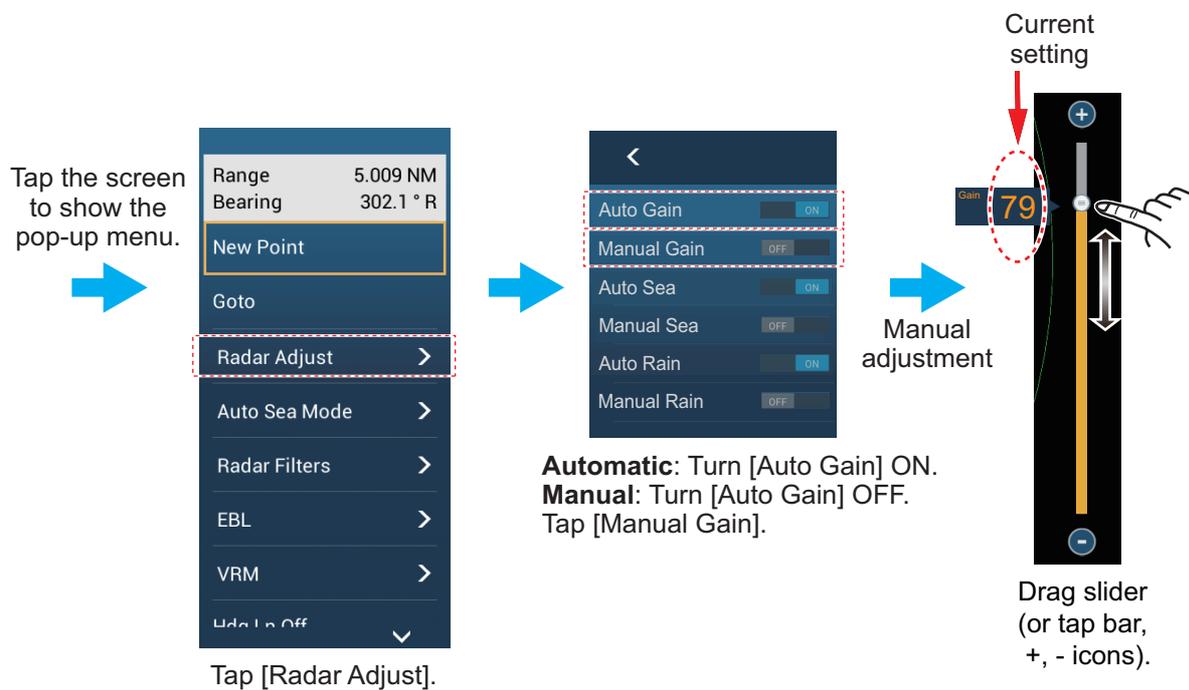
You can adjust the gain (sensitivity) of the radar receiver. The correct setting shows some background noise on the screen. If you do not use enough gain, weak echoes are erased. If you use more gain than necessary, the background noise hides both weak and strong targets.

The gain can be adjusted from the data area or the pop-up menu.

Method 1: pop-up menu

Tap the screen to show the pop-up menu then tap [Radar Adjust]. Turn [Auto Gain] on for automatic adjustment.

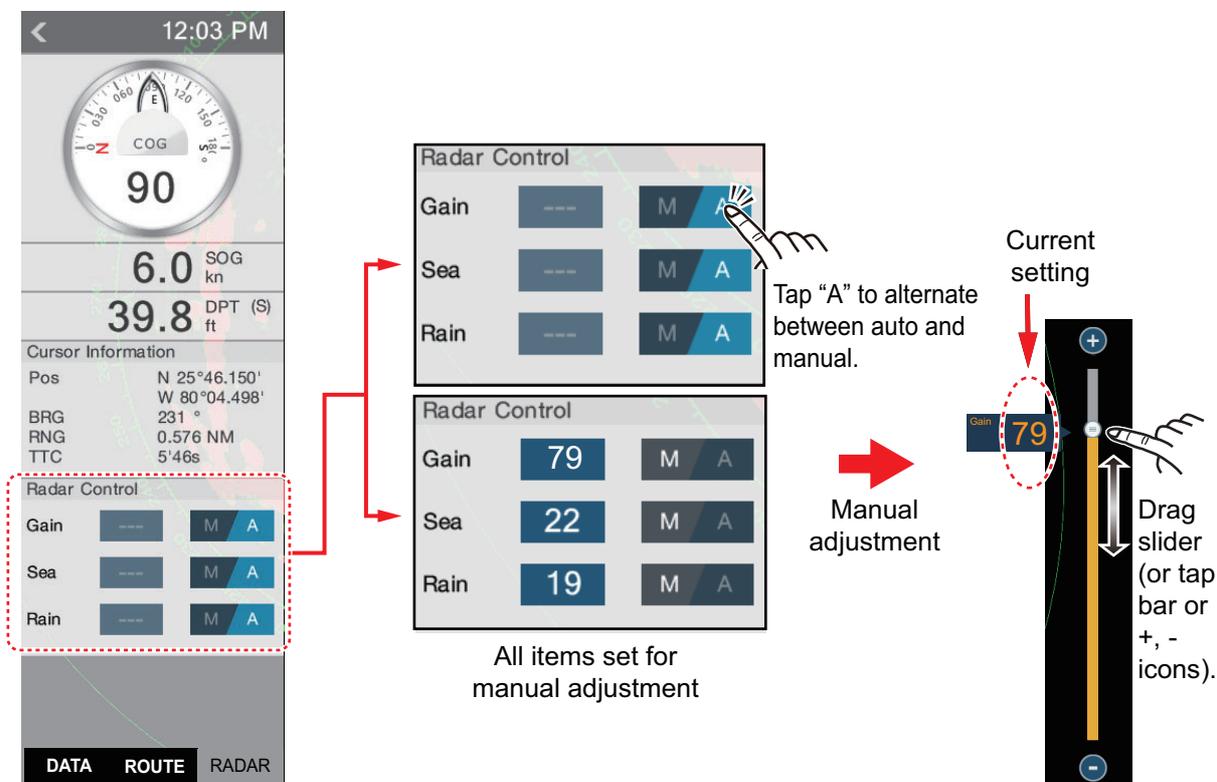
For manual adjustment, turn off [Auto Gain], tap [Manual Gain] then adjust the gain with the slider. Tap the screen to finish.



How to adjust the gain

Method 2: Radar Control data box in data area

The gain can be adjusted from the data area, with the [Radar Control] box in the [RADAR] data box. On the box, tap the [A] part of the [Gain] flipswitch to switch between manual and automatic adjustment. For manual adjustment, drag the slider to adjust. Tap the screen to finish.

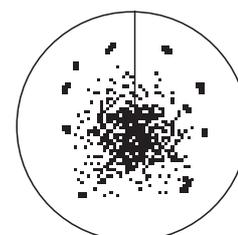


6.4 How to Reduce the Sea Clutter

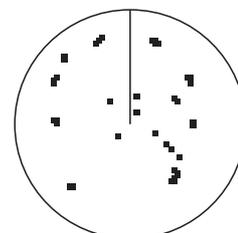
The reflected echoes from waves appear at the central part of the screen and have the name “sea clutter”. The sea clutter increases in width as the height of waves and the height of the antenna above the water increase. If the sea clutter is strong, targets can be hidden inside the clutter, like in the left-hand figure shown below.

When the sea clutter hides targets, adjust the sea control (automatically or manually) to reduce the clutter. After the sea clutter is gone, turn off the sea control to prevent the loss of targets. Like with gain, sea clutter can be adjusted from the pop-up menu or data area. See the procedures in section 6.3.

For automatic sea clutter suppression, there are two methods: [Advanced] and [Coastal]. [Advanced] provides for standard suppression of sea clutter and is intended for normal use. [Coastal] suppresses sea clutter further than does [Advanced] and paints land and target echoes thicker. Use [Coastal] when you are cruising along a coastline. To select an automatic sea clutter suppression method, open the pop-up menu, tap [Auto Sea Mode] then turn on [Advanced] or [Coastal].



Sea clutter at screen center



Sea control adjusted; sea clutter suppressed

6.5 How to Reduce the Rain Clutter

When your ship is in or near rain or snow, the reflections from rain or snow appear on the screen. These reflections have the name “rain clutter”. When the rain clutter is strong, targets in or near the rain clutter are hidden in the clutter. Reflections from the rain clutter are easily identified from true targets by their wool-like appearance.

The rain control breaks the continuous display of rain or snow reflections into a random pattern. The rain control also helps to reduce the target clutter in good weather in busy harbors. When the rain clutter hides targets, adjust the rain control (automatic or manual) to reduce the clutter. After the rain clutter is gone, turn off the rain control to prevent the loss of targets.

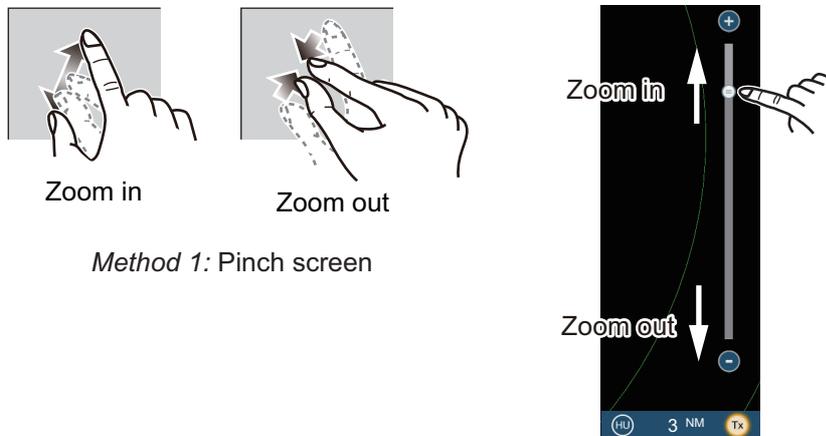
Like with gain, rain clutter can be adjusted from the pop-up menu or data area. See the procedures in section 6.3.

6.6 Range Scale

The range setting controls the size of the area (in nautical miles, kilometers or statute miles) that appears on your screen. The range appears at the bottom right-hand corner of the screen.

How to zoom in or out the range scale

The range scale can be selected two ways, as shown below. The slider bar can be shown or hidden with [Show Scale Slider] in the [Settings] - [Radar] menu.



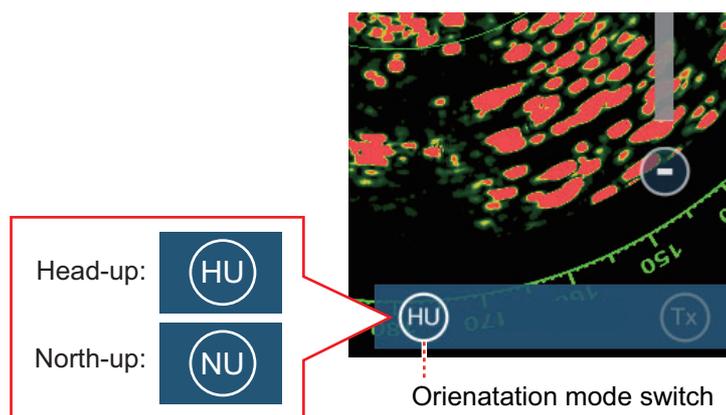
Method 2: Drag slider
(or tap bar or +, - icons)

6.7 Orientation Mode

The orientation mode controls the relationship between your ship and all the other targets.

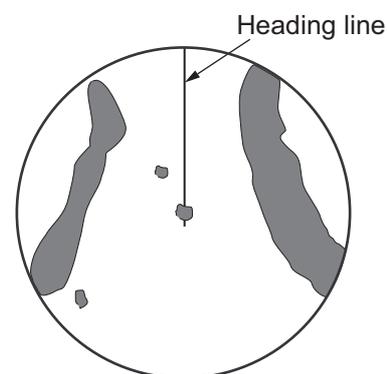
The heading data is required in the north-up mode. When the heading data is lost, the orientation mode automatically goes to head-up. Restore the compass signal to show the heading indication. Select the orientation mode again if necessary.

To select an orientation mode, tap the orientation mode icon [HU] (or [NU], whichever is shown) icon at the bottom right corner of the screen to show [HU] (Head-up) or [NU] (North-up).



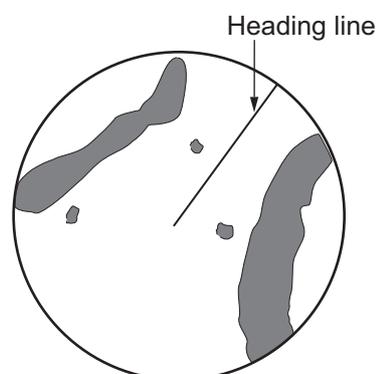
Head-up

A display without azimuth stabilization in which the line that connects the center with the top of the screen indicates your heading. Targets are shown at their measured distances and in their directions relative to your heading.



North-up

Targets are shown at their measured distances and their true (compass) directions from your ship. North is at the top of the screen. The heading line changes its direction according to your heading.



6.8 How to Measure the Range and Bearing from Your Ship to a Target

You can measure the range or bearing to a target by the following four methods.

	Range measurement	Bearing measurement
Fixed range rings	Yes	No
Ruler	Yes	Yes
VRM (Variable Range Marker)	Yes	No
EBL (Electronic Bearing Line)	No	Yes

6.8.1 How to display the range rings

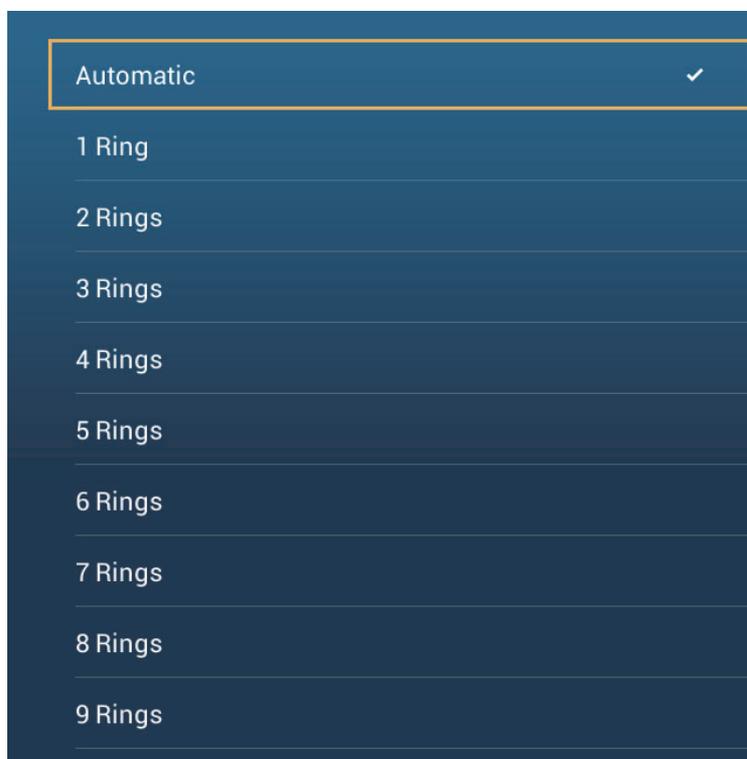
The range rings are the concentric solid circles about your ship. Use the fixed range rings to get a rough estimate of the range to a target.

To show or hide the range rings, open the [Layers] menu then turn [Radar Rings] on or off.

To measure the range with the range rings, count the number of rings between the center of the screen and the target. Check the range ring interval and estimate the distance of the echo from the inner edge of the nearest ring.

6.8.2 How to set the number of the range rings to show

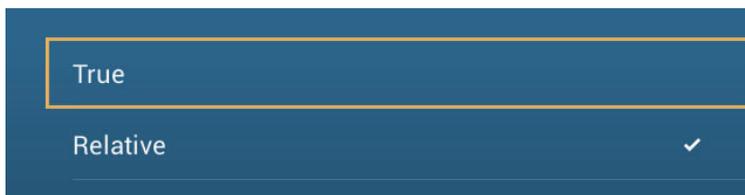
1. Open the home screen, then tap [Settings] - [Radar].
2. Tap [Rings Interval].



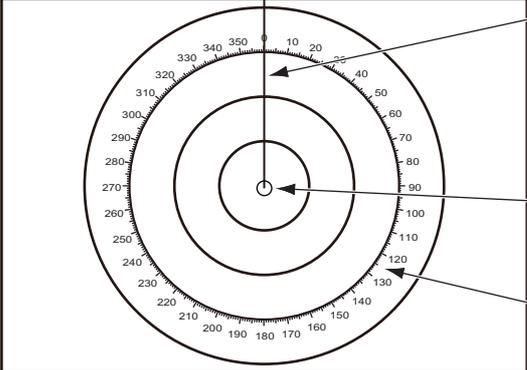
3. Tap a number. [Automatic] automatically selects the number of rings according to the range scale.
4. Tap the close button to finish.

6.8.3 How to select the range rings mode

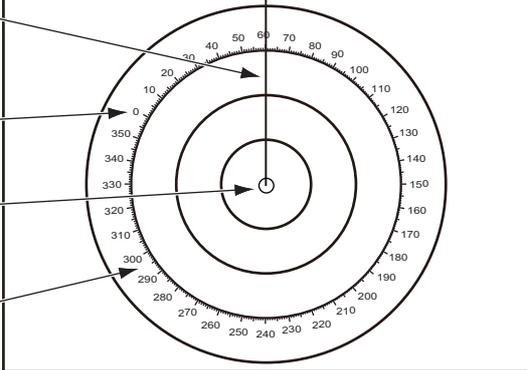
To select the range rings mode, open the home screen, then tap [Settings] - [Radar]. Set [Bearing Scale Mode] and [Relative] or [True].



Head-up mode



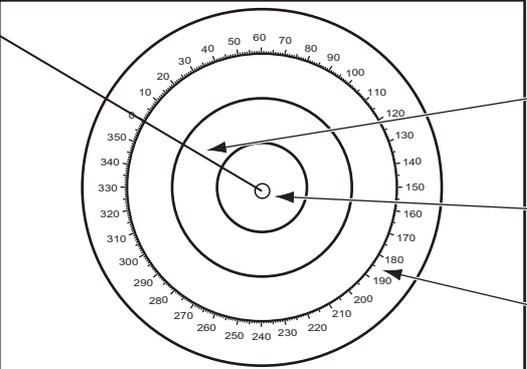
Relative: Bearing scale is fixed and "0" is at the top of the screen.



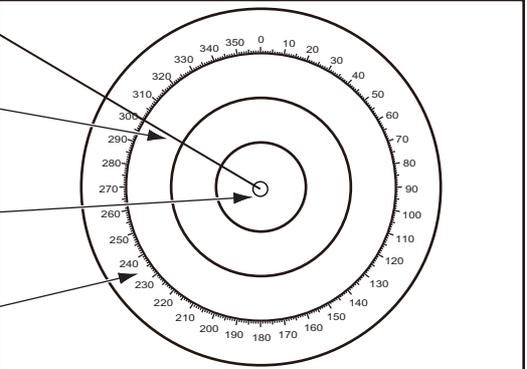
True: Bearing scale rotates according to the movement of your ship.

Labels for both displays: Heading line, North ("0"), Boat icon, Bearing scale.

North-up mode



Relative: Bearing scale rotates according to the movement of your ship.



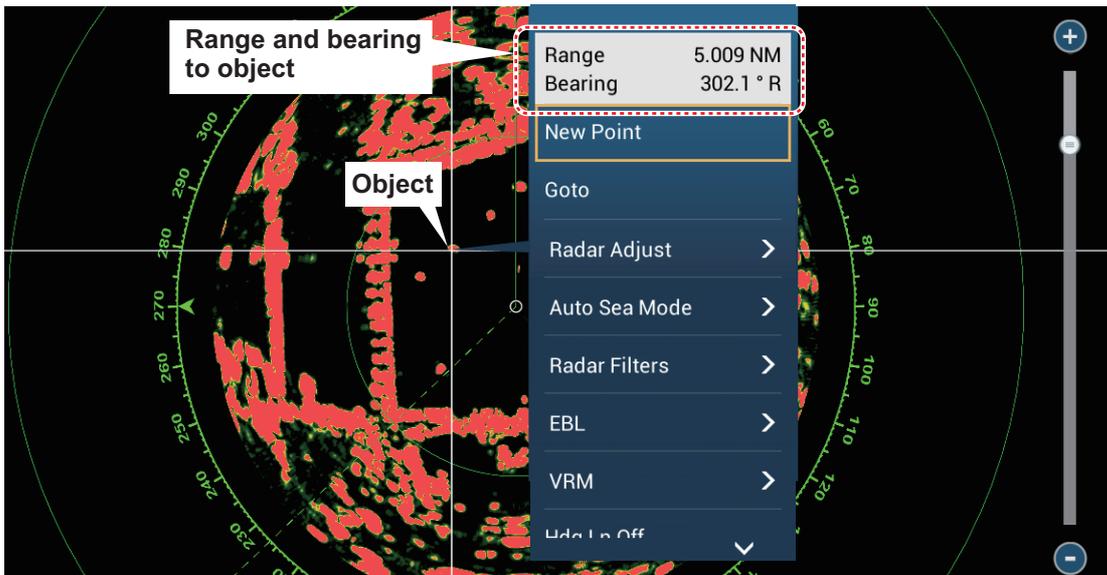
True: Bearing scale is fixed and "0" is at the top of the screen.

Labels for both displays: Heading line, Boat icon, Bearing scale.

6. RADAR

6.8.4 How to measure the range and bearing to an object

Tap an object to get its range and bearing from own ship. Read the range and bearing in the pop-up menu.



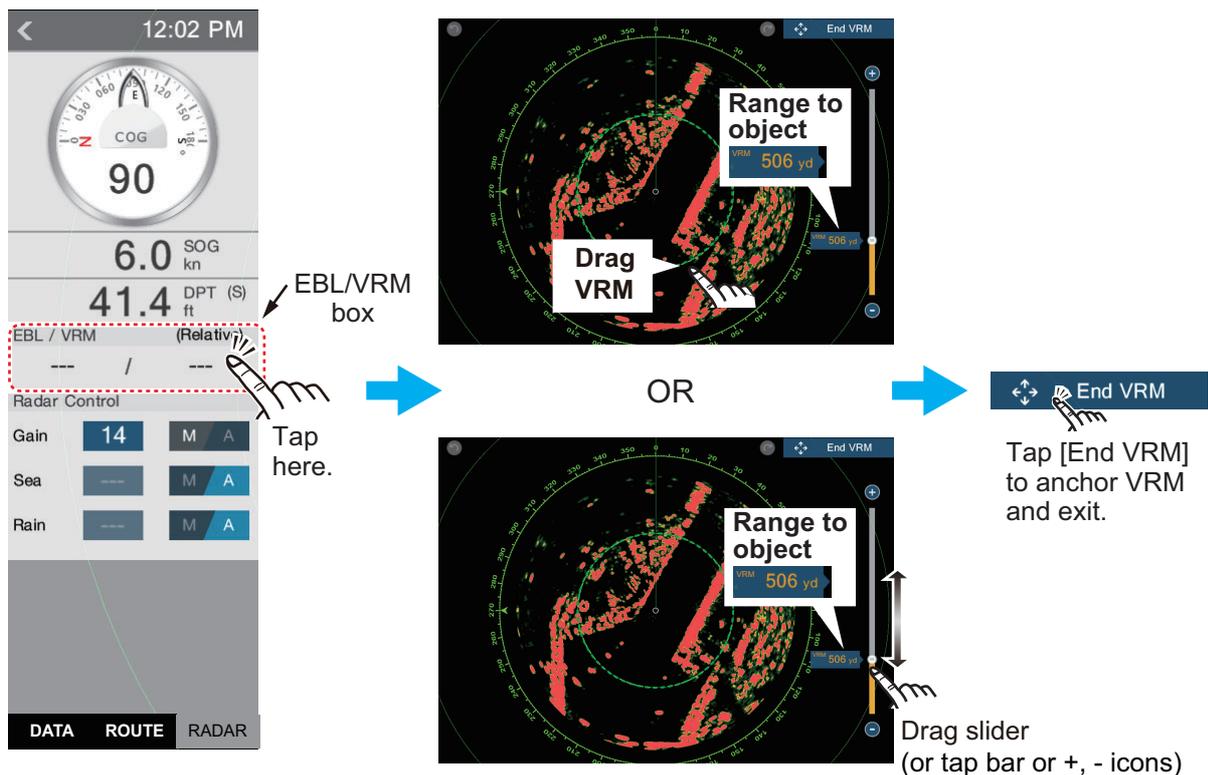
6.8.5 How to measure the range with the VRM

The VRM is a dashed ring so that you can identify the VRM from the fixed range rings.

Method 1: From the data area

Open the data area. Tap the VRM indication in the [EBL/VRM] box. Drag the VRM or slider to set the VRM. Tap [End VRM] to anchor the VRM and finish. The range to the VRM appears to the left of the slider bar and in the [EBL/VRM] data box.

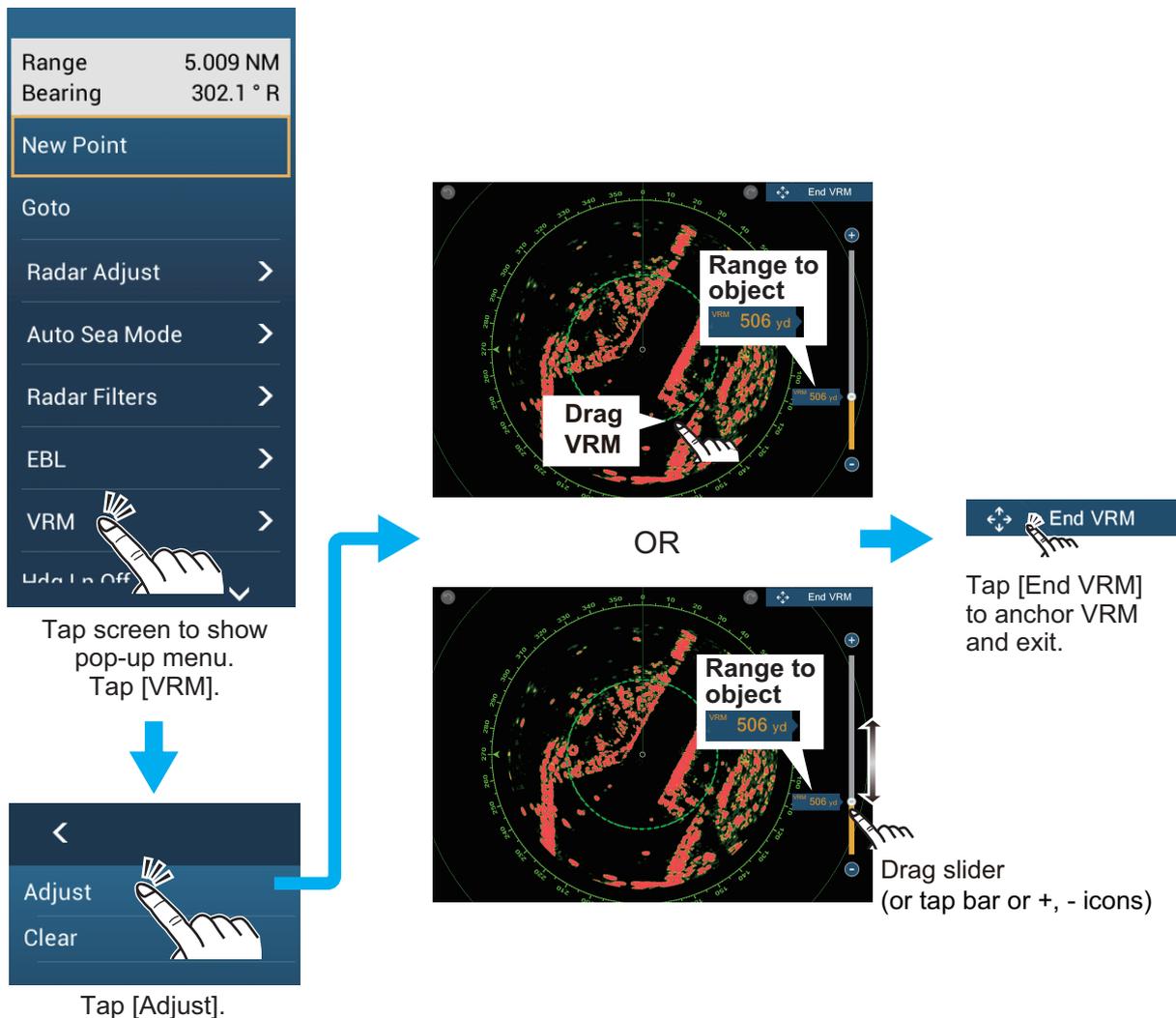
To clear the VRM, open the pop-up menu, then tap [EBL] and [Clear].



Method 2: From the pop-up menu

Tap the screen to show the pop-up menu, then tap [VRM]. Drag the VRM or slider to set the VRM. Tap [End VRM] to anchor the VRM and finish. The range to the VRM appears to the left of the slider bar.

To clear the VRM, open the pop-up menu, the tap [VRM] and [Clear].



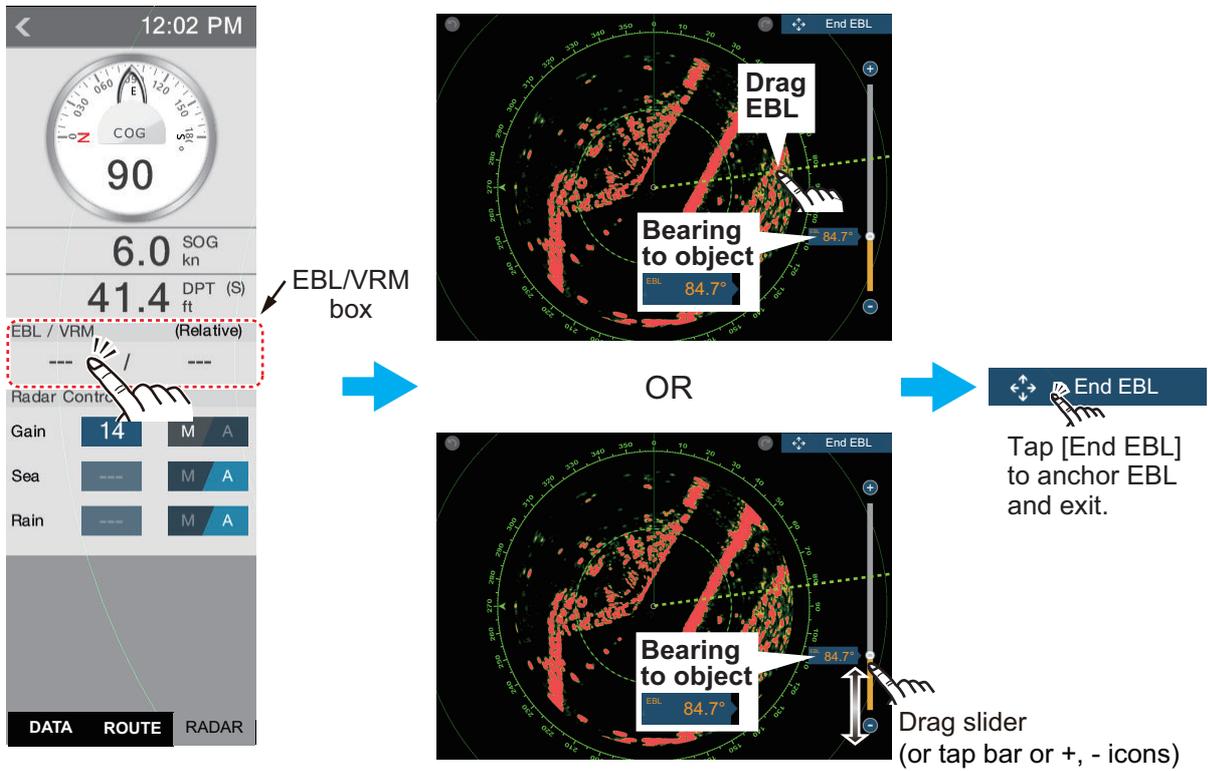
6. RADAR

6.8.6 How to measure the bearing with the EBL

Method 1: From the data area

Open the data area. Tap the EBL indication in the [EBL/VRM] data box. Drag the EBL or slider to set the EBL. Tap [End EBL] to anchor the EBL and finish. The range to the VRM appears to the left of the slider bar and in the [EBL/VRM] data box.

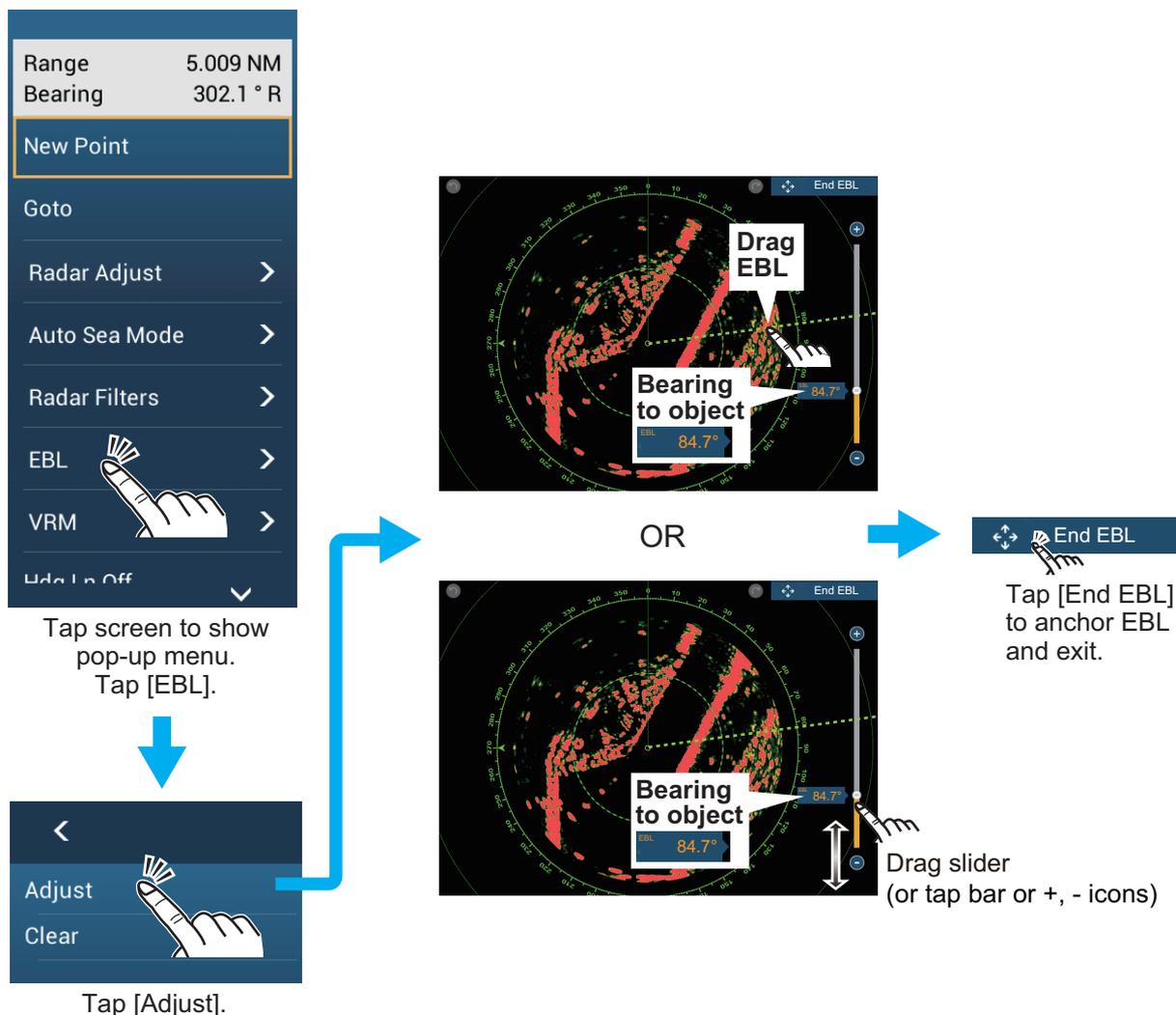
To clear the EBL, open the pop-up menu, then tap [EBL] and [Clear].



Method 2: From the pop-up menu

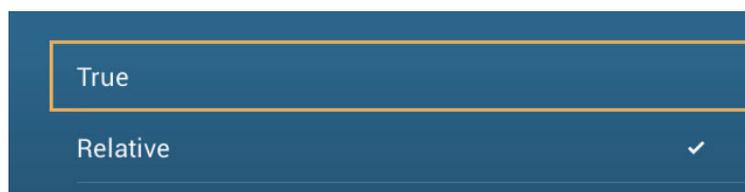
Tap the screen to show the pop-up menu, then tap [EBL]. Drag the EBL or slider to set the EBL. Tap [End EBL] to anchor the EBL and finish. The range to the EBL appears to the left of the slider bar.

To clear the EBL, open the pop-up menu, then tap [EBL] and [Clear].

**6.8.7 How to select the EBL reference**

You can select the EBL reference from [True] or [Relative]. [True] means the bearing is in reference to the north. [Relative] means the bearing is relative to the heading of your ship. True bearing requires a heading sensor.

1. Open the home screen, then tap [Settings] - [Radar].
2. Tap [EBL Reference].

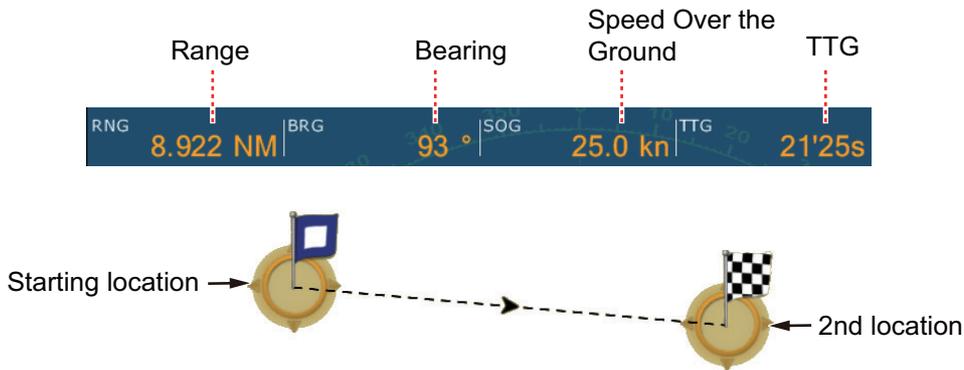


3. Tap [True] or [Relative].
4. Tap the close button to finish.

6.9 How to Measure the Range and Bearing Between Two Targets

You can measure the range and bearing between any two targets with the ruler.

1. Open the slide-out menu then tap [Distance] to display the ruler, which has two drag-gable circles connected with a line.
2. Drag the circles to set them on the objects for the measurement. The range and bearing between the objects, SOG and TTG appear at the top of the screen.

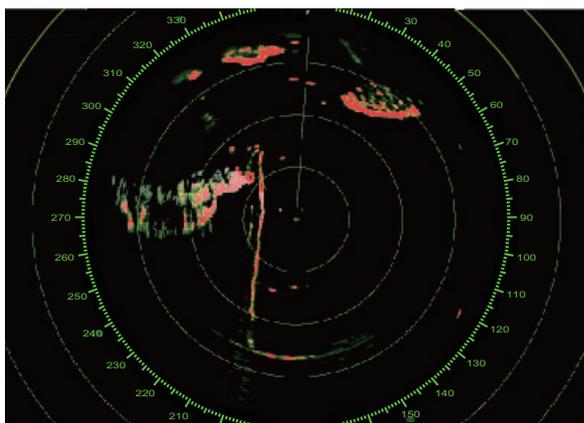


3. Tap [Cancel Ruler] at the top right-hand corner of the screen to erase the ruler and the indications.

6.10 How to Off-center the Picture

You can off-center your position to expand the view field without selecting a larger range scale. The position can be off-centered in the bow, stern, port or starboard direction, but not more than 75% of the range in use.

Pan the radar display by dragging with a finger. To return your ship to the center of the screen, tap [Center Radar] at the top right-hand corner of the screen.



Normal picture



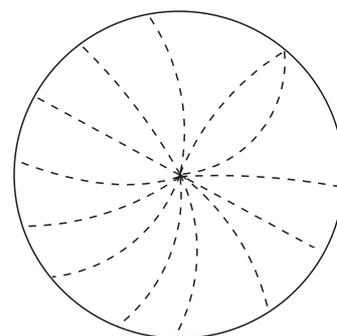
Picture off-centered in stern direction

6.11 Heading Line

The heading line indicates your heading in all orientation modes. This line connects between your position to the outer edge of the radar display. The line is at zero degrees on the bearing scale in the head-up mode. The orientation of the line changes in the north-up mode with the movement of your ship. If it is hard to identify the echoes on the heading line, you can hide the heading line and range rings for a few seconds. Open the pop-up menu, then tap [Hdg Ln Off] to hide the heading line and range rings. The heading line and the range rings reappear after approx. 5-6 seconds.

6.12 How to Reduce Radar Interference

Radar interference can occur when your ship is near the radar of another ship that operates on the same frequency band with your radar. The interference shows on the screen in many bright dots. The dots can be random or in the shape of dotted lines that run from the center to the edge of the screen. You can identify the interference from the normal echoes, because the interference does not appear in the same location at the next rotation of the antenna.



Turn off the interference rejector when there is no interference to prevent the loss of weak targets.

1. Tap the screen then tap [Radar Filters].
2. Turn [Int Reject] on or off.

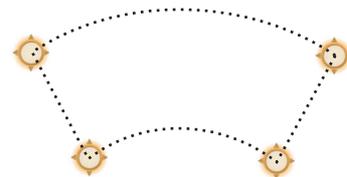
6.13 Guard Zone

The guard zone provides aural and visual alarms against targets (ships, islands, landmasses, etc.) that enter the area you set.

6.13.1 How to set the guard zone

Note: You can not set the guard zone with the MCU-002. Use the touch operation to set the guard zone.

1. Open the [Layers] menu.
2. Turn on [Guard Zone 1] or [Guard Zone 2]. A guard zone appears with a circle at each of its four corners.



3. Drag the circles to set the guard zone.
Note: To set a 360-degree guard zone, set the same bearing for all four circles.
4. Tap [Done] at the top right-hand corner of the screen to complete the guard zone and erase the circles.

If you need to readjust a guard zone, tap on a line of the guard zone to show the pop-up menu then tap [Resize]. Drag the circles to adjust the guard zone. Tap [Done] at top right corner to finish.

6.13.2 How to activate or deactivate the guard zone

1. Tap on a line of the guard zone to show the pop-up menu.
2. Turn [Alarm] on or off. The alarm is active when the guard zone lines are solid and the lines are dashed when the alarm is deactivated.

When a target enters an active zone, the aural alarm sounds (if active), the target flashes, and the message "TARGET ALARM" flashes in the status bar. Tap the status bar to silence the aural alarm and stop the flashing message. The message remains in the status bar and the target continues to flash until the target leaves the guard zone or the alarm is deactivated.

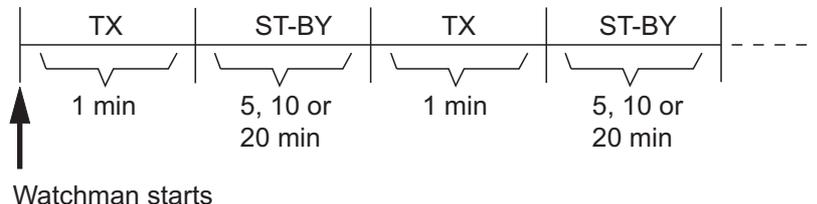
You can mute the audio alarm by turning off [Alarm Sound] in the [Settings] - [Alarm] menu. (see paragraph 2.10.6).

6.13.3 How to hide the guard zone

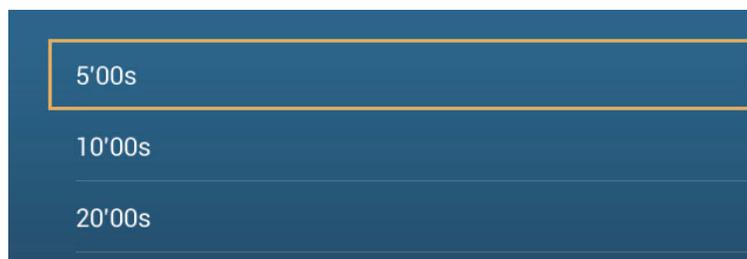
Open the [Layers] menu and turn [Guard Zone 1] or [Guard Zone 2] off. The guard zone is erased from the screen.

6.14 Watchman

The watchman feature transmits the radar for one minute at a specified time interval (5, 10 or 20 minutes) to monitor the guard zone. If a target is found in the guard zone, the watchman is canceled and the radar continues to transmit. This feature helps you watch for targets in the area you set when you do not continuously require the radar.



1. Set a guard zone. See section 6.13. (Watchman does not operate unless a guard zone is active. Set Watchman when the radar is in transmit state.)
2. Open the home screen, then tap [Settings] - [Radar].
3. Tap [Watchman].

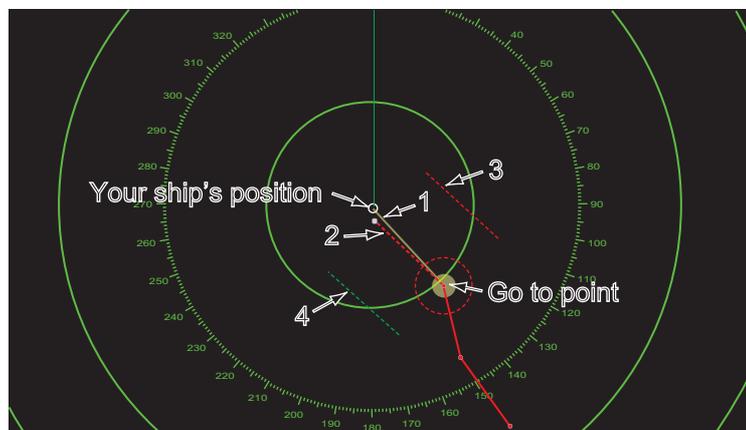


4. Tap a watchman rest interval.
5. Tap the close button to finish.
6. On the radar display, tap the screen to show the pop-up menu. Turn [Watchman] on to activate the watchman function.

6.15 How to Show, Hide or Cancel an Active Route

You can show, hide the active route on the radar display. Open the [Layers] menu then turn [Routes] on or off.

To cancel route navigation, tap any part of the route then tap [Stop Nav] on the pop-up menu.



6.16 How to Show or Hide the Own Ship Icon

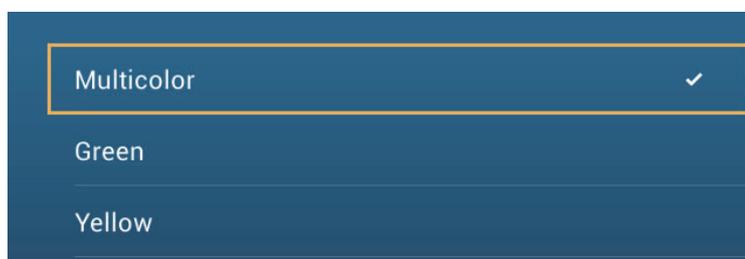
You can show or hide the boat icon on the radar display.

1. Open the home screen, then tap [Settings] - [Radar].
2. Turn [Own Ship Icon] on or off.
3. Tap the close button to finish.

6.17 Echo Color

Echo color is available in colors of green, yellow or multicolor. [Multicolor] displays echoes in colors of red, yellow and green, corresponding to signal levels of strong, medium and weak.

1. Open the home screen, then tap [Settings] - [Radar].
2. Tap [Echo Color].

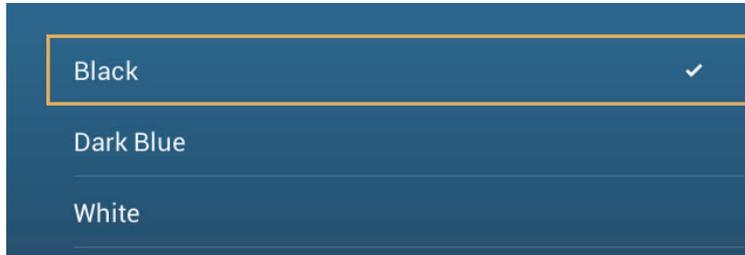


3. Tap a color.
4. Tap the close button to finish.

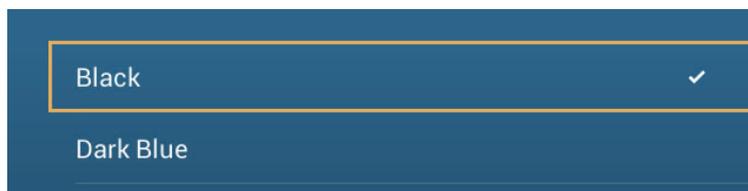
6.18 Background Color

You can select the background color for daytime and nighttime operations.

1. Open the home screen, then tap [Settings] - [Radar].
2. Tap [Day Background Color] or [Night Background Color] menu.



Day background color



Night background color

3. Tap a color.
4. Tap the close button to finish.

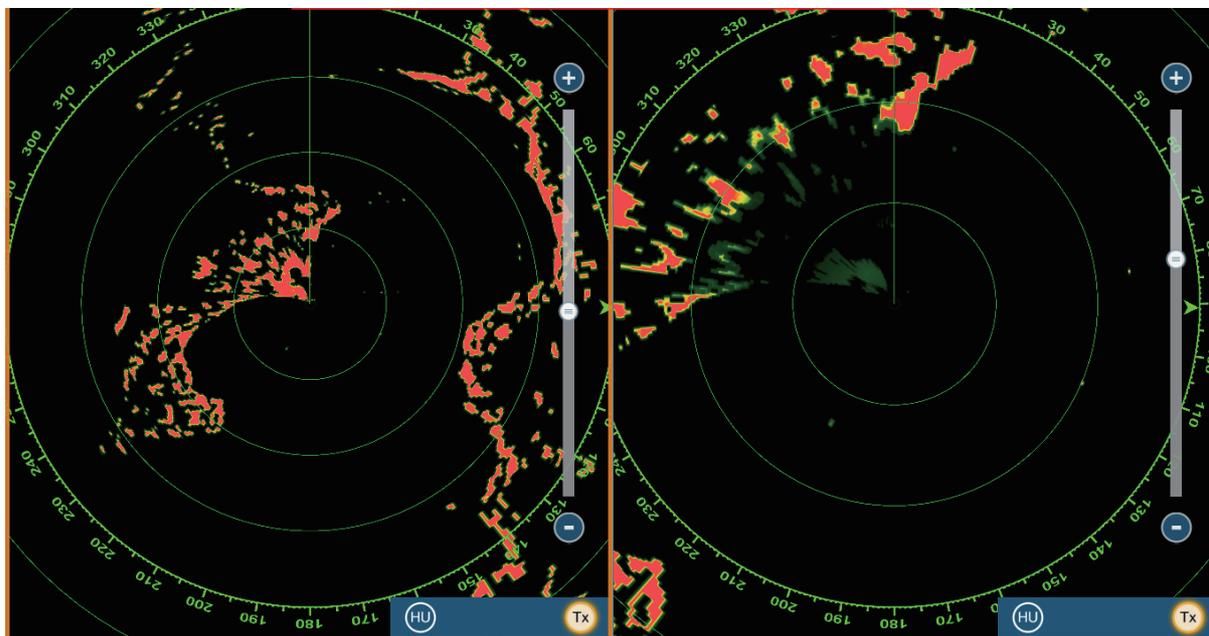
6.19 Radar Overlay Range Link

The radar overlay range link automatically keeps the display range and radar range in sync. This feature helps you understand the relation between the radar and the chart. You can activate or deactivate this feature from the plotter display. See paragraph 3.2.3.[]

Note: The radar picture can look “out of focus” on long ranges when the range link is active. This out of focus appearance does not indicate a problem, because it is a characteristic of the digital zoom.

6.20 Dual-Range Display

The dual-range display scans and displays two different radar ranges at the same time, with a single antenna. There is no time delay between the two pictures and you have separate control of each picture. This feature lets you keep a close watch on close-range targets while watching the movement of distant targets.



Long range display

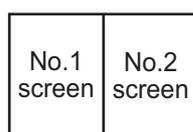
Short range display

To get the dual-range display, set dual-range displays on the home screen. See paragraph 1.7.1 for the procedure. You can put the dual-range displays in the two-way and three-way split screens.

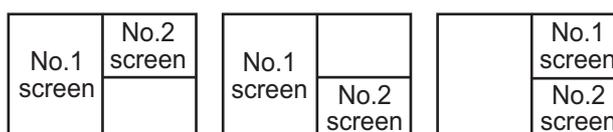
The radar functions that are adjusted separately are as follows:

- Active route (show or hide)
- Rain (rain clutter)
- Heading line and rings (hide temporarily)
- Range
- Orientation mode (head-up or north-up)
- Auto sea mode ([Advanced] or [Coastal])
- Transmission* (Can not set stand-by mode separately)
- Gain
- Sea (sea clutter)
- AIS/DSC (show or hide)
- Range rings (show or hide)
- Trail (clear to restart)
- Interference rejector

*: The no.1 screen is independent of the no.2 screen when the no.2 screen is in stand-by. However, when the no.2 screen goes to transmit state, so does the no.1 screen.



Two-way split



Three-way split

6.21 Radar Menu

This section provides the descriptions for the radar menu items not mentioned earlier.

Radar Initial Setup

[Antenna Rotation]: Starts or stop antenna rotation. For the serviceman. See the installation manual.

[Antenna Heading Align]: Compensates for error in positioning of the antenna unit at installation. See the installation manual for the adjustment procedure.

[Main Bang Suppression]: Reduces main bang, the clutter appearing at the screen center. See the installation manual for the adjustment procedure.

[Enable Sector Blanking]: Sets the area(s) where to prevent transmission. For example, set the area where an interfering object at the rear of the antenna would produce a dead sector (area where no echoes appear) on the display. See the installation manual for the procedure.

Antenna position

[Longitudinal (from bow)], [Lateral (-Port)]: Set the position of the radar antenna in relation to the bow and port.

Other items

[Antenna Height]: Set the height of the radar antenna above the waterline.

[Auto Tuning]: Activate or deactivate auto tuning.

[Tuning Source]: Selects the radar range for the adjustment, [Range 1] (long range), [Range 2] ((short range).

[Manual Tuning]: Manually tune.

[Radar Monitoring]: Show various voltage levels, and ARPA data. For the serviceman.

[ARPA Advanced Settings]: Sets ARPA parameters. For the installer, serviceman. Do not change the settings.

[Set Hardware to Factory Default]: For the serviceman. No use for the user.

[Reset Default Settings]: Restore default settings for items other than those in the [RADAR INITIAL SETUP] section.

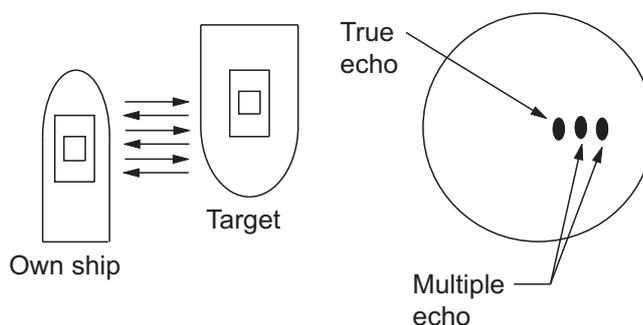
6.22 How to Interpret the Radar Display

6.22.1 False echoes

Echo signals can appear on the screen at positions where there is no target or disappear where there are targets. You can identify false targets when you understand why the false echoes appear. A description of false echoes follows.

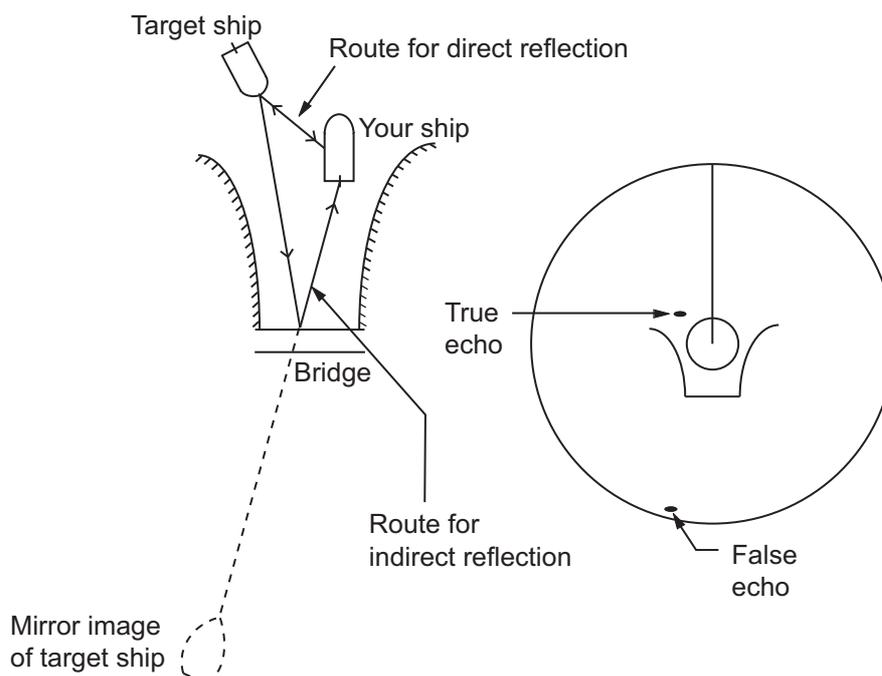
Multiple echoes

Multiple echoes occur when a transmitted pulse returns from a solid object like a large ship, bridge, or breakwater. A second, a third or more echoes can be seen on the screen at two, three or more times the true range of the target as shown below. You can reduce and sometimes remove these multiple echoes if you decrease the gain, or correctly adjust the sea clutter.



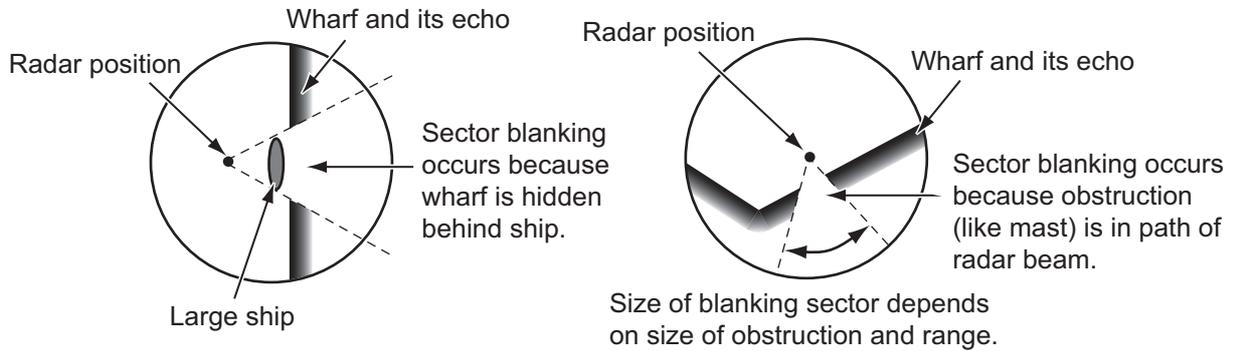
Virtual image

A large target near your ship can show at two positions on the screen. One of the positions is the true echo reflected by the target. The other position is a false echo which is caused by the “mirror effect” of a large object on or near your ship. See the figure shown below for an example of this type of false echo. If your ship gets near a large metal bridge, for example, a false echo appears on the screen. The echo disappears after move some distance from the bridge.



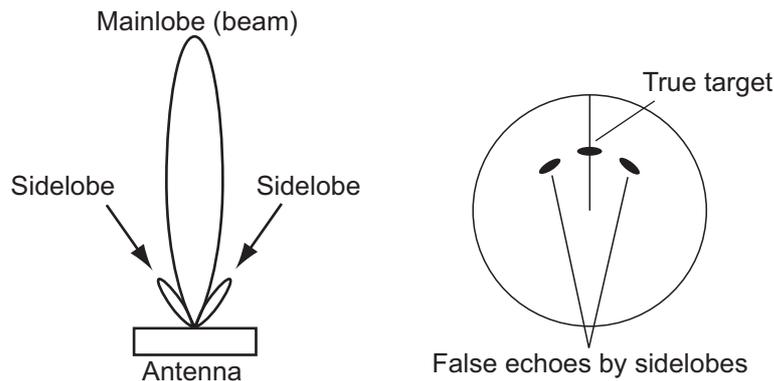
Sector blanking

Funnels, stacks, masts, or derricks in the path of the antenna stop the radar beam. If the angle opposite the antenna is more than one or two degrees, a sector or shadow sector appears on the screen. Targets are not displayed within the sector.



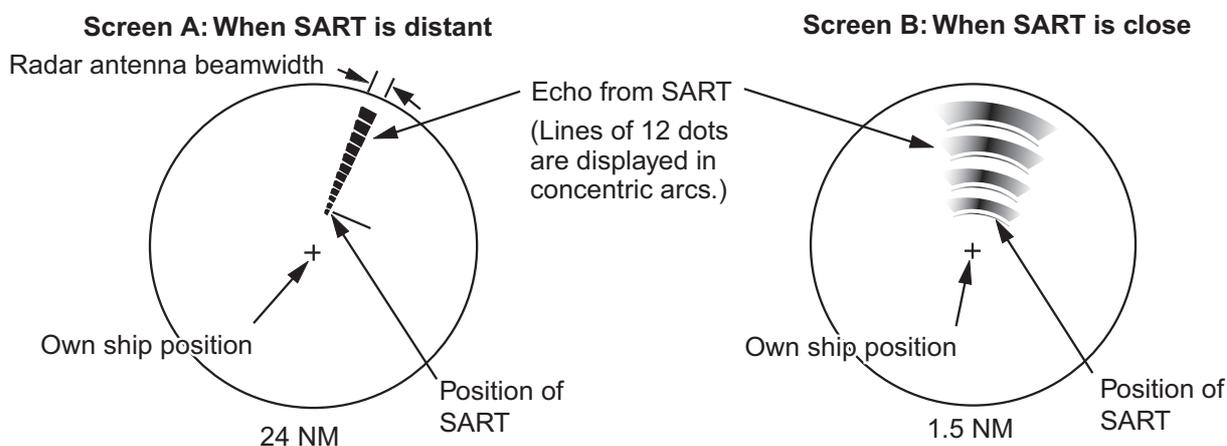
Sidelobe echoes

Each time the radar transmits, some radiation leaves on each side of the beam. This lost energy has the name "sidelobes" If a target is detected by both the sidelobes and the mainlobe, the sidelobe echoes can appear at both sides of the true echo at the same range. Sidelobes normally show only on short ranges and from strong targets. You can reduce sidelobes if you reduce the gain, or correctly adjust the sea clutter.



6.22.2 Search and rescue transponder (SART)

A ship in distress uses a radar-SART to show a series of dots on the radar display of nearby ships to indicate distress. A SART transmits when it receives a radar pulse from any X-Band (3 cm) radar within a range of approximately 8 nm. When a SART receives a radar pulse, the SART transmits a response across all the radar frequency band.



How to detect the SART response

- Use the range scale of 6 or 12 NM. The distance between the SART responses is approximately 0.6 NM (1125 m) to identify the SART.
- Turn off all the automatic clutter filters.
- Turn off the interference rejector.

6.22.3 Racon (Radar Beacon)

A racon is a radar transponder that sends a characteristic signal when the racon receives a radar pulse (normally only the three-centimeter band). If the racon signal is sent on the same frequency as that of the radar, the signal appears on the radar display. The racon signal appears on the radar in one of two methods:

- A line that starts just after the position of the Racon
- A Morse code signal displayed with a line just after the position of the Racon



6.23 ARPA Operation

The ARPA (Automatic Radar Plotting Aid) shows the movement of a maximum of 30 radar targets. The targets can be acquired manually or automatically. All 30 targets can be acquired manually when the ARPA acquisition area is not active. If the ARPA acquisition area is active, that total is equally divided between manual and auto acquisition.

ARPA requires speed and heading data.

Note: The DRS4DL radar sensor does not have the ARPA function.

 WARNING
<p>No one navigational aid should be relied upon for the safety of vessel and crew. The navigator has the responsibility to check all aids available to confirm position. Electronic aids are not a substitute for basic navigational principles and common sense.</p> <ul style="list-style-type: none"> · This auto plotter automatically tracks an automatically or manually acquired radar target and calculates its course and speed, indicating them by a vector. Since the data generated by the auto plotter are based on what radar targets are selected, the radar must always be optimally tuned for use with the auto plotter, to ensure required targets will not be lost or unwanted targets such as sea returns and noise will not be acquired and tracked. · A target does not always mean a landmass, reef, ships or other surface vessels but can imply returns from sea surface and clutter. As the level of clutter changes with environment, the operator should properly adjust the Sea, Rain and Gain to be sure target echoes are not eliminated from the radar screen.

 CAUTION
<p>The plotting accuracy and response of this auto plotter meets IMO standards. Tracking accuracy is affected by the following:</p> <ul style="list-style-type: none"> · Tracking accuracy is affected by course change. One to two minutes is required to restore vectors to full accuracy after an abrupt course change. (The actual amount depends on gyrocompass specifications.) · The amount of tracking delay is inversely proportional to the relative speed of the target. Delay ranges from 15 - 30 seconds for high relative speed; 30 - 60 seconds for low relative speed.
<p>Display accuracy is affected by the following:</p> <ul style="list-style-type: none"> · Echo intensity · Radar transmission pulsewidth · Radar bearing error · Gyrocompass error · Course change (your ship or target)

6.23.1 How to show or hide the ARPA display

Open the [Layers] menu, then turn [ARPA Targets] on or off.

6.23.2 How to manually acquire a target

You can manually acquire a target from both the radar display and the radar display overlay. Tap the target to acquire to show the pop-up menu, then tap [Acquire].

After you acquire a target, the radar marks the target with a broken square and a vector appears within 30 s. The vector indicates the direction of the target. Within 90 s after you acquire the target, the first tracking step is finished and the target is tracked continuously. At this point, the broken square changes to a solid circle.

ARPA Symbol	Meaning
	At acquisition of the target.
	30 s after the acquisition, the plotting symbol changes to a small circle, which indicates steady-state tracking. A vector appears to show the direction of the target.
	A lost target is indicated by a diamond symbol, created from two equal triangles.

Note 1: For successful acquisition, the target must be within 0.05 to 16 NM from your ship and not hidden in sea or rain clutter.

Note 2: When the capacity for manual acquisition is reached, you cannot acquire more targets. Cancel tracking of non-threatening targets to acquire additional targets manually.

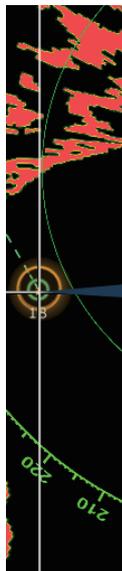
6.23.3 How to automatically acquire a target

Any target that enters the ARPA acquisition area is acquired and tracked automatically. When a target enters the area, the buzzer sounds.

1. Create a guard zone referring to section 6.13.
2. Tap a line on the guard zone to show the pop-up menu. Turn on [Auto Acquire]. The dotted lines for the guard zone turn into solid lines.

6.23.4 How to display target data

You can find the bearing, range, etc. of an ARPA target. Tap the ARPA target to get its simple information in the pop-up menu. For detailed information, tap the ARPA target to display the pop-up menu, then tap [Info].



ID	18
COG	239.8 °
SOG	41.2 kn
Range	2.262 NM
Bearing	244.7 °
CPA	1.682 NM
TCPA	3'07s
Acquire	
Cancel	
Clear	
New Point	
Info	

Simple information

ID	18
COG	242.7 °
SOG	39.2 kn
CPA	1.534 NM
TCPA	3'07s
Range	2.193 NM
Bearing	245.7 °
Status	Tracking
Lat	N 26°29.045'
Lon	W 79°44.501'

Detailed information

6.23.5 How to stop tracking targets

You can stop tracking ARPA targets individually or all together.

Individual target

Tap the ARPA target to display the pop-up menu, then tap [Cancel] to delete the target from the screen

All targets

Open the [Layers] menu, tap [ARPA], then tap [Cancel All] to delete all targets from the screen.

6.23.6 How to clear a lost target

An ARPA target not detected in five scans becomes a lost target. You can clear lost targets separately or all together.

Individual lost target

Tap the lost target to display the pop-up menu, then tap [Clear] to remove the lost target from the screen.

All lost targets

Open the [Layers] menu, tap [ARPA], then tap [Clear Lost] to delete all lost targets from the screen.

6.23.7 CPA/TCPA alarm

This alarm helps you keep your ship away from collision by warning of targets on a collision course. The ARPA continuously monitors the predicted range at the Closest Point of Approach (CPA) and predicted time to CPA (TCPA) of each tracked target. When both the predicted CPA and TCPA are less than their set values, the alarm sounds and the message "CPA/TCPA Alarm" appears and flashes at the top of the screen.

Make sure that the gain, sea and rain controls are correctly adjusted before you use this alarm.

CPA/TCPA alarm ranges must be set correctly according to the size, tonnage, speed, turning performance and other characteristics of your ship.

How to set the CPA/TCPA alarm

1. Open the home screen, then tap [Settings] - [Targets].
2. Turn on [CPA/TCPA Alarm].
3. Tap [CPA Alarm Value] or [TCPA Alarm Value] to display the software keyboard.
4. Set the value, then tap ✓ to confirm.
5. Tap the close button to finish.

How to acknowledge the CPA/TCPA alarm

The CPA/TCPA alarm sounds when the CPA and TCPA of an ARPA target are within the CPA/TCPA alarm range. The alarm indication "CPA/TCPA Alarm" appears and flashes at the top of the screen. To acknowledge the alarm and stop the audio alarm and flashing of the indication, tap the indication "CPA/TCPA Alarm" (see paragraph 2.10.7). (The ARPA vector must be displayed at least 30 seconds to calculate CPA and TCPA.)

How to deactivate the CPA/TCPA alarm

1. Open the home screen, then tap [Settings] - [Targets].
2. Turn off [CPA/TCPA Alarm].
3. Tap the close button to finish.

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7. FISH FINDER (SOUNDER)

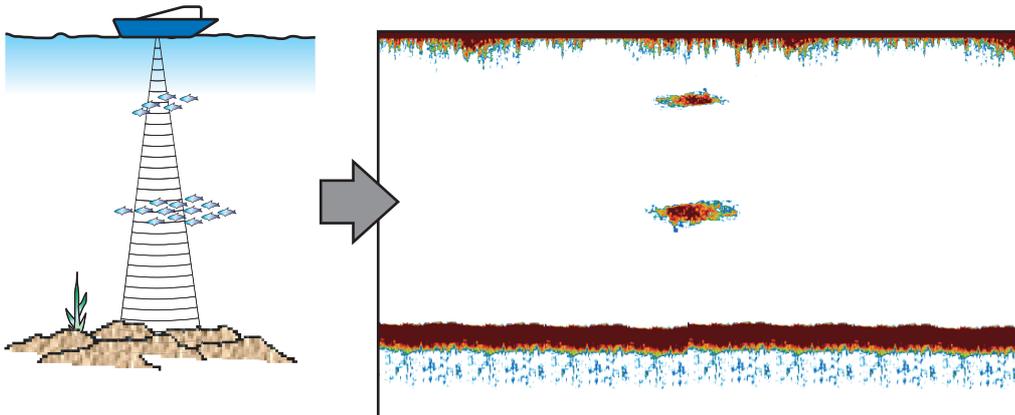
This chapter describes the functions of the built-in fish finder.

7.1 How the Fish Finder Operates

The fish finder calculates the distance between its transducer and underwater objects like fish, lake bottom or seabed. The results are shown in different colors or shades of gray according to echo strength.

The ultrasonic waves transmitted through water move at a constant speed of approximately 4800 feet (1500 meters) per second. When a sound wave "hits" an underwater object like fish or sea bottom, part of the sound wave is reflected toward the source. To find the depth to an object, the fish finder calculates the time difference between the transmission of a sound wave and the time the reflected sound wave is received.

The picture displayed by the fish finder contains a series of vertical scan lines. Each line is a "picture" of the objects under the boat. The series of pictures are put side-by-side across the screen to show the contours of the bottom and echoes from fish. The amount of history of objects that have moved under the boat can be less than a minute to more than one minute depending on the picture advance speed.



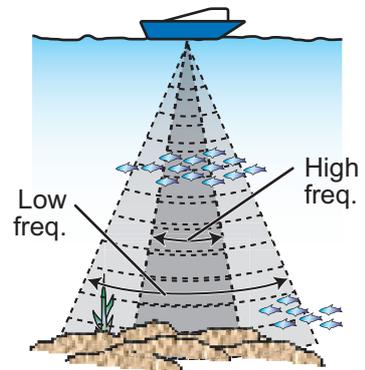
7.2 How to Select a Display

Your fish finder has six display modes. These modes are single frequency, dual frequency, bottom zoom, bottom lock, A-scope, and bottom discrimination.

7.2.1 Single frequency display

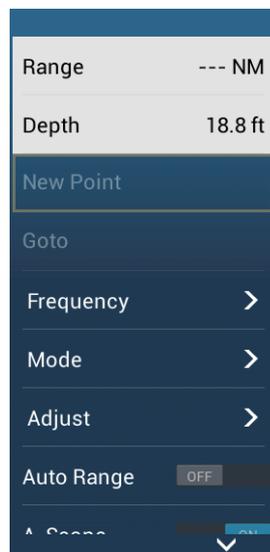
The single frequency display shows either the low-frequency or high-frequency picture on all the screen. Select a frequency according to your purpose.

- A low frequency gives a wide detection area. Use the low frequency for general search and to find bottom conditions.
- A high frequency gives better resolution. Use the high frequency to inspect a school of fish.



How to select a single frequency display

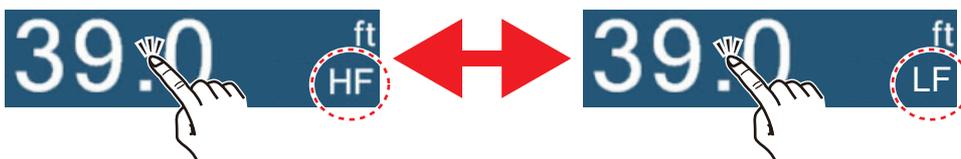
Tap the screen to show the pop-up menu. Tap [Mode]→[Single Freq.].



How to switch between the low and high frequency displays

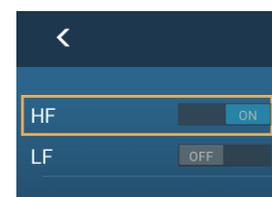
You can switch between the high and low frequency displays by two methods.

Method 1: Tap the depth indication box.



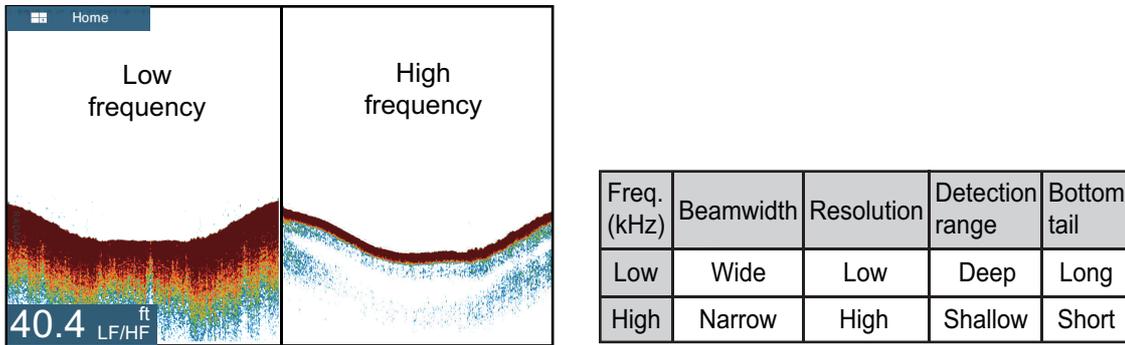
Method 2: Tap the screen to show the pop-up menu. Tap [Frequency], then tap the flipswitch of [HF] or [LF] as appropriate.

Note: The above two methods can also be used to reverse the location of the high and low frequency pictures in the dual frequency display and switch between low and high frequency pictures in a zoom display.



7.2.2 Dual frequency display

The dual frequency display provides both low and high frequency pictures, the low frequency on the left half (default). Use the dual frequency display to compare the same picture with two different sounding frequencies.



How to select the dual frequency display

Tap the screen to show the pop-up menu. Tap [Mode], [Dual Freq.].

7.2.3 Zoom displays

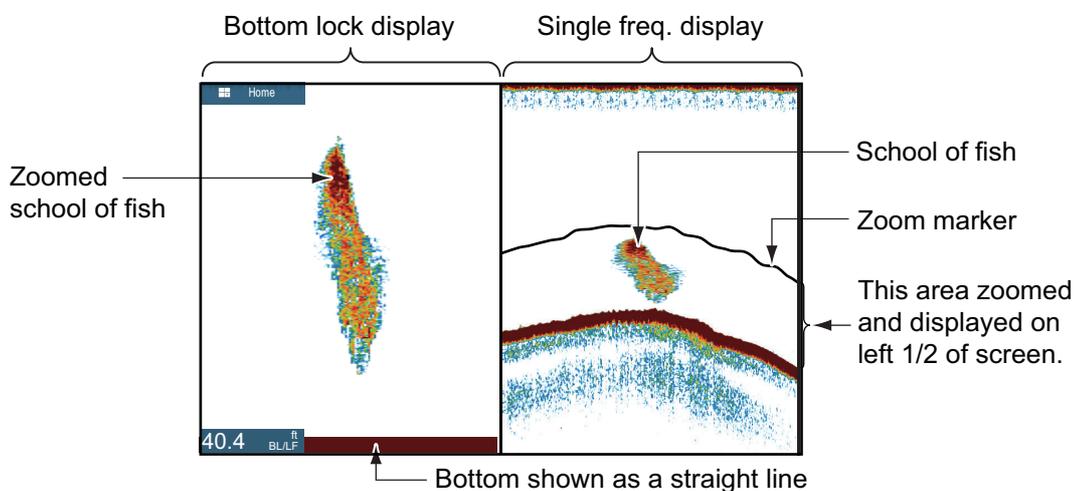
Zoom mode expands selected area of the single frequency picture. Two modes are available: bottom lock and bottom zoom.

How to activate, deactivate a zoom display

Tap the screen to open the pop-up menu. Tap [Mode], then tap [Bottom Lock] or [Bottom Zoom]. To quit the zoom display and go to the single frequency display, tap [Mode], [Single Freq.] on the pop-up menu.

Bottom lock display

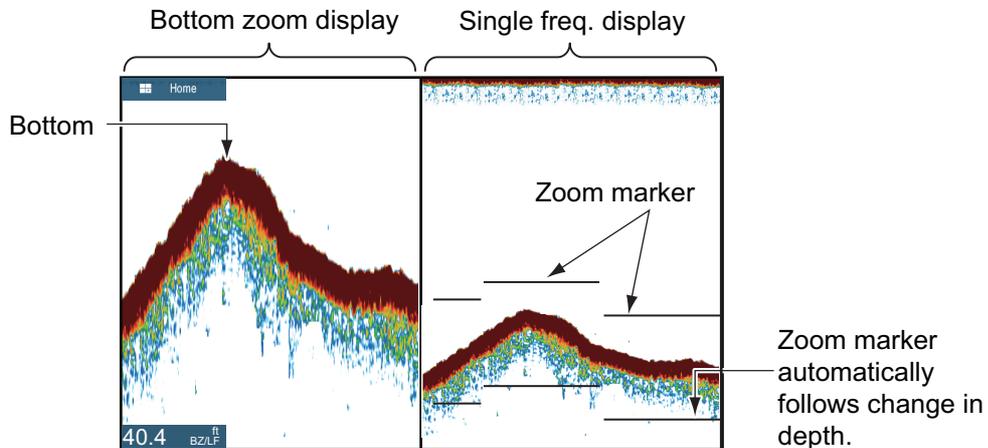
The bottom lock display provides a compressed normal picture on the right half and a 7 to 400 feet (2 to 120 meter) wide layer in contact with the bottom is expanded on the left half. This display helps you separate the fish near the bottom from the bottom echo. You can select the bottom lock range with [Bottom Lock Range Span] in the [Settings] - [Sounder] menu.



7. FISH FINDER (SOUNDER)

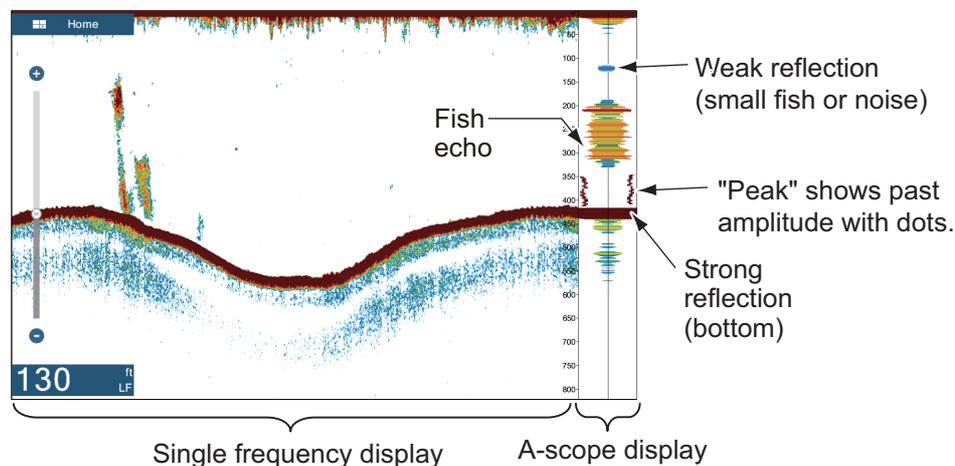
Bottom zoom display

The bottom zoom display expands the bottom and the fish near the bottom according to the zoom range selected on [Zoom Range Span] in the [Settings] - [Sounder] menu. This display helps you find the density of the bottom. A short echo tail normally indicates a soft bottom (sand bottom, etc.). A long echo tail indicates a hard bottom.



7.2.4 A-scope display (display only)

The A-scope display appears at the right of the screen and is available in any fish finder mode. This display shows the echoes at each transmission with the amplitudes and tone in balance with their intensities. This display helps you identify possible fish species and bottom structure.



How to show or hide the A-scope display

Tap the screen to show the pop-up menu, then turn [A-Scope] on or off.

A-scope peak hold

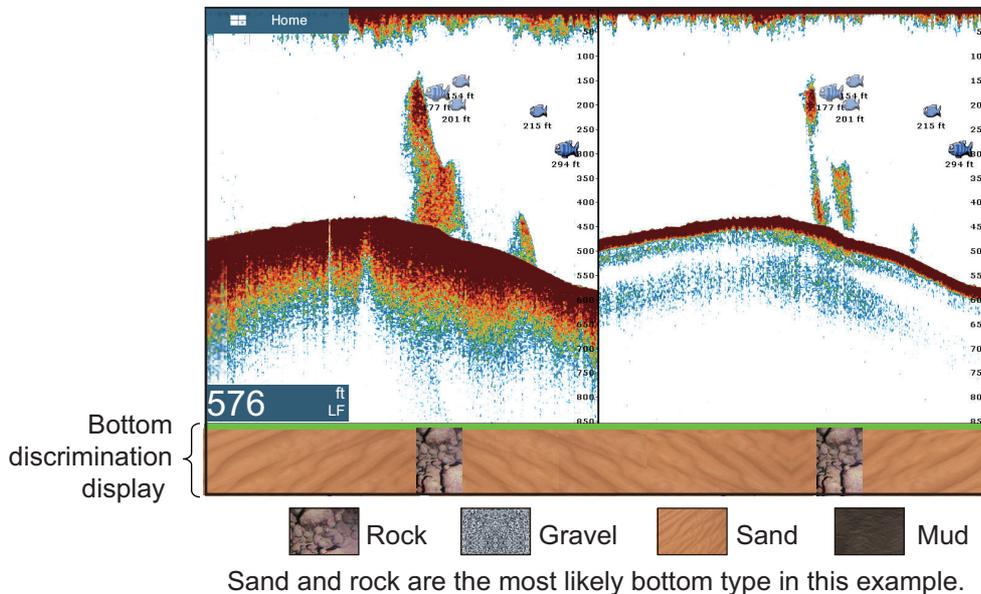
You can show the "normal" A-scope display plus the peak-hold amplitude picture for the last five seconds in dots.

1. Open the home screen, then tap [Settings] - [Sounder].
2. Turn on [A-Scope Peak Hold].
3. Tap the close button to finish.

7.2.5 Bottom discrimination display

The bottom discrimination display, which requires a bottom discrimination capable transducer or Bottom Discrimination Sounder BBDS1 or Network Fish Finder DFF1-UHD, identifies probable bottom composition. The display is available in all screen divisions, single or dual frequency mode, and occupies the bottom 1/6 of the screen in the full screen display.

Use this feature with ship speed 10 knots or less and depths between 5 and 100 m.



How to active or deactivate the bottom discrimination display

1. Open the home screen, then tap [Settings] - [Sounder].
2. Tap [Fish Finder Source].
3. Tap [TZTL12F],[TZTL15F], [BBDS1] or [DFF1-UHD] as applicable.
4. Tap the close button to finish.
5. To activate or deactivate the bottom discrimination display, turn [Bottom] on or off from the pop-up menu.

7.3 Automatic Fish Finder Operation

Your fish finder can be adjusted automatically to let you do other tasks.

7.3.1 How the automatic fish finder operates

The automatic fish finder function automatically adjusts the gain, clutter, TVG, echo offset and range. The main features of the automatic mode are as shown below.

- Gain adjusts the sensitivity of the receiver to show the bottom echo in reddish-brown (default color arrangement).
- Clutter automatically reduces low-level noise like plankton.
- The TVG function is automatically adjusted.
- The echo offset balances the gain on high and low frequencies.
- Range is adjusted automatically to show the bottom echo.

7.3.2 How to select an automatic fish finder mode

There are two types of automatic fish finder modes: [Auto Fishing] and [Auto Cruising]. [Auto Fishing] searches for schools of fish, and [Auto Cruising] tracks the bottom. [Auto Cruising] uses a higher clutter removal setting than [Auto Fishing]. Do not use [Auto Cruising] when your purpose is to find fish, because the clutter removal circuit can erase weak echoes.

To select an automatic fish finder mode, tap the screen to open the pop-up menu, tap [Adjust] then tap [Auto Fishing] or [Auto Cruising]

7.4 Manual Fish Finder Operation

Use the manual operation to see schools of fish and the bottom echo with a fixed gain setting. The gain, range and range shift functions let you select the depth you can see on the screen.

7.4.1 How to select the manual mode

Tap the screen to open the pop-up menu. tap [Adjust] then tap [Manual].

7.4.2 How to select the display range

Manual range setting

Pinch the fish finder screen or use the slider bar. The slider bar can be shown or hidden with [Show Scale Slider] in the [Settings] - [Sounder] menu.

How to turn on or off the auto range

The range can be selected automatically or manually. tap the screen to open the pop-up menu, then turn [Auto Range] on or off.

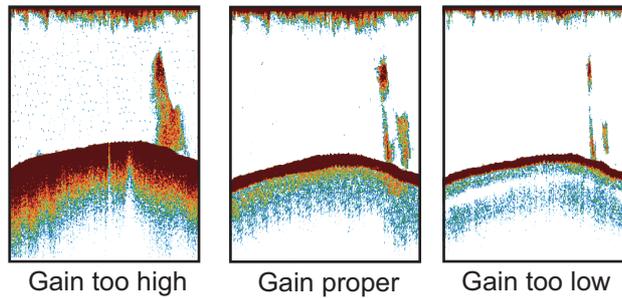
7.4.3 How to shift the range

The basic range and range shift functions let you select the depth you can see on the screen. This function is not available when [Auto Range] is active.

1. Open the home screen, then tap [Settings] - [Sounder].
2. Tap [Range Shift] to open the software keyboard.
3. Set the range then tap ✓ to confirm.
4. Tap the close button to finish.

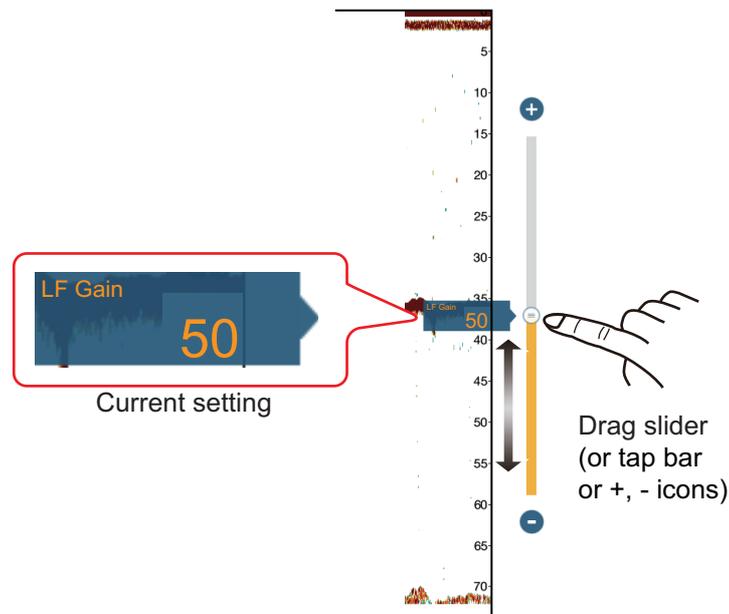
7.4.4 How to adjust the gain

The gain controls how echoes of different strengths are displayed. Set the gain to show a slight amount of noise on the screen. Increase the gain for greater depths and lower the gain for shallow waters.



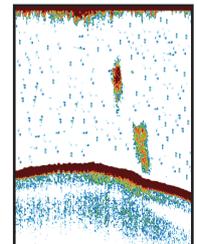
Note: This function is not available in the auto mode.

1. Tap the screen to open the pop-up menu, then tap [Adjust].
2. Tap [HF Gain] or [LF Gain].
3. Drag the slider to set the gain, as shown in the figure below.



7.4.5 How to reduce the clutter

Low intensity “spots” of noise appear over most of the screen like in the illustration shown below. These spots are caused by sediment in the water or noise. You can reduce this type of noise.

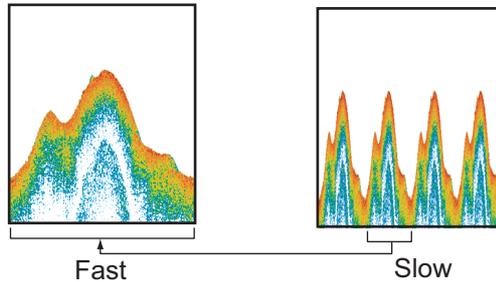


Note: This function is not available in the auto mode.

1. Open the home screen, then tap [Settings] - [Sounder].
2. Drag the slider at [Clutter] to set the level. The larger the setting value, the greater the degree of reduction.
3. Tap the close button to finish.

7.5 Picture Advance Speed

The picture advance speed controls how quickly the vertical scan lines move across the screen. A fast advance speed expands the size of a school of fish horizontally on the screen. A slow advance speed shortens the school of fish. Use a fast advance speed to see the hard bottom. Use a slow advance speed to see the smooth bottom.

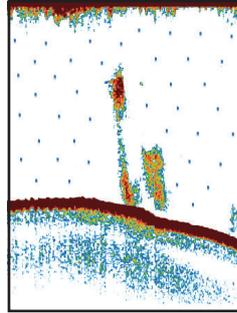


1. Open the home screen, then tap [Settings] - [Sounder].
2. Tap [Picture Advance].
3. Tap a picture advance speed. The options in the window indicate the number of scan lines made per transmission. For example, [1/2] creates one scan line per two transmissions. [1/16] is the slowest advance speed and [4/1] is the fastest speed. [Stop] stops picture advance, and is useful for taking a photo or screenshot of the screen.
4. Tap the close button to finish.

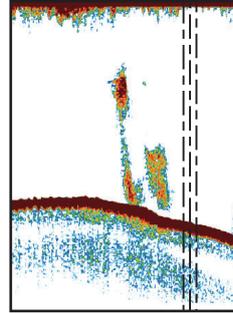
	CAUTION
The picture is not refreshed when picture advancement is stopped.	
Cruising in this state in shallow waters may ground the vessel.	

7.6 How to Reduce Interference

Interference from other fish finders and electrical equipment appears on the screen as shown in the illustration. When these types of interference appear on the screen, use the interference rejector to reduce the interference. Turn off the interference rejector when there is no interference, so that you do not erase weak echoes.



Interference from other sounder



Interference from electrical equipment

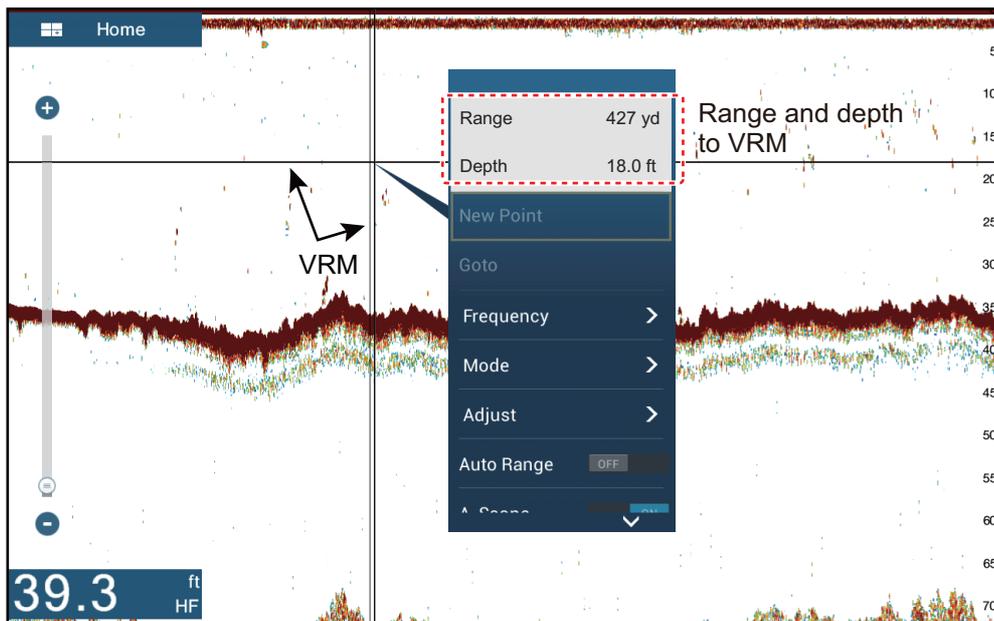
1. Open the home screen, then tap [Settings] - [Sounder].
2. Turn on [Interference Rejection].
3. Tap [Low], [Medium], [High] or [Auto]. [High] provides the greatest interference rejection. [Auto] automatically selects suitable interference setting.
4. Tap the close button to finish.

To deactivate the interference rejection, tap [Off] at step 3.

7.7 How to Measure Range, Depth to an Object

You can measure the range and depth to an object with the VRM.

Tap an object to display the VRM. Read the range and depth in the pop-up menu.



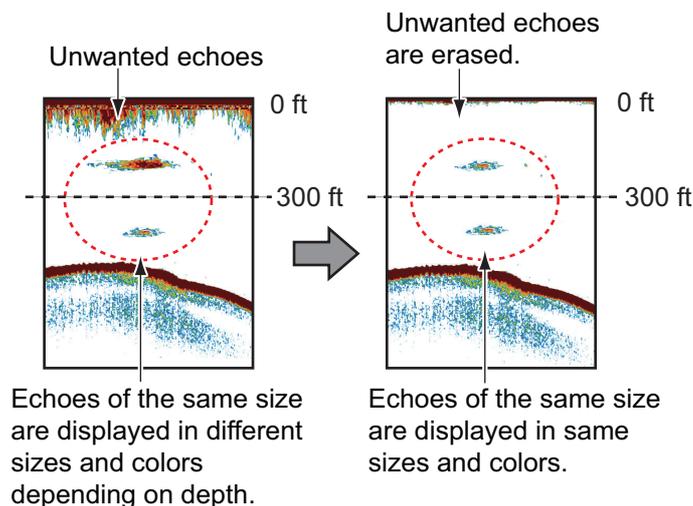
7.8 Echo History Display

You can view past echoes which are off the screen. Swipe the screen to the right to display past echoes. To return to the active display, tap [Cancel Hist] at the top right-hand corner of the screen.

7.9 How to Balance Echo Strength

A school of fish at a depth deeper than a school of equal strength in shallow water appears in weaker colors. This condition is caused by the attenuation of the ultrasonic wave. To display the schools of fish in the same colors, use the TVG. The TVG automatically increases the gain with depth so that echoes of the same strength and different depths are shown in the same colors. In the illustration shown below, for example, the TVG is set for 300 ft and the TVG level is adjusted. Unnecessary echoes at a distance less than 300 ft are deleted and echoes at depths greater than 300 ft are not adjusted.

Note: This function is not available in the auto mode.



1. Open the home screen, then tap [Settings] - [Sounder].
2. Drag the slider in [TVG HF] (high frequency) or [TVG LF] (low frequency) to set the level. The TVG setting method changes with the fish finder connected.

Fish finder	TVG setting method
Internal sounder (TZTL12F or TZTL15F), DFF1, DFF1-UHD, BBDS1	The higher the setting the greater the distance gain.
DFF3	The higher the setting the lower the distance gain.

3. Tap the close button to finish.

7.10 Fish Finder Alarms

Two types of fish alarms release audio and visual alarms to tell you that echoes from fish are in the area you selected. These alarms are [Fish Alarm] and [Fish Alarm for Bottom Lock].

The [Fish Alarm] function tells you when an echo above some strength (selectable) is within the alarm range you specify.

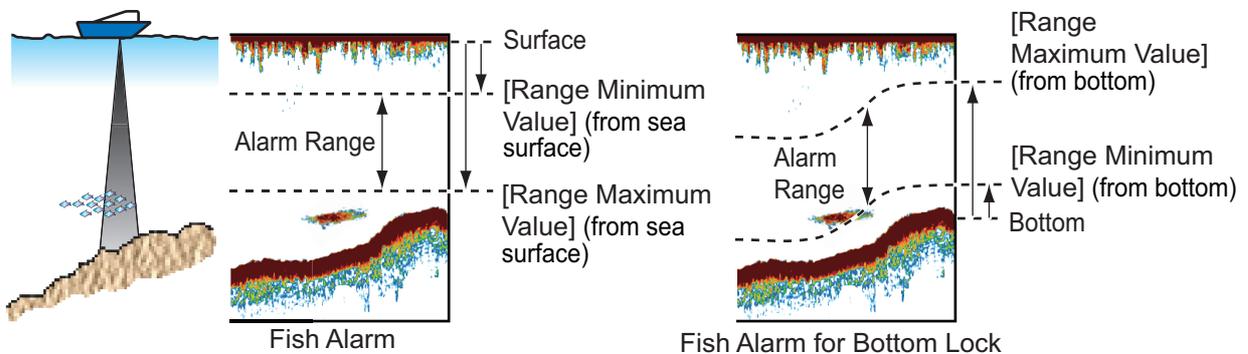
The [Fish Alarm for Bottom Lock] function tells you when fish are within some distance from the bottom. The bottom lock display must be active to use this alarm.

7.10.1 How to set an alarm

1. Open the home screen, then tap [Settings] - [Sounder]. Scroll the menu to show the fish finder alarms section.
2. **Fish alarm:** Tap [Range Minimum Value] or [Range Maximum Value] below [Fish Alarm] to display the software keyboard.
Bottom lock fish alarm: Tap [Range Minimum Value] or [Range Maximum Value] below [Fish Alarm for Bottom Lock] to display the software keyboard.



3. Set the start depth in [Range Minimum Value], the end depth in [Range Maximum Value].



4. Tap the close button to finish.

7.10.2 How to activate or deactivate an alarm

Fish alarm

1. Open the home screen, then tap [Settings] - [Sounder].
2. Turn [Fish Alarm] on or off.

The fish alarm can also be activated or deactivated with [Fish Alarm] on the pop-up menu.

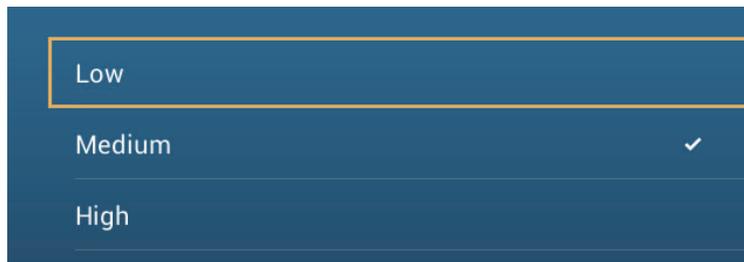
Bottom lock fish alarm

Open the home screen, then tap [Settings] - [Sounder]. Turn [Fish Alarm for Bottom Lock] on or off.

7.10.3 Alarm sensitivity

You can select the echo strength that releases the fish alarms.

1. Open the home screen, then tap [Settings] - [Sounder].
2. Tap [Fish Alarm Level].



3. Tap which echo strength releases the fish and bottom lock alarms.
[Low]: Light-blue or stronger echoes
[Medium]: Yellow or stronger echoes
[High]: Red and reddish-brown echoes
4. Tap the close button to finish.

7.11 ACCU-FISH™

The ACCU-FISH™ feature, which requires an ACCU-FISH™ capable transducer or Bottom Discrimination Sounder BBDS1 or Network Fish Finder DFF1-UHD, identifies probable bottom composition estimates the length of each fish and shows a fish symbol and depth value or fish length.

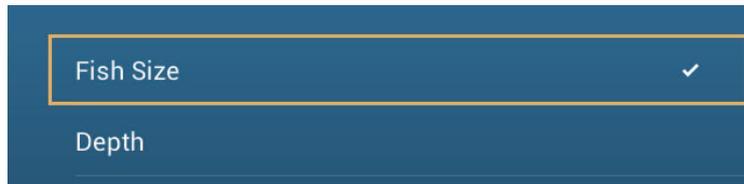
Usage guidelines

- The information given by this feature is intended for reference only.
- ACCU-FISH™ uses both low and high frequency echoes for the measurements regardless of the frequency mode in use.
- The intensity of an echo depends on fish species. If the indicated length is different from the true length, you can apply an offset in the [Sounder] - [ACCU-FISH Size Correction] menu of the menu.
- 50 kHz and 200 kHz beams are transmitted alternately without reference to the current display mode.

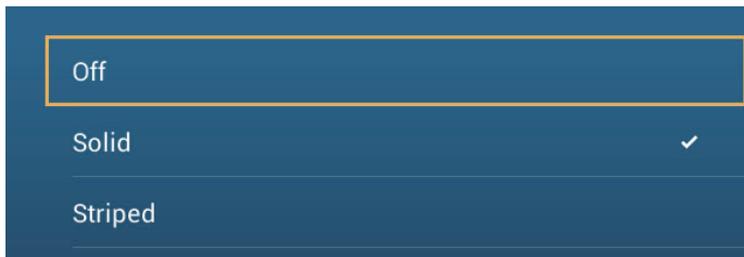
- Use this feature with ship speed of 10 knots or less and depth between 5 and 100 m.
- The signal attenuation on the inside-hull transducer is different between 50 kHz and 200 kHz. This attenuation causes some fish to get ignored and the fish length indicated can be shorter than the true length.
- Echoes from a school of fish can be in more than one layer, which can cause wrong length indication.
- The fish symbol indication is not shown when the bottom echo does not appear on the screen.

7.11.1 How to set ACCU-FISH™

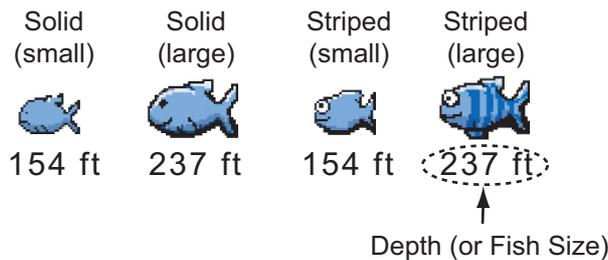
1. Open the home screen, then tap [Settings] - [Sounder].
2. Tap [ACCU-FISH Info].



3. Tap [Fish Size] or [Depth].
4. Tap [ACCU-FISH Symbols].



5. Tap [Solid], [Striped] or [Off] (turn off fish symbol).



Fish size	Solid	Striped
Large fish symbol (more than 51 cm (20.08 inch))		
Small fish symbol (10 to 50 cm (3.9. to 19.69 inch))		

6. Tap the close button to finish.

7. FISH FINDER (SOUNDER)

7.11.2 Fish size correction

The fish size shown on the screen can be different from the true size. If the size is wrong, add an offset to the measured value to get a more accurate indication on the screen.

1. Open the home screen, then tap [Settings] - [Sounder].
2. Drag the slider at [ACCU-FISH Size Correction] to set correction percentage (setting range: -80% to 100%).

Setting	Revised size
+100	Two times
+50	1.5 times
-50	1/2
-65	1/3
-75	1/4
-80	1/5

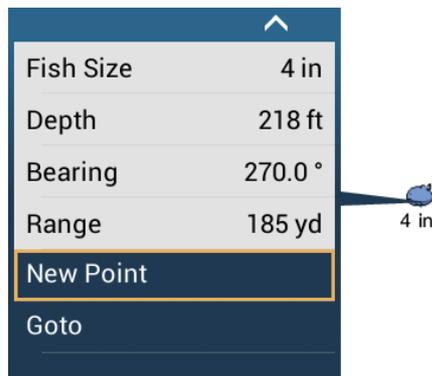
3. Tap the close button to finish.

7.11.3 How to turn the fish symbol indication on or off

Tap the screen to open the pop-up menu. Turn [ACCU-FISH] on or off. Fish symbols and their depth values or fish lengths appear on the screen. If you selected [Off] at step 5 in paragraph 7.11.1, the fish symbols are hidden and only the depth values or fish lengths appear.

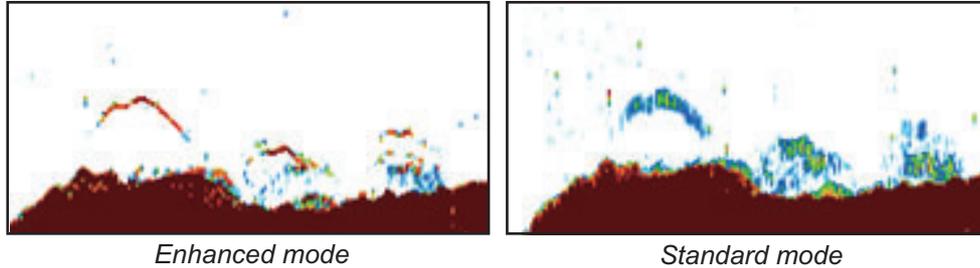
7.11.4 How to display the fish information

Tap a fish symbol to display the information (size, depth, bearing and range) about the fish.



7.12 RezBoost™

With connection of a RezBoost™ capable transducer, echo resolution can be improved. In the example below, it is difficult to distinguish fish from the bottom. With [Enhanced] RezBoost™, however, fish near the bottom are clearly seen.

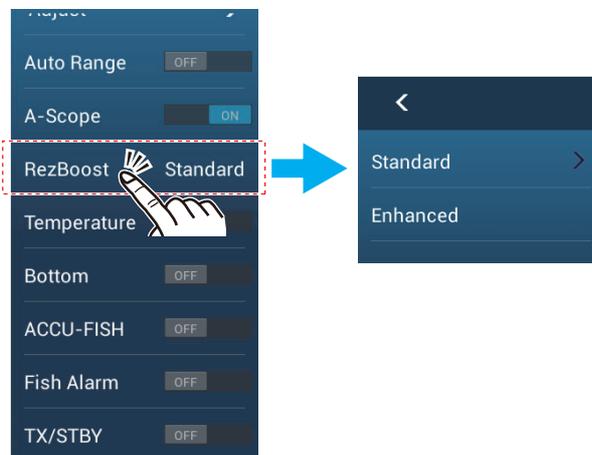


RezBoost™ is available with the following transducers.

	Transducer (option)
600 W	520-5PSD, 520-5MSD, 520-PLD, 525-5PWD, 525T-PWD, 525T-BSD, 525T-LTD/12, 525T-LTD/20, 525STID-MSD, 525STID-PWD, SS60-SLTD/12, SS60-SLTD/20
1 kW	50/200-1T, 526TID-HDD

How to set RezBoost™:

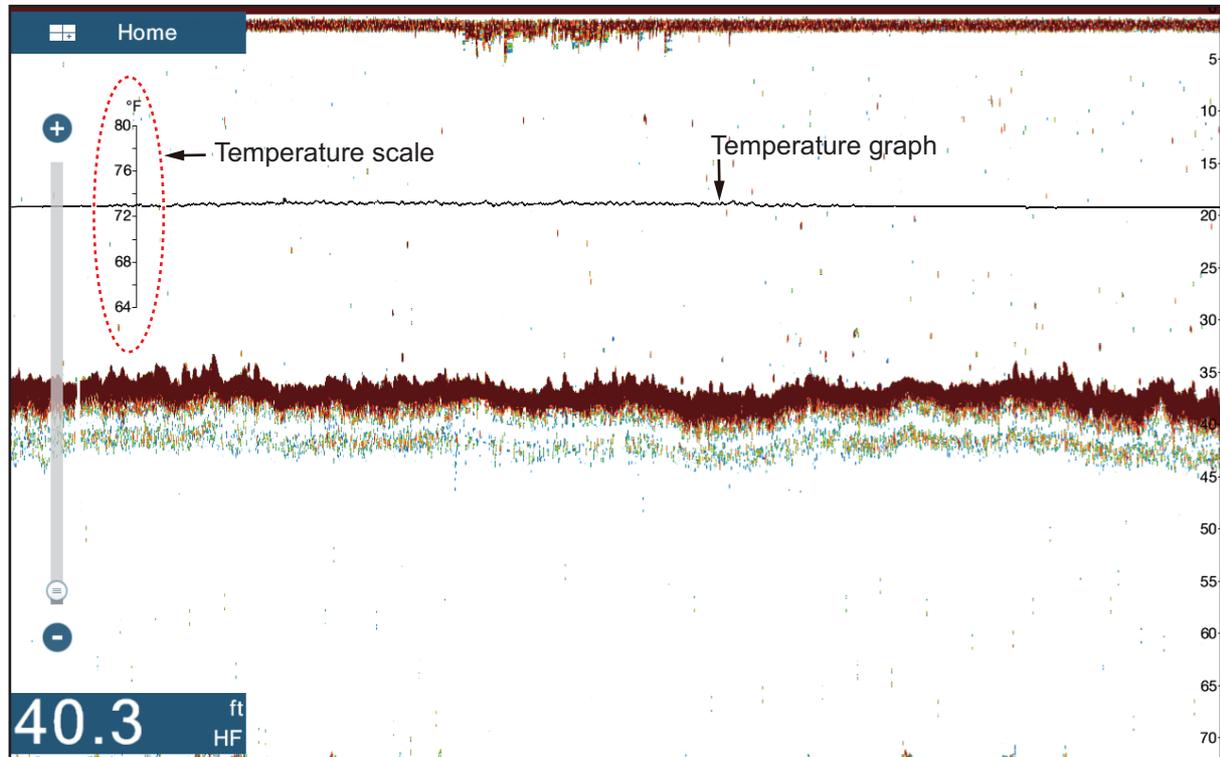
Tap the sounder display to show the pop-up menu, then scroll the menu to show [Rez Boost]. Tap [RezBoost], then tap [Enhanced]* or [Standard].



*Not available if the transducer is manually selected or a non-compliant transducer is used.

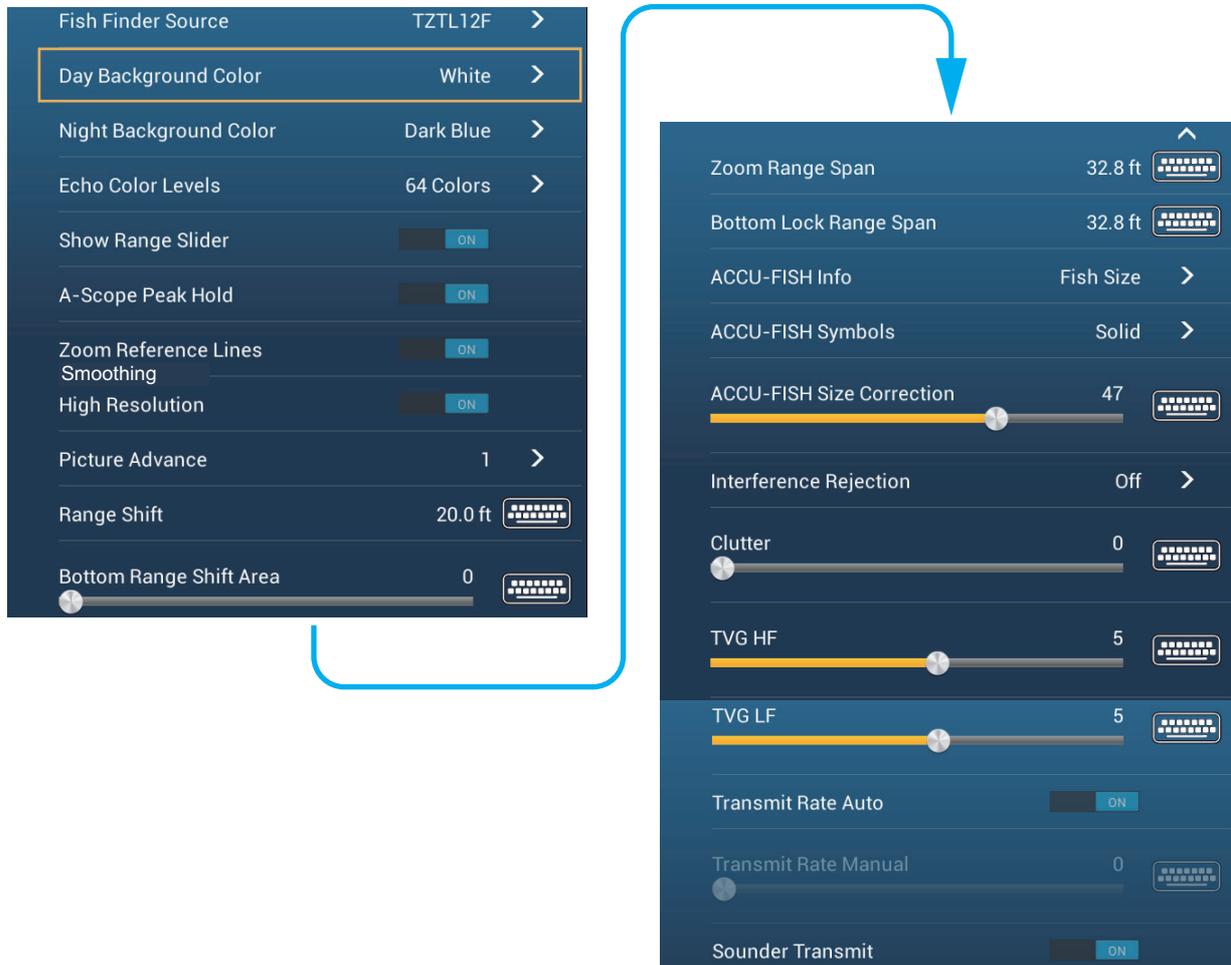
7.13 Temperature Graph

With connection of a water temperature sensor, you can plot sea surface temperature over time. Open the pop-up menu and turn on [Temperature]. The temperature graph runs across the screen from right to left, the latest temperature at the right edge. The temperature scale is at the left edge of the display. The unit of measurement ($^{\circ}\text{C}$ or $^{\circ}\text{F}$) can be selected with [Temperature] in the [Units] menu.



7.14 Sounder Menu

This section describes the fish finder functions not described in previous sections. Open the home screen, then tap [Settings] - [Sounder].



[Day Background Color]: Select the background color for use during daylight hours. The options are [White], [Light Blue], [Black] and [Dark Blue].

[Night Background Color]: Select the background color for use at nighttime. The options are [Black] and [Dark Blue].

[Echo Color Levels]: Select the number of colors shown on the screen. The selections are [8 Colors], [16 Colors] and [64 Colors].

[Show Range Slider]: Show or hide the range slider.

[Zoom Reference Lines]: Show or hide the zoom marker, which appears in the bottom lock and bottom zoom modes.

[Smoothing]: When you select [OFF], smoothed echoes are displayed, however, the screen resolution is lower. To get higher screen resolution and greater detail, select [ON].

[Bottom Range Shift Area]: Select the area where to show the bottom echo, when [Auto Range] is active. For example, setting 75% would place the bottom echo at a position equivalent to 75% from the top of the screen.

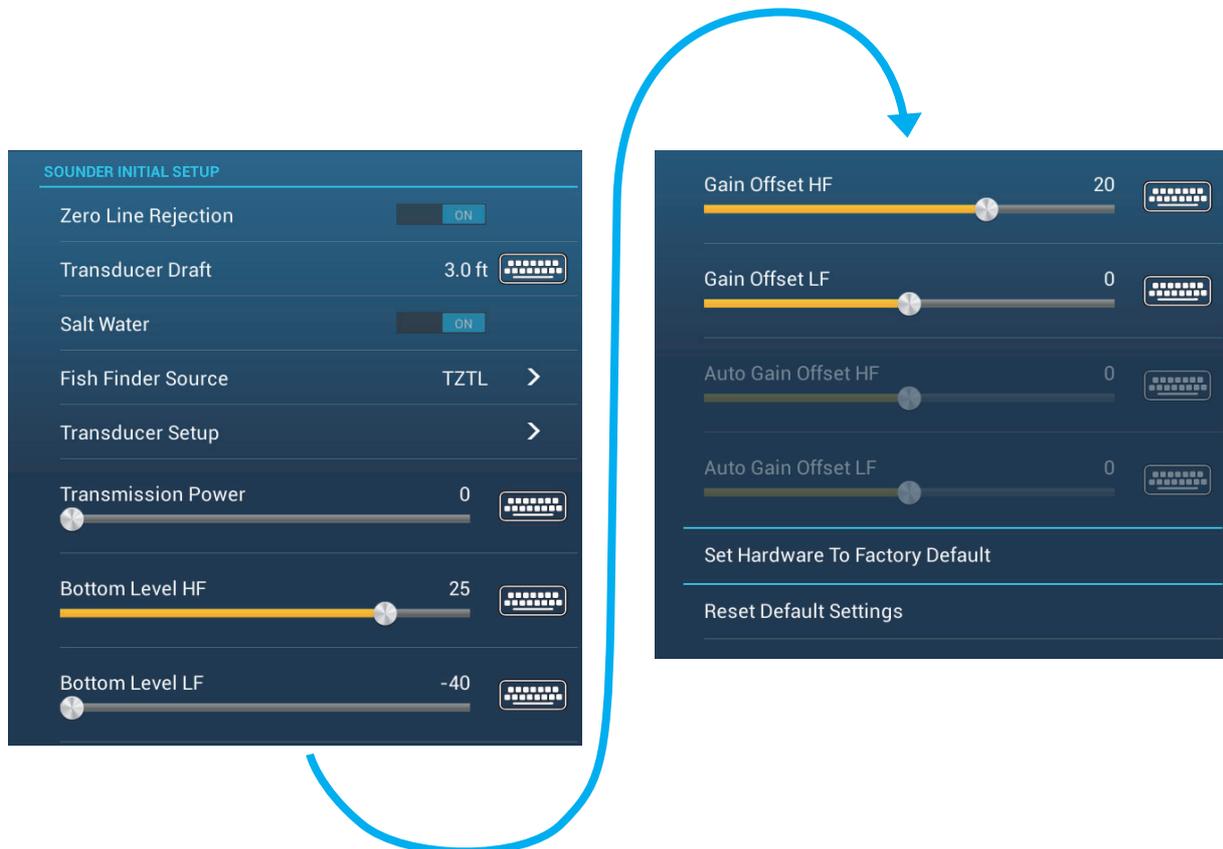
7. FISH FINDER (SOUNDER)

[Transmit Rate Auto]: Automatically set the transmit rate according to ship's speed, and is inoperative when there is no speed data.

[Transmit Rate Manual]: Change the TX pulse repetition rate in 21 levels (21 is highest power.). Use 20 in normal use. Lower the TX rate in shallow waters to prevent the second reflection echo.

[Sounder Transmit]: Turn on or off the sounder transmission.

Sounder initial setup



[Zero Line Rejection]: Turn the zero line (transmission line) on or off. When turned on, the transmission line disappears, which allows you to better watch fish echoes near the surface. The length of the transmission line changes with transducer used and installation characteristics.

Note: If the sounder source is [DFF3], adjust [Zero Line Range] (below) to set the area where to reject the zero line.

[Zero Line Range]: This feature adjusts the transmission line so that the transmission line disappears when the menu item [Zero Line Rejector] is turned on. For a long tail, increase the value. If the transmission line does not disappear, lower the TX power. Applicable to Network Sounder DFF3.

[Transducer Draft]: Set the distance between the transducer and the draft line to show the distance from the sea surface (Setting range: 0.0 to 99.9 ft).

[Salt Water]: Select [ON] to use this equipment in salt water.

[Fish Finder Source]: Select the sounder used, among DFF1, BBDS1, DFF3, or DFF1-UHD.

[Transducer Setup]: Select the method to setup the transducer, by model, manually, or TDID (transducer ID). See the installation manual for details.

[Transmission Power]: Interference can appear on the screen when the fish finder on your ship and another ship have the same TX frequency. To prevent this interference, lower your TX power and ask the other ship to lower their TX power. (Internal sounder and external sounder other than DFF1-UHD)

[External KP]: Turn on to sync with external keying pulse. (For external sounder)

[Bottom Level HF (LF)]: The default bottom level setting (0) determines that two strong echoes received in sequence are bottom echoes. If the depth indication is not stable in the default setting, adjust the bottom level here.

[Gain Offset HF (LF)]: If the gain setting is wrong, or there is a difference in the gain between the low and high frequencies, you can balance the gain for the two frequencies here.

[Auto Gain Offset HF (LF)]: If the auto gain offset is wrong, or there is a difference in the gain between the low and high frequencies, set an offset here to balance auto gain for the two frequencies.

[STC HF (LF)]: Delete unnecessary echoes (plankton, air bubbles, etc.) near the surface that hide the fish near the surface. The setting range is 0 to 10, and 0 is off. 10 deletes unnecessary echoes from the surface to approximately 16 ft. Make sure you do not use more STC than necessary, because you can erase the small echoes near the surface. (For DFF3, DFF1-UHD)

[Frequency Adjust HF (LF)]: You can adjust the TX frequency of both the low- and high-frequency transducers. Use this feature when your fish finder and another fish finder operate on the same frequency, causing interference. Change the frequency of your transducer by enough percentage points to remove the interference. (For DFF3)

[TX Pulse HF (LF)]: The pulse length is automatically set according to range and shift. Use a short pulse for better resolution and a long pulse when detection range is important. To improve resolution on zoom displays, use [Short 1] or [Short 2]. [Short 1] improves the detection resolution, but the detection range is shorter than with [Std] (pulse length is 1/4 of [Std]). [Short 2] raises the detection resolution, however detection range is shorter (pulse length is about 1/2 of [Std]) than [Std]. [Std] is the standard pulse length, and is suitable for general use. [Long] increases the detection range but lowers the resolution (about 1/2 compared to the [Std] pulse length). (For DFF3)

[Rx Band HF (LF)]: The RX bandwidth is automatically set according to pulse length. To decrease noise, select [Narrow]. For better resolution, select [Wide]. (For DFF3)

[Temperature Port]: Select the data source for water temperature. (For DFF3, DFF1-UHD)

[MJ]: The water temperature data from the water temperature/speed sensor

[Low Frequency]: The low frequency measured water temperature

[High Frequency]: The high frequency measured water temperature

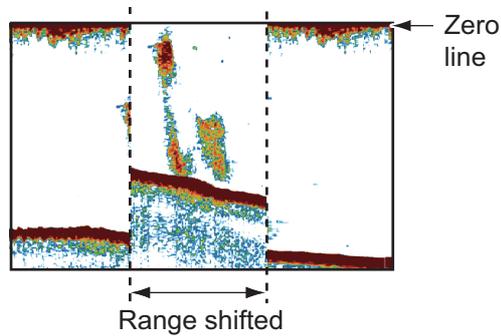
[Set Hardware to Factory Default]: Select this menu item to restore default settings for the unit selected in [Fish Finder Source].

[Reset Default Settings]: Select this menu item to restore default settings for the [Sounder] menu.

7.15 Interpreting the Display

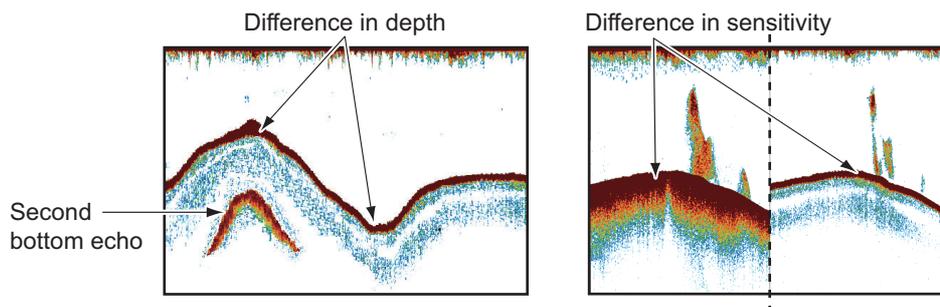
Zero line

The zero line (transmission line) shows the position of the transducer. The line disappears from the screen when the range is shifted.



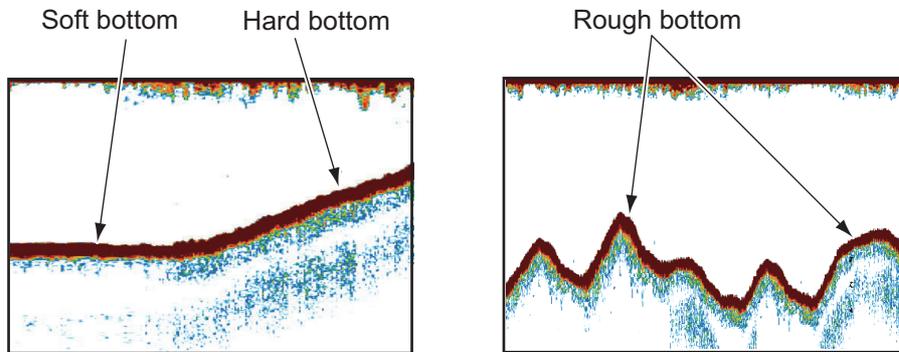
Bottom echoes

The strongest echoes are from the bottom, and are normally shown in reddish-brown or red. The colors and the width change with bottom material, depth, sea condition, installation, frequency, pulse length and sensitivity.



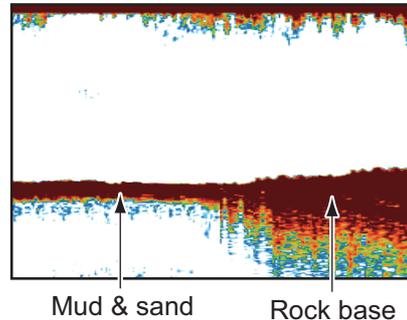
Bottom contour

The tail from a hard bottom is longer than the tail from a soft bottom, because the hard bottom reflects more of the ultrasonic pulse. An echo from shallow water gives a stronger reflection than the echo received from deep water. A longer bottom tail appears on slopes, because of the difference in travel time at both edges of the beam angle. For the rough bottom, echoes are reflected on many different planes, which displays echoes in many layers, giving a 3D effect.



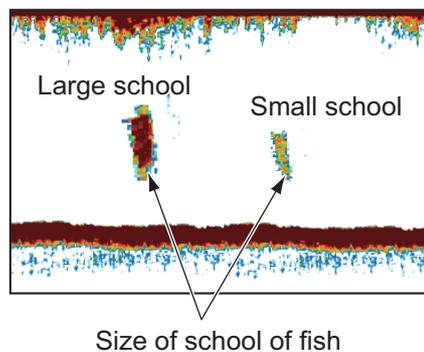
Nature of a bottom

The nature of a bottom is known from the intensity and length of the bottom tail. To find the nature of a bottom, use a long pulse length and normal gain. For the hard and rough bottom, the bottom echo is reddish-brown with a long tail. For the mud or sand bottom, the bottom echo has less red and with a short tail. A bottom with a lot of small particles can give a long tail on the low frequency picture.



Fish volume

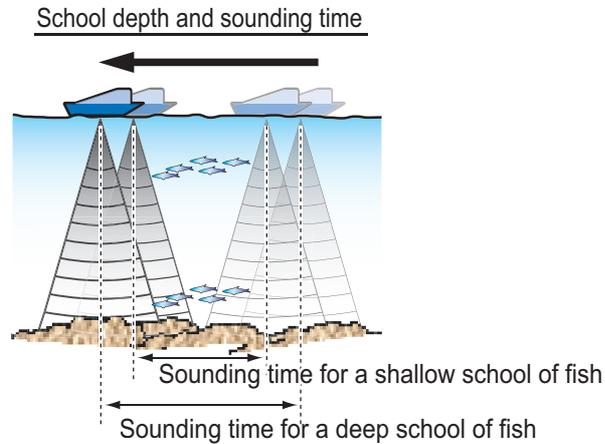
The size and density of a school of fish are indicators of the quantity of fish.



7. FISH FINDER (SOUNDER)

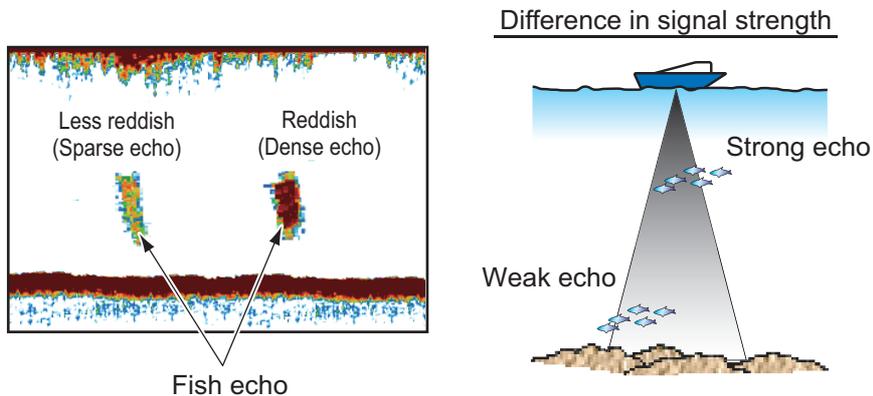
Size of a school of fish

Usually the size of fish echoes on the screen is proportional to the actual size of the school of fish. However, if two fish echoes appear at different depths with the same size, the school of fish at the shallower depth is larger because the ultrasonic beam widens as it propagates and a school of fish in deep water is displayed larger.



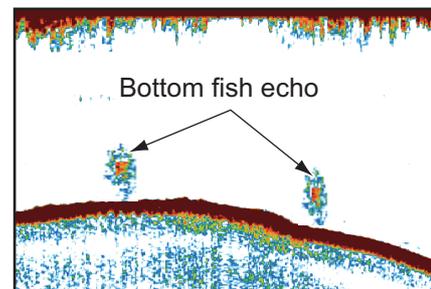
Density of a school of fish

If two schools appear with the same color at different depths, the one in deeper water is denser because the ultrasonic wave attenuates as it propagates and the school of fish in deep water tends to be displayed in a weaker color.



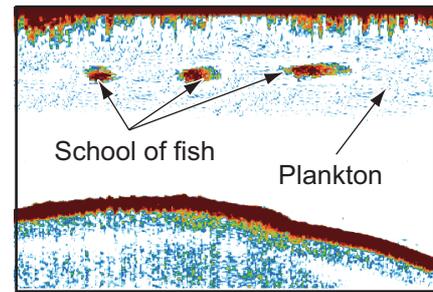
Bottom fish

The echoes from the bottom are stronger than the bottom fish echoes so that you can distinguish between them by colors. The bottom echoes are normally shown in reddish-brown or red, the bottom fish echoes in weaker color.

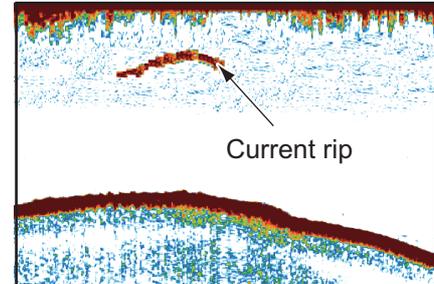


Plankton

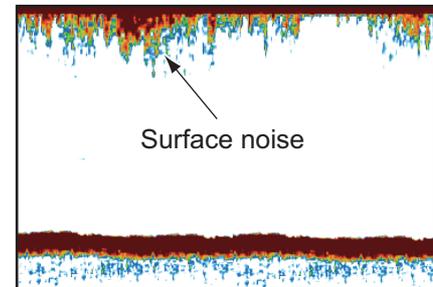
A plankton layer appears as a large amount of green or blue dots, and is a possible location for fish. A plankton layer moves down in the day and up at night.

**Current rip**

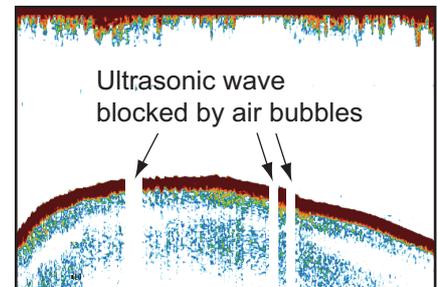
When two ocean currents of different speeds and directions and water temperatures meet, a current rip occurs. A current rip appears on the screen as shown in the right illustration.

**Surface noise**

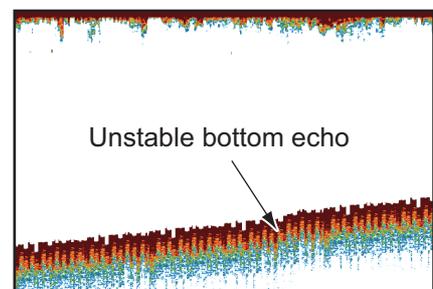
When the sea is rough or the ship moves over a wake, surface noise can appear at the top of the screen.

**Air bubbles in the water**

When the sea is rough or the ship makes a quick turn, there can be blank spots in the bottom echo (see the right illustration). These blank spots are caused by air bubbles which stop the movement of the sound wave. These air bubbles can occur with the low frequency ultrasonic waves.

**Unstable bottom echo**

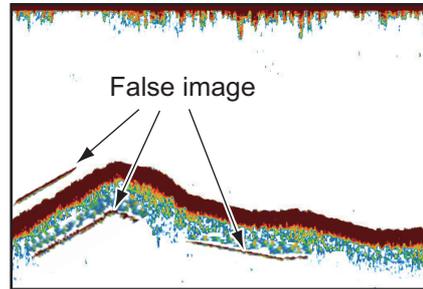
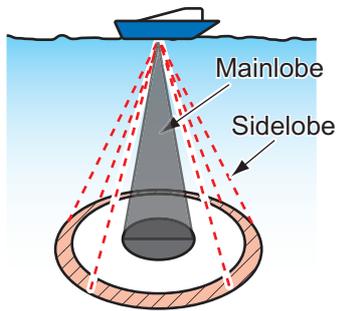
The bottom echoes can have a saw-tooth appearance. This occurs in heavy weather because pitching and rolling changes the direction of the ultrasonic pulses and the vertical motion of the ship causes the distance to the bottom to change.



7. FISH FINDER (SOUNDER)

False echo

When an ultrasonic pulse is transmitted, some energy leaves from each side of the beam. This energy has the name "sidelobe". Echoes from sidelobes show on the screen as false images like in the illustration shown below.



8. FILE OPERATIONS

Points, tracks* and routes can be imported and exported and track can be exported, using micro SD cards (w/SD card unit) or USB memory. (The card drive at the rear of the display unit is for chart cards.)

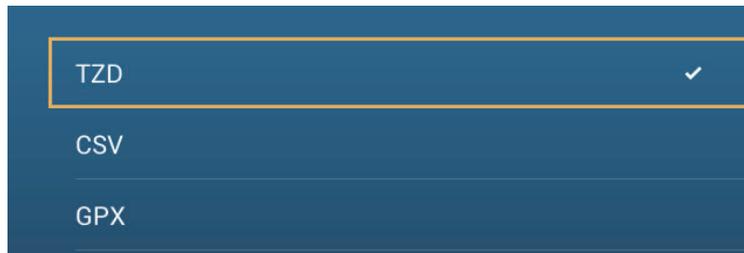
* All points and routes are erased from the plotter display when tracks are imported.

Note: DO NOT remove an SD card while it is being accessed, to prevent loss of data or damage to the card.

8.1 File Format

You can select the file format to use to export data.

1. Open the home screen, then tap [Settings] - [Files].
2. Tap [Export File Format].



3. Tap [TZD], [CSV] or [GPX].
[TZD]: For NavNet TZtouch2
[CSV]*: For use with NavNet 3D
* The CSV format has the following export restrictions:
 - 2,000 points maximum
 - 200 routes (100 points per route) maximum
 - 10,000 track points maximum**[GPX]:** For use with PC plotter
4. Tap the close button to finish.

8.2 How to Export Points and Routes

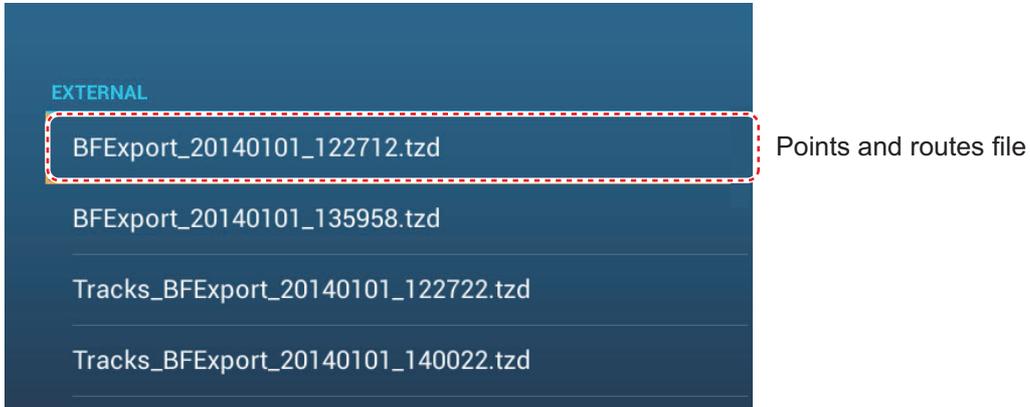
When the capacity for point is reached, the oldest point is erased to clear space for new point. A new route cannot be entered when the memory for routes is full. If you need to save points and routes permanently, save them to a micro SD card.

1. Put a formatted micro SD card in the right hand card slot in the SD card unit.
2. Open the home screen, then tap [Settings] - [Files].
3. Tap [Export All Points & Routes].
4. Tap [SDCardRight].
5. You are asked if you are sure to export points and routes. Tap [OK].
6. The message "EXPORT SUCCEEDED" appears if the exporting was successful. Tap [OK] to finish.

8.3 How to Import Points and Routes

You can import points and routes to the hard disk of a NavNet TZtouch2 unit.

1. Put the correct micro SD card in the SD card unit.
2. Open the home screen, then tap [Settings] - [Files].
3. Tap [Import Points & Routes]. A list of files stored on the SD card appear.



4. Tap the points and routes file to import. You are asked if you are sure to import points and routes. Tap [OK].
5. The message "IMPORT SUCCEEDED" appears if the importing was successful. Tap [OK] to finish.

8.4 How to Import or Export Track

How to import track

You can import tracks to the hard disk of a NavNet TZtouch2 unit.

1. Put the correct micro SD card in the SD card unit.
2. Open the home screen, then tap [Settings] - [Files].
3. Tap [Import Tracks]. A list of files stored on the SD card appears. Tap a tracks file.



4. You are asked if you are sure to import tracks. Tap [OK].
5. The message "IMPORT SUCCEEDED" appears if the importing was successful. Tap [OK] to finish.

How to export track

You can export tracks to a micro SD card.

1. Put a blank formatted micro SD card in the SD card unit.
2. Open the home screen, then tap [Settings] - [Files].
3. Tap [SDCardRight].
4. You are asked if you are sure to export tracks. Tap [OK].
5. The message "EXPORT SUCCEEDED" appears if the exporting was successful. Tap [OK] to finish.

8.5 How to Backup the Equipment Settings

You can save the settings to a micro SD card to use the settings on other NavNet TZtouch2 units.

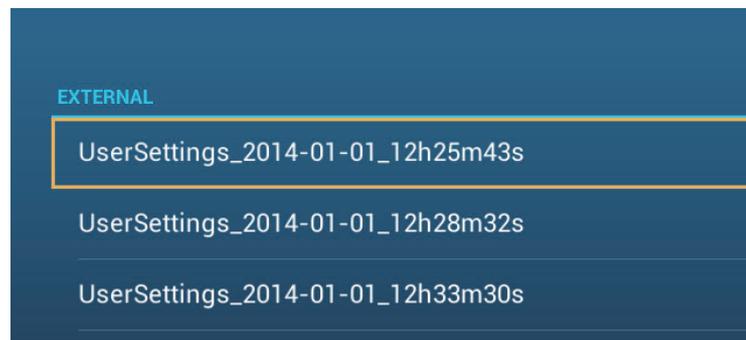
1. Put a blank formatted micro SD card in the SD card unit.
2. Open the home screen, then tap [Settings] - [Files].
3. Tap [Backup Settings].
4. Tap [SDCardRight]

The message "EXPORT SUCCEEDED" appears if the exporting was successful. Tap [OK] to finish.

8.6 How to Load the Equipment Settings

You can load the saved settings in a micro SD card to this unit.

1. Put the correct micro SD card in the SD card unit.
2. Open the home screen, then tap [Settings] - [Files].
3. Tap [Restore Settings].
4. Tap [SDCardRight]. A list of user settings appears. Tap a user settings file.

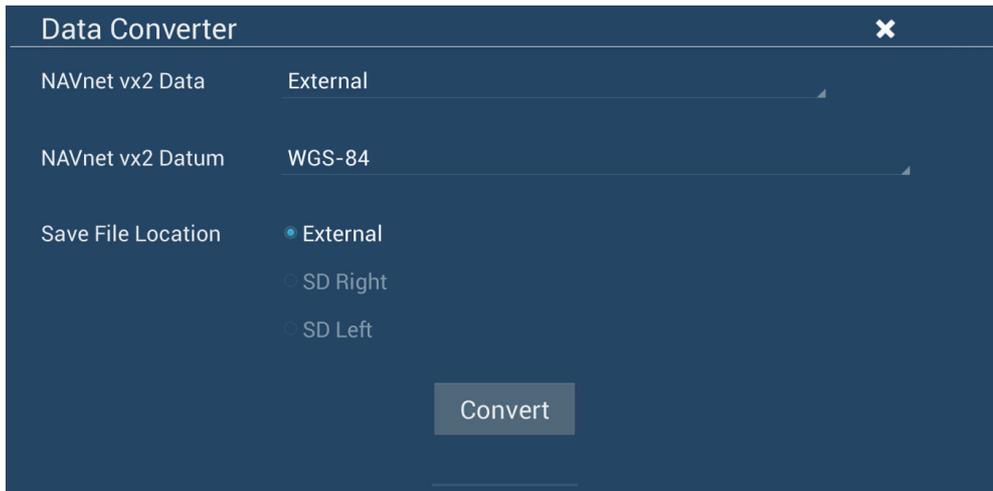


5. You are asked if you are sure to restore settings. Tap [OK].
6. The message "IMPORT SUCCEEDED" appears if the importing was successful. Tap [OK] to finish.

8.7 How to Convert NavNet vx2 Data

NavNet vx2 data (points, routes, tracks) can be converted for use with NavNet TZtouch2. Save the data to a micro SD card or USB memory then do as follows:

1. Set the micro SD card (USB memory) into the SD card unit (USB port).
2. Open the [Files] menu, then tap [Convert Old Format Data]. The message "YOUR APPLICATION WILL RESTART AFTER THE CONVERSION. DO YOU WANT TO CONVERT OLD DATA" appears. Tap [OK].
The equipment restarts and upon completion the [Data Converter] window appears.



3. Select the location of the source data ([External], [SD Right], or [SD Left]) at [Navnet vx2 Data].
4. At [Navnet vx2 Datum], select the geographical datum under which to convert the data.
5. At [Save File Location], select where to save the converted files.
6. Tap the [Convert] button to convert the data.

Tracks, points and routes are converted and saved to separate .csv files. You can now import the data files to NavNet TZtouch2. See section 8.3 (points and routes) and section 8.4 (tracks).

9. CAMERA/VIDEO/FUSION-Link

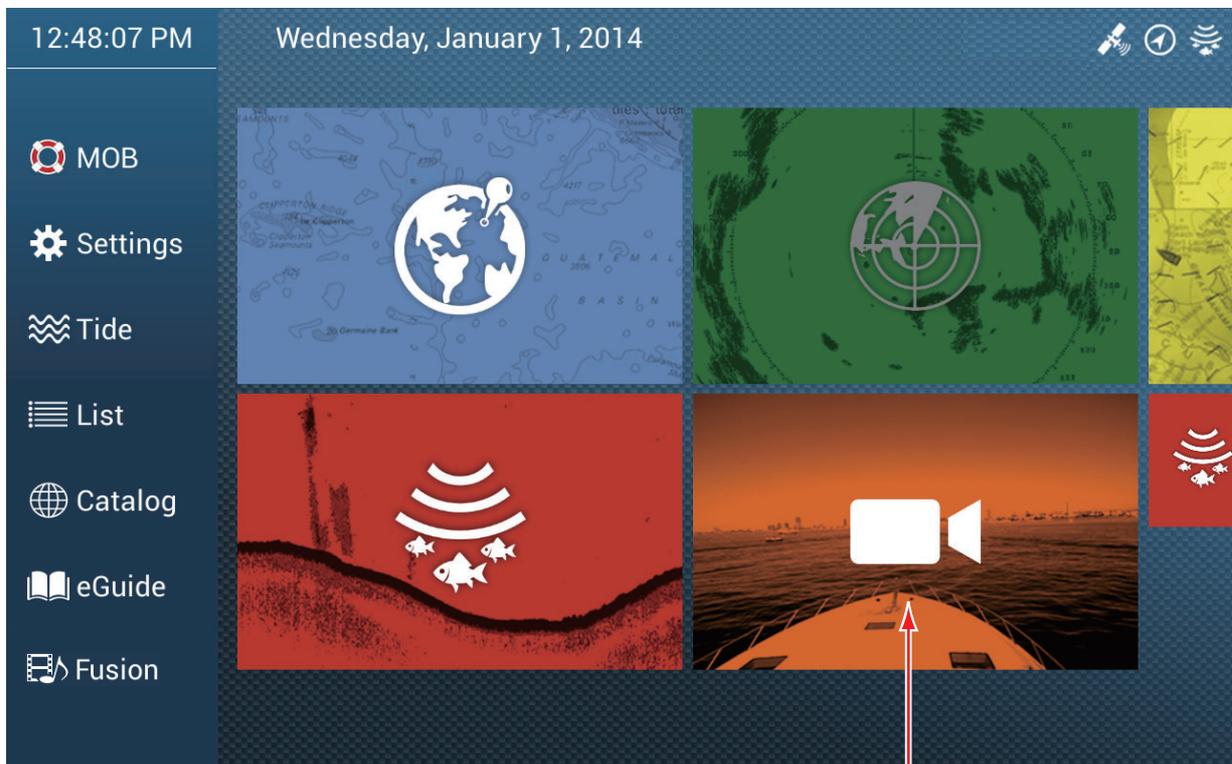
The camera/video function allows you to use your unit to play back images from a video player, on-board camera, or DVD player. A video signal can be seen only on the NavNet TZtouch2 unit that receives the video signal. Image size, brightness, contrast and color of images can be adjusted.

FUSION-Link allows compatible NavNet TZtouch2 displays to interface and achieve control of specialized FUSION marine entertainment equipment.



9.1 How to Display a Video Image

The camera application is included on the home screen. Tap the Home icon to show the home screen. Tap the camera display icon to activate the camera display.



Camera display

9.2 Video Signal Type

There are three types of video signals connected to this equipment.

- **Analog:** Images from a video player, on-board camera or DVD player
- **FLIR:** Images from a FLIR brand infrared camera

9.3 How to Set the Video Display

9.3.1 How to set the video signal

FLIR camera

Images from an infrared camera allow you to navigate easily at night or in bad weather. Open the home screen, then [Settings] - [Camera] - [FLIR Installation].



Note: To use the PTZ function of the FLIR camera with the NavNet TZtouch2, a setting (Nexus CGI Interface, port: 8090) is required at the FLIR camera. See the operator's manual of the FLIR camera for details.

[Scan IP]: Tap [Scan IP] to scan the IP address automatically when connecting an FLIR camera.

[FLIR IP]: Enter the IP address manually with the software keyboard then tap ✓.

[Video Source]: Select the input source for the FLIR.

[Camera Offset (Right-left)]: Adjust the side position of the FLIR camera.

[Camera Offset (Up-Down)]: Adjust the up-and down position of the FLIR camera.

[Automatic Zoom]: Turn on to turn on the automatic zoom.

[Zoom Distance]: Set the distance to zoom automatically.

[Camera Altitude]: Set the altitude for the FLIR camera.

9.3.2 How to adjust the image size

You can adjust the image size from the pop-up menu.

1. In the camera mode, tap the screen to show the pop-up menu.
2. Tap the camera display to adjust.
3. Tap [Stretch] or [Fit].

[Stretch]: Shrink or enlarge the image to fit the monitor's width.

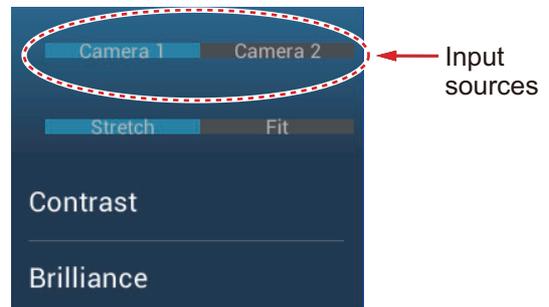
[Fit]: Shrink or enlarge the image to fit the monitor's height. The aspect ratio is kept, so a black bar appears on the right and left sides of the picture, but this is normal.



9.3.3 How to switch your video inputs

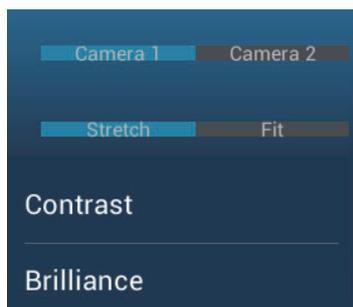
If you have more than one camera installed, you can switch your video inputs from the camera screen.

1. On a camera display, tap the screen to show the pop-up menu.
2. Tap the camera image to show, at the top of the pop-up.



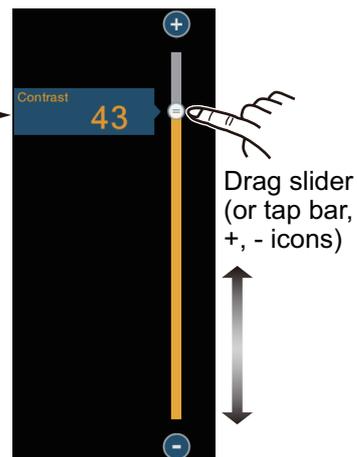
9.3.4 How to adjust the video image

Tap the screen to show the pop-up menu. Tap [Contrast] or [Brilliance] on the pop-up, then drag the slider to adjust.



Tap screen to show pop-up menu.
Tap [Contrast] or [Brilliance].

Current setting
(ex. Contrast)

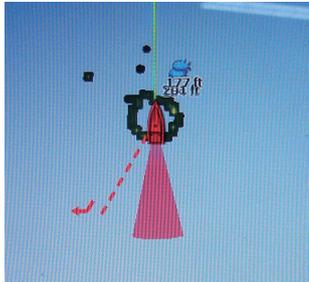


9.4 Control of FLIR Camera

[Camera FoV] menu

You can display the field of view by the FLIR camera on the plotter display.

1. Tap the boat icon to display the pop-up menu.
2. Tap [Cone]. The boat icon is put inside a red translucent circle.



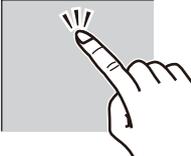
[Move Camera] and [Lock Camera] menus

You can rotate the FLIR camera about the position you select (touch) on the plotter or radar display. Open the pop-up menu then tap [Lock Camera]. To track the position, tap [Move Camera] on the pop-up menu.

9.5 Tracking Active Waypoint, MOB

The camera can be set to automatically track the active waypoint and/or MOB. Open the [Settings] - [Camera] menu and then turn on [Automatic Lock on Active Waypoint] or [Automatic Lock on MOB].

9.6 Touch Control on the Camera Display

	Operation	Function
Tap		Opens the pop-up menu. During zoom mode, center the position tapped.

9.7 FUSION-Link

FUSION-Link allows compatible NavNet TZtouch2 displays to interface and achieve control of specialized FUSION marine entertainment equipment.

9.7.1 How to access the FUSION screen and controls

The FUSION controls can be accessed two ways:

- From the home screen (full screen)
- Slide-out menu (minimized screen)

Method 1: Tap [Fusion] on the home screen to get the full screen FUSION display.



Zones 1 and 2 volumes synched.



Zones 1 and 2 volumes independent.



: Select tracks or albums.



: Repeat one or all.

Close button

Drag slider to adjust volume.

Globally adjust volume.

Show or hide [ZONES] panel.

Show or hide [MENU] panel.

Swipe to change source.

Show or hide [TONES] panel (tone controls).



Tap: Goto previous title.
Hold down: Go back.



Lower volume.



Playback



Mute/unmute.



Tap: Goto next number.
Hold down: Fast forward.



Raise volume.

TONES

Bass 15

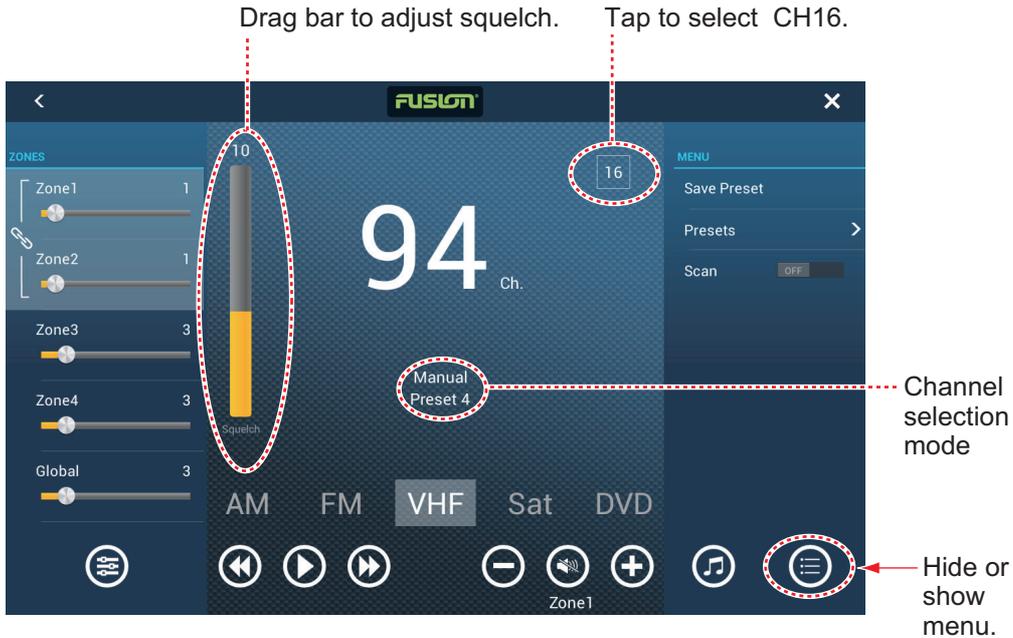
Middle 4

Treble -15

Sub Zone 1 24

Example1: iPod in the full screen

9. CAMERA/VIDEO/FUSION-Link

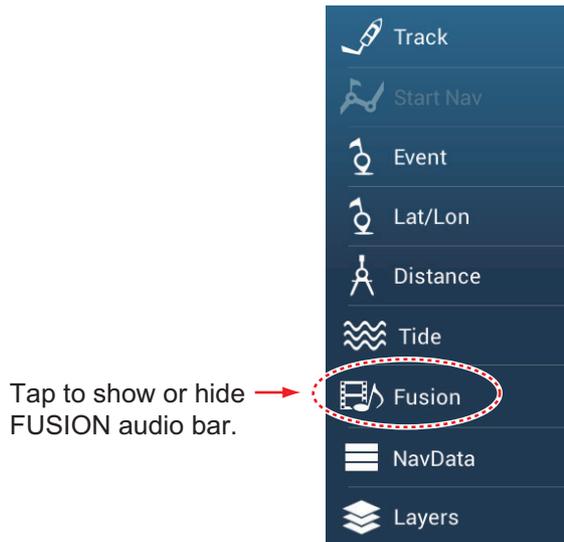


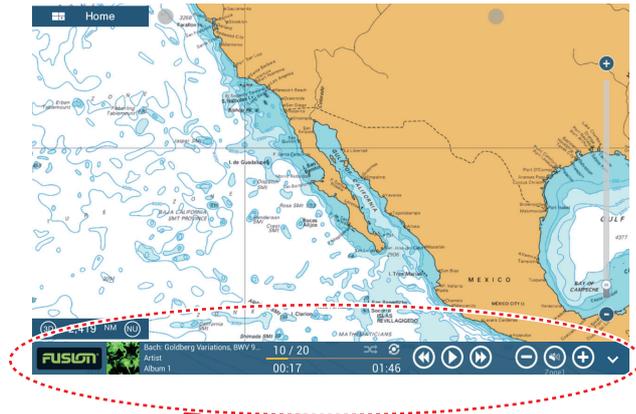
-   Select channel.
-  Tap: Switch channel selection mode between preset and manual.
Long tap: After selecting channel in manual mode, long tap to register the channel as preset channel.
-  Lower volume.
-  Mute/unmute.
-  Raise volume.

Example2: VHF in the full screen

Note: For details, see the manual for the FUSION-Link equipment.

Method 2: Open the slide-out menu, then tap [Fusion] to show or hide the audio control bar. The illustration on then next page shows the audio control bar for iPod and VHF on the plotter display.





Tap to go to full screen FUSION display.

Tap to hide bar.



For iPod



For VHF

9.7.2 FUSION settings

Open the Home screen, tap [Initial Setup], then scroll down to find the [FUSION] section. Set the [FUSION] items referring to the descriptions shown below.



[Connect to Fusion]: Connects to your FUSION equipment.

[Fusion Auto Volume]: Set to [ON] to allow the NavNet TZtouch2 unit to control the FUSION volume.

[Minimum Speed]: Set the minimum speed that triggers the volume auto control.

[Maximum Speed]: Set the maximum speed that triggers the volume auto control.

[Volume Increase]: Set the amount of extra volume to output when the speed is that set at [Maximum Speed].

10. INSTRUMENT DISPLAY

The instrument display provides comprehensive navigation and environment data. The instrument display can be programmed to a full screen or three-way split screen. Applicable sensors are required.

10.1 How to Show the Instrument Display

Set the instrument display on the home screen referring to paragraph 1.7.1. Tap the instrument display icon to show the instrument display.



Instrument display
(3-way screen)

Instrument display
(full screen)

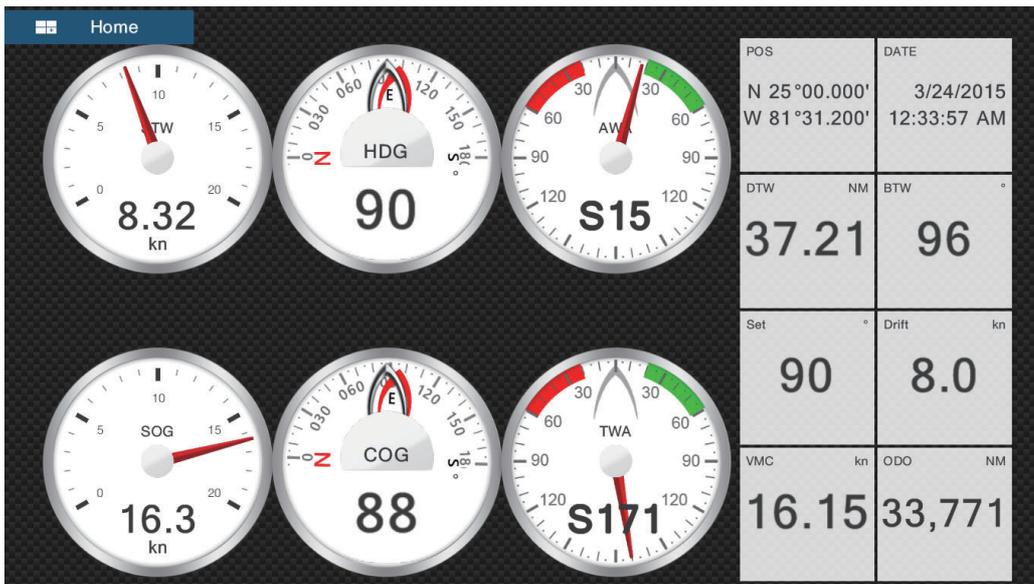
10.2 Instrument Displays

This section provides examples of the available instrument displays, with their default configurations. Your displays may be different depending on your system configuration.

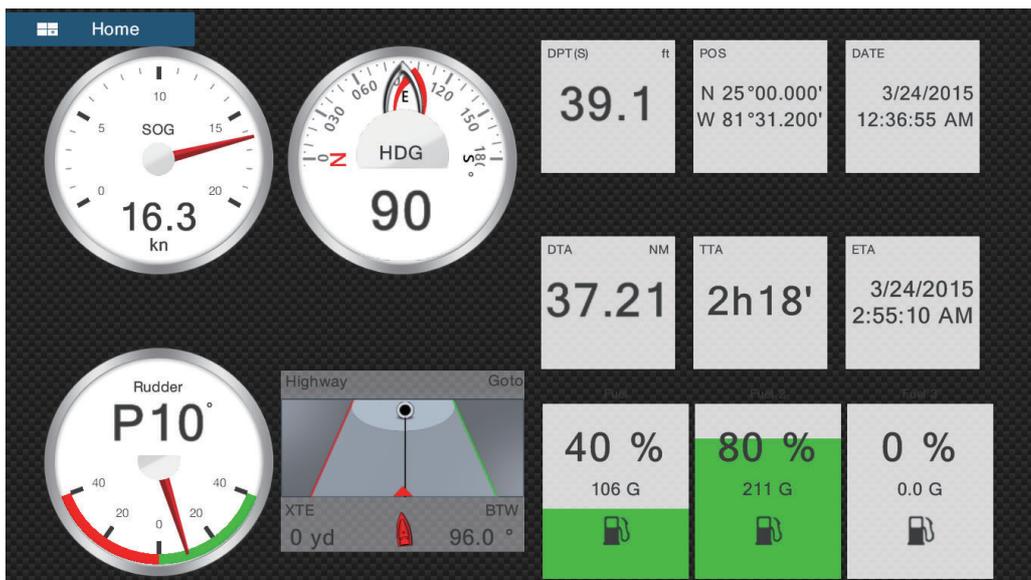
The instrument theme is available in black (default color) or white. The sample displays shown in this chapter use the white theme.

10.2.1 Full screen displays

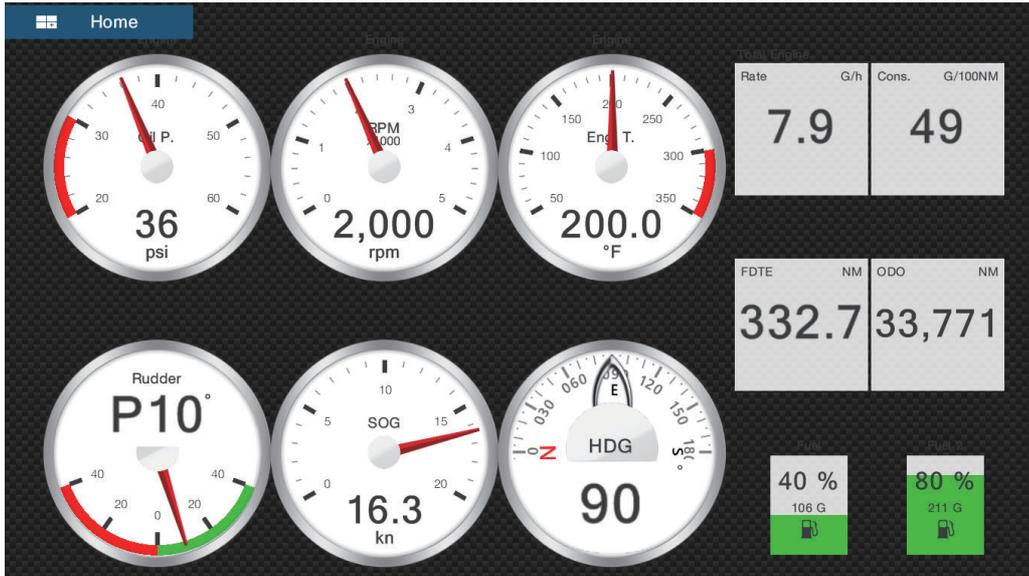
Full 1 display



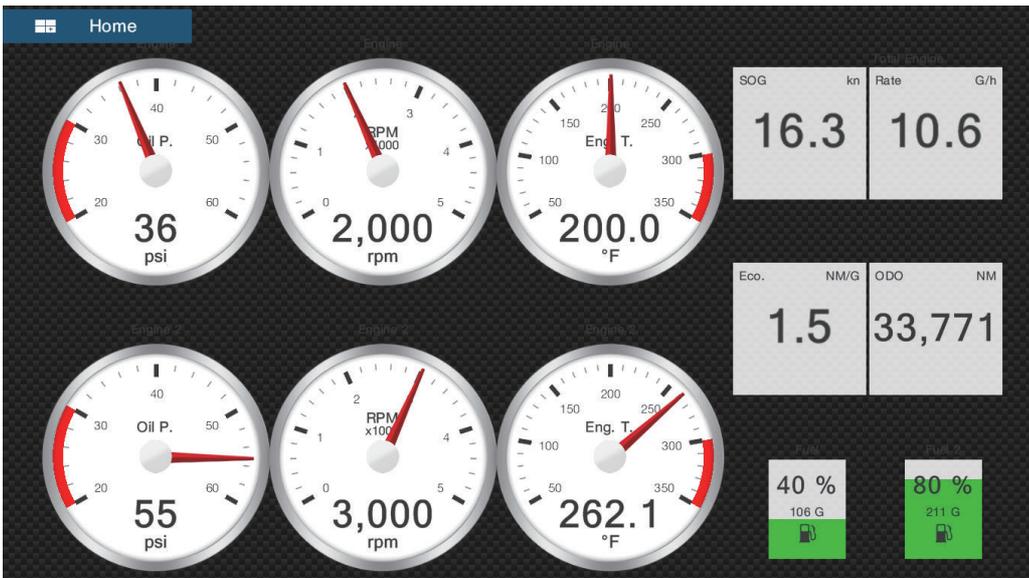
Full 2 display



Single engine display

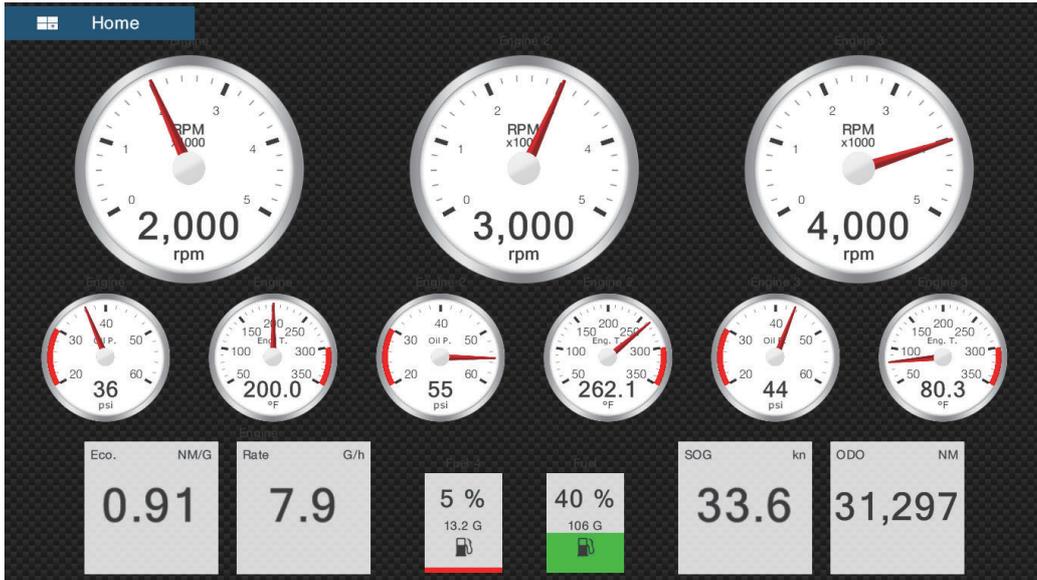


Twin engines display

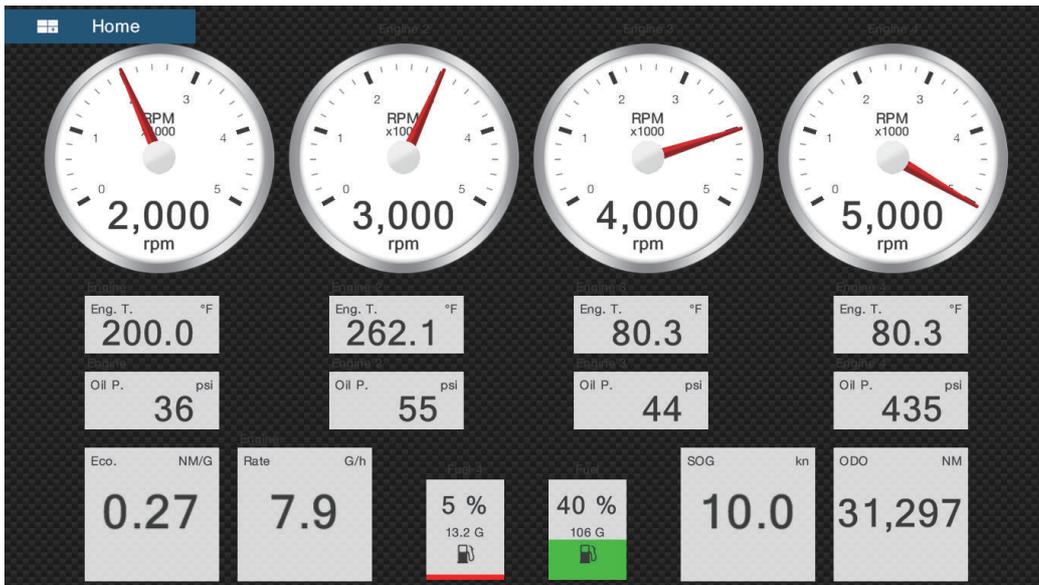


10. INSTRUMENT DISPLAY

Tri engines display

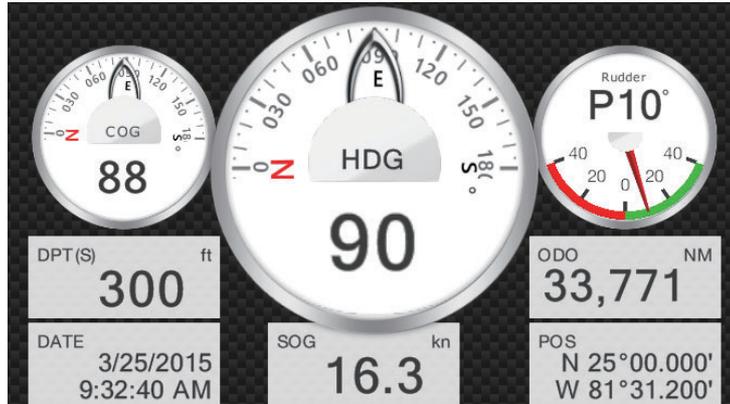


Quad engines display

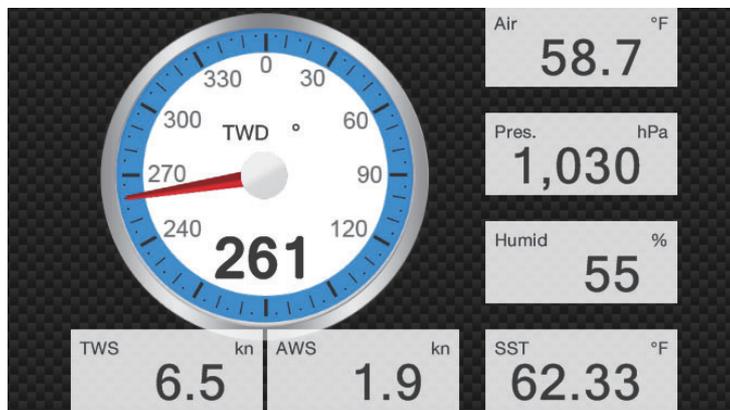


10.2.2 Split screen displays

Navigation display



Environment display

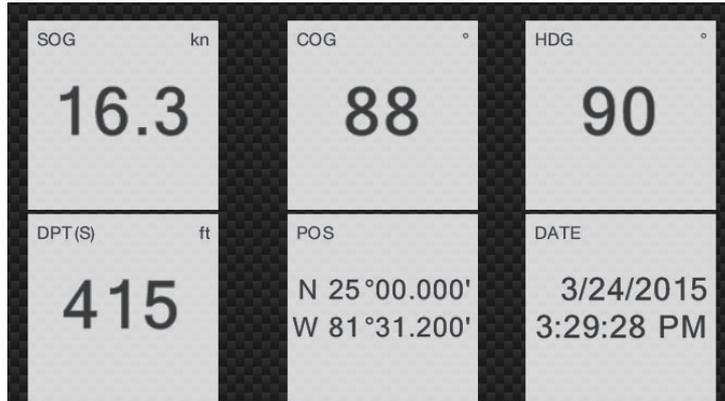


Wind display

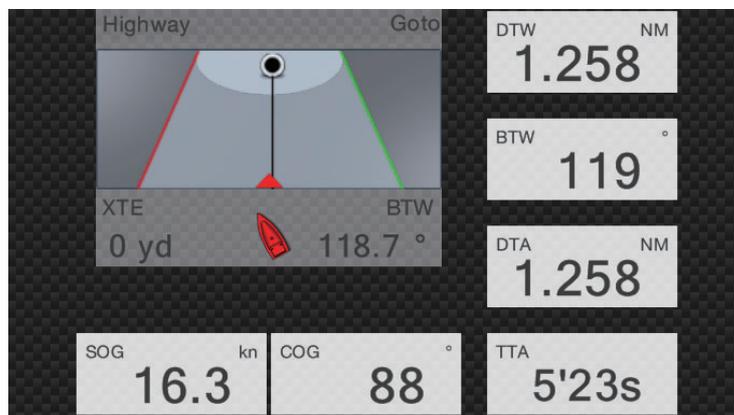


10. INSTRUMENT DISPLAY

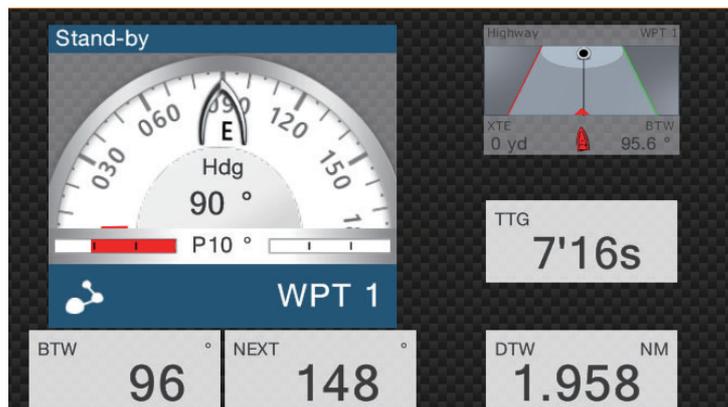
Numeric display



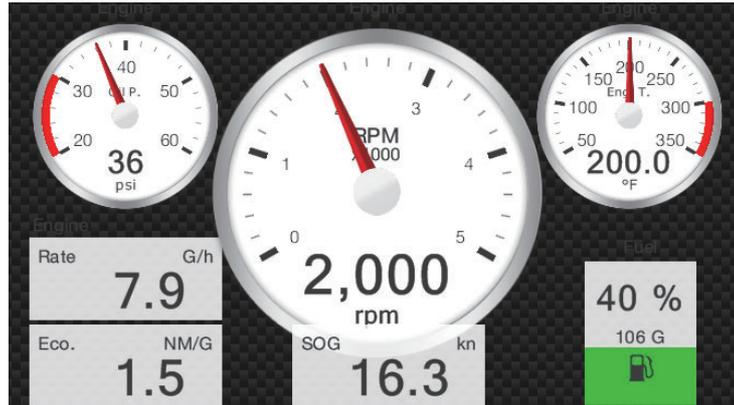
Highway display



NAVpilot display



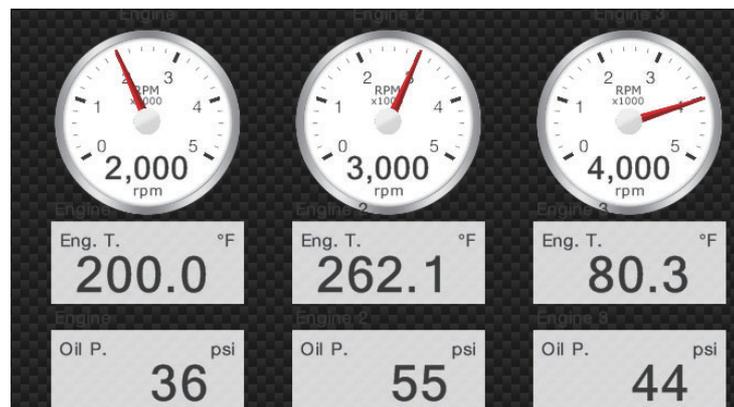
Single engine display



Twin engines display



Triple engines display



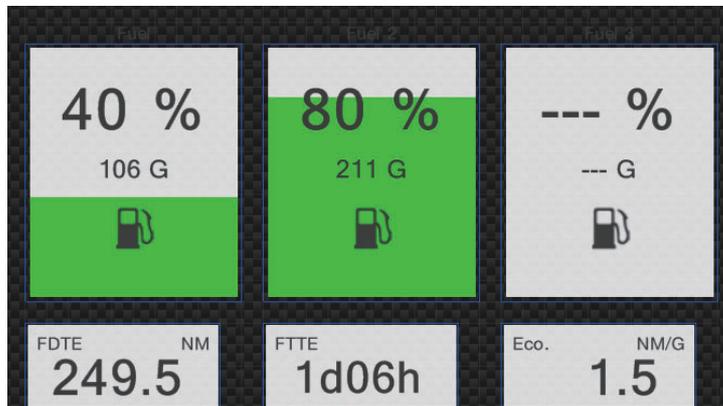
10. INSTRUMENT DISPLAY

Tank display

The tank indication shows fuel level in both analog and digital formats. The analog indicator rises or lowers with fuel level and the color changes according to the percentage of fuel remaining.

Green: 10% - 100%

Red: 0% - 10%

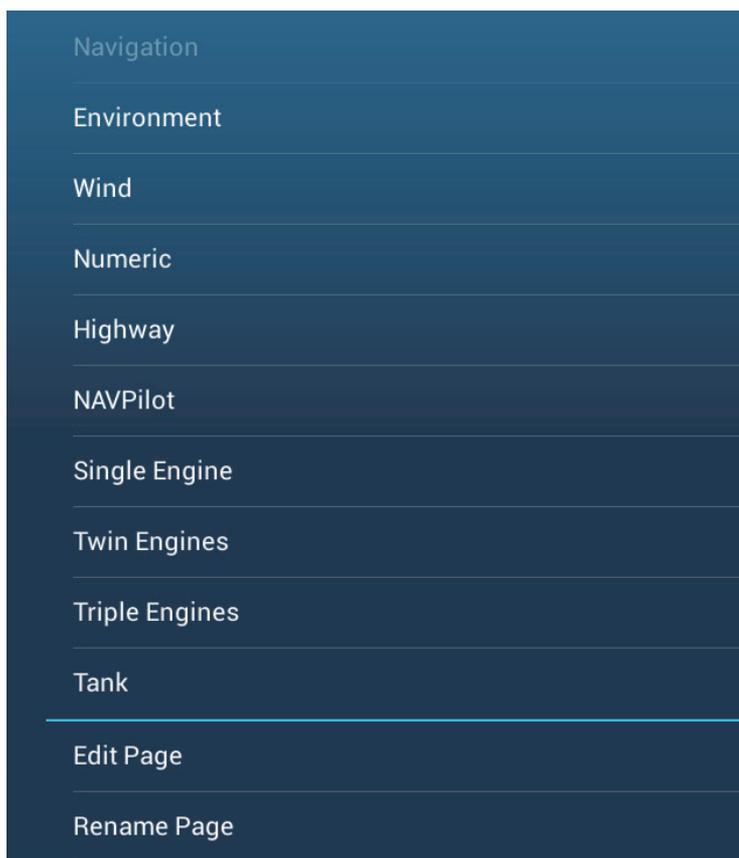


10.2.3 How to switch between instrument displays

3-way split screen

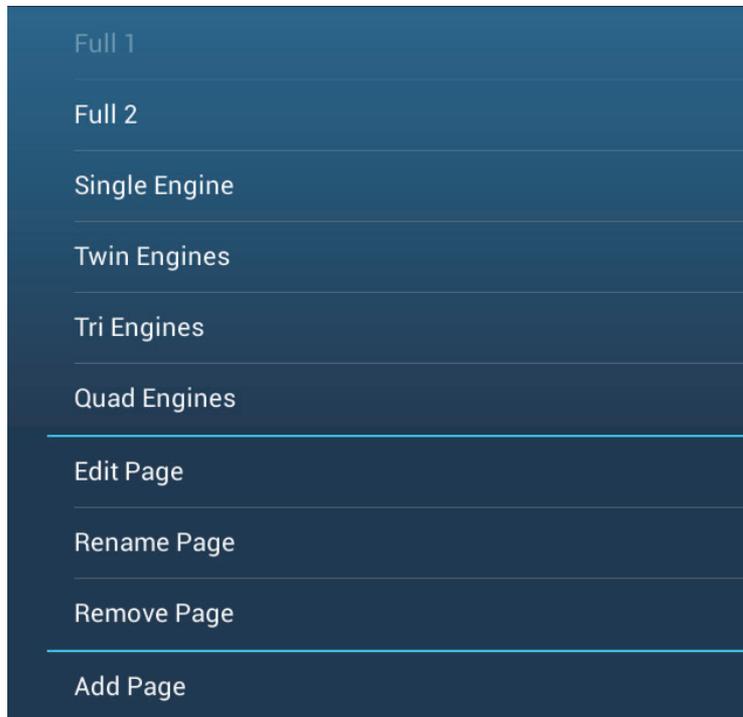
The default display screens in the 3-way split screen are environment, wind, numeric, highway, NAVpilot, single engine, twin engines, triple engines, and tank. The availability of a display depends on your system configuration.

You can switch between the displays by swiping downward at the bottom of the display, or tapping the screen to display the pop-up menu shown below and tapping the display of your choice.



Full screen

The default full screens are [Full 1], [Full 2], [Single Engine], [Twin Engines], [Tri Engines], and [Quad Engines]. (The availability of the displays depends on your system configuration.) You can switch between the displays by swiping downward at the bottom of the display, or tapping the screen to display the pop-up menu shown below and tapping the display of your choice.



10.3 How to Edit the Instrument Displays

The instrument displays are fully customizable. You can edit the displays as follows:

- Remove an indication from a display
- Add an indication to a display
- Rearrange the indications in a display
- Rename a display
- Delete a display
- Remove a display
- Add a custom display

Note: To restore the default instrument displays, go to the Home screen, then tap [Settings] - [Initial Setup] - [Graphic Instruments Setup] - [Reset Instrument Pages]. All default displays are restored and any custom displays are deleted.

10.3.1 How to prepare for editing

To start the editing process, tap anywhere on an instrument display to show the pop-up menu, then tap [Edit Page] on the menu. A blue line circumscribes each indication in the display, as shown in the figure below. Edit the display referring to the procedures in the coming sections. To save your changes, tap anywhere on the instrument display to show the pop-up menu, then tap [End Edit] on the menu.

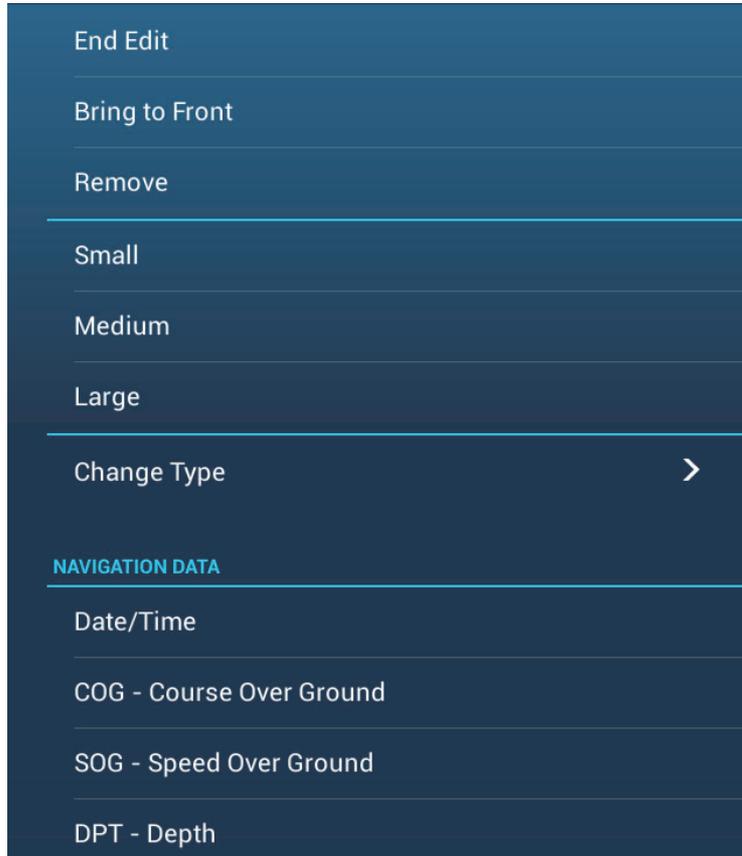


10.3.2 How to rearrange the indications in an instrument display

Drag and drop the indications to your liking.

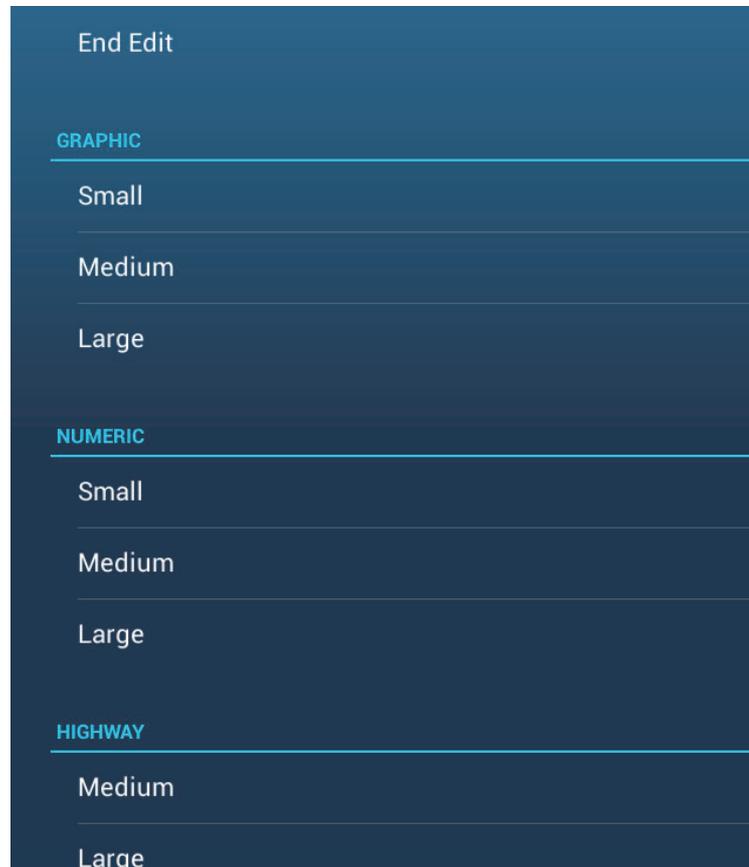
10.3.3 How to edit, remove an indication in an instrument display

1. Prepare the display for editing as shown in paragraph 10.3.1.
2. Tap the indication to process to show the [Edit Instrument] pop-up menu.



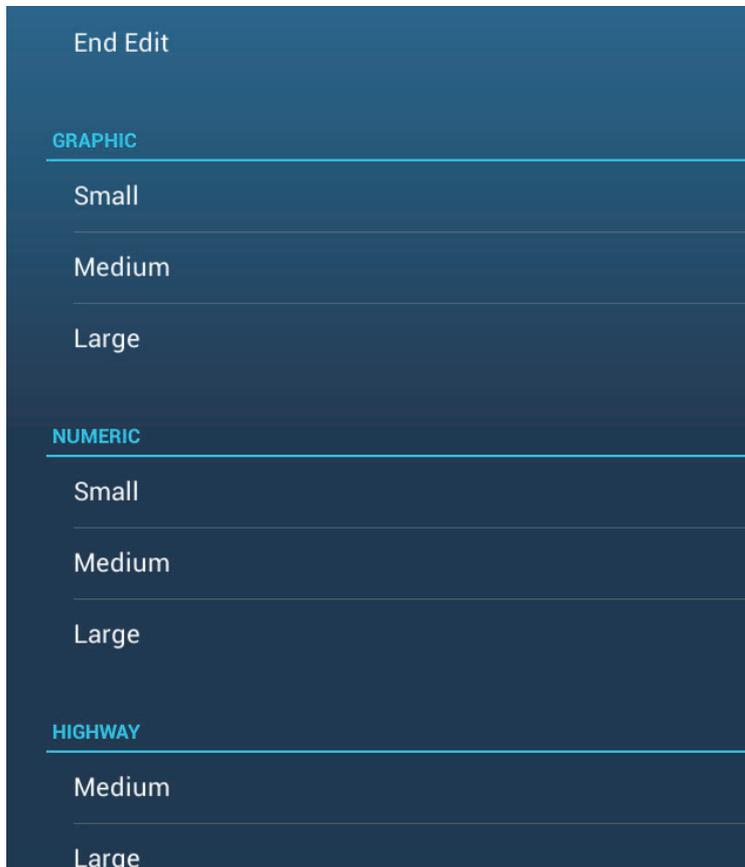
3. Do one of the following depending on your objective:
 - **Bring to front:** If two indications are occupying the same location, you can select one to bring to the front. Tap the indication to bring to the front, then tap [Bring to Front].
 - **Remove the indication:** Tap [Remove].
 - **Change the indication:** Tap required data in the [NAVIGATION DATA], [ROUTE INFORMATION], or [WIND AND WEATHER].

- **Change the indication type:** Tap [Change Type] to show the [Edit Instrument] pop-up menu, shown on the next page. [GRAPHIC] changes the size of a graphic indication or changes a numeric indication to the corresponding graphic indication. [NUMERIC] changes the size of a numeric indication or changes a graphic indication to the corresponding numeric indication. [HIGHWAY], [NAVPILOT] (if available) select respective display.



10.3.4 How to add an indication to an instrument display

1. Prepare the display for editing as shown in paragraph 10.3.1.
2. Tap an unoccupied position on the display to show the [Add Instrument] pop-up menu. (If there is no space available, remove an unnecessary indication following the procedure in paragraph 10.3.3.)



3. Tap a size in [GRAPHIC], [NUMERIC], [HIGHWAY], or [NAVPILOT] (if available). For [GRAPHIC] and [NUMERIC], an indication is automatically selected. These are an analog/digital clock with month and day, and the time and date, respectively.
4. To change the graphic or numeric indication, see paragraph 10.3.3.

10.3.5 How to rename an instrument display

Show the instrument display that you want to rename. Tap the display to show the pop-up menu, then tap [Rename] on the menu. The software keyboard appears. Change the name, then tap ✓ to confirm the name and close the keyboard.

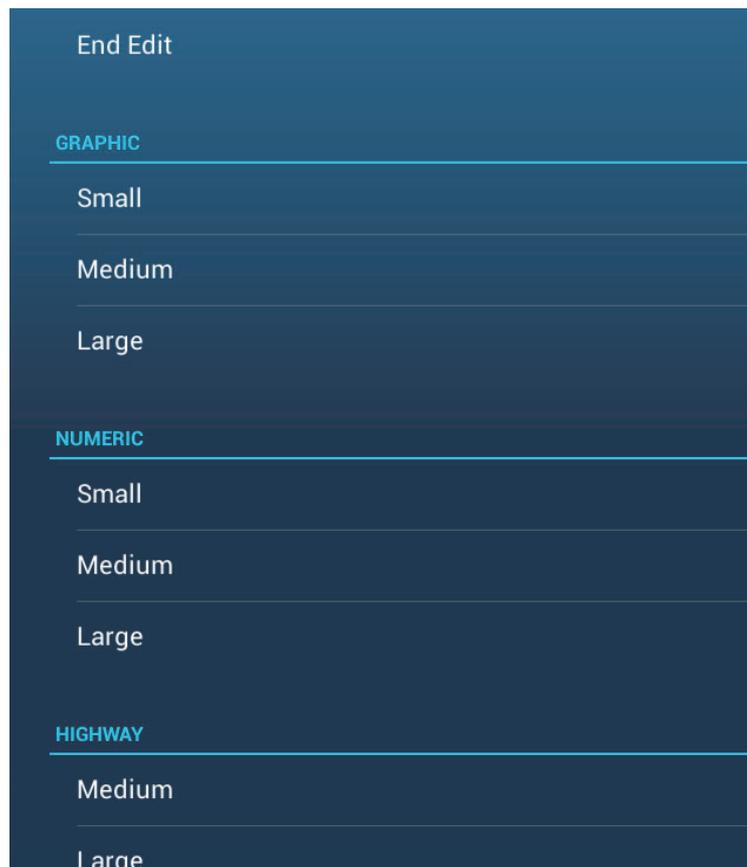
10.3.6 How to remove an instrument display

Show the instrument display that you want to remove. Tap the instrument display to show the pop-up menu, then tap [Remove] on the menu.

10.3.7 How to add an instrument display

Ten full size and six split screen instrument displays are preset in this equipment. If the displays do not meet your requirements, you may add custom displays as necessary. A maximum of ten each of full screen and split screen displays is available.

1. Tap the instrument display to show the pop-up menu, then tap [Add Page] on the menu.
Note: If you have reached the capacity for the screen configuration selected, [Add Page] is grayed out. Remove an unnecessary page referring to paragraph 10.3.6.
2. The software keyboard appears; enter a name for the page then tap ✓. A blank page appears.
3. Tap the blank page to show the [Add Instrument] pop-up menu.

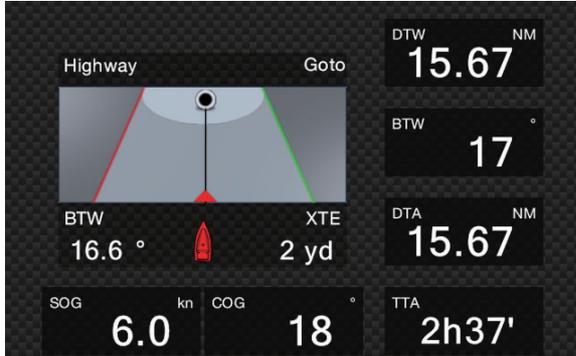


4. Tap the item to add.
5. Repeat step 4 to add other items.
6. After you have added all items required, tap [End Edit].

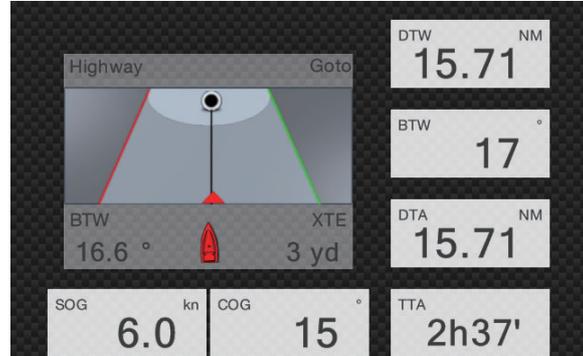
The page name appears in the [Choice of The Config Type] pop-up menu.

10.4 Instrument Theme

The instrument theme is available in black or white. To change the theme, go to the home screen and tap [Settings] - [General]. Set [Instrument Theme] to [Black] or [White]. The setting also controls the graphic format navigation data displays in the data area.



Black



White

11. WEATHER

This equipment provides the weather information (Sirius (only U.S.) and NavCenter (worldwide)). When connected to the Sirius Weather Receiver BBWX2, the weather radar information can be displayed.

Sirius weather receiver

- Purchase the Sirius Weather Receiver BBWX2.
- Purchase a Sirius weather service subscription. Contact Sirius Satellite Radio INC., for additional information.
- Connect the BBWX2 and the NavNet TZtouch2 displays then turn on both of those units. Your unit then receives WX data from the BBWX2, which takes approximately 30 minutes.
- During the installation of the equipment, the Installation Wizard checks if the BBWX2 is connected to this NavNet TZtouch2 unit. If the unit cannot find the BBWX2, check the connections between the two units.

11.1 Weather Display Introduction

Your system displays the current and forecasted weather information for your area. The weather information is updated in real time so that you have current weather information for your area and any area in the U.S.

Information provided by the Sirius Marine Weather service is advisory in nature. You, the customer, agree to release FURUNO ELECTRIC CO., LTD., Sirius Satellite Radio Inc., Navcast Inc. and WSI Corporation from any problems that occur from this service. And you acknowledge that you have read the conditions of your subscription agreement and agree to all the conditions of the subscription. If you do not have the subscription agreement, got to www.sirius.com/marineweatheragreement or call 1-800-869-5480 to have a copy sent to you.

You can put a point on the weather display. Tap the screen where to put a point, then tap [New Point] on the pop-up menu.

11. WEATHER

How to select the weather display

The weather display is overlaid on the 2D plotter display. Select the weather display on the home screen.



11.2 NavCenter Weather

You can download the NavCenter data from the internet via Wireless LAN. See section 1.18 for how to connect to the internet.

Note: Data which is downloaded by a NavNet TZtouch2 unit can be shared with other NavNet TZtouch2 units via the network. Data is shared automatically; no operation is required.

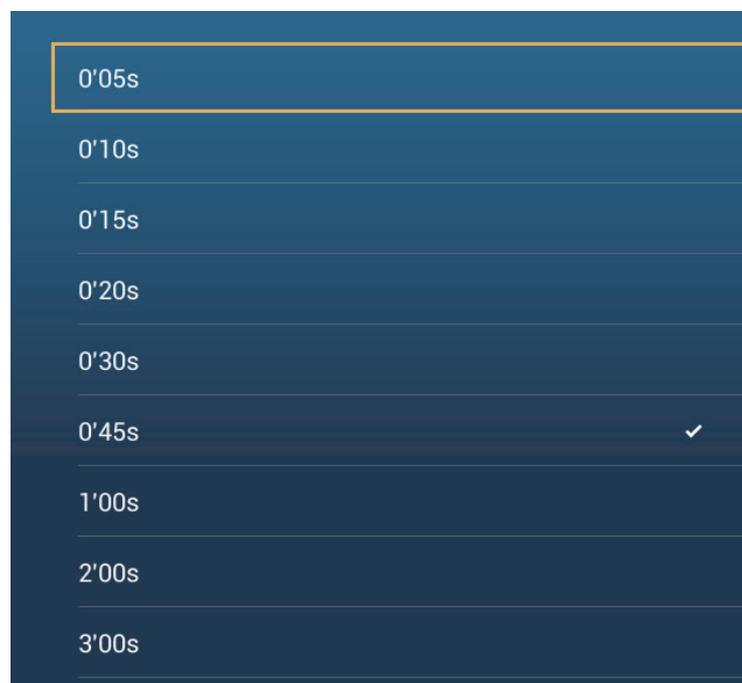
11.2.1 How to set up for NavCenter weather

1. Open the home screen, then tap [Settings] - [Weather].
2. Tap [Load Weather File].
Note: The option [Sirius] appears when connecting BBWX2.
3. Tap [NavCenter] then tap < to return to the menu.

4. Tap [Tidal Step].



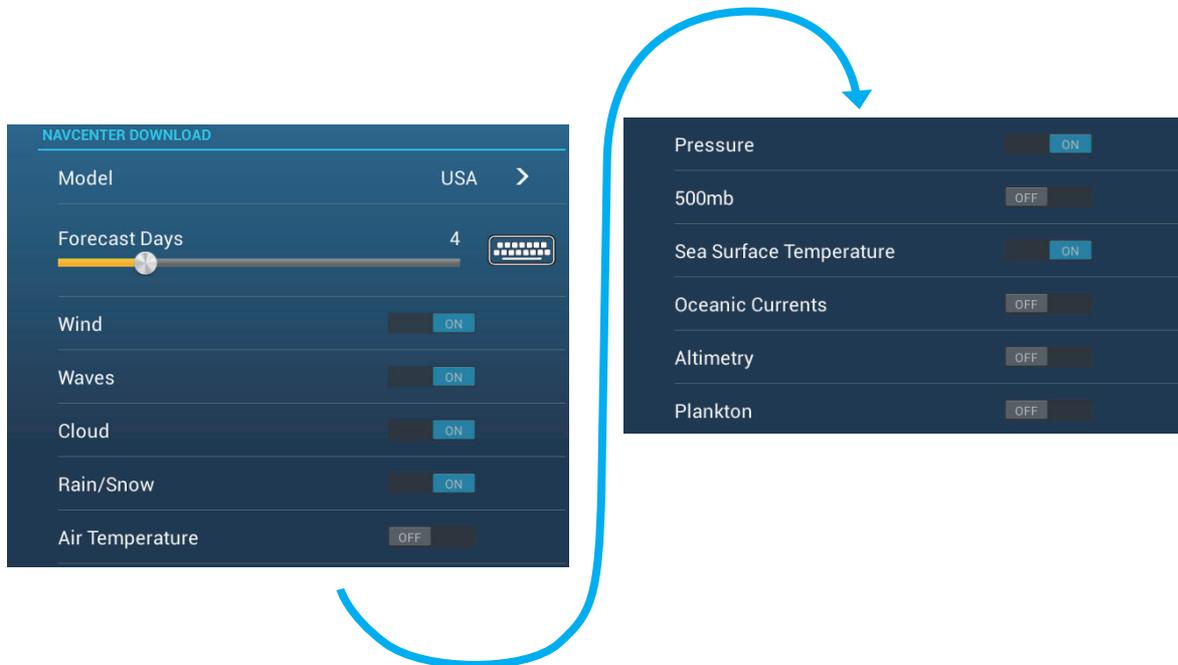
5. Tap the update interval (which determines how often tidal data are captured) for the tide icon.
6. Tap [Duration of Animation].



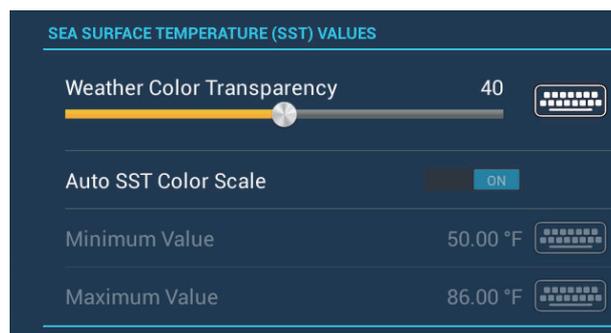
7. Tap the update interval for the animation. The larger the time, the slower the animation moves.

11.2.2 How to download the NavCenter weather data

1. Open the home screen, then tap [Settings] - [General].
2. Tap [Wireless LAN Settings].
3. Turn on [Wireless].
4. After the internet connection is established, tap the close button to exit.
5. Open the home screen, then tap [Settings] - [Weather].



6. Tap the data model from [Model] in the [NAVCenter Download] section. (The options are [USA] and [Worldwide].)
7. Drag the slider in [Forecast Days] to select how many days' data to download.
8. Turn on the items to receive, from [Wind] to [Plankton].
9. For [Sea Surface Temperature], set the following menu items.



[Weather Color Transparency]: Adjust the degree of transparency for the weather overlay. Use a large figure to increase the degree of transparency.

[Auto SST Color Scale]: Activate this feature to adjust the SST color scale automatically according to the sea surface temperature.

[Minimum Value]: Set the minimum value for the SST color when [Auto SST Color Scale] is deactivated.

[Maximum Value]: Set the maximum value for the SST color when [Auto SST Color Scale] is deactivated.

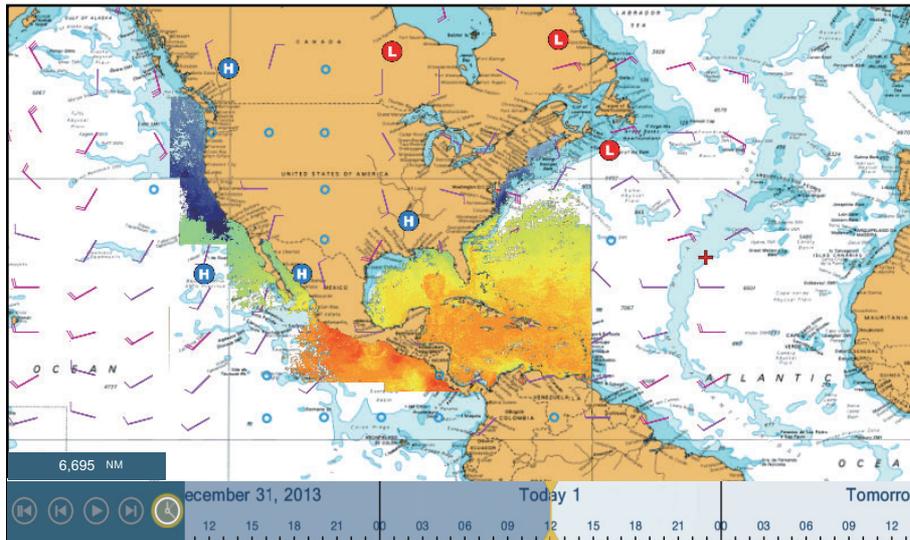
10. Tap the close button to finish.

- Open the weather display, then tap the screen to show the pop-up menu. Tap [Get Latest Wx].

The notification bar at the top of the screen flashes "Weather Update in Progress" during the downloading. If the downloading was successful, the message "DOWNLOAD SUCCEEDED" appears. Tap [OK] to finish.

11.2.3 How to display the NavCenter data

The NavCenter data display provides forecast data that includes [Wind], [Waves], [SST] (sea surface temperature), [Cloud], [Rain], [Pressure], [500mb], [Air Temp], [Currents], [Altimetry], [Plankton].



- Tap the screen to show the pop-up menu then tap [Wx Data].
- Tap a menu item to display its data.
- Repeat steps 1 and 2 to select all menu items required.
- Tap [Anim Forecast] on the pop-up menu. The animation forecast is displayed for a specified-day period. To stop the animation display, tap [End Anim] at the top right-hand corner of the screen.
You can operate the animation display with the animation bar at the bottom of the screen.

Tap to start or restart the animation display.



The time scale moves.



- Tap to set the time scale to the current time and display the current data.
- Tap to suspend the animation display.

11.2.4 How to load a weather file

You can load a weather file saved on a micro SD card.

1. Set the applicable micro SD card in the SD card unit.
2. Open the home screen, then tap [Settings] - [Weather].
3. Tap [Load Weather File]. Tap the data to load then tap [OK].
4. After the equipment has loaded the selected data, tap the close button to finish.

11.3 Sirius Weather

Sirius weather radar information and advanced weather information are available in North America with connection of the Sirius Weather Receiver BBWX2.

11.3.1 How to set up for Sirius weather

1. Open the home screen, then tap [Settings] - [Weather].
2. Tap [Weather Data Server].
3. Tap [Sirius] then tap < to return to the menu.
4. Tap [Sirius Weather Radar].
5. Tap the Sirius weather radar to use, [US Now Radar] (USA) or [CanadRad] (Canada). [US Now Radar] shows the type and level of precipitation. The amount of precipitation increases with level.

Precipitation indication on USNowRadar.

Weather radar color	Precipitation type	Level
Light green	Rain	15-19 dBz
Medium green	Rain	20-29 dBz
Dark green	Rain	30-39 dBz
Yellow	Rain	40-44 dBz
Orange	Rain	45-49 dBz
Light red	Rain	50-54 dBz
Dark red	Rain	over 55 dBz
Light blue	Snow	5-19 dBz
Dark blue	Snow	over 20 dBz
Light pink	Mixed	5-19 dBz
Dark pink	Mixed	over 20 dBz

Precipitation indication on CanadianRadar

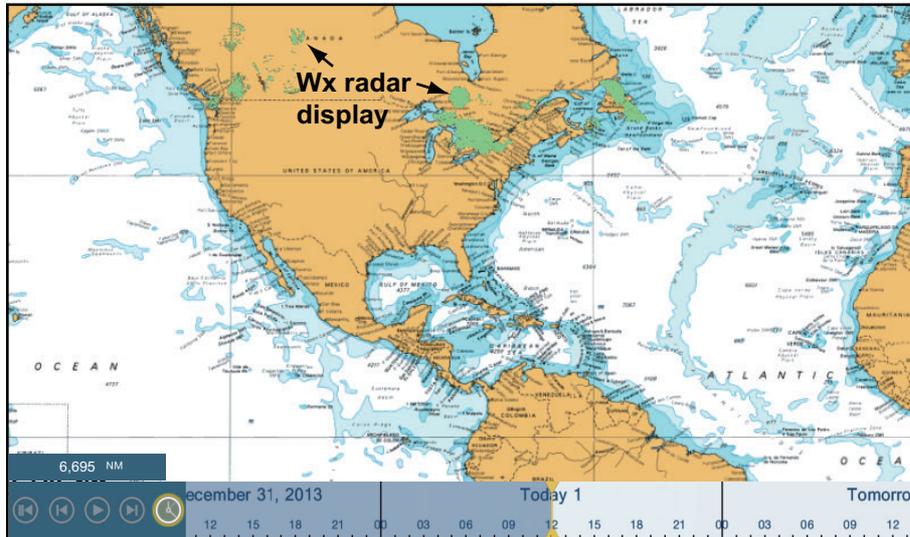
Weather radar color	Level (mm per hour)
Transparent (low precipitation)	0.00 to 0.20 mm/hr
Light green	0.21 to 1.00 mm/hr
Medium green	1.01 to 4.00 mm/hr
Dark green	4.01 to 12.00 mm/hr
Yellow	12.01 to 24.00 mm/hr
Orange	24.01 to 50.00 mm/hr
Light red	50.01 to 100 mm/hr
Dark red	over 100.01 mm/hr

6. Tap the close button to finish.

11.3.2 How to display the Sirius data

[Wx Radar] (Weather radar)

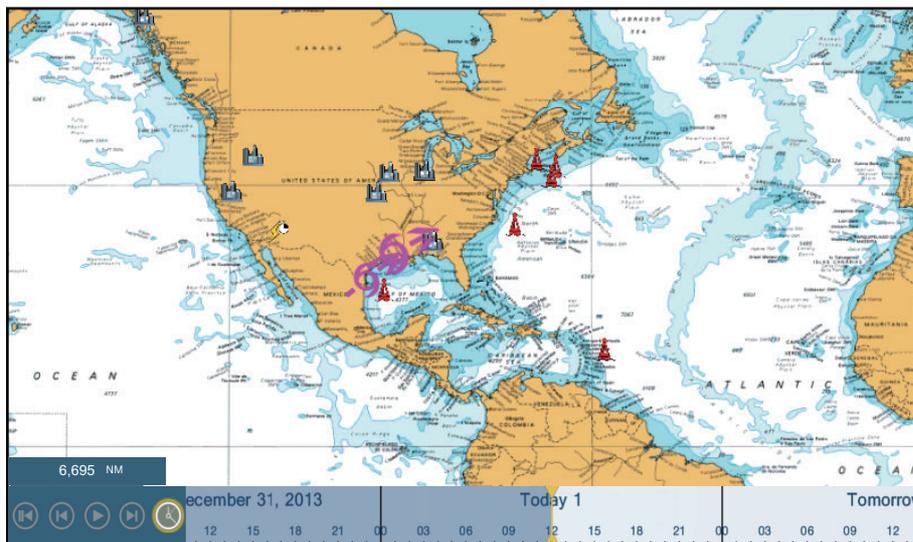
NOWRAD and Canadian weather radar information are put on top of your chart (see paragraph 11.3.1). This display lets you see possible storm fronts to help you identify the clouds from possible sea clutter. To display the weather radar, turn on [Wx Radar] from the pop-up menu.



[Adv Wx Data] (Advanced weather)

The advanced weather display provides the weather data; [Buoys], [City], [Storm], [Lighting] or [Storm Tracks]. For the icons of these data, see section 11.4.

1. Tap the screen to show the pop-up menu, then tap [Adv Wx Data].
2. Tap a menu item to display its data.
3. Repeat steps 1 and 2 to select all menu items desired.



[Anim Radar] (Animation radar)

The animation radar display provides the past weather radar information. To show the animation radar display, tap [Anim Radar] on the pop-up menu. To stop the animation display, tap [End Anim] at the top right-hand corner of the screen.

11.4 Weather Icons (Sirius Weather)

The table below shows the weather icons that appear on the Sirius weather display. You can show or hide these icons from the pop-up menu, with [Wx Data].

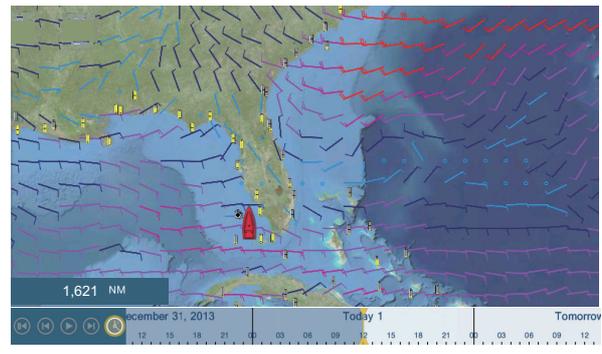
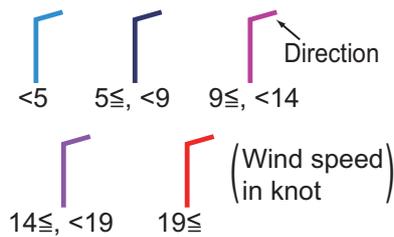
Icon	Meaning
	Storm cast
	Lightning
	Surface observation stations
	Wind
	City
	Currents
	Storm tracks
 <p>etc.</p>	Surface pressure

11.5 Weather Data (NavCenter or Sirius)

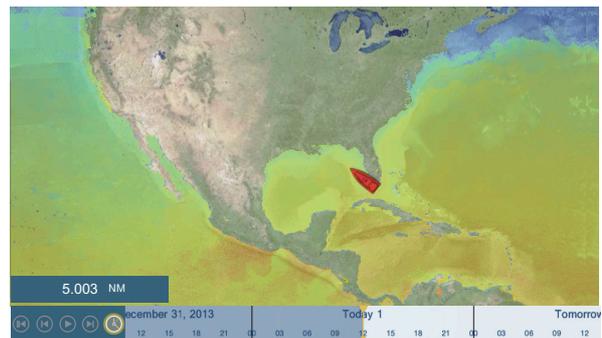
The table below shows the weather data available for displaying according to weather data server (NavCenter or Sirius).

Items	NavCenter	Sirius	Item	NavCenter	Sirius
Wind	Yes	Yes	Currents	Yes	No
Waves	Yes	Yes	Altimetry	Yes	No
SST	Yes	Yes	Plankton	Yes	No
Cloud	Yes	No	Buoys	No	Yes
Rain	Yes	No	City	No	Yes
Pressure	Yes	Yes	Storm	No	Yes
500mb	Yes	No	Lightning	No	Yes
Air Temp	Yes	No	Storm Tracks	No	Yes

[Wind]: The wind forecast displays the wind speed by color. The bar at the top points in the wind direction.



[Waves]: The waves forecast displays wave height with color. 0 foot (minimum) is displayed in light blue, 35 feet (maximum) in red.

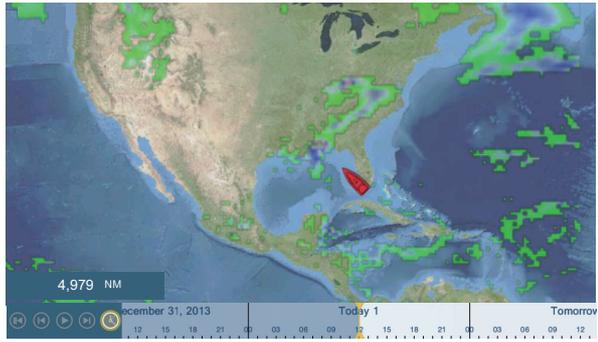


[Cloud]: The cloud forecast displays cloud images. 8% of cloud amount (minimum) is displayed in white, 100% (maximum) in black. The cloud amount under 8% is transparent.

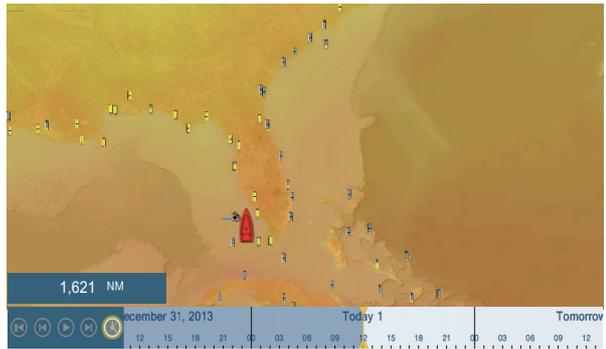


11. WEATHER

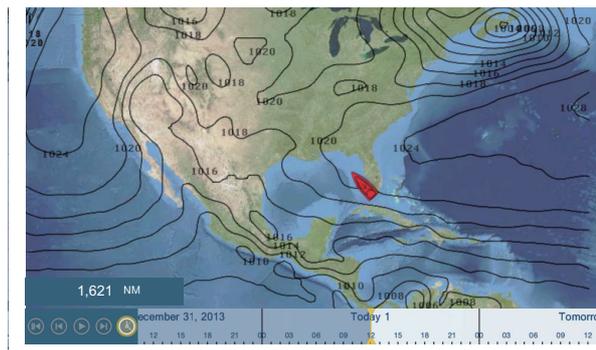
[Rain/Snow]: The rain/snow forecast displays rain/snow images. 0.1 mm/hour of rainfall/snowfall (minimum) is displayed in green, 5 mm/hour (maximum) in dark violet.



[Air Temp]: The air temp forecast displays the air temperature by color. -45°C (-49°F) (minimum) is displayed in dark violet, 45°C (113°F) (maximum) is displayed in red.



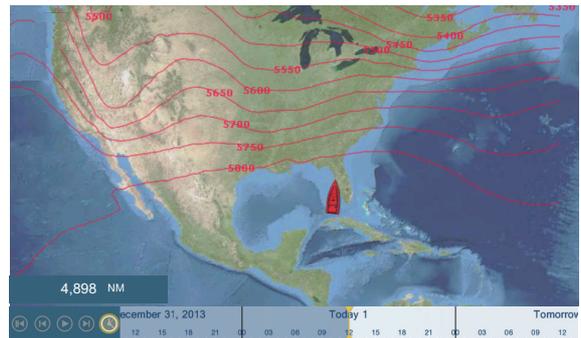
[Pressure]: The pressure forecast displays surface pressure.



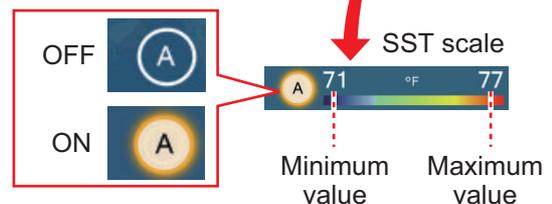
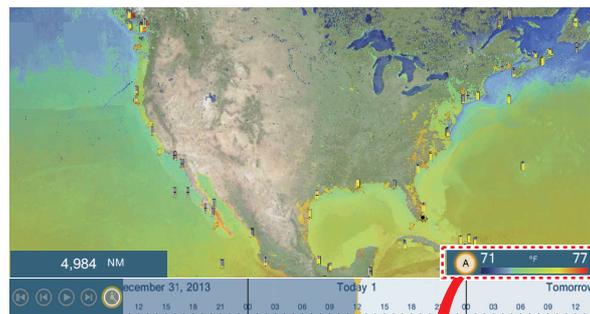
Pressure icon	Meaning
	High pressure
	Low pressure
	Warm front
	Cold front
	Occluded front
	Stationary front

Pressure icon	Meaning
	Trough
	Squall line
	Dry line
	Isobars

[500mb]: The 500mb forecast displays the contour lines over 500 mb.



[SST] (Sea surface temperature): This data layer shows the temperature of the sea surface in shades. Lower temperatures are in dark blue, higher in red. On the screen, you can turn on or off the automatic SST scale with tapping [A]. Set the minimum or maximum value for which to show SST. See page 3-5 for how to set the value. This is available when [Auto] is off.



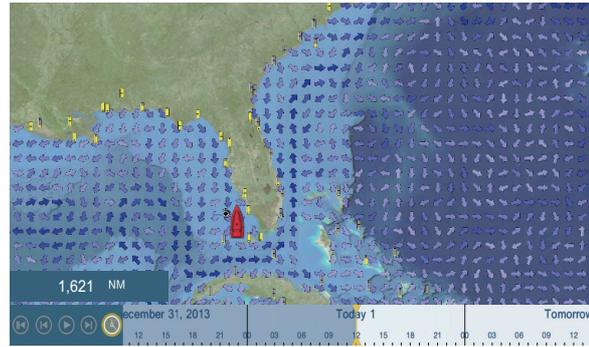
You can turn the automatic SST scale adjustment on or off by tapping the "A".

OFF: SST can be adjusted manually, with the range sliders.

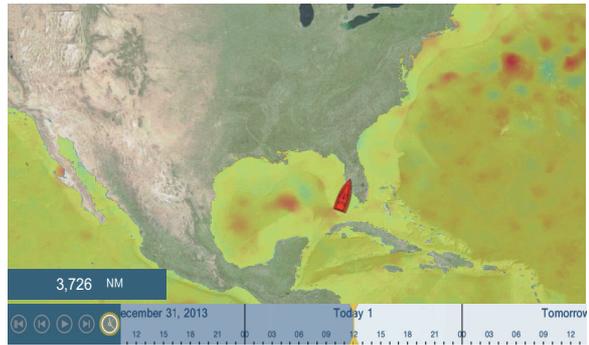
ON: SST set according to the depth shading selection set in the menu.

11. WEATHER

[Currents]: The current forecast displays the tidal current speed and direction by blue arrow. The darker the blue, the faster the current speed (0 to 2 kn).



[Altimetry]: The altimetry forecast displays the sea height anomalies by color. The large anomalies are displayed in red, smaller ones in light green.



[Plankton]: The plankton forecast displays the plankton growth in tones of green. The darker the green, the greater the density of plankton.

12. AIS, DSC MESSAGE

12.1 What is AIS?

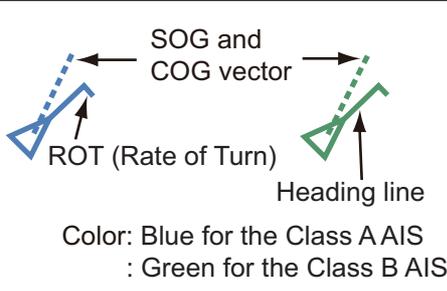
AIS (Automatic Identification System) is a system that continuously transmits the identification and position of your ship to AIS-equipped ships within VHF range. All such ships also receive data from other AIS-equipped ships and display their positions and other relevant information. The AIS broadcasts this information over a VHF transceiver. The information is as shown below.

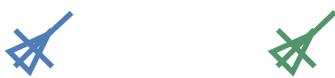
- Position
- Name of ship
- Course over ground
- Position of position-fixing equipment
- Heading
- Call sign
- Speed over ground
- Name of position-fixing equipment
- Rate of turn

12.2 How to Show or Hide the AIS Symbols

1. On the radar display or plotter display, open the [Layers] menu.
2. Turn [AIS Targets] on or off.

12.3 AIS Target Symbols

Target type	Symbol	Description
Activated AIS target	 <p>Color: Blue for the Class A AIS : Green for the Class B AIS</p>	<p>COG is indicated on the symbol with a dotted line.</p> <p>Note: An AIS symbol that has a "TX marker" (callout) above it indicates that vessel has transmitted an AIS safety message.</p> <p>TX marker (callout)</p> 
Dangerous AIS target	<p>Color: Red</p> 	<p>The target whose CPA and TCPA are smaller than the [CPA Alarm Value] and [TCPA Alarm Value], which are set in the [Settings] - [Targets] menu, is indicated as a dangerous target.</p>

Target type	Symbol	Description
Lost AIS target	 <p>Color - AIS target: Blue for the Class A AIS : Green for the Class B AIS</p>	<p>An AIS target becomes a lost target if a signal is not received from the AIS target for x* minutes. The lost target symbol is erased if a signal is not received for an additional x* minutes.</p> <p>*: The time depends on the AIS transponder. Check the operator's manual for your AIS transponder for information about lost targets.</p>
No CPA/TCPA target	 <p>Color: Blue for the Class A AIS : Green for the Class B AIS</p>	<p>AIS symbols are shown in broken lines in the following cases:</p> <ul style="list-style-type: none"> No water or ground tracking speed of your ship, or there is no speed data. All AIS symbols are shown in broken lines. No speed data from AIS target. The symbol of the corresponding AIS target is shown in broken lines. A target with neither a reported heading nor COG is oriented toward the top of the operational display area.

Other AIS symbols that may appear are shown in the table below.

Symbol	Meaning
	AtoN
	Base Station
	Aircraft
	SART

12.4 Proximity AIS Target Alarm

The proximity AIS target alarm alerts you when an AIS target is within the distance you specify, and is applicable to both displayed and not displayed targets. When an AIS target is within the distance set, the alarm indication "Proximity AIS Alarm" flashes in the status bar and the audio alarm sounds. (See paragraph 2.10.7).

1. Open the home screen, then tap [Settings] - [Targets].

2. Turn on [Proximity AIS Target Alarm].
3. Tap [Proximity AIS Target Alarm Value] to open the software keyboard.
4. Set the alarm value, then tap ✓.
5. Tap the close button to finish.

12.5 How to Ignore Slow Moving AIS Targets

The proximity AIS target alarm may often sound in areas of heavy vessel traffic. You can prevent frequent release of the alarm against slow, non-threatening targets by specifying the maximum target speed that triggers the alarm. Any target whose speed is lower than set here does not trigger the alarm.

1. Open the home screen, then tap [Settings] - [Targets].
2. Tap [Ignore Alarms for AIS Slower than...] to open the software keyboard.
3. Set a speed, then tap ✓. The setting range is 0.0 - 9.9 (knots).
4. Tap the close button to finish.

12.6 How to Hide AIS Targets

You can hide the AIS symbols that are beyond the distance you set here.

1. Open the home screen, then tap [Settings] - [Targets].
2. Tap [Hide AIS Targets Farther than...].



3. Tap a distance. Targets at a distance greater than selected here are not shown on the screen.
4. Tap the close button to finish.

12.7 How to Display an AIS Safety Message

When you receive an AIS safety message (addressed or broadcast) from an AIS transponder equipped vessel, the Status bar displays "New Safety Related Message(s)" flashing. Tap the Status bar to display the message. The AIS symbol for the vessel that transmitted the message is put at the center of the screen, and the [Target Info] window appears displaying the message, an example of which is shown in section 12.8).

12.8 How to Display AIS Target Data

Tap an AIS target (plotter or radar display) to display the simple information in the pop-up menu.

For detailed information, tap the target, then tap [Info] on the pop-up menu to show the [Target Info] window. If there is an AIS safety message (addressed or broadcast) from the ship, it appears at the top of the window. You can delete the message by tapping [Delete Message].

Name	FURUNO
MMSI	124365890
COG	342.0°
SOG	0.0 kn
Range	7.293 NM
Bearing	325.2°
CPA	5.992 NM
TCPA	-41'30s
Last Update	30'42s
New Point	
Info	

Simple information

BROADCAST SAFETY RELATED TEXT :	
GALE WARNING 27.16N 82.40W	
Date	Wednesday, January 1, 2014
Time	12:29:41 PM
Delete Message	
TARGET INFO	
NickName	
MMSI	001234567
Call Sign	
COG	57.3 °
SOG	1.9 kn
CPA	--- NM
TCPA	---

Detailed information

12.9 How to Show or Hide the Target IDs

You can show or hide the target ID of AIS targets.

1. Open the home screen, then tap [Settings] - [Targets].
2. Turn [Display Target IDs] on or off.
3. Tap the close button to finish.

12.10 AIS List

The AIS list provides information about the AIS targets you are receiving navigation data from.

How to open the AIS list

Open the home screen, then tap [Lists] and [AIS].

The vertical bar at the right side of the list is colored according to that vessel's AIS transponder type or vessel's status.

Blue: Class A AIS transponder

Green: Class B AIS transponder

Red: Dangerous AIS target

You can sort the list with the buttons on the title bar of the window.

[Name]: AIS targets sorted in alphanumeric order.

[Range]: AIS targets sorted by range in ascending order.

[CPA]: AIS targets sorted by CPA in ascending order.

The screenshot shows the AIS List interface. At the top, there is a title bar with a back arrow, the text 'AIS', and four buttons: 'Name', 'Range', 'CPA', and 'Refresh'. A red dashed box highlights these four buttons, with a red arrow pointing to them from the text 'List sort buttons' on the right. Below the title bar is a list of vessels. The first section is labeled 'A' and contains four entries. The second section is labeled 'B' and contains one entry. Each entry has a vertical bar on the left side, colored blue for Class A and green for Class B. The table columns are Name/MMSI, Range/Bearing, and CPA/TCPA. A chevron icon is visible at the bottom right of the list.

Name/MMSI	Range/Bearing	CPA/TCPA
AHRENSHOOP 341400000	3.864 NM 284 °	0.814 NM 26'09s
AMERICA FEEDER 277367000	17.34 NM 11 °	16.71 NM 31'59s
ANAIS 518111000	1.847 NM 268 °	0.730 NM 11'13s
ATLANTIC 372012000	4.545 NM 288 °	0.619 NM 30'49s
BIMIMI CAT 334309000	4.541 NM 288 °	0.595 NM 30'52s

[Refresh] updates the list.

How to display the detailed information for an AIS target

Tap the AIS target on the AIS list then tap [Detail]. The name of the AIS is shown in the title bar and navigation data appears in the [TARGET INFO] section.

TARGET INFO	
NickName	[Edit Nickname]
Name	FURUNO
MMSI	000886617
Call Sign	HO4721
COG	0.0 °
SOG	0.0 kn
CPA	2.115 NM
TCPA	-4h41'
Range	28.17 NM
Bearing	266 °
Destination	MIAMI, FL.
Vessel Type	Cargo ships - Carrying DG, HS, or MP, IMO hazard or pollutant category A

How to find an AIS target on the plotter display

Tap the AIS target on the AIS list, then tap [Find On Chart]. The plotter display opens and the selected AIS target is zoomed in.

How to edit an AIS nickname

1. Tap the AIS target to edit its nickname.
2. Tap [Edit Nickname] to display the software keyboard.
3. Enter the nickname. You can use a maximum of 20 alphanumeric characters.
4. Tap ✓.
5. Tap the close button to finish.

12.11 How to Register an AIS or DSC Target to the Buddies List

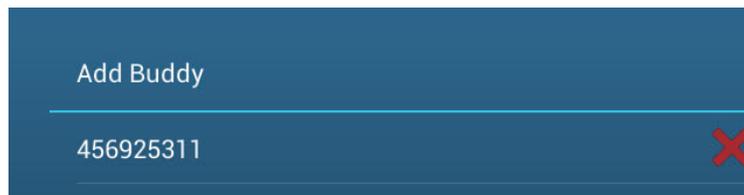
The buddies list provides a quick reference to ships' MMSI and nickname. For example, you might want to enter the MMSI and nickname of partner ships or ships that often operate in your area.

How to add an MMSI no. to the buddies list

1. Open the home screen, then tap [Settings] - [Targets].
2. Tap [Buddies List (AIS & DSC)].



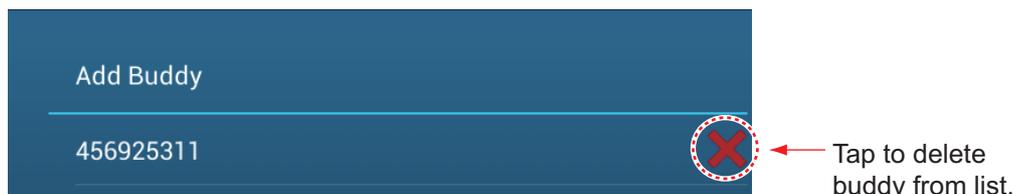
3. Tap [Add Buddy] to open the numeric software keyboard.
4. Enter the MMSI number, then tap ✓.
5. Tap the MMSI number just entered to show the software keyboard.
6. Enter the nickname, then tap ✓.



7. Tap the close button to finish.

How to delete an entry from the buddies list

1. Open the home screen, then tap [Settings] - [Targets].
2. Tap [Buddies List (AIS & DSC)].
3. Tap the red "X" (to the right of the nickname) of the buddy to delete.



4. You are asked if you are sure to delete the buddy. Tap [OK].
5. Tap the close button to finish.

12.12 AIS Transponder FA-30, FA-50

The FURUNO AIS Transponder FA-30 (or FA-50) installs in the NavNet TZtouch2 network and can be controlled from a NavNet TZtouch2 display. To access the menu for the transponder, do as shown below. See the respective operator's manual for details.

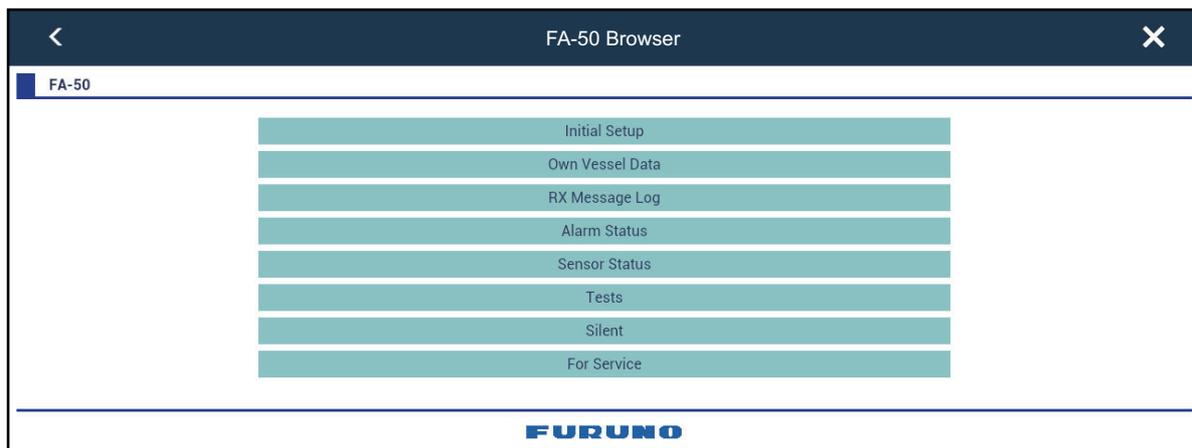
1. Connect the FA-30 (or FA-50) to the NavNet TZtouch2 network.
2. Open the home screen, then tap [Settings] - [Initial Setup].
3. Tap [FA30 Browser] or [FA50 Browser].



↓ Select an "FA" browser



OR



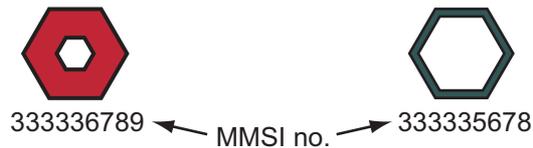
12.13 DSC Message Information

The DSC (Digital Selective Calling) message information feature provides, on the plotter and radar displays, the MMSI no. and position* of the ships that have transmitted a DSC message to you. A hexagon-shaped marker marks the position of the ship at the time the DSC was transmitted to you. The marker is color-coded according to the type of DSC message sent, red for distress and green for non-distress.

* Position at the time of message transmission. Position information is not updated.

Red: DSC marker for
a distress message

Green: DSC marker for
a non-distress message



This feature requires connection of a DSC capable radiotelephone that outputs the DSC sentence in NMEA 0183 format.

12.13.1 DSC distress message notification

When a DSC distress message is received, the message "DSC Distress Call" appears in red on the status bar at the top of the screen. To delete the distress message, tap the status bar.

12.13.2 How to go to a DSC point

Tap the DSC marker to go then tap [Go To] on the pop-up menu.

12.13.3 How to display DSC information

Tap a DSC marker to display the simple information (position, MMSI no. of the ship that transmitted a DSC message, etc.). To get detailed information, tap a DSC marker, then tap [Info] on the pop-up menu.

Name	ANAIS
MMSI	518111000
COG	0.0 °
SOG	0.0 kn
Range	25.81 NM
Bearing	214.4 °
CPA	14.61 NM
TCPA	-25'35s
Last Update	1'58s
New Point	
Info	

Simple information

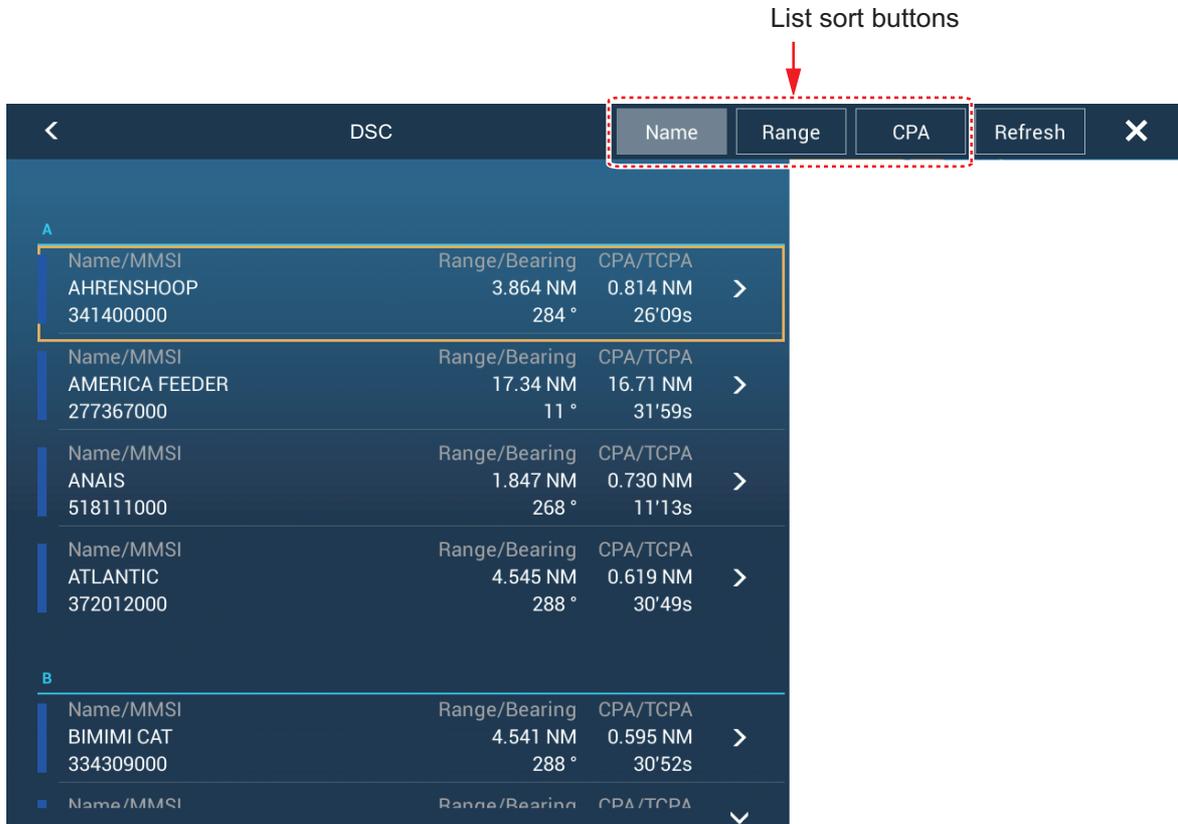
NickName	
MMSI	387654321
COG	0.0 °
SOG	0.0 kn
CPA	5.992 NM
TCPA	41'30s
Range	7.293 NM
Bearing	325.2°
Last Update	30'56s
Lat	N 34°36.000'
Lon	E 135°12.000'
Nature Of Distress	---

Detailed information

12.13.4 The DSC list

The DSC list shows the name, MMSI, range, bearing, CPA and TCPA of vessels from which you have received a DSC message.

1. Open the home screen, then tap [Lists] - [DSC].



2. Tap [Name], [Range] or [CPA] at the top of the list to sort the list.

[Name]: DSC targets sorted in alphanumeric order.

[Range]: DSC targets sorted by range in ascending order.

[CPA]: DSC targets sorted by CPA in ascending order.

[Refresh] updates the list.

12. AIS, DSC MESSAGE

To see the detailed information for a DSC target, tap a DSC then tap [Detail]. To put a DSC marker at the center of the plotter display, tap the DSC target, then tap [Find On Chart].

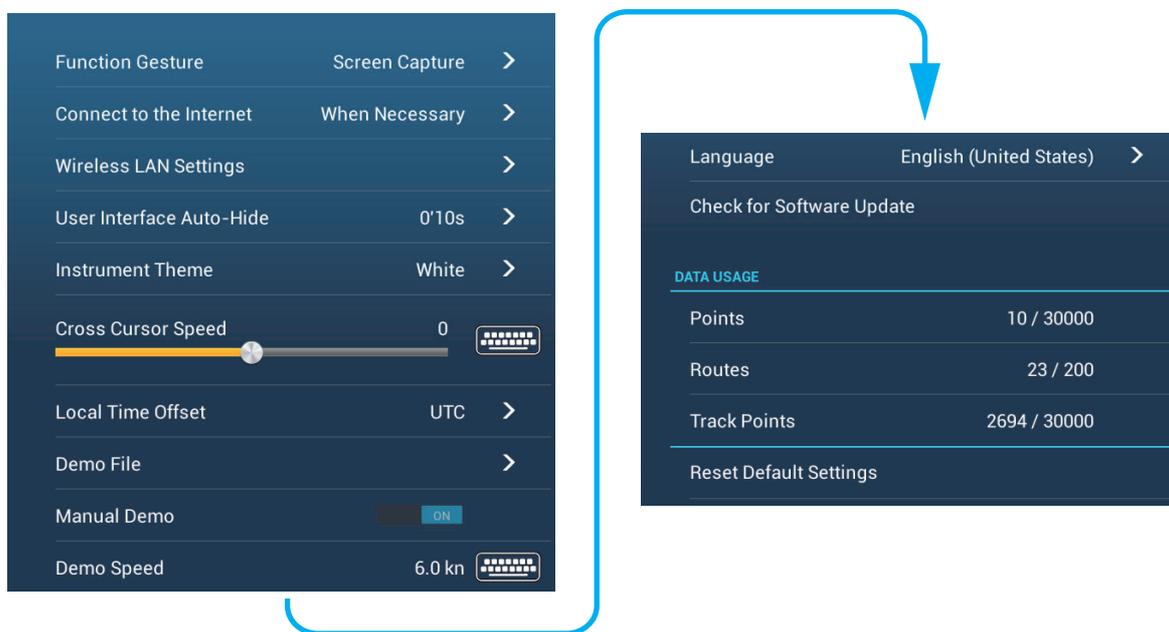
TARGET INFO	
NickName	
MMSI	387654321
COG	0.0 °
SOG	0.0 kn
CPA	1,840 NM
TCPA	-10d00h
Range	7,521 NM
Bearing	274 °
Last Update	31'27s
Lat	N 34°36.000'
Lon	E 135°12.000'
Nature Of Distress	---

13. OTHER FUNCTIONS

Once you have become acquainted with your equipment, you can set it according to your needs. You can change system configuration, change how the equipment operates and displays information, etc. The descriptions contained in this section are only those not previously mentioned.

13.1 General Menu

The [General] menu contains items that once preset do not require frequent adjustment.

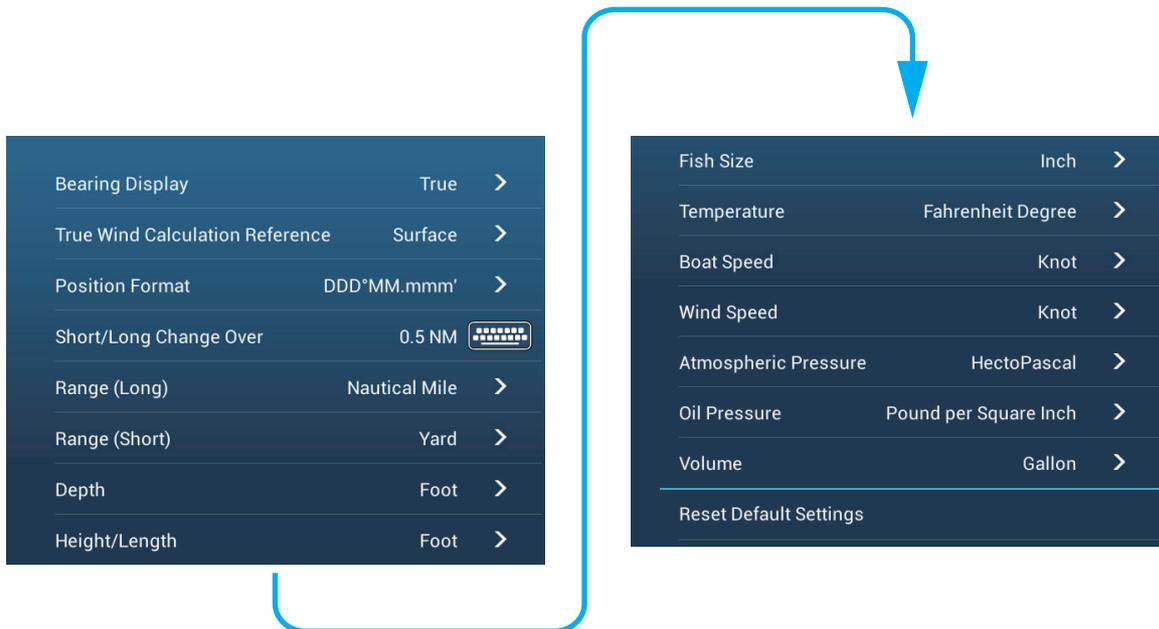


Menu item	Function	Options
[User Interface Auto-Hide]	Select the time to wait before closing a pop-up menu when no operation is found.	[2 s], [3 s], [5 s], [10 s], [15 s]
[Cross Cursor Speed]	Adjust the cross cursor speed.	-7 to +7
[Local Time Offset]	Select the time difference between local time and UTC time.	UTC -12:00 to UTC +13:00 (at one-hour intervals)
[Demo File]	Select the demo file to use with the demo mode. Insert the SD card containing the demo file in the SD card unit (right slot) then select the demo file from the SD card.	
[Manual Demo]*	Activate or deactivate the demo mode.	[ON], [OFF]
[Demo Speed]	Set the ship's speed to use in the demo mode.	0 to 20 kn
[Check for Software Update]	Update the software version. See section 13.5.	-
[Reset Default Settings]	Restore default settings for the items of the [General] menu.	-

* In the demo mode, plotter display, you can relocate the boat icon to the location tapped. Tap the screen where you want to relocate the boat icon, then tap [Move Boat] on the pop-up menu.

13.2 Units Menu

The [Units] menu sets the unit of measurement for speed, distance, depth, etc.



Menu item	Options
[Bearing Display]	[Magnetic], [True] The mode (magnetic or true) of all heading and bearing data.
[True Wind Calculation Reference]	[Ground], [Surface] Select wind value to display from speed over ground or speed through water (surface).
[Position Format]	[DDD°MM.mmmm'], [DDD°MM.mmm'], [DDD°MM.mm'], [DDD°MM'SS.ss'], [DDD.dddddd°]
[Short/Long Change Over]	Set the distance at which to change between short and long range. Set the long range here (0.0 to 2.0 NM)
[Range (Long)]	[Nautical Mile], [Kilometer], [Mile]
[Range (Short)]	[Foot], [Meter], [Yard]
[Depth]	[Foot], [Meter], [Fathom], [Passi Braza]
[Height/Length]	[Foot], [Meter]
[Fish Size]	[Inch], [Centimeter]
[Temperature]	[Fahrenheit Degree], [Celsius Degree]
[Boat Speed]	[Knot], [Kilometer per Hour], [Mile per Hour], [Meter per Second]
[Wind Speed]	[Knot], [Kilometer per Hour], [Mile per Hour], [Meter per Second]
[Atmospheric Pressure]	[HectoPascal], [Millibar], [Millimeter of Mercury], [Inch of Mercury]
[Oil Pressure]	[KiloPascal], [Bar], [Pound per Square Inch]
[Volume]	[Gallon] (Gallon & Gallon/Hour), [Litre] (Litre & Litre/Hour)
[Reset Default Settings]	Restore default settings for the [Units] menu.

13.3 Initial Setup Menu

The [Initial Setup] menu, which is mainly for use by the installer of the equipment, sets up the system according to the sensors connected. These adjustments require some knowledge of marine electronics equipment. If you are unsure of your abilities, have a qualified marine electronics technician make the adjustments. Inadequate adjustment can affect performance.

GPS POSITION section

Menu item	Description	Options (setting range)
[Longitudinal (from bow)]	Enter the GPS antenna positioning bow-stern (Longitudinal) and port-starboard (Lateral) position from the origin.	0 m to 999 m
[Lateral GPS Position (-Port)]		-99 m to +9 m



BOAT INFORMATION section

Menu item	Description	Options (setting range)
[Boat Length]	Set the length of your boat.	0.0 m to 999 m
[Size of Static Icon]	Set the size of static (such as own ship) icons.	50 to 150
[Depth Display]	Select the start point for depth measurement.	[Under Keel], [Under Sea Level]
[Transducer Draft]	Set the transducer draft.	0.0 m to 99.9 m
[Keel Draft]	Set the keel draft.	0.0 m to 99.9 m
[Graphic Instruments Setup]	Set the graphic instruments display. See the description below.	
[Engine & Tank Setup]	Set the engine and tank displays. See "Engine & Tank Setup" on the next page.	

Graphic Instruments Setup:

Menu Item	Description	Options (setting range)
[Maximum Boat Speed]	Set the transducer's maximum detectable speed.	1 kn to 99 kn
[Maximum Wind Speed]	Set the transducer's maximum detectable speed.	1 kn to 99 kn

[Graphic Instruments Setup] - [Depth]

Menu Item	Description	Options (setting range)
[Minimum Depth]	Set the transducer's minimum detectable depth.	1 m to 19 m
[Maximum Depth]	Set the transducer's maximum detectable depth.	20 m to 2000 m

13. OTHER FUNCTIONS

[Graphic Instruments Setup] - [Sea Surface Temperature]

Menu Item	Description	Options (setting range)
[Minimum Sea Surface Temperature]	Set the transducer's minimum detectable temperature.	0.00°C to 99.99°C
[Maximum Sea Surface Temperature]	Set the transducer's maximum detectable temperature.	0.01°C to 99.99°C

[Graphic Instruments Setup] - [Propulsion Engine]

Menu Item	Description	Options (setting range)
[Max. RPM]	Set the maximum rpm of your engine to show on the RPM display.	1 rpm to 20,000 rpm
[Red Zone Oil Pressure]	Set the starting value for the red zone area of the oil pressure meter.	0 kPa to 59 kPa
[Max. Oil Pressure]	Set the maximum oil pressure of your engine.	60 psi to 144 psi
[Min. Temperature]	Set the minimum temperature for your engine.	0.00°C to 99.00°C
[Red Zone Temperature]	Set the starting value for the red zone area of the engine temperature indicator.	0.01°C to 999.00°C

[Graphic Instruments Setup] - [Other Engine]

Menu Item	Description	Options (setting range)
[Max. RPM]	Set the maximum rpm of your engine to show on the RPM display.	0 rpm to 20,000 rpm
[Red Zone Oil Pressure]	Set the starting value for the red zone area of the oil pressure meter.	0 kPa to 999 kPa
[Max. Oil Pressure]	Set the maximum oil pressure of your engine.	0 kPa to 999 kPa
[Min. Temperature]	Set the minimum temperature for your engine.	0°C to 99°C
[Red Zone Temperature]	Set the starting value for the red zone area of the engine temperature indicator.	0°C to 999°C
Reset Instrument Pages	Resets all instrument pages to default.	[OK], [Cancel]

Engine & Tank Manual Setup:

Menu Item	Description	Options (setting range)
[Nickname]	Change the nickname for the engine or tank.	
[Used For Propulsion]	Select which engine/tank is used to calculate the distance which may be traveled using the remaining fuel. [ON] uses the engine/tank for calculations, [OFF] ignores the engine/tank.	[ON], [OFF]
[Reset]	Resets the engine/tank details to default	[OK], [Cancel]

DATA ACQUISITION section

Menu Item	Description	Options (setting range)
[GP330B WAAS Mode]	Select [ON] to use the WAAS mode for the corresponding GPS antenna.	[ON], [OFF]
[WS200 WAAS Mode]		
[Data Source]	Select the source for each data to input to the system. If two or more sources are connected for a data, select one using the pull-down dialog box. The FURUNO products are shown at the upper part of the list.	
[Sensor List]	Show the information for sensors connected to your equipment. Also, you can set "Nickname" for them here.	
[NMEA0183 Output]	Select [ON] to output NMEA sentences.	
[NMEA 2000 PGN Output]	Select [ON] for the PGN's (Parameter Group Number, CAN bus (NMEA2000) message) to output from the CAN bus port.	
[Sky View]	Show the condition of GPS and GEO (WAAS) satellites on the [GPS SkyView] display. The bearing and elevation angle of all GPS and GEO satellites (if applicable) in view of your receiver appear. For the service technician. Note: The [GPS SkyView] display can also be shown by tapping the GPS icon (shown right) on the home screen.	

INTERNAL GPS SETUP section

Menu Item	Description
[WAAS Mode]	Set to [OFF] when using external GPS.

SC-30 SETUP section

Menu item	Description	Options (setting range)
[WAAS Mode]	Select [ON] to use the WAAS mode.	[ON], [OFF]
[Heading Offset]	Enter the offset value for heading.	-180° to +80°
[Pitch Offset]	Enter the offset value for pitching.	-90° to +90°
[Roll Offset]	Enter the offset value for rolling.	-90° to +90°

CALIBRATION section

Menu item	Description	Options (setting range)
[Heading]	Offset heading data.	-180.0° to +180.0°
[Speed Through Water]	Calibrate speed data. Enter amount in percentage.	-50% to +50%
[Wind Speed]	Offset wind speed data. Enter amount in percentage.	-50% to +50%
[Wind Angle]	Offset wind angle data.	-180° to +180°
[Sea Surface Temperature]	Offset sea surface temperature data.	-10° to +10°

DATA DAMPING section

Menu item	Description	Options (setting range)
[COG & SOG]	Set data damping time. The lower the setting the faster the response to change.	0 to 59 seconds
[Heading]		
[Speed Through Water]		
[Wind Speed&Angle]		
[Rate of Turn]		

13. OTHER FUNCTIONS

FUSION section

Menu item	Description	Options (setting range)
[Connect to Fusion]	Connect to your Fusion equipment.	
[Fusion Auto Volume]	Set to [ON] to allow this unit to control the Fusion volume.	
[Minimum Speed]	Set the minimum speed threshold. Exceeding this speed activates volume auto control.	0.0 kn to 19.9 kn
[Maximum Speed]	Set the maximum speed threshold.	0.1 kn to 99.0 kn
[Volume Increase]	Set the amount of extra volume to output.	10% to +50%

BROWSER INSTALLATION section

Menu item	Description	Option (setting range)
[FAX30 Browser]	Show the Facsimile Receiver FAX-30 display.	
[FA30 Browser]	Show the AIS Receiver FA-30 display.	
[FA50 Browser]	Show the AIS Receiver FA-50 display.	

Other items

Menu item	Description	Option (setting range)
[Chart Master Device]	Set to ON to set this equipment as the chart master and share one System ID and chart unlock code in the network.	
[System ID]	The system ID for this device within the network.	
[IP Address]	IP address for this unit within the network.	
[Quick Self Test]	Test the equipment.	
[Certification Mark]	Show the certification marks this equipment has received.	
[ServiceMan]	Requires login password. For the serviceman.	
[Reset Default Settings]	Reset the system to default settings.	

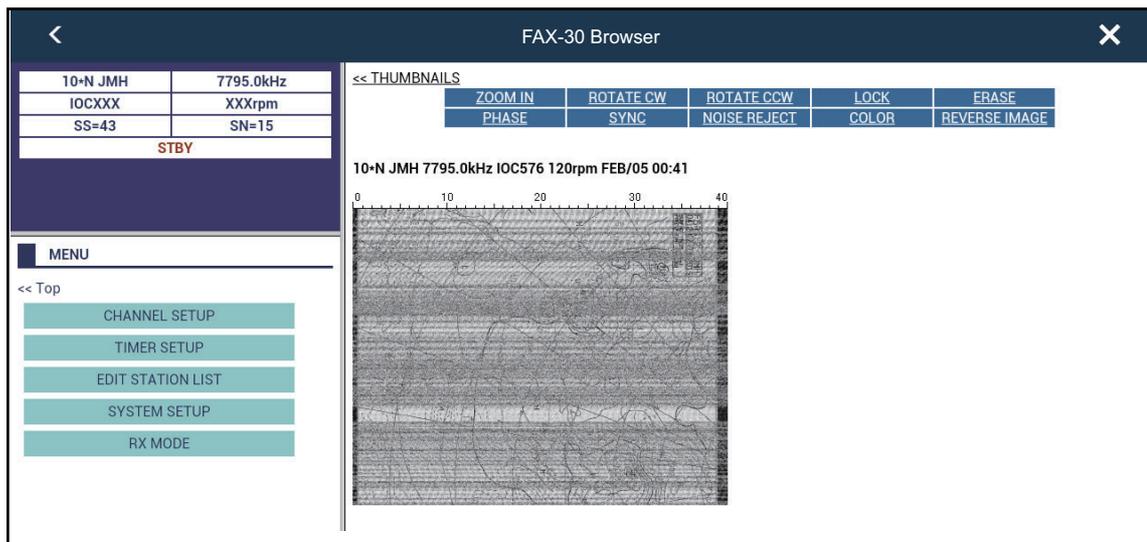
13.4 Facsimile Receiver FAX-30

The FURUNO Facsimile Receiver FAX-30 installs in the NavNet TZtouch2 network and can be controlled from a NavNet TZtouch2 display. Below are the steps to start fax operation.

1. Connect the FAX-30 to the NavNet TZtouch2 network.
2. Open the home screen, tap [Initial Setup], then tap [Fax30 Browser] in the [BROWSER INSTALLATION] section.



3. Tap [WX FAX] or [NAVTEX].



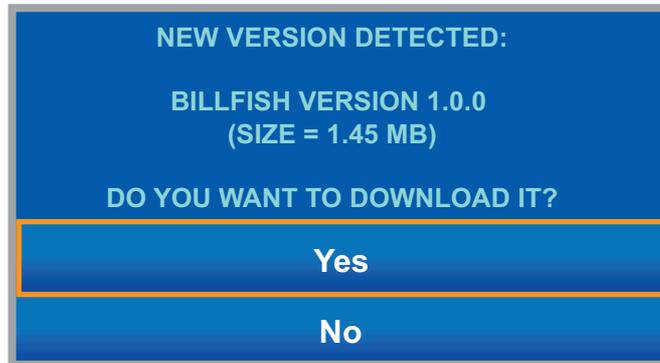
4. Refer to the Operator's Manual of the FAX-30 for operation information.

The FAX-30 display can only be accessed by one NavNet TZtouch2 unit at a time. When another NavNet TZtouch2 display accesses the FAX-30, control of the FAX-30 is given to that display after the picture has stopped completely. This sequence takes approximately one minute.

13.5 Software Update

You can update the software for this equipment via the internet. See section 1.18 for how to connect to the internet. It is recommended to back up stored data (waypoints, routes, etc.) to a micro SD card before updating the software, in case something should go wrong during the updating.

1. Connect to WLAN.
2. Open the home screen, then tap [Settings] - [General].
3. Tap [Check for Software Update]. The following messages appear.



4. Tap [Yes].

The system starts updating. Do not turn off the power during the updating. The power switch turns orange when the updating is completed.

13.6 How to Manage Your Charts

The NavNet TZtouch2 uses the same Mapmedia charts as NavNet 3D. Even though NavNet TZtouch2 is a master-less system in networking, for charts one NavNet TZtouch2 unit should be set as Chart Master to share the System ID, which will be necessary to obtain an unlock code of a chart from Mapmedia.

13.6.1 How to view your charts

Tap the Home icon to show the home screen, then tap [Catalog] to display your charts catalog.

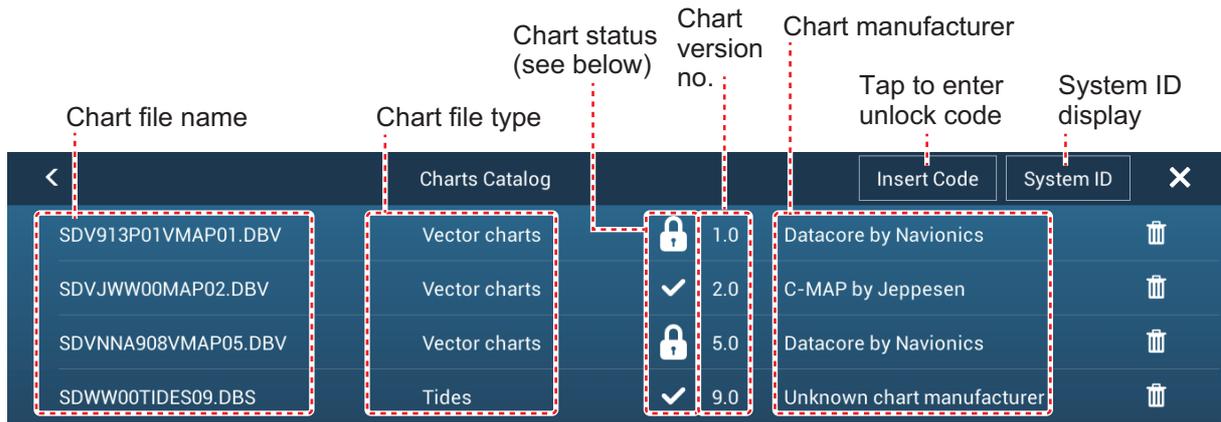


Chart status icon	Meaning
	Free chart. An unlock code is not necessary.
	Unlock code is necessary to use the chart. Tap the [Insert Code] button at the top of the [Charts Catalog] screen. Enter the unlock code then tap ✓ to finish.
	Unlock code entered.

13.6.2 How to update or add charts

Free (USA and NOAA) and for-fee NavNet TZtouch2 compatible charts are provided by FURUNO and Mapmedia. Go to the URLs shown below to download chart data.

Download the chart file to your desktop. Unzip the file, then copy it to the root of a micro SD card. Insert the card into the SD card slot on the display unit, or the left card slot in the SD Card Unit (SD-001). For the detailed procedure, refer to the instructions on the FURUNO website.

A for-fee chart requires that you enter its chart unlock code. Go to the Home screen and tap [Catalog] to show the [Charts Catalog] display. Tap the [Insert Code] button then enter the chart unlock code from the software keyboard.

Where to obtain chart data:

FURUNO

<http://www.furunousa.com/Products/Products.aspx?category=Products+%3a+NavNet+TZtouch+%3a+Charts+for+NavNet+TZtouch>

Mapmedia

<http://www.mapmedia.com/charts-catalog.html>

13.6.3 How to delete charts

Before replacing a chart you should delete the old chart data on every NavNet TZtouch2 unit. Only delete the chart data that you intend to replace or no longer require.

Open the charts catalog. Tap the trashcan icon of the chart to delete. You are asked "ARE YOU SURE YOU WANT TO DELETE THIS FILE?" Tap [OK] to delete the file.

14. MAINTENANCE, TROUBLE-SHOOTING

This chapter has information about maintenance and troubleshooting that the user can follow to care for the equipment.

WARNING

ELECTRICAL SHOCK HAZARD
Do not open the equipment.

Only qualified persons can work inside the equipment.

NOTICE

Do not apply paint, anti-corrosive sealant or contact spray to plastic parts or equipment coating.

Those items contain products that can damage plastic parts and equipment coating.

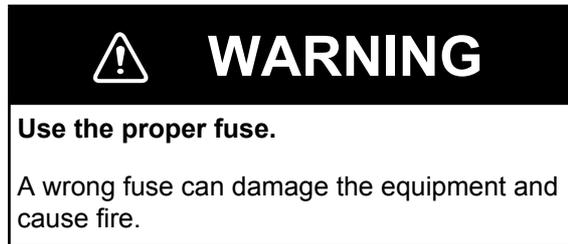
14.1 Maintenance

Routine maintenance helps keep your equipment in good condition and prevents future problems. Check the items shown in the table below on a regular basis to help keep your equipment in good condition for years to come.

Check item	Check point	Remedy
Cables	Cable connection, corrosion	Connect the cables that have loosened. Replace any damaged cables.
Cabinet	Dust on the cabinet	Remove dust with a dry clean cloth. Do not use commercial cleaners to clean the equipment - they can remove paint and markings.
LCD	Dust on the LCD	Wipe the LCD carefully to prevent scratching, using tissue paper and an LCD cleaner. To remove dirt or salt deposits, use an LCD cleaner, wiping slowly with tissue paper so as to dissolve the dirt or salt. Change paper frequently so the salt or dirt will not scratch the LCD. Do not use solvents such as thinner, acetone or benzene for cleaning. Also, do not use degreaser or antifog solution, as they can strip the coating from the LCD.
	Waterdrops on the LCD	Waterdrops on the LCD can slow touch response. Wipe the LCD with a dry cloth to remove the water.
Radar antenna	Foreign material on the radar antenna	Foreign material can reduce sensitivity. Clean the antenna with a cloth wetted with freshwater. Do not use commercial cleaners to clean the radiator - they can remove paint and markings.
Transducer	Transducer face	Marine growth on the transducer face can reduce sensitivity. Remove any growth with a wooden stick or fine grade sandpaper.

14.2 Fuse Replacement

The fuse in the fuse holder in the power cable protects the equipment from high electric current and equipment fault. If you cannot turn on the power, check the fuse to see if it has blown. Find the reason for the blown fuse before you replace the fuse. If the fuse blows again after the replacement, contact your dealer for advice.



Name	Type	Code No.	Remarks
Fuse	FGBO-A 125V 5A PBF	000-155-853-10	12 VDC, 24 VDC

14.3 Life of Parts

Magnetron

When a magnetron reaches the end of its life, targets do not appear on the radar display. If long-range performance appears to have declined, contact your dealer about replacement of the magnetron.

Radar Sensor	Magnetron	Code No.	Approx. Life
DRS2D	E3590	000-164-574-11	2,000 hours
DRS4D	E3571	000-146-867-11	2,000 hours
DRS4DL	80-0691	001-266-460	5,000 hours
DRS4A	MAF1421B	000-158-786-11	3,000 hours
DRS6A	MAF1422B	000-158-788-12	3,000 hours
DRS12A	MAF1565N	000-174-559-10	3,000 hours
DRS25A	MG5436(E2V)	000-140-762-10	2,000 to 3,000 hours

The total time of power-on ("ON TIME") and transmission ("TX TIME") are displayed on the radar screen during the stand-by mode.

LCD

The life of the LCD is approximately 18,000 hours for the TZTL15F, and 25,000 hours for the TZTL12F. The actual number of hours depends on ambient temperature and humidity. When the brilliance cannot be raised sufficiently, contact your dealer about replacement of the LCD.

Fan

The approximate life of the fan is as shown in the table below, and the actual life depends on ambient temperature. When the fan does not rotate sufficiently, an applicable message appears in the status bar. Turn off the power and contact your dealer about replacement of the fan.

Item	Type	Code No.	Estimated Life
FAN MOTOR	MFB52A-12HA-002	000-175-998-10	Approx. 21,000 hours

14.4 Troubleshooting

This section provides simple troubleshooting procedures that the user can follow to restore normal operation. If you cannot restore normal operation, do not check inside the unit. Have a qualified technician check the equipment.

14.4.1 General troubleshooting

Problem	Remedy
You can not turn on the power.	<ul style="list-style-type: none"> • Check for blown fuse. • Check that the power connector is tightly fastened. • Check for corrosion on the power cable connector. • Check for the power cable for damage. • Check battery for correct voltage output. • Use bare finger to turn on the power. (The power cannot be turned with gloved hands.)
Picture is not displayed properly.	Turn off and on the power. If the picture is still improper, contact your dealer for instructions.
Nothing appears on the screen after you press the power switch.	Check if the unit is plugged into the power source.
The display has frozen.	Push the power switch until the power goes off. Turn the power on again.

14.4.2 Radar troubleshooting

Problem	Remedy
You tapped the [TX] icon on the radar display to transmit but nothing happens.	<ul style="list-style-type: none"> • Tap the [TX] icon again. (The icon is filled in white when the radar is in transmit state.) • Check that the antenna cable is tightly fastened. • Check if the radar source is correct.
Marks and characters appear, but echoes do not appear.	Check that the antenna cable is tightly fastened.
Picture is not updated or the picture freezes.	<ul style="list-style-type: none"> • Check the antenna cable for damage, loose connection. • If the picture has frozen, turn the power off and on again.
You tuned the receiver, but the sensitivity is weak.	The life span of the magnetron is over. Have a technician check the magnetron.
You changed the range, but the radar picture does not change.	<ul style="list-style-type: none"> • Try to change the range again. • Turn the power off and on again.
Poor discrimination in range.	Adjust the sea control.
Range rings are not displayed.	Check if [Range Rings] is turned on in the [Layers] menu.
You tapped the [TX] icon to transmit. The "TX screen" appears momentarily, but the radar soon goes into stand-by.	The overload protection has activated. To restore normal operation, turn off all equipment in the network. Wait a few seconds then turn on all the equipment.

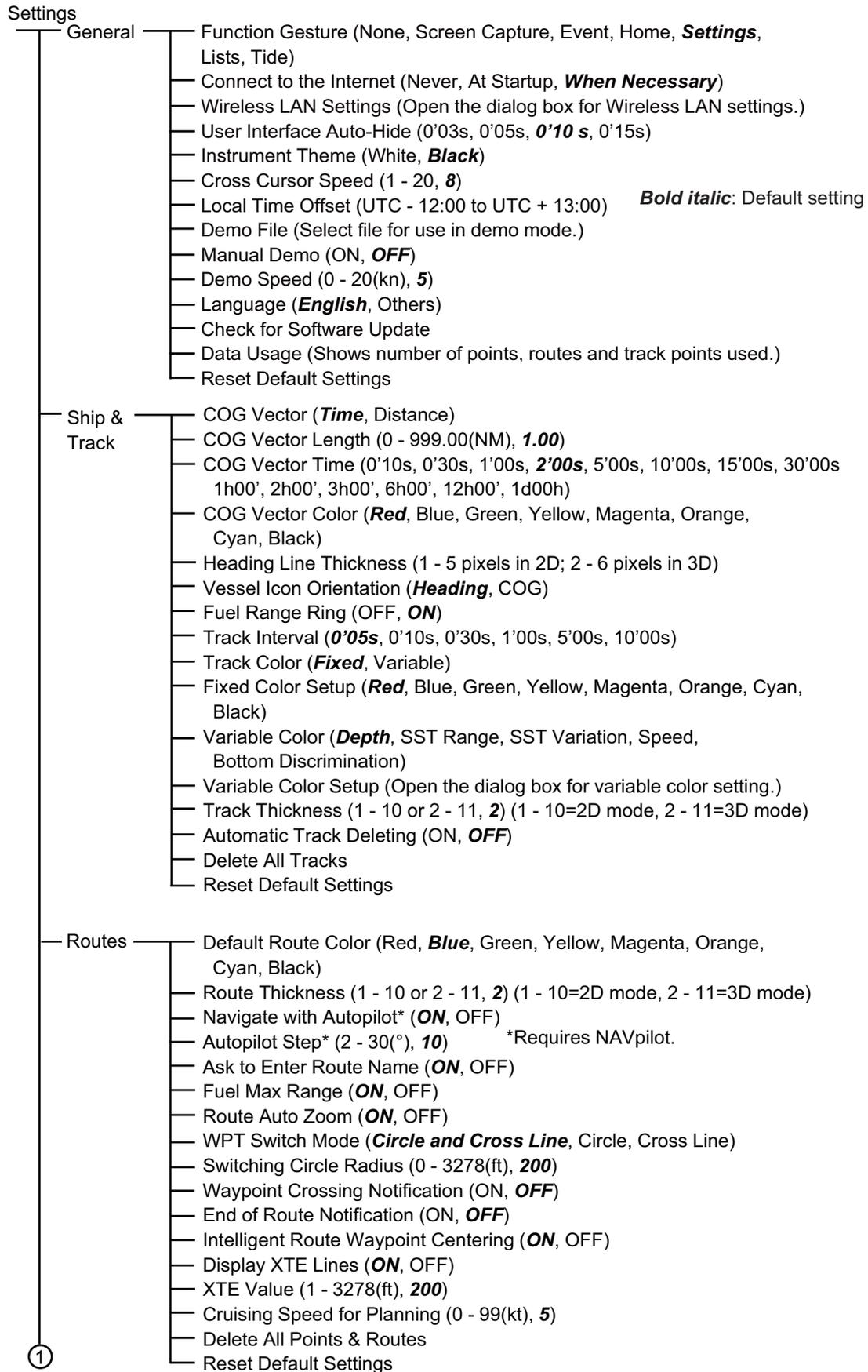
14.4.3 Plotter troubleshooting

Problem	Remedy
Position is not fixed.	Check for interfering objects near the display unit that might be blocking reception.
The track of your ship is not plotted.	Check if [Tracks] is turned on in the [Layers] menu.

14.4.4 Fish finder troubleshooting

Problem	Remedy
You selected a fish finder display, but no picture appears.	<ul style="list-style-type: none"> • Check that the transducer cable is tightly fastened. • Check that the fish finder source is correct. • If you are using a network fish finder, check that it is properly connected.
Marks and characters appear, but no picture appears.	Check if the transducer cable is tightly connected.
Picture appears but zero line does not appear.	<ul style="list-style-type: none"> • The picture is shifted. Check the shift setting. • Check if the draft setting ([Settings] - [Sounder] - [Transducer Draft]) is zero or higher.
The picture sensitivity is too low.	<ul style="list-style-type: none"> • If you are in the manual mode, check the gain setting. • Check the transducer face for marine life and air bubbles. • Bottom is too soft to return an acceptable echo.
The depth indication does not appear.	<ul style="list-style-type: none"> • For manual operation, adjust the gain and range to display the bottom echo in reddish-brown. • Adjust the bottom level HF/LF.
Noise or interference shows on the display.	<ul style="list-style-type: none"> • Make sure the transducer cable is not near the engine. • Check the ground for tight connection, corrosion. • Check if another fish finder near your boat has the same frequency as your fish finder. • Try to reject the interference with [Interference Rejection] in the [Settings] - [Sounder] menu.

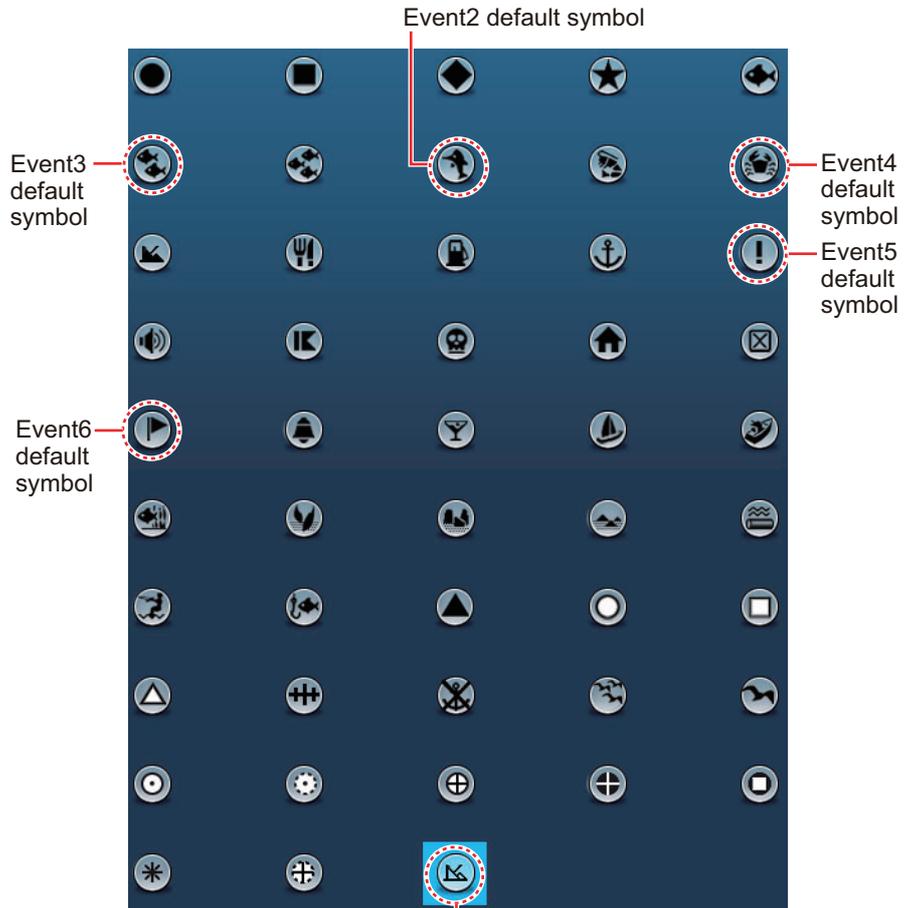
APPENDIX 1 MENU TREE



APPENDIX 1 MENU TREE

①

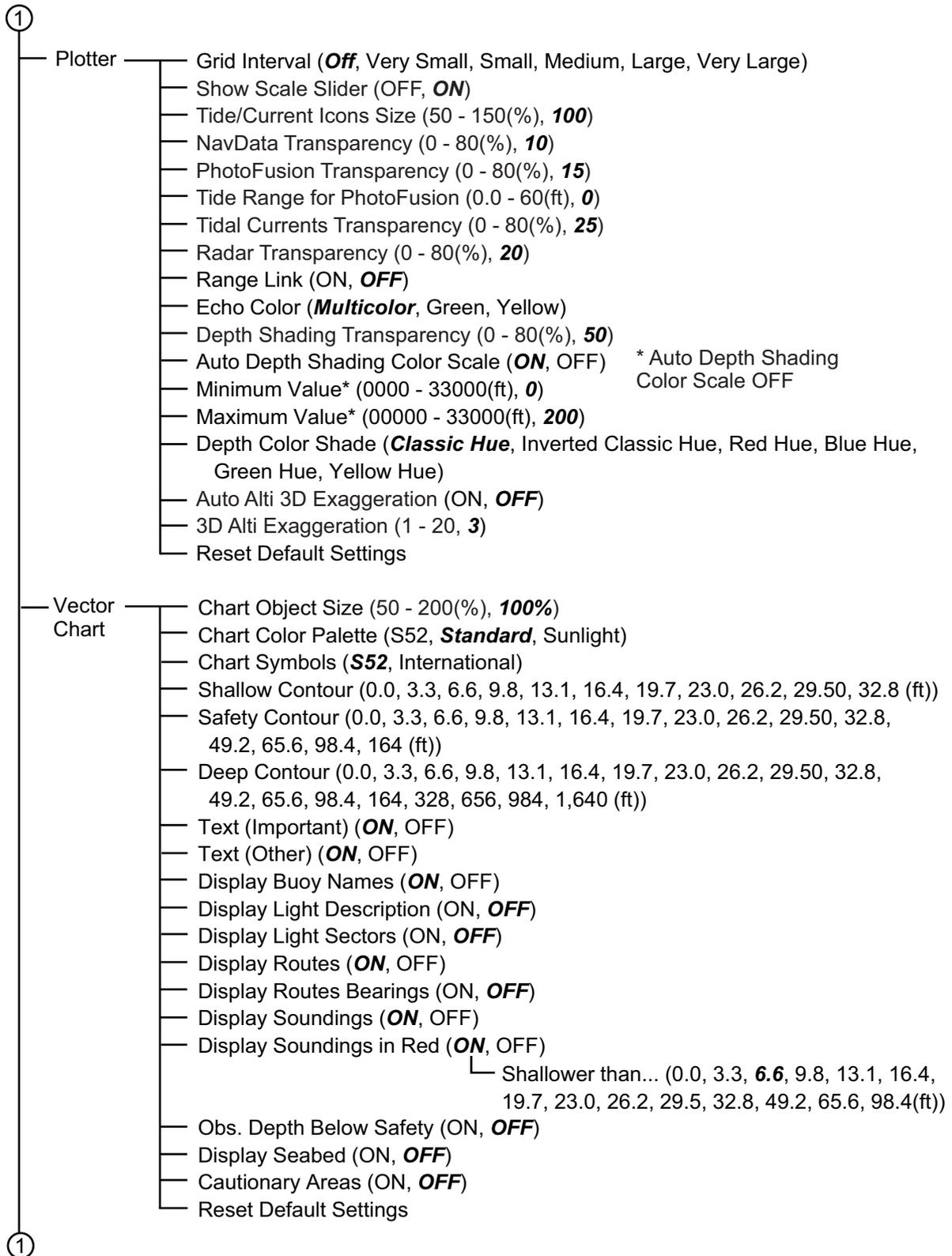
- Points
 - Display Points Names (**ON**, OFF)
 - Default Point Symbol (Select the default icon for point.)
 - Default Point Color (Red, Blue, Green, **Yellow**, Magenta, Orange, Cyan, Black)
 - Point Size (50 - 200(%), **100**)
 - Icons Set (**Modern**, Classic)
 - Data to Be Recorded in Event Comment (**None**, Date, SST, Date And SST)
 - Record Event1 Automatically (ON, **OFF**)
 - Default Event 1 - 6 Symbol



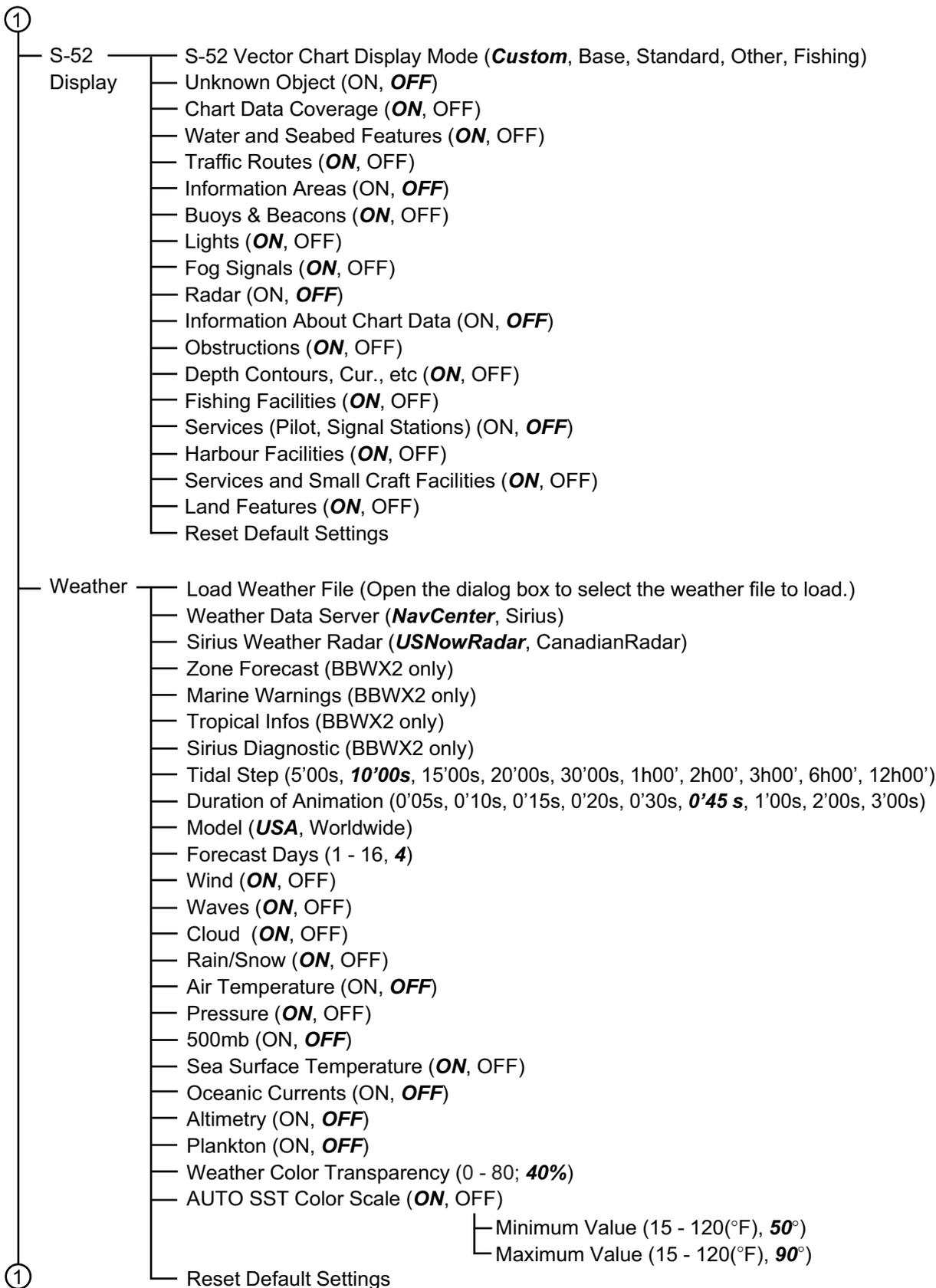
- Default Event 1 - 6 Color

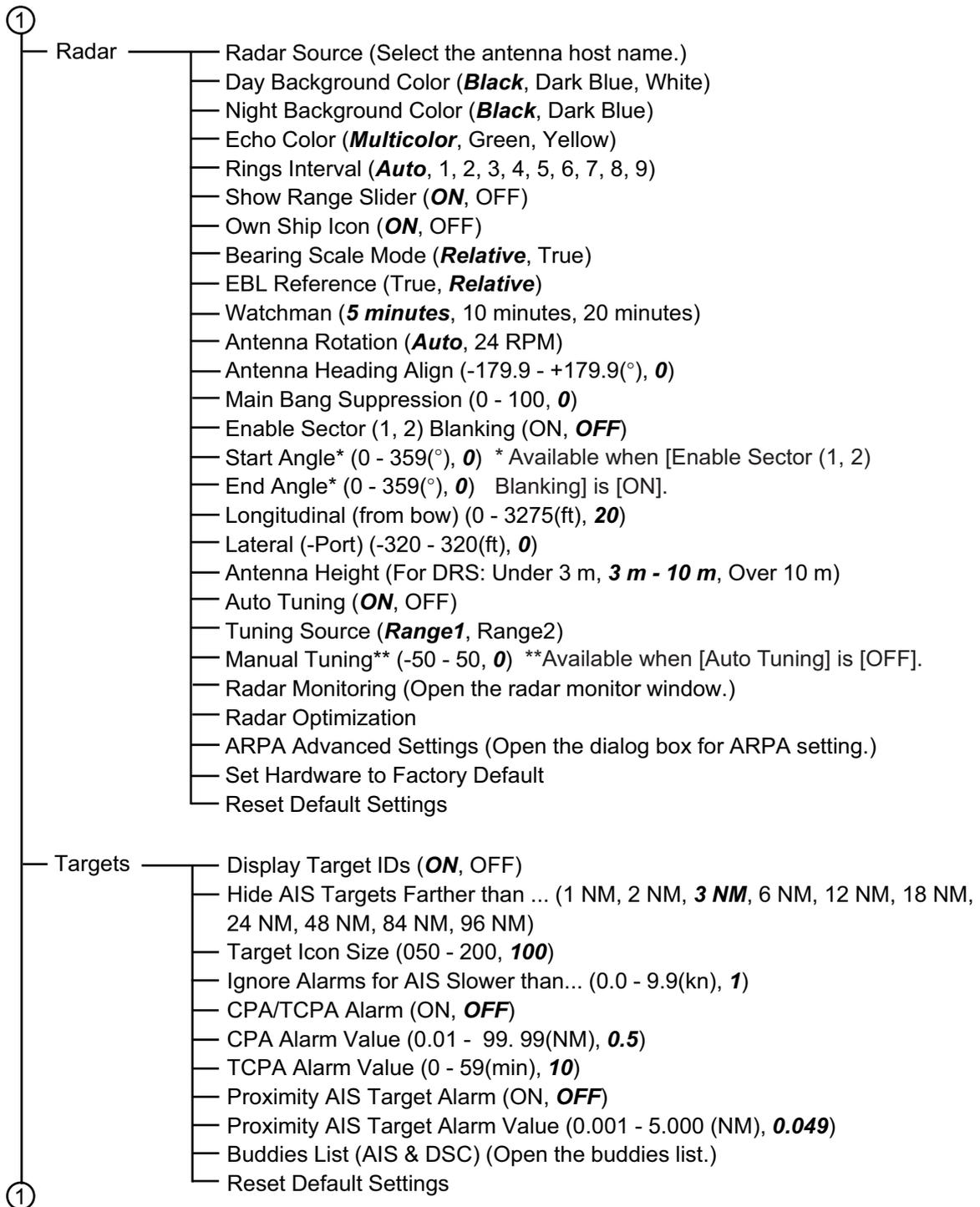
Red	Blue	Green	Yellow	Purple	Orange	Light-blue	Black
Event1 default color	Event2 default color	Event3 default color	Event4 default color	Event5 default color	Event6 default color		
- Delete All Points & Routes
- Reset Default Settings

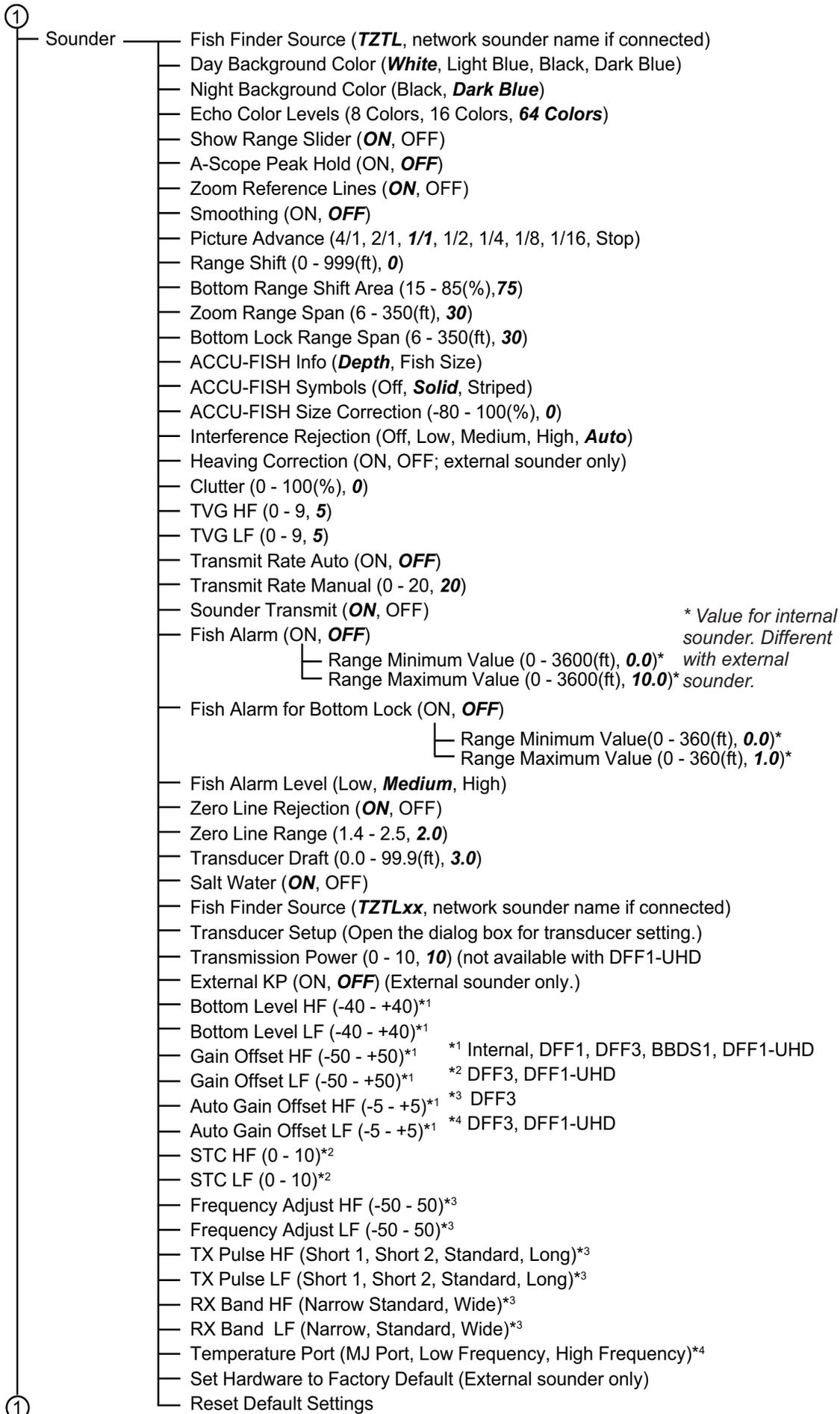
①

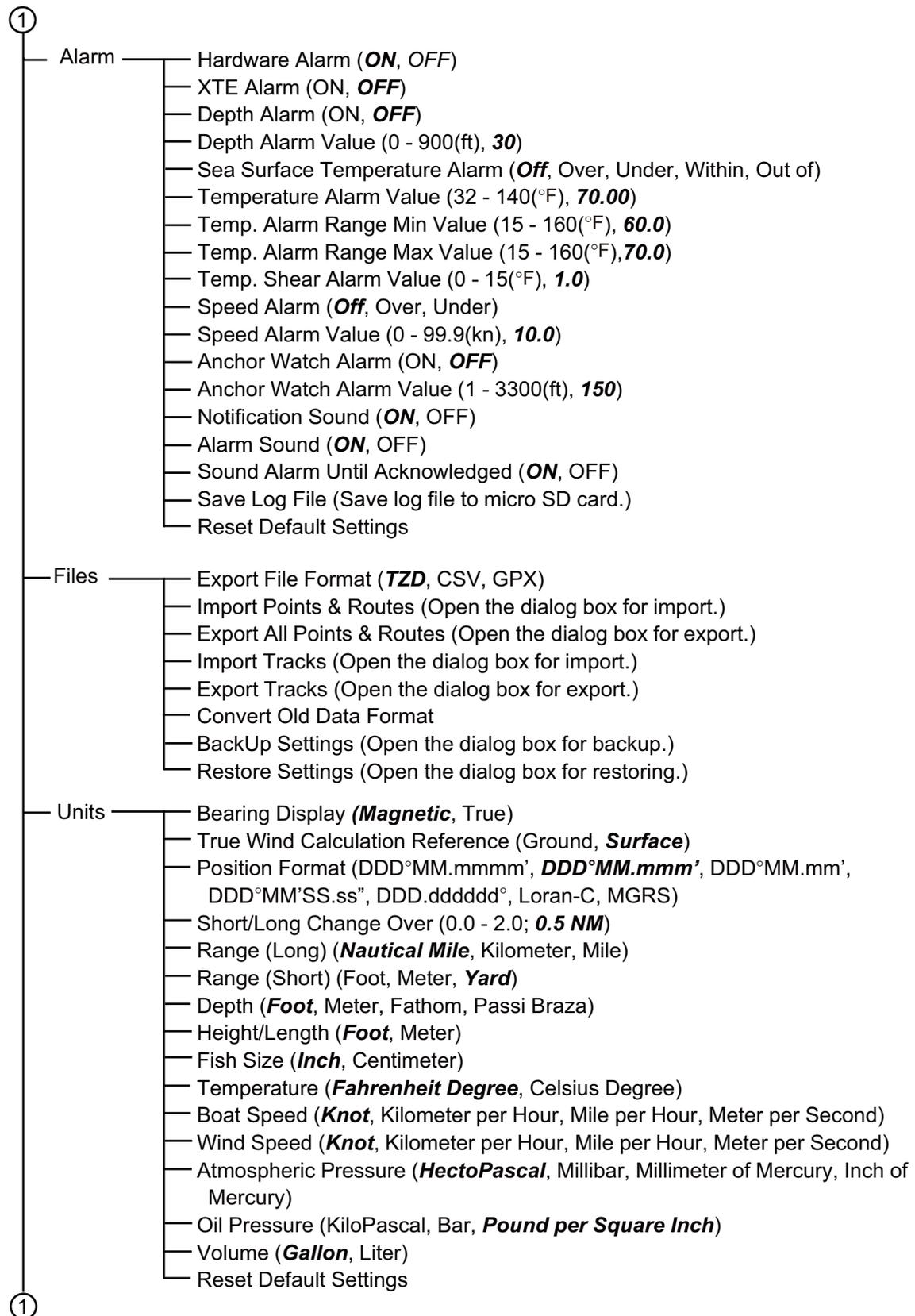


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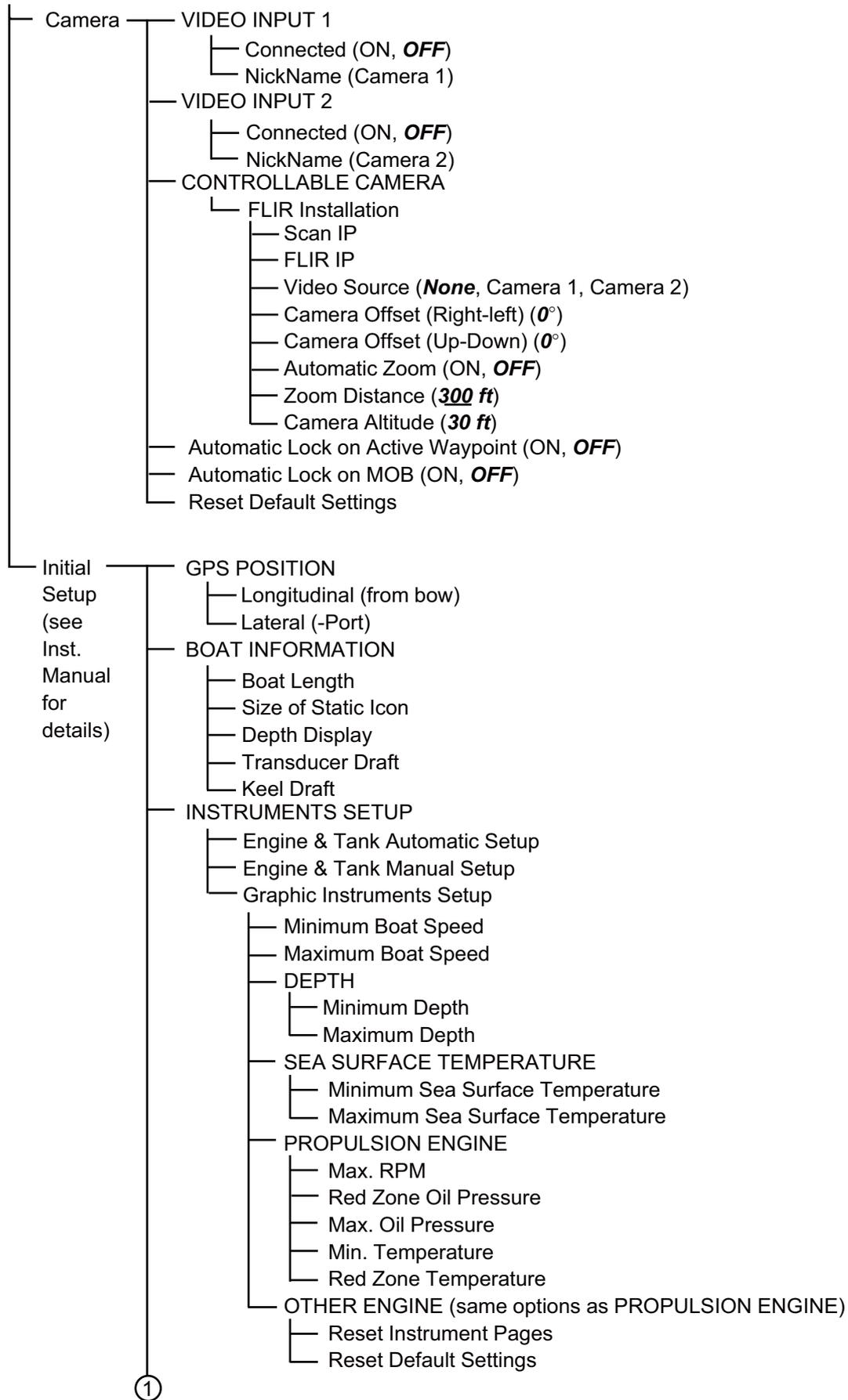


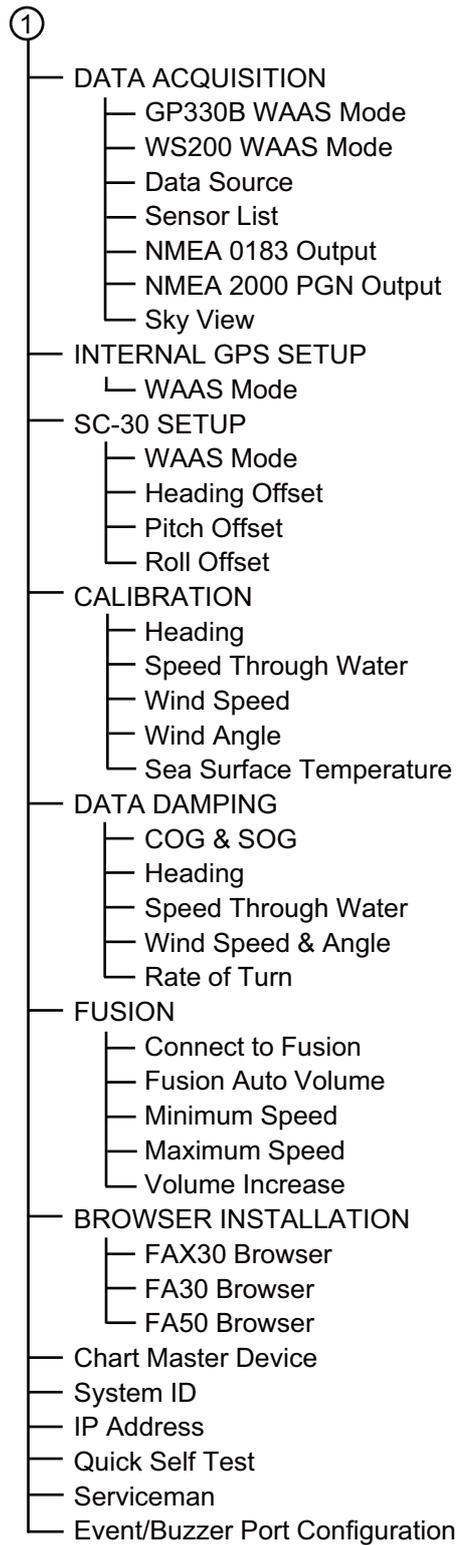






APPENDIX 1 MENU TREE





APPENDIX 2 RADIO REGULATORY INFORMATION

Wireless Interoperability

This product is designed to be interoperable with any wireless LAN product that is based on direct sequence spread spectrum (DSSS) and orthogonal frequency division multiplexing (OFDM) radio technology and to comply with the following standards.

- IEEE Std 802.11b Standard on 2.4 GHz Wireless LAN
- IEEE Std 802.11g Standard on 2.4 GHz Wireless LAN
- IEEE Std 802.11n Standard on 2.4 GHz Wireless LAN

Safety

This product, like other radio devices, emits radio frequency electromagnetic energy. The level of energy emitted by this device, however, is less than the electromagnetic energy emitted by other wireless devices such as mobile phones. This product operates within the guidelines found in radio frequency safety standards and recommendations. These standards and recommendations reflect the consensus of the scientific community and result from deliberations of panels and committees of scientists who continually review and interpret the extensive research literature. In some situations or environments, the use of this product may be restricted by the proprietor of the building or responsible representatives of the applicable organization. Examples of such situations include the following:

- Using this product onboard airplanes, or
- Using this product in any other environment where the risk of interference with other devices or services is perceived or identified as being harmful.

If uncertain of the policy that applies to the use of wireless devices in a specific organization or environment (an airplane, for example), ask for authorization to use this product before turning it on.

Export Regulation

Radio wave certification is necessary at the export destination. The Wireless LAN of this product operates in the 2.4 GHz band, which does not require a license in most countries. However, the conditions for use of the wireless LAN depend on the country or the area.

USA-Federal Communications Commission (FCC)

Below are descriptions for built-in Wireless LAN module.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by tuning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the distance between the equipment and the receiver.
- Connect the equipment to outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Caution: Exposure to Radio Frequency Radiation.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines in Supplement C to OET65.

This equipment should be installed and operated keeping the radiator at least 20cm or more away from person's body.

This device must not be co-located or operating in conjunction with any other antenna or transmitter.

Canada-Industry Canada (IC)

Below are descriptions for built-in Wireless LAN module.

This device complies with RSS 210 of Industry Canada.

Operation is subject to the following two conditions:

- (1) This device may not cause interference, and
- (2) This device must accept any interference, including interference that may cause undesired operation of this device.

L'utilisation de ce dispositif est autorisée seulement aux conditions suivantes.

- (1) il ne doit pas produire de brouillage et
- (2) l'utilisateur du dispositif doit être prêt à accepter tout brouillage radioélectrique reçu, même si ce brouillage est susceptible de compromettre le fonctionnement du dispositif.

Caution: Exposure to Radio Frequency Radiation.

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment and meets RSS-102 of the IC radio frequency (RF) Exposure rules. This equipment should be installed and operated keeping the radiator at least 20cm or more away from person's body.

Cet équipement est conforme aux limites d'exposition aux rayonnements énoncées pour un environnement non contrôlé et respecte les règles d'exposition aux fréquences radioélectriques (RF) CNR-102 de l'IC. Cet équipement doit être installé et utilisé en gardant une distance de 20 cm ou plus entre le dispositif rayonnant et le corps.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

**SPECIFICATIONS OF MULTI FUNCTION DISPLAY
TZTL12F/15F**

1 GENERAL

- 1.1 Display
 - TZTL12F 12.1-inch wide TFT color LCD, 1280 x 800 (WXGA)
 - TZTL15F 15.6-inch full-wide TFT color LCD, 1366 x 768(FWXGA)
- 1.2 Brightness 1300 cd/m² typical (TZTL12F), 1100 cd/m² typical (TZTL15F)
- 1.3 Display colors 16,770,000 colors (plotter), 64 colors (echo), 16 colors (radar)

2 PLOTTER FUNCTION

- 2.1 Display mode Course plot, NAV data (includes instrument and engine data)
- 2.2 Projection Mercator
- 2.3 Usable area 85° latitude or below
- 2.4 Memory capacity
 - Track: 30,000 points, Point/MOB: 30,000 point
 - Route: 200 courses w/500 points each
 - ARPA: 30 targets, AIS: 100 targets
- 2.5 GPS receiver
 - Receiving frequency 1575.42 MHz
 - Number of channel GPS: 56 ch, SBAS: 1 ch
 - Accuracy (approx.) GPS: 10 m (2drms, HDOP<4),
WAAS: 3 m (2drms, HDOP<4), MSAS: 7 m (2drms, HDOP<4)
 - Ship's speed range 500 m/s max. (all satellites at -130dBm)
 - Position fixing time Cold start: 100 s typical
 - Position update interval 1 s

3 RADAR FUNCTION

- 3.1 Orientation mode Head-up, North-up (heading data required)

4 SOUNDER INDICATION

- 4.1 Output power 600 Wrms or 1 kWrms (MB-1100 required)
- 4.2 Frequency 50/200 kHz alternative output
- 4.3 Display mode ACCU-FISH™, A-scope, Auto (Fishing/ Cruising),
Temperature graph, Estimation of bottom composition

5 OTHER FUNCTIONS

- 5.1 Instrument display Instrument data required
- 5.2 Camera monitor NTSC/PAL data required
- 5.3 Language Chinese, Danish, English (USA/UK), Finnish, French, German, Greek, Italian, Japanese, Norwegian, Portuguese, Spanish, Swedish
- 5.4 AIS information AIS receiver required
- 5.5 DSC display Target data required
- 5.6 Alarm School of fish*, School of fish for bottom lock*, Anchor Watch, XTE, Speed, Sea surface temperature*, CPA/TCPA*, Depth*, Hardware
*: option

5.7 Notification DSC receiving, Waypoint crossing, End of route, AIS target count, NAVpilot engagement (NAVpilot-700 required)

6 INTERFACE

6.1 Number of port

LAN	1 port, Ethernet 100Base-TX
NMEA2000	1 port (LEN=1), external power input required
USB	1 port, USB2.0
Video output	1 port, HDMI (720 p)
Video input	2 ports, NTSC/PAL
SD card slot	1 port, micro-SDXC
Contact closure	1 port, operator fitness signal (normal open)

6.2 Wireless LAN IEEE802.11b/g/n

Transmit frequency	2.412 to 2.462 GHz
Output power	12 dBm max.

6.3 NMEA0183 (V2.0) sentences (Ethernet)

Output	AAM, APB, BOD, GGA, GLL, GNS, GSA, GSV, RMB, RTE, TLL, TTM, VTG, WPL, XTE, ZDA
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6.4 NMEA2000 PGN

Input	065280, 126992/993/996, 127237/245/250/251/257/488/489/505, 128259/267, 129025/026/029/033/038/039/040/041/291/538/540, 129793/794/798/801/802/808/809/810, 130306/310/311/312/313/314/316, 130577/578/817/818/820/822/823/826/827/828/880
Output	126992/993/996, 127250/251/257/258, 128259/267/275, 129025/026/029/033/283/284/285, 130306/310/312/313/314/316

7 POWER SUPPLY

7.1 Multi function display

TZTL12F	12-24 VDC: 3.0-1.5 A
TZTL15F	12-24 VDC: 3.6-1.8 A

7.2 Rectifier (option) 100-115/220-230 VAC, 1 phase, 50/60Hz

8 ENVIRONMENTAL CONDITIONS

8.1 Ambient temperature -15°C to +55°C

8.2 Relative humidity 95% or less at +40°C

8.3 Degree of protection IP56

9 UNIT COLOR

N2.5 (fixed)

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