TZT9/TZT14/TZTBB OPERATOR'S MANUAL

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FURUNO ELECTRIC CO., LTD.

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FURUNO Authorized Distributor/Dealer

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(GREG) TZT9/TZT14/TZTBB

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FURUNO ELECTRIC CO., LTD.

FURUNO

NAVnet TZtouch

9" MULTI FUNCTION DISPLAY
14.1" MULTI FUNCTION DISPLAY
MULTI FUNCTION DISPLAY BLACK BOX TYPE

Model **TZT9/TZT14/TZTBB**

OPERATOR'S MANUAL



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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  - Name: FURUNO EUROPE B.V.
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How to discard this product

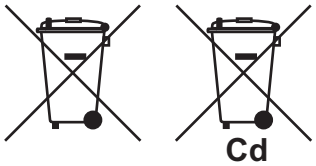
Discard this product according to local regulations for the disposal of industrial waste. For disposal in the USA, see the homepage of the Electronics Industries Alliance (http://www.eiae.org/) for the correct method of disposal.

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. If a battery is used, tape the + and - terminals of battery before disposal to prevent fire, heat generation caused by short circuit.

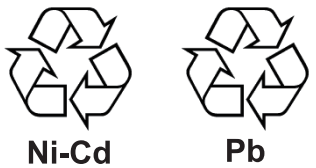
In the European Union

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 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 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

Read 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 sends the 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/m^2 and 10 W/m^2 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
DRS4D-NXT	N/A	0.7 m
DRS6A	N/A	1.2 m
DRS6A X-Class w/XN10A	0.1 m	3.0 m
DRS6A X-Class w/XN12A	N/A	2.2 m
DRS6A X-Class w/XN13A	N/A	1.9 m
DRS12A w/XN12A	0.2 m	2.4 m
DRS12A w/XN13A	0.2 m	1.9 m
DRS12A X-Class w/XN12A	0.3 m	3.1 m
DRS12A X-Class w/XN13A	0.2 m	2.9 m
DRS25A w/XN12A	0.5 m	5.3 m
DRS25A w/XN13A	0.4 m	4.4 m
DRS25A X-Class w/XN12A	0.8 m	7.7 m
DRS25A X-Class w/XN13A	0.7 m	6.8 m
DRS12A-NXT w/XN12A	0.2 m	1.9 m
DRS12A-NXT w/XN13A	0.15 m	1.8 m
DRS25A-NXT w/XN12A	0.3 m	2.8 m
DRS25A-NXT w/XN13A	0.2 m	2.65 m
DRS6A-NXT w/XN10A	N/A	0.7 m
DRS6A-NXT w/XN12A	N/A	0.6 m
DRS6A-NXT w/XN13A	N/A	0.4 m

CAUTION

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 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

Keep units other than the radar antenna away from the rain and water.

Fire or electrical shock can occur if water gets inside the equipment.

Do not disassemble or modify the equipment.

Fire or electrical shock can occur if the equipment is disassembled or modified.

Do not operate the equipment with wet hands.

Electrical shock can occur.

⚠ WARNING

Do not depend on one navigation device for the navigation of the vessel.

Always check your position against all available aids to navigation, for the safety of vessel and crew.

A radar is an excellent anti-collision aid, but remember to keep watch for possible collision conditions.

Always keep a watch while underway.

Do not leave any objects near the radar antenna.

Fire, electrical shock or injury can occur if something gets caught in the radar antenna.

Use the correct fuse.

A wrong fuse can cause fire or serious damage to the equipment.

Do not maneuver the vessel only from the depth indication.

Grounding can occur.

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 TZT9, TZT14 and TZTBB

Congratulations on your choice of the TZT9, TZT14 and TZTBB Multi Function Display, an integral part of our new NavNet TZtouch series 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 TZtouch series, equipped with a touch screen with multi touch capacity, is a networked navigation system that gives you radar, chart plotter, fish finder, AIS receiver, etc. Information is transferred between NavNet TZtouch units through Ethernet or CAN bus. The plug and play format allows expansion and you can connect a maximum of six NavNet devices. Also, you can remote-control the NavNet TZtouch units and display the data on an iPhone, iPod or iPad.

Main features

- Intuitive touch control operation.
- Remote-control of the equipment with iPhone, iPod or iPad.
- Wireless LAN signal for connection to the internet.

Chart plotter

- TimeZero^{TM} technology displays charts immediately with no load time.
- Loaded with full scale, complete Mapmedia NOAA raster and vector charts for all the United States.
- 3D display with controls for pitch and orientation.
- Points (Waypoints), routes, etc. are transferred between NavNet TZtouch/NavNet TZtouch2 units through the Ethernet.
- Large memory stores 30,000 track points, 30,000 points, and 200 routes.
- The overlay displays show depth shading, tide, tidal current, satellite photo (North America only), etc.

Radar sensor (option)

- The radar antennas are in radome or open-array type.
- The radar echoes appear in green, yellow or multi-colors.
- Automatic control of sea clutter, tuning and gain for easier operation.
- Guard zone checks for targets within the area you indicate.
- ARPA provided standard.
- Dual-range display for watch on short and long distances at the same time.
- Solid state radar sensor (DRS4D-NXT) available. Hereafter we use the term “solid state radar” when referencing this radar sensor.

Fish finder (option)

- Measures the depth to the bottom and displays underwater conditions in multi-colors according to echo strength.
- The zoom mode enlarges fish echoes.
- Automatic and manual operation. Auto mode automatically adjusts range, gain and clutter according to purpose, fishing or cruising.
- ACCU-FISH^{TM} estimates length and depth of individual fish.
  (Requires appropriate transducer and Bottom Discrimination Sounder BBDS1, Network Sounder DFF series, or FCV-1150.)
- The bottom discrimination display helps identify probable bottom composition. (Requires Bottom Discrimination Sounder BBDS1 or Network Fish Finder DFF1-UHD.)

Other

- The AIS function receives AIS data from other ships, shore stations and navigational aids and displays this data.
- The DSC (Digital Selective Calling) message information feature provides the MMSI no. and position of ships that have transmitted a DSC message to you. (Requires DSC capable radiotelephone.)
- USB port connects the plug and play USB devices (mouse, etc.).
- Instrument displays (steering, engine, weather, and wind) with connection of the correct sensors:
- The weather information display available with connection of Sirius weather receiver.
- You can download the latest weather data with internet connection.
- The sensor data is transferred to units through the Ethernet or CAN bus.
- IP camera (local supply) monitors activity on the ship.
- CAN bus for the connection of GPS receiver, Weather Station, FI-50 (instrument series), Satellite Compass, etc.

Program No.

- 1950123-04.**
  ** denotes minor modifications.

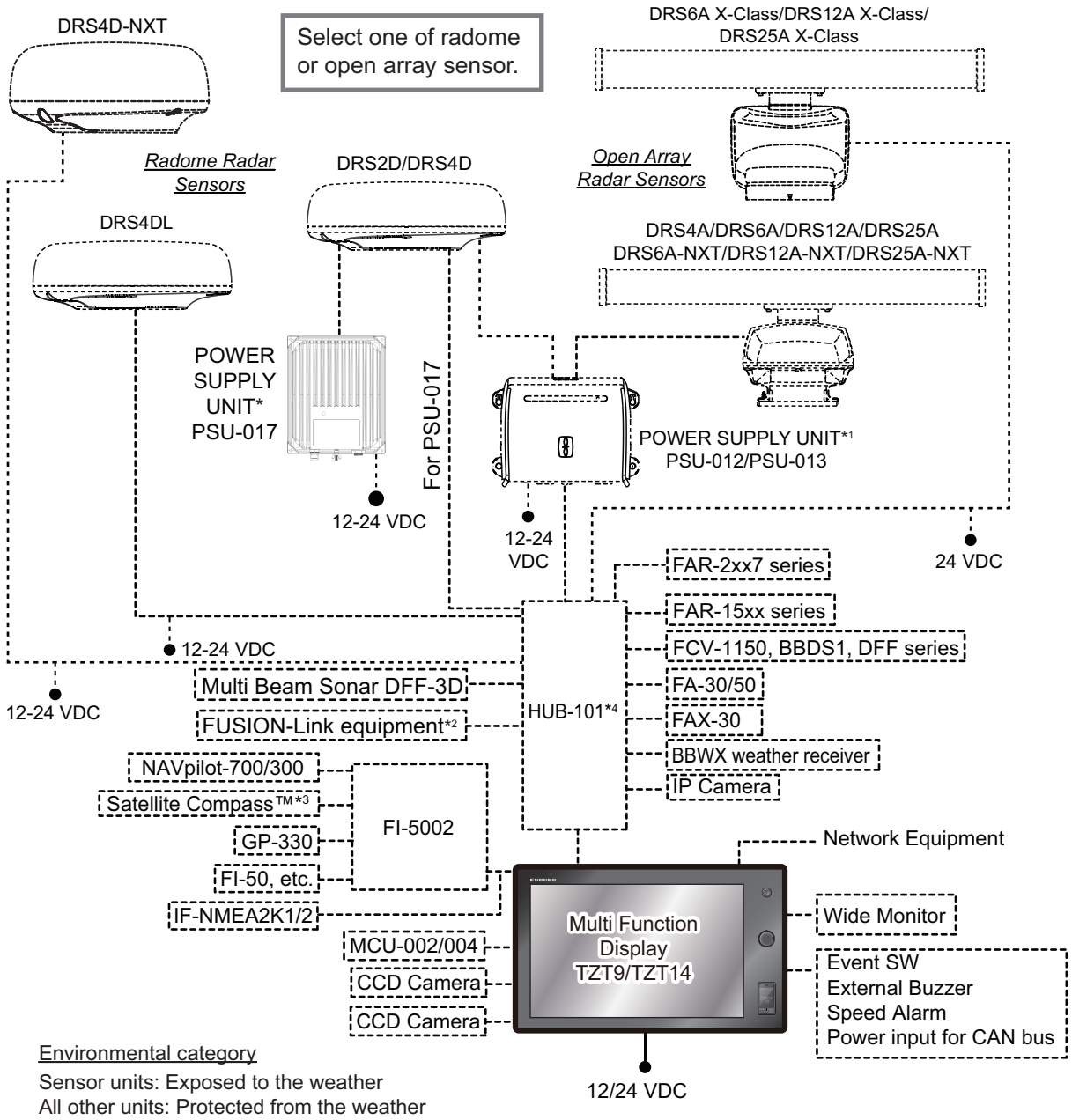
CE declaration

With regards to CE declarations, please refer to our website (www.furuno.com), for further information about RoHS conformity declarations.

SYSTEM CONFIGURATION

Basic configuration is shown with solid line.

TZT9/14



*1: A power supply is required for the following antenna units:
DRS2D/4D/4A/6A/12A: PSU-012
DRS25A: PSU-013
DRS2D/4D: PSU-017

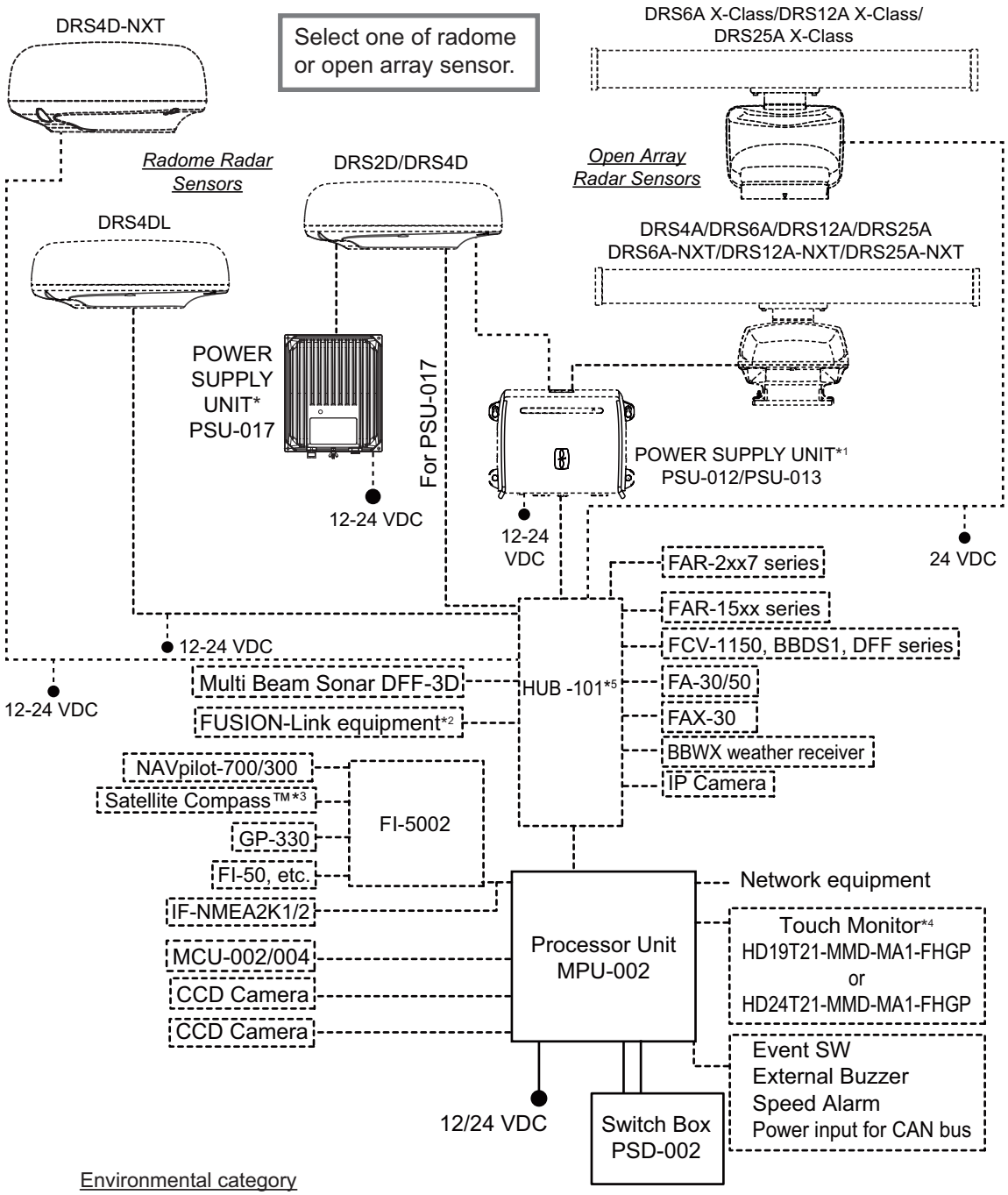
*2: FUSION APOLLO series (MS-RA770, MS-SRX400) and 755 series (MS-AV755, MS-UD755) only. Must be connected via Ethernet. Wireless connection and NMEA2000 connection not available.

*3: SC-30, SC-33, SCX-20 available.

*4: Maximum 3 HUB 101 units per network.

Note: When you connect an external monitor to the TZT unit, use a monitor whose aspect ratio is the same as the TZT unit (5:3 for TZT9, 16:10 for TZT14). The pictures may be stretched or shrunk with a different aspect ratio.

TZTBB



Environmental category
Sensor units: Exposed to the weather
All other units: Protected from the weather

*1: A power supply is required for the following antenna units:
DRS2D/4D/4A/6A/12A: PSU-012
DRS25A: PSU-013
DRS2D/4D: PSU-017
*2: FUSION MS-700 series only.
*3: SC-30, SC-33, SCX-20 available.
*4: Hatteland Display monitor.
*5: Maximum 3 HUB 101 units per network.

Note 1: Do not connect or disconnect the DVI cable between TZTBB and the touch monitor while TZTBB is powered.

Note 2: When connecting two monitors, resolutions and aspect should match between two monitors. Both screens show same images (compatible with clone mode only).

1. SYSTEM INTRODUCTION

This chapter provides the information necessary to get you started using your system. Some of the topics are how to turn on the equipment and an introduction to the main screens.

Standards used in this manual

- ***TZT9/TZT14***: There are three keys on the control panel: Home, RotoKey™ and Power.
  TZTBB: There is a power key on the switch box (PSD-002). The home key is displayed at the top right-hand corner of the screen as an icon (◉) instead of a key. The TZTBB does not have a RotoKey™.

  The **Home** and **RotoKey**™ are shown in bold face. The power key is indicated as ⏻ key. Other items that appear on the screen with touch controls or the **RotoKey**™, are shown in brackets in normal typeface. For example, [Head Up].
- The menu system has main menus and related sub menus.
  How to operate the main menu
  1. ***TZT9/TZT14***: Press the **Home** key to display the menu icon bar (see section 1.13).
     TZTBB: Tap the **Home** icon at the top right-hand corner of the screen.
  2. Select (tap) the [Menu] icon to open the main menu.
     This manual states steps 1 and 2 as “Select [Menu] on the menu icon bar to open the main menu.”
  3. Drag the main menus to display a menu desired. The selected menu is indicated with a yellow highlight. The sub menus for the selected menu appear (see section 1.13).

  When you are asked to select a menu item from the main menu, the name of the main menu and sub menu are given, separated by a hyphen. For example, "Select the [Routes] - [Default Route Color] menu".
- This equipment has a RotoKey menu that gives you access to full control of the NavNet TZtouch system.
  How to operate the RotoKey menu
  1. ***TZT9/TZT14***: Push the **RotoKey**™ to open the RotoKey menu.
     TZTBB: Tap the screen.
  2. Select a menu item as follows:
     - ***TZT9/TZT14***: Rotate the **RotoKey**™ to select a menu desired then push the **RotoKey**™ to do the function.
     - ***TZT9/TZT14/TZTBB***: Drag the RotoKey menu to display a menu desired then select (tap) it to do the function marked on the menu item.

  This manual states this operating procedure as "Select [menu name] from the RotoKey menu.”
- The colors mentioned for track, route, point, etc. are the default colors.
- This manual states the operation for the home and Rotokey functions based on TZT9/TZT14.
- Most of the screenshots in this manual are for TZT9/TZT14.

1.1 Controls

The TZT9/TZT14/TZTBB are operated by key(s) and touch control.

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

- Key(s)
- Touch control
- Menus, where you select options
- Pop-up menus, where you select options
- Lists, where you can edit items

When you operate a key, a single beep sounds. If you do not need the key beep, de-activate the beep sound from the [General] - [Key Beep] menu of the main menu.

Key control description

The key controls of your system are in the figures shown below. The key controls are illuminated for nighttime use.



TZT9



TZT14



Switch box (PSD-002) Monitor

TZTBB

No.	Label	Function
1	⏻	• Turns the power on. • Adjust the brilliance of the display (TZT9/14). • Adjusts the brilliance of the power indicator and the backlighting for the ⏻ key (TZTBB). • Adjust display hue (TZT9/14). • Turns the power off. (Device or Network) • Selects brilliance mode - adjustment of brilliance according to time of day.
2	Card drive	Card drive for memory cards.

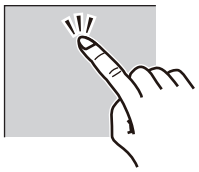
3	**RotoKey**™ (TZT9/TZT14 only)	• **Push**: Opens the RotoKey menu or validates the selected item.
		• **Rotate**:
		  • Selects an item on the RotoKey menu.
		  • Selects the range scale on the chart plotter or the radar screen.

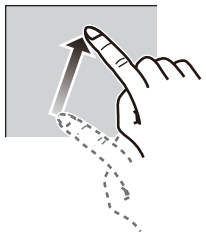
4	**Home** (For TZTBB, an icon is displayed on the screen.)	• Opens the display selection window. • Displays the menu icon bar.

Touch control description

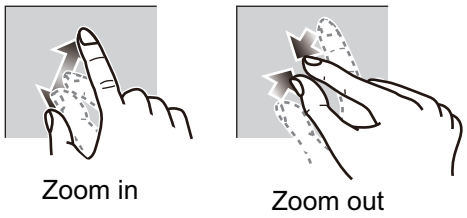
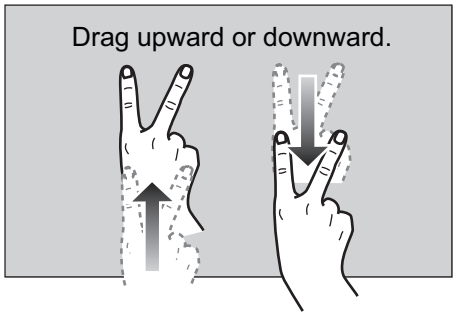
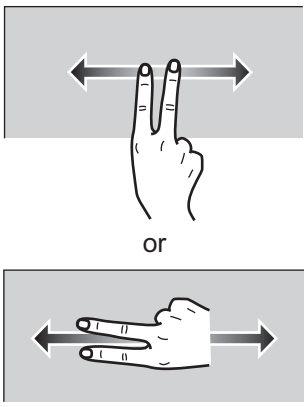
The touch control depends on the screen type. The basic operations are in the tables that follow.

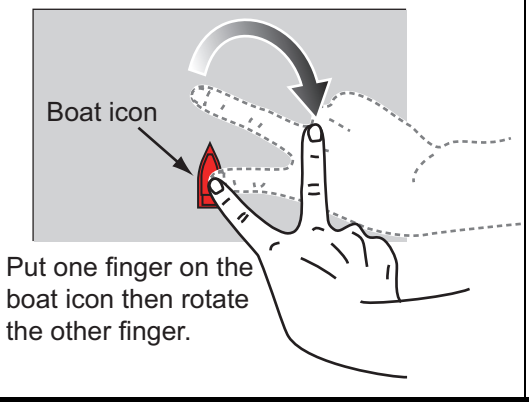
Operation with a finger

Operation with a finger		Function
Tap		• Opens the RotoKey menu or validates the selected item (TZTBB only). • Select a menu item. • Select an object or position to display the corresponding pop-up menu.

Operation with a finger		Function
Drag		• Pan the charts. • Scroll the menu.

Operation with two fingers

Operation with two fingers		Function
Pinch		• Zoom in or out the chart scale in the 2D/ 3D modes or weather display. • Select radar range on the radar display.
Drag		Switch from 2D to 3D.
		Orientate 3D view.
Tap		Execute the function which is selected in [General] - [Function Gesture] of the main menu (see section 1.15).

Operation with two fingers		Function
Rotate		Switch between head up and north up in the 2D/3D modes.

For TZT9/TZT14, when both **RotoKey**™ and touch control are available for the same function, this manual states the operation by touch control.

Notes for touch control

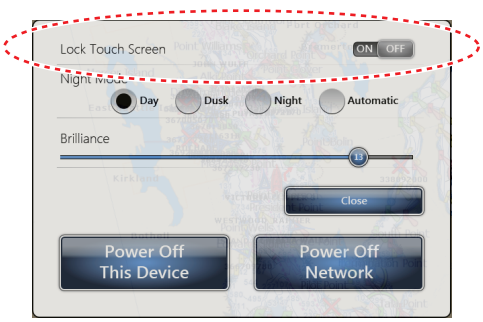
- A large amount of waterdrops on the screen can cause misoperation and slow touch response. Wipe the screen with a dry cloth to remove the water.
- This equipment uses a capacitive touch screen. Tap the screen with your fingertips directly. Do not use sharp objects (needle, pen, nail) or a stylus pen. Be careful not to scratch the screen.
- Do not tap the screen with gloved fingers. Misoperation or no response can result.
- Do not put objects (stickies, etc.) on the screen. The touch control can fail to work properly.
- Keep the equipment away from a radio antenna, fluorescent light, solenoid valve or other electronic devices to prevent false operation from 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.
- For TZTBB, see the manuals for the touch monitor.

How to lock the touch screen

The touch screen can be locked to prevent operation.

With the power applied, press the ⏻ key to show the power and brilliance window. Set the flipswitch for [Lock Touch Screen] to the [ON] position to lock the touch screen, or the [OFF] position to unlock the touch screen.

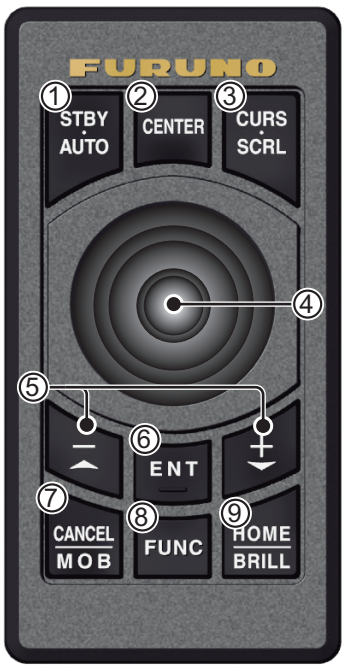
Note: The [Lock Touch Screen] flipswitch is displayed only on TZT9/TZT14.



1.2 Remote Control Unit (Option)

You can operate the equipment by the Remote Control Unit MCU-002 or MCU-004, without touching the screen.

1.2.1 Remote Control Unit MCU-002

	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	• Returns your ship to the center of the screen (Plotter/Weather/Radar display). • Cancels the echo history (Fish finder display).
	3	**CURS•SCRL** key	Switches the joystick gesture between the cursor mode and scroll mode.
	4	Joystick	Short press: Works same as tap gesture. • Opens the pop-up menu. • Activates the item selected by the cursor. Long press: Works same as long tap gesture. • Opens the detail pop-up menu. Operate the joystick: Cursor mode operation • Moves the cursor. Scroll mode operation • Pans the display (Plotter/Weather/Radar display). • Shifts the range and scrolls back the picture (Fish finder display).
	5	**+**, **-** key	• Selects an item from the RotoKey™/main/pop-up menu and dialog box. • Zooms in (+) and out (-). • Raises (+) and lowers (-) the brilliance on the Brilliance/Power window.
	6	**ENT** key	• Activates a selected item. • Opens the RotoKey™ menu.
	7	**CANCEL/MOB** key	Short press: • Closes the menu or dialog box. • Stops the alarm sound. • Ends the tool mode (End Route, End Move, etc.). Long press: • Enters the MOB mark at the own ship's position.
	8	**FUNC** key	Activates the function set at [Function Gesture].
	9	**HOME/BRILL** key	Short press: • Opens the display selection window. Long press: • Opens the Brilliance/Power window.

*: When you switch the steering mode with the **STBY•AUTO** key, the beep sounds and message shown below appears. The message does not appear on the display selection window.
- STBY mode → AUTO mode: "NAVpilot is engaged."
- AUTO mode → STBY mode: "NAVpilot is disengaged."

1.2.2 Remote Control Unit MCU-004



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	**HOME/BRILL** key	• Short push: Opens the display selection window. • Long push: Opens the Brilliance/Power window.
3	**CONTROL** key	Switches between displays that can be controlled with the MCU-004 when multiple displays are installed in the same network.
4	**FUNC** key	Activates the function set at [Function Gesture] in the [General] menu.
5	**CURS•SCRL** key	Switches the function of the joystick between the Cursor and Scroll modes.
6	CENTER key	• Returns own ship to center of screen (Plotter/Weather/Radar display). • Cancels the echo history (Fish finder display).
7	**Rotary** knob	• Selects an item from the menu and dialog box. • Zooms in (+) and out (-).
8	Joystick	Short push: Works same as tap gesture. • Opens the pop-up menu. • Activates the item selected by the cursor. Long push: Works same as long tap gesture. • Opens the detail pop-up menu. Operate the joystick: **Cursor mode operation**: • Moves the cursor. **Scroll mode operation**: • Pans the display (Plotter/Weather/Radar display). • Shifts the range and scrolls back the picture (Fish finder display).
9	**EDGE** key	Opens the RotoKey™ menu..
10	**CANCEL/ MOB** key	Short push: • Closes the menu or dialog box. • Stops the aural alarm. • Ends the tool mode (End Route, End Move, etc.). Long push: • Enters the MOB mark (at the own ship's position).

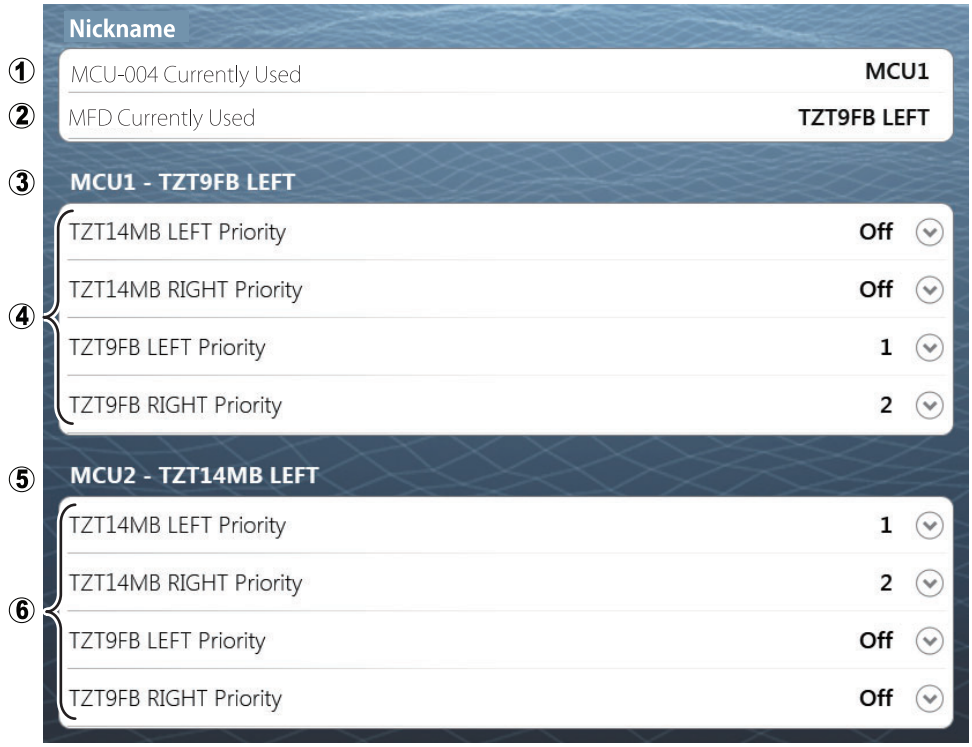
* When you switch the steering mode with the STBY•AUTO key, a beep sounds and then one of the messages shown below appears. The message does not appear on the home screen.
- STBY mode→AUTO mode: "NAVpilot is engaged."
- AUTO mode→STBY mode: "NAVpilot is disengaged."

Remote Control Unit MCU-004 group setting

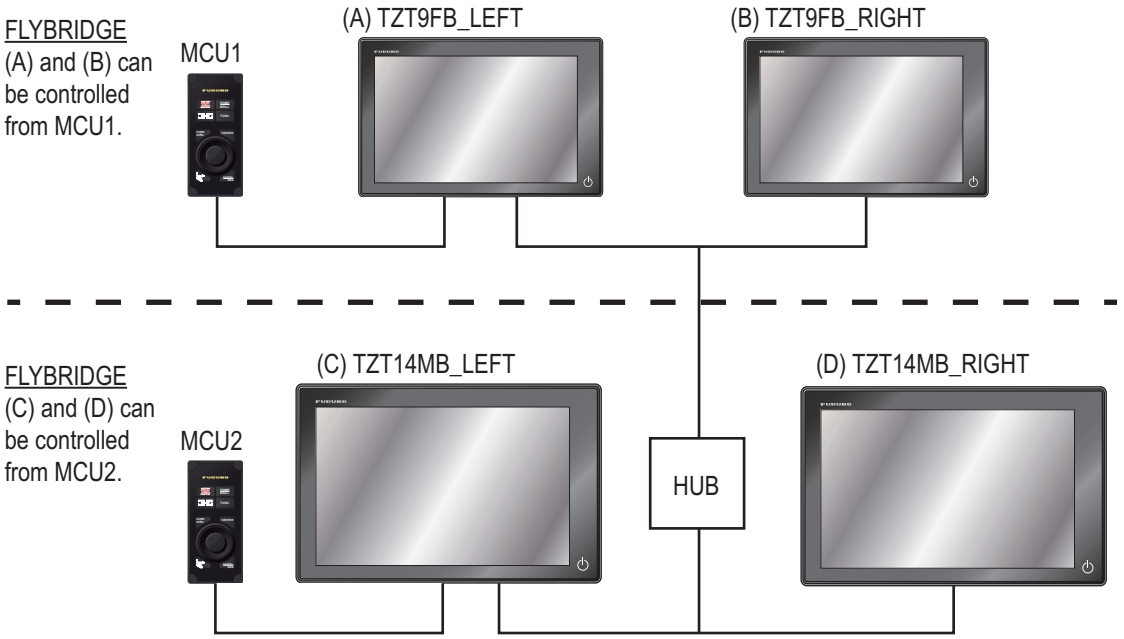
If multiple NavNet TZtouch/TZtouch2 units are installed in the network, you can the select the display to show on a unit, using the MCU-004. Additionally, you can select the order in which to cycle through the displays.

Note: Confirm that there are no duplicate unit nicknames in the network. If a duplicate name is found, change the name on the Sensor List ([Initial Setup]→[Sensor List]).

1. Open the main menu.
2. Open [Initial Setup]-[Remote Controller Configuration].



No.	Description
1	The nickname assigned to the MCU-004.
2	The nickname assigned to this unit.
3	Setting for the unit connected to TZT9FB_LEFT, controlled by MCU1.
4	Set the cycling order of units controlled by MCU1. To skip a unit, select it to [Off].
5	Setting for the unit connected to TZT14MB_LEFT, controlled by MCU2.
6	Set the cycling order of units controlled by MCU2. To skip a unit, select it to [Off].



3. Select the displays to cycle.
4. Set the order (1-10). To skip a display, select it to [Off].
5. Select [OK].
6. Close the menu.

Tips and Notice for the Remote Control Unit

- In the cursor mode of the MCU-002, the cross cursor is easier to use than the arrow cursor. To use the cross cursor, set [Cross Cursor] to [ON] in the [General] menu.



- You can not set the guard zone with the MCU-002. Use the touch operation to set the guard zone. For guard zone operation, see section 6.13.

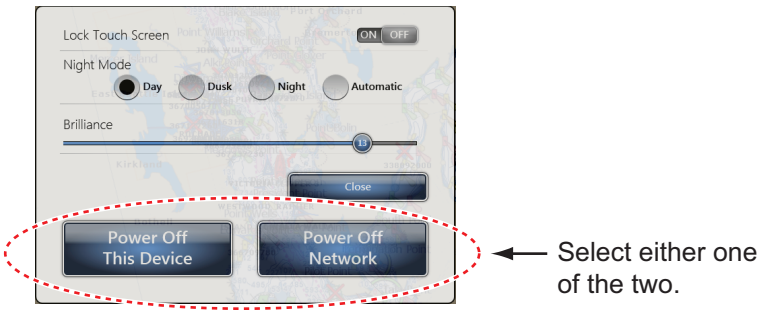
1.3 Power ON and OFF

Press the ⏻ key to turn the power ON.

When you turn on the power, a beep sounds and the start-up screen appears. Approximately 90 seconds after you apply the power, the chart plotter display appears.



To turn the power OFF, press the ⏻ key. The following window appears.



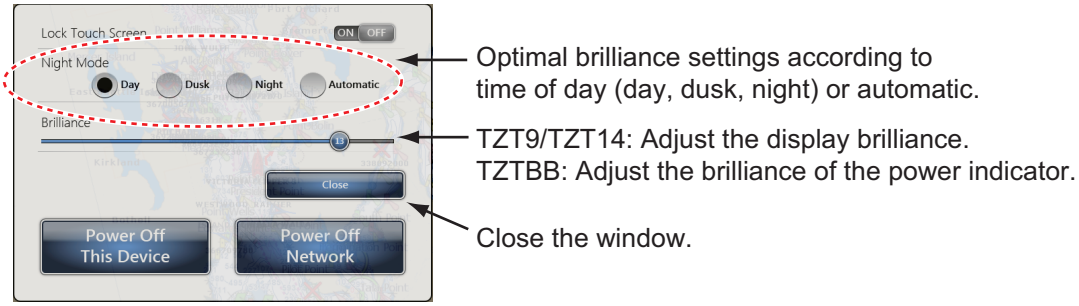
Select [Power Off This Device] or [Power Off Network]. 15 seconds after the screen goes blank, the power turns off. (The power is on for this 15 seconds.)

Note 1: Do not turn off the power during the start-up. Wait until the start-up is completed before you turn the power off.

Note 2: The screen refreshes slower in low ambient temperature.

1.4 How to Adjust the Brilliance of Display or Power Indicator

Press the ⏻ key to show the following window.



TZT9/TZT14: Drag the circle icon to adjust the display brilliance. The brilliance level is indicated on the icon. You can also adjust the display brilliance with short press of the ⏻ key repeatedly.

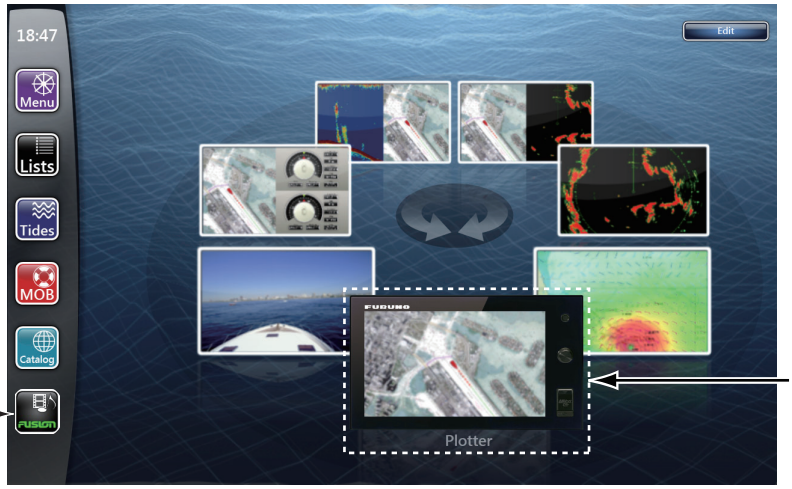
TZTBB: Drag the circle icon to adjust the brilliance of the power indicator and the backlighting for the ⏻ key. The brilliance level is indicated on the icon. You can also adjust them with short press of the ⏻ key repeatedly.



1.5 How to Select a Display

Use the **Home** key (or icon) and the **RotoKey**™ (or touch control) to select a display, from the display selection window.

1. Press the **Home** key (or tap the **Home** icon) to show the display selection window.



2. Do one of the following:
   - ***TZT9/TZT14***: Rotate the **RotoKey**™ to put the required display in the monitor area at the bottom of the screen then push the key.
   - ***TZT9/TZT14/TZTBB***: Select (tap) the required display.

For details, see section 14.2.

1.6 SD Cards

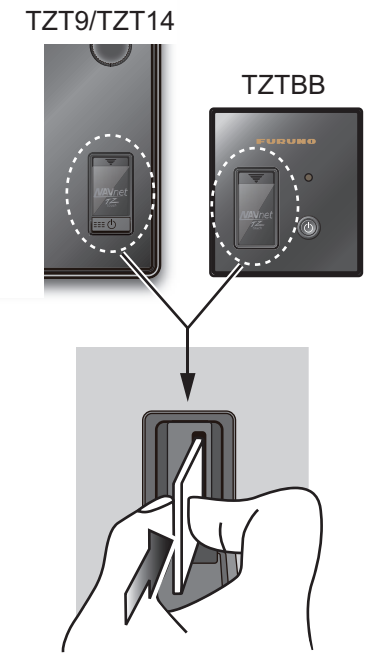
The SD card stores the tracks, routes, points, settings, etc. Set and remove SD cards as shown below. The Secure Digital Extended Capacity (SDXC) cards can also be used.

How to format an SD card

You do not normally need to format an SD card for use with the system. If the card becomes corrupted, format the card with a formatting program that is compatible with the specifications of the SD card. The SD Memory Card Formatting Software made by Panasonic is an example.

How to set an SD card

1) Pull the tab on the card drive cover to open the card drive.
2) As shown in the right figure, put the SD card in the right card drive with the label right. If the card does not set easily, do not use force.
   Note: The left card drive has a cover.
3) Push the card until the card is in position.



How to remove an SD card

1) Pull the tab on the card drive cover to open the card drive.
2) Push the card to release the card from the card drive.
3) Remove the card with your fingers then close the cover.

About the SD cards

- Use SD cards carefully. Wrong use can damage the card and destroy its contents.
- Make sure the 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 the card or writing to the card.
- If there is water at the bottom of the card cover, DO NOT open the cover. Remove the water with a dry cloth completely and then open the cover.

• The memory cards in the tables below have been tested:

Type	Capacity	Maker
LSD64GCBJP133	64 GB	Lexer
SD-E064GUA	64 GB	TOSHIBA
SD6A/64GB	64 GB	Kingston
RP-SDW32G	32 GB	Panasonic
SD-E032GUX	32 GB	TOSHIBA
RP-SDM16GK1K	16 GB	Panasonic
RP-SDM08GK1K	8 GB	Panasonic
RP-SDV08GK1K	8 GB	Panasonic
SDSDRH-8192-903	8 GB	SANDISK
RP-SDV04GK1K	4 GB	Panasonic
RP-SDM04GK1K	4 GB	Panasonic
SDSDBR-4096-J85	4 GB	SANDISK
SDSDRH-4096-903	4 GB	SANDISK
SDSDRX-4096-903	4 GB	SANDISK
AD-SDH2G	2 GB	ADTEC
HPC-SD2GM2	2 GB	HAGIWARA SYS-COM
HPC-SD2GT	2 GB	HAGIWARA SYS-COM
QSDS-2G	2 GB	PQI
RP-SDK02GJ1A	2 GB	Panasonic
RP-SDR02GJ1A	2 GB	Panasonic
RSDC-G2G	2 GB	BUFFALO
RSDC-S2G	2 GB	BUFFALO
SD/2GBFE	2 GB	Kingston
SD-2G	2 GB	I/O DATA
SDP-2G	2 GB	I/O DATA
SD-B002GT4	2 GB	TOSHIBA
SDSDB-2048-J60	2 GB	SANDISK
SDSDH-2048-903	2 GB	SANDISK

Note: Use an SD card class 6 or above for storing chart data.

1.7 Chart Plotter Introduction

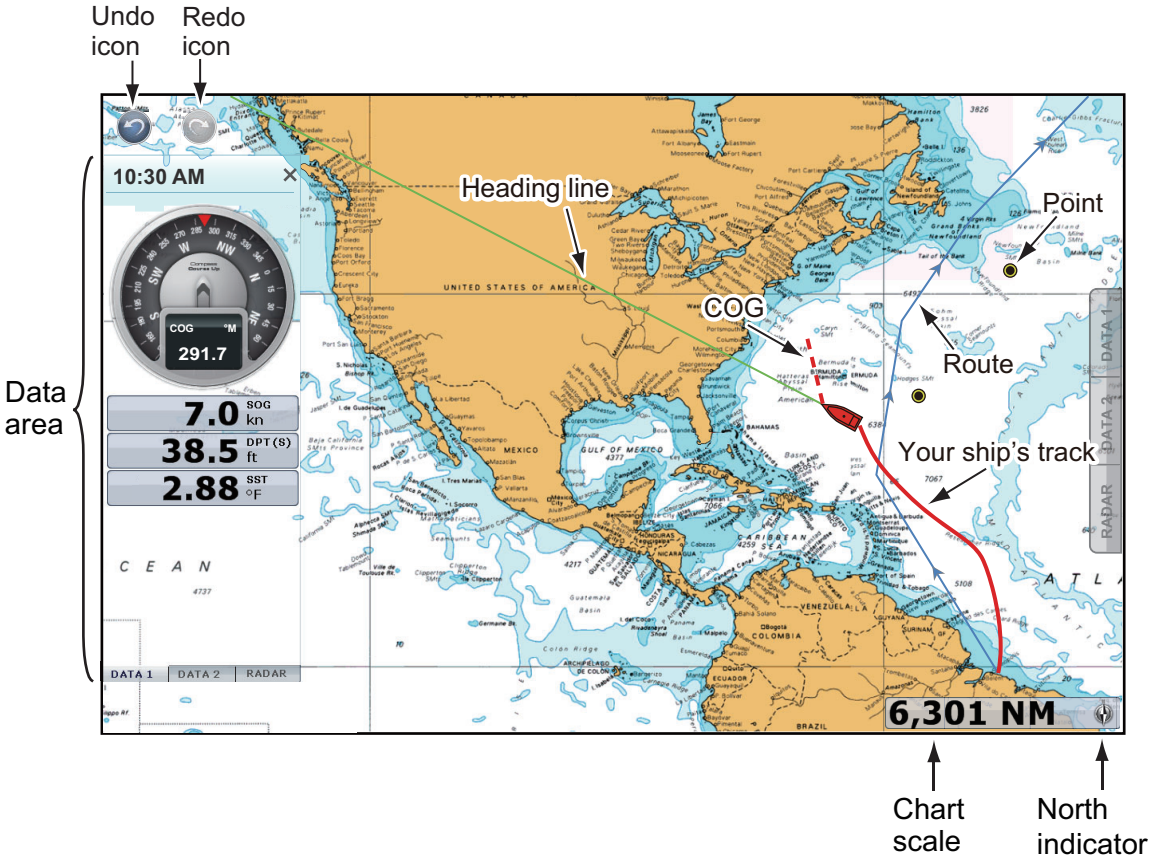
The chart plotter provides a small world map in raster format. A vector chart for the US coastline (with Alaska and Hawaii) is provided also. The plotter section has functions to enter points, and create and plan routes.

The chart plotter receives position information supplied from the position-fixing equipment like GPS or DGPS. Your position is marked on the screen with the boat icon. You can change the shape of the boat icon to match that of your ship.

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 chart plotter also

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



The undo and redo icons are available for point and route operations.
Undo: Reverse the last action.
Redo: Repeat the last action.

1.8 Radar Introduction

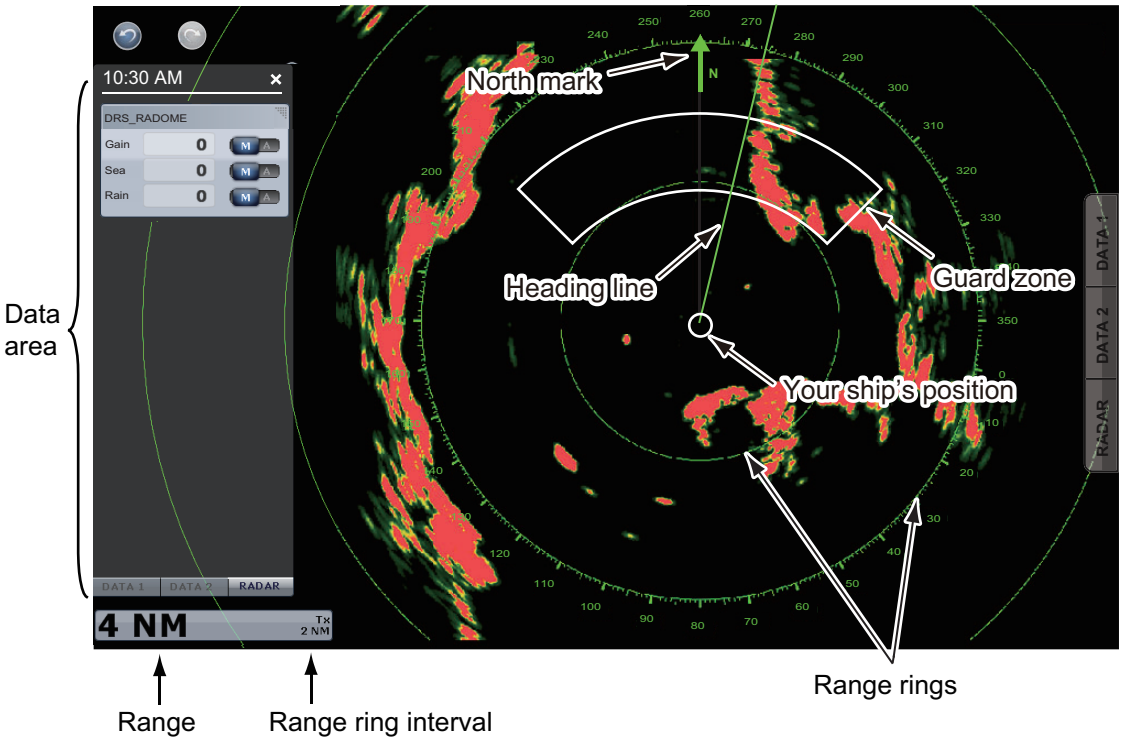
A radar system operates in the microwave part of the radio frequency (RF) range. The radar detects the position and movement of objects. Objects are shown on the radar display at their measured distances and bearings in intensities according to echo strength.

The radar display is available in head-up and north-up modes.

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.

The dual range display scans and displays two different radar ranges at the same time. This display lets you watch on both short and long ranges at the same time.

Note: Dual range display is not available with the DRS4DL radar sensor.



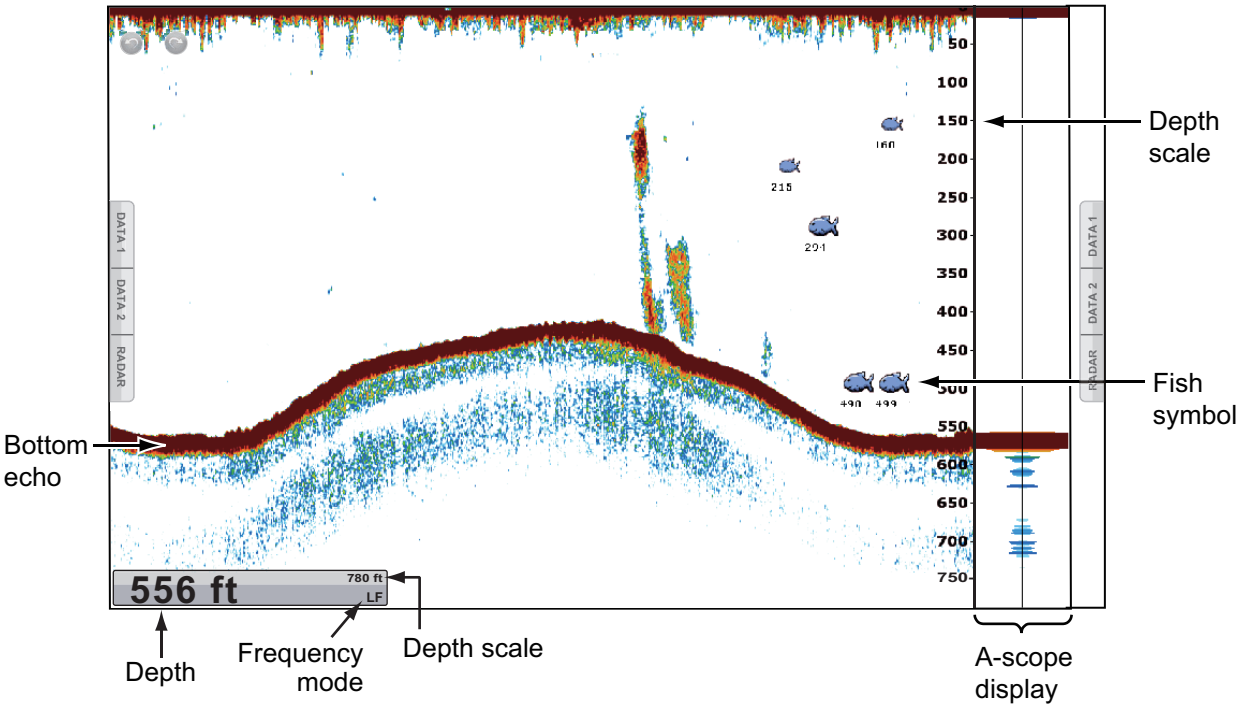
1.9 Sounder (Fish Finder) Introduction

The sounder (fish finder) 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.

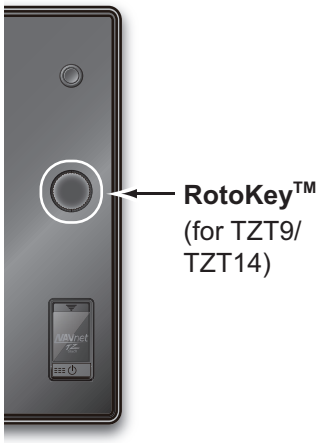
Both low and high TX frequencies are provided. (Frequencies depend on the transducer connected.) The low frequency has a wide detection area, which is for general detection and understanding bottom conditions. The high frequency has a narrow beam that helps you inspect fish.

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



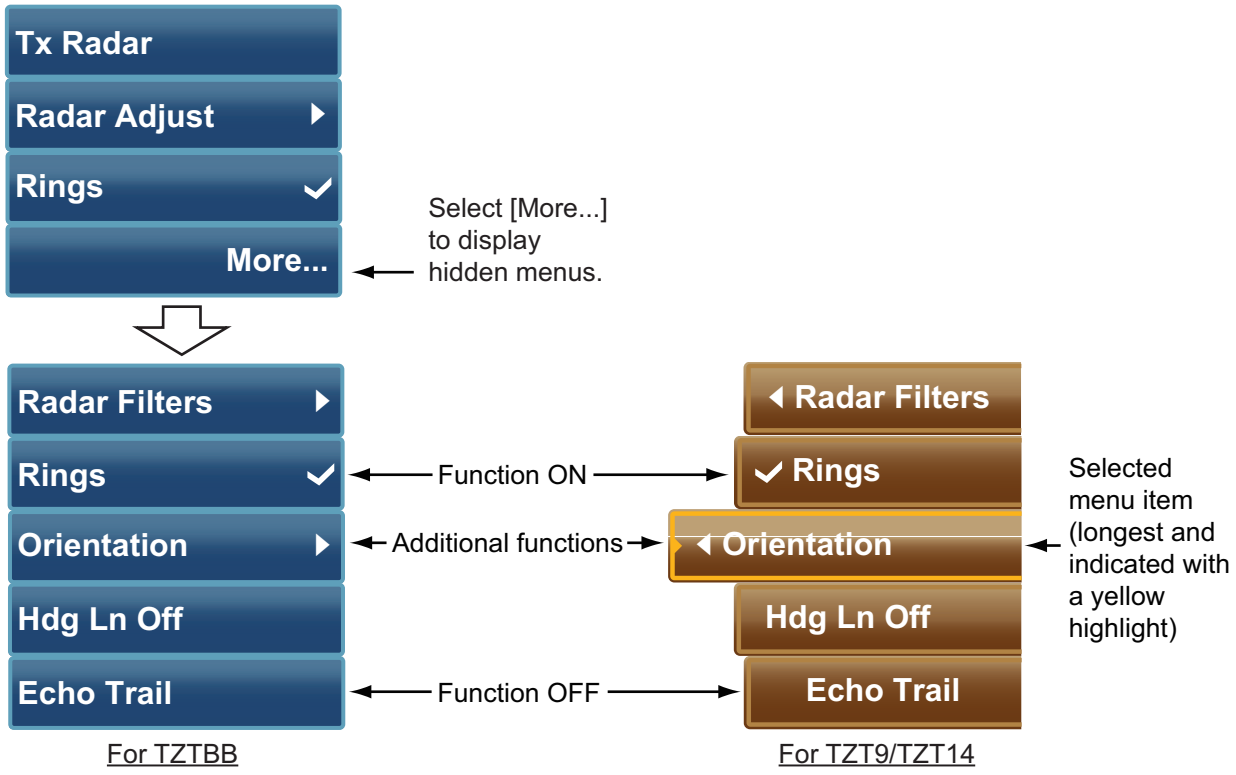
1.10 RotoKey Menus

The main function of the **RotoKey**™ is to display the RotoKey menu, which is a set of menu items that change with the operating mode. For ***TZT9/TZT14***, push the **RotoKey**™ to display the RotoKey menu then rotate the **RotoKey**™ to select a menu item. You can also select a menu item by dragging with a finger. When you search through the menu item, the now-selected menu item is the longest and surrounded in yellow. For ***TZTBB***, tap the screen to display the RotoKey menu. If the menu you are looking for is not shown, select [More...] (then drag the menu items) to select a menu item. Push the **RotoKey**™ or tap the menu item to do the function shown on the selected menu item. For details, see section 14.1.



The indication at the end of a menu item indicates menu item category:

- The "◀" mark indicates a multi-function menu item. Push the **RotoKey**™ (or tap the menu item desired) to go to the next level.
- The "✓" mark indicates ON status (selected) of the item shown on the menu item. The "✓" mark disappears with OFF status (deselected). Push the **RotoKey**™ (or tap the menu item desired) to switch ON or OFF.
  This manual states these operation procedures as follows:
  ON status with the "✓" mark: Select [menu item name].
  OFF status: Deselect [menu item name].
- There is no mark on a menu item that does the function labeled on the control, for example, [Hdg Ln Off] in the radar display. Push the **RotoKey**™ (or tap the menu item desired) to process the item.



1.11 Pop-up Menus

The pop-up menus let you quickly access the commands according to the selected object, position or active display. Select an object or position to display the pop-up menu. The pop-up menus shown on the screen depend on the RotoKey mode (see section 14.1). The right figure shows the Chart Plotter pop-up menu for TZT9/TZT14.



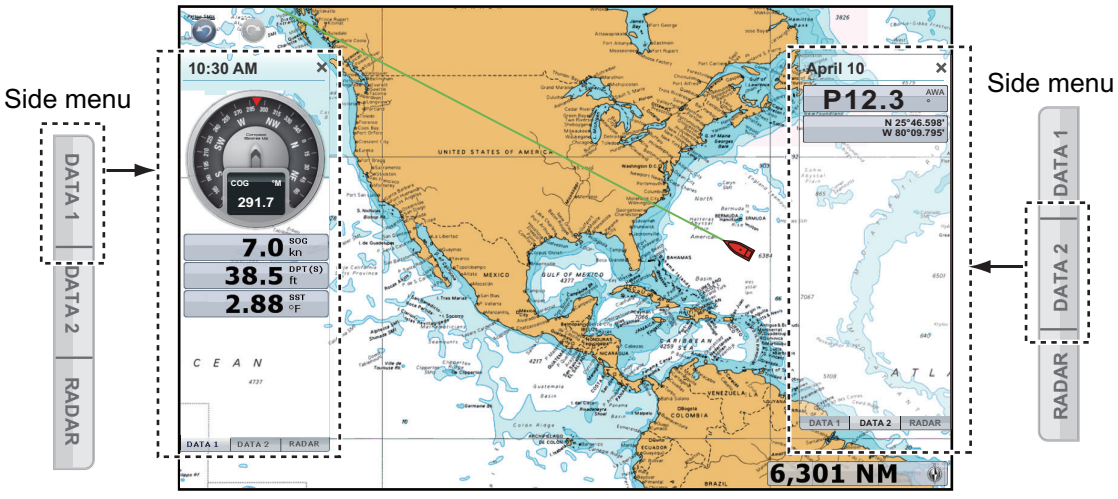
How to operate a pop-up menu

Rotate the **RotoKey**™ (or drag the menu items with a finger) to select an item. The operation is same as the RotoKey menu.

- The "◀" mark indicates a multi-function menu item. Push the **RotoKey**™ (or tap the menu item desired) to go to the next level.
- The "✓" mark indicates ON status (selected) of the item shown on the menu item. The "✓" mark disappears with OFF status (deselected). Push the **RotoKey**™ (or tap the menu item desired) to switch ON or OFF.
- There is no mark on a menu item that does the function labeled on the control or displays the window for the function, for example, software keyboard. Push the **RotoKey**™ (or tap the menu item desired) to process the item.

1.12 Data Area (Data Box)

The data area at both sides of the screen shows the navigation data, with data boxes. You can select the data to display in the area, and show or hide the data boxes as necessary. The data that you can show depends on your system configuration.



Note: A data box set is displayed at the left side in a three-way split screen.

Select [DATA 1], [DATA 2] or [RADAR] of the side menu at the left or right of the screen to show a data box set. To hide a data box set, select [×] at the top right-hand corner of the data area.

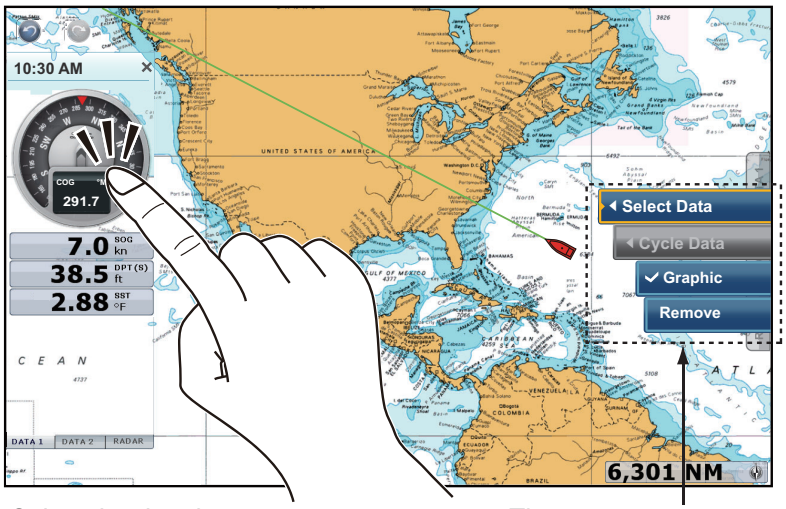
You can select the data to display in each data box on the screen.

When you can scroll the data box, [⌄] appears at the bottom of the box. Touch [⌄] to scroll the display area of the data box.

1.12.1 How to set and operate the data boxes

How to change the contents of a data box

1. Select the data box to change. The pop-up menu appears.



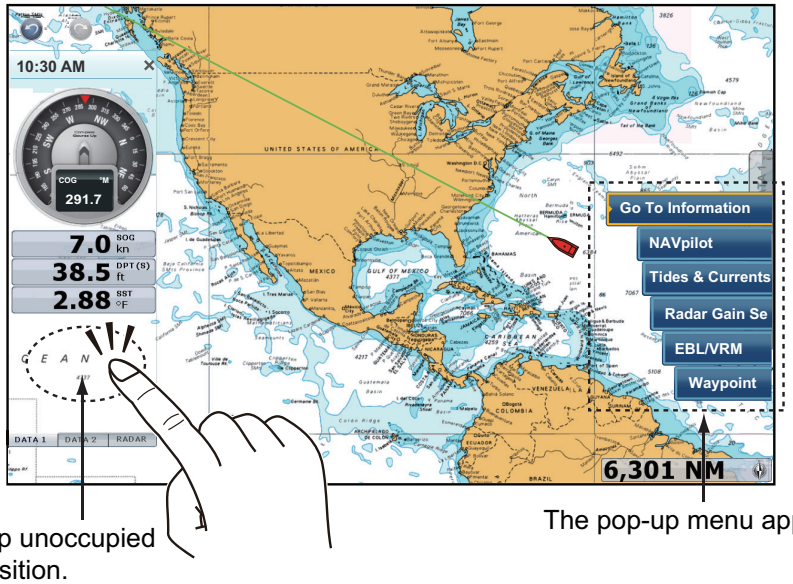
Select the data box to change (in this case, COG).

The pop-up menu appears.

2. Select [Select Data].
3. Select the new data.

How to add a data box to a data area

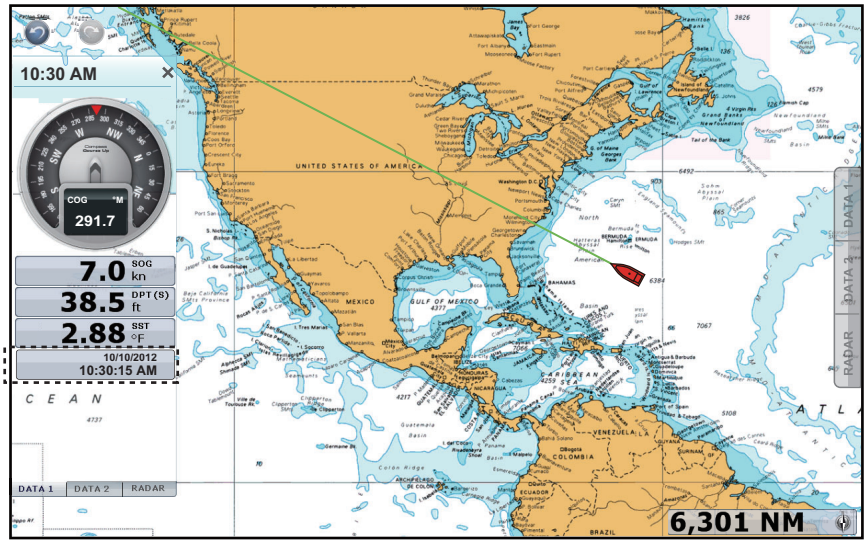
1. Tap any unoccupied area in the data area to display the pop-up menu.



Tap unoccupied position.

The pop-up menu appears.

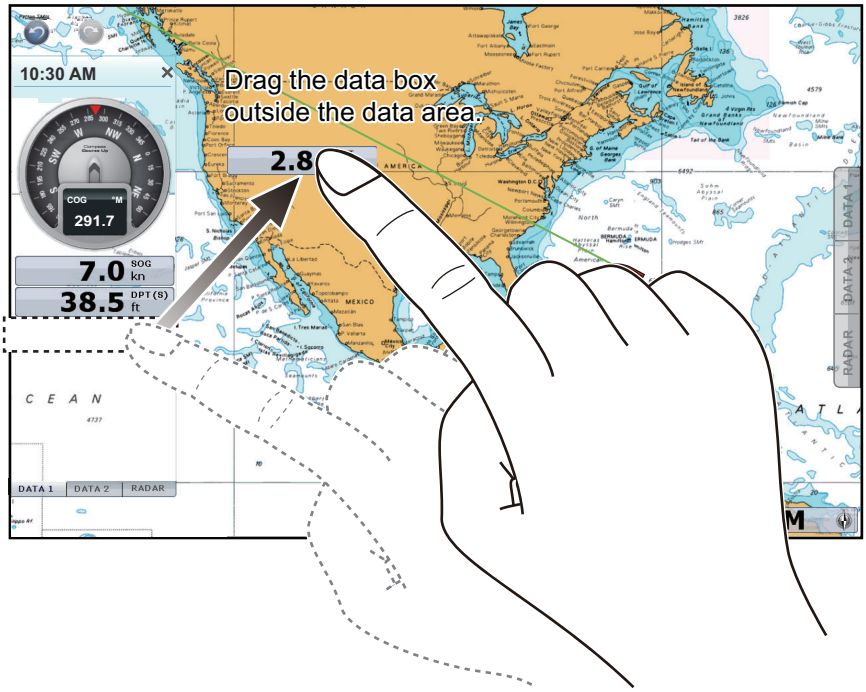
2. Select the data to add. The added data appears under the bottommost data box. [Date] is added in the following example.



You can sort the data boxes by drag and drop.

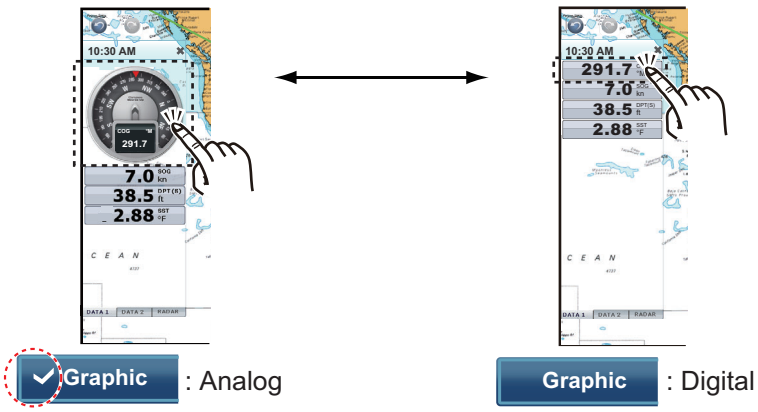
How to delete a data box from a data area

Pop-up menu: Select the data box to delete. The pop-up menu appears. Select [Remove].
Touch control: Drag the data box outside the data area.



How to switch the indication between analog (graphic) and digital

Select the data box for which to switch the indication. The pop-up menu appears. Select [Graphic] to display the analog indication. Deselect [Graphic] to display the digital indication.



How to reset the trip log

The trip log can be reset from the [TRIP] box. Tap the [TRIP] box to show the pop-up menu. Tap [Reset Trip] on the pop-up menu, and a window with the message "Are you sure you want to reset the Trip Log?" appears. Tap [Yes] to reset the trip log.



1.12.2 Data cycling

A data box may contain more than one data indication. In this case you can cycle the data, at the interval desired.

How to add a data indication to a data box and cycle the data

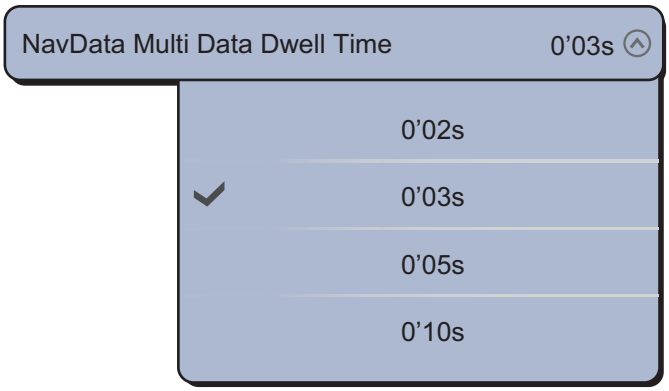
Do the following to add data indication(s) to a data box and cycle the data.

1. Select the data box for which you want to add a data indication. The pop-up menu appears.
   Note: You can not cycle the analog data.
2. Select [Cycle Data].
3. Select the data to add.
4. Repeat steps 1 to 3 to continue adding data.

How to set the cycling time

You can set the cycling time interval as follows:

1. Select [General] - [NavData Multi Data Dwell Time] of the main menu.
2. Select [2s], [3s], [5s] or [10s].
3. Select [Close] to exit the menu.



1.12.3 How to adjust transparency of the data box

You can adjust the degree of transparency for the data box with the [NavData Transparency] slider with [General] of the main menu. The available degree of transparency is 0 - 80(%). (Alpha blending technology is used for transparency effects.)



1.13 Menu Introduction

The menu system has main menus and related sub menus. The number of menus depends on equipment connected.

How to use the menu

1. Press the **Home** key (or tap the **Home** icon) to display the menu icon bar.



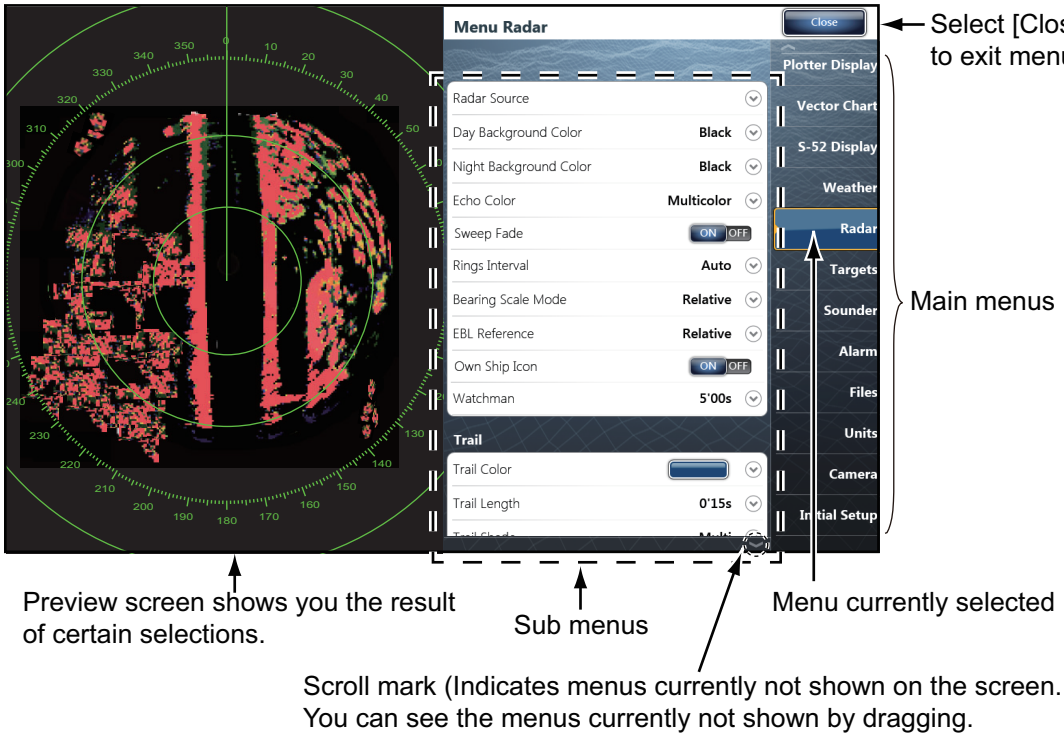
2. Select (tap) the icon desired on the menu icon bar. The function for each icon is in the following table.

Menu icons

Menu icon	Function	Menu icon	Function
Menu	15 main menus; set the screens for chart plotter, radar, fish finder, and so on.	MOB	Mark the MOB position.
Lists	The lists for points, routes, detailed routes, AIS, DSC and ARPA	Catalog	Open the list for the installed chart data. Enter the unlock codes.
Tides	Open the tide graph.	FUSION	Open the fusion screen.

For example, select (tap) the [Menu] icon to open the main menu.

3. Drag the main menus on the right side of the screen to display a menu desired. The selected menu is indicated with a yellow highlight. The sub menus for the selected menu appear. Below is an example screen for the [Radar] menu.



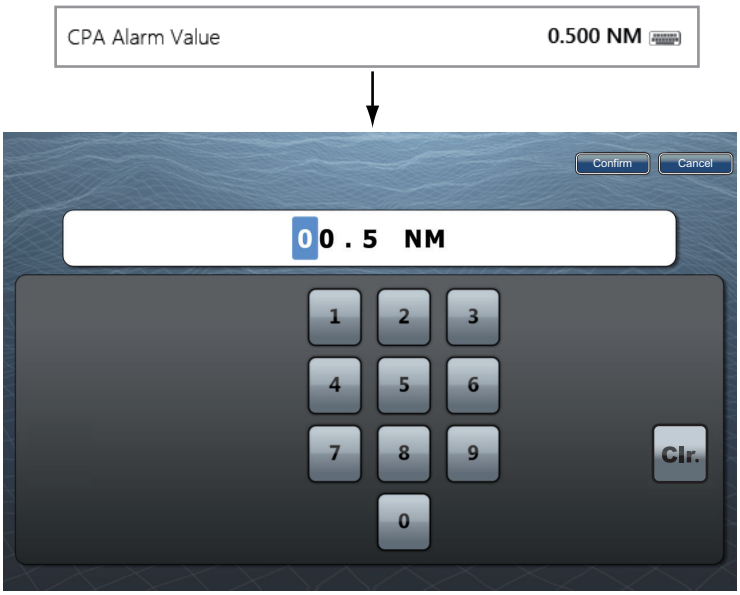
4. Do one of the following according to the menu type:
   - [ON] or [OFF] icon: Select (tap) the [ON] or [OFF] icon as appropriate.



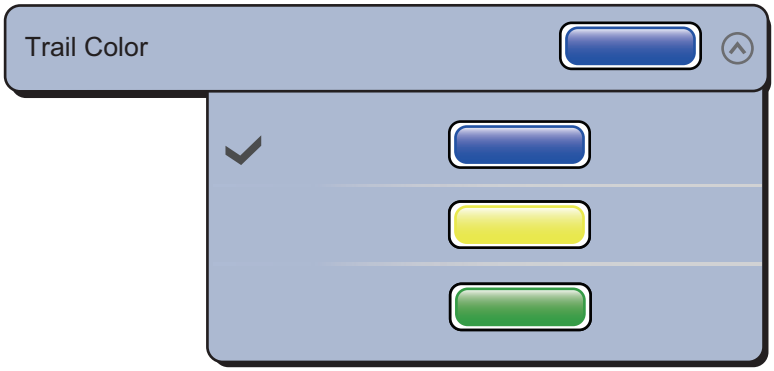
   - Slider bar: Drag the circle icon to set the level. Current level is indicated on the icon.



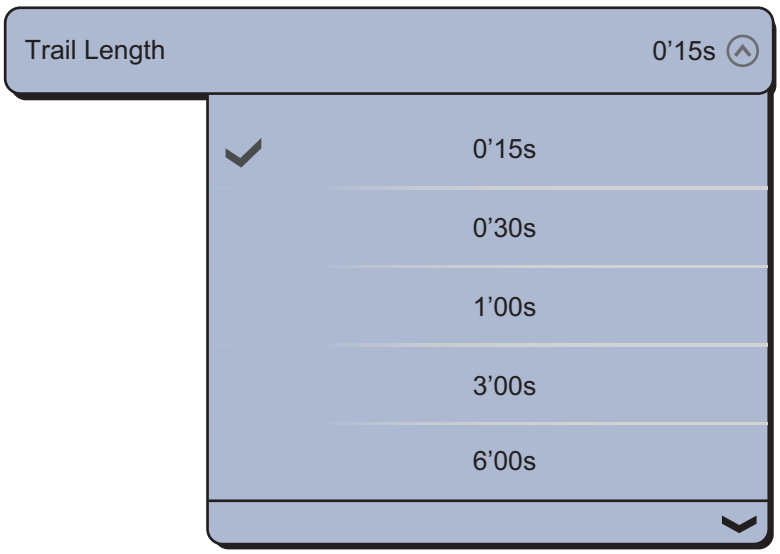
- Numerical value with the software keyboard icon ( ): Select (tap) the menu to open the software keyboard. Set the value then select [Confirm].



- Color icon: Select (tap) the menu to open the options. Select (tap) the option desired. Current selection has a checkmark.



- Options: Select (tap) the menu to open the options. Select (tap) the option desired. Current selection has a checkmark.

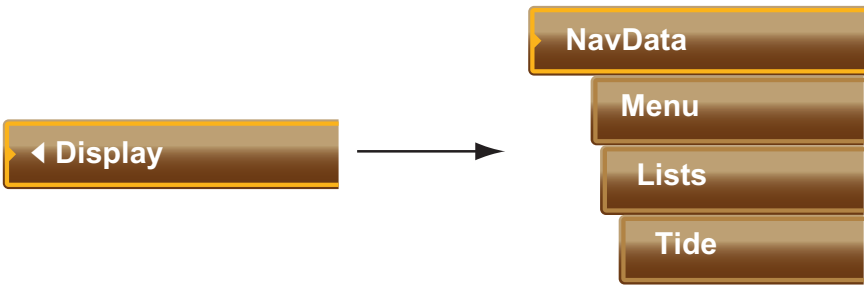


5. Select [Close] to exit the menu.

1.14 [Display] Menu on the RotoKey Menu (TZT9/ TZT14 only)

[Display] on the RotoKey menu is common for all displays.

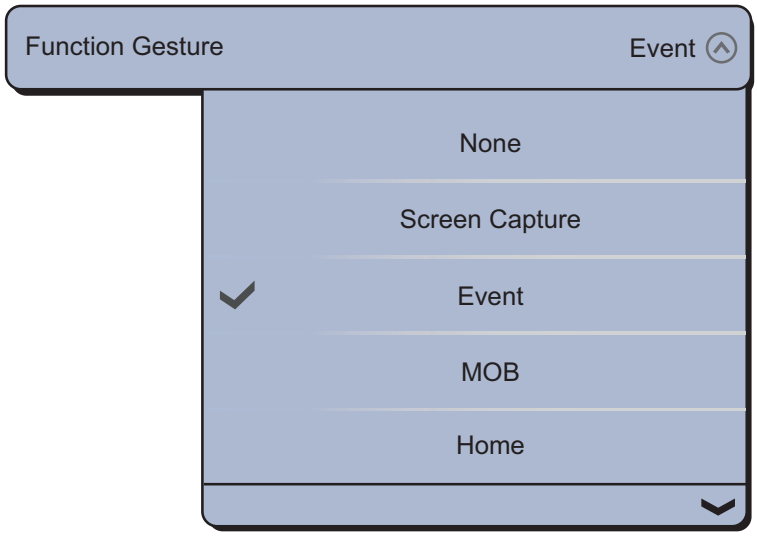
[NavData]: Open the data boxes (see section 1.12).
[Menu]: Open the main menu (see section 1.13).
[Lists]: Open the lists menu (see section 1.13 and section 4.8).
[Tide]: Open the tide graph (see section 1.13 and subsection 3.2.4).



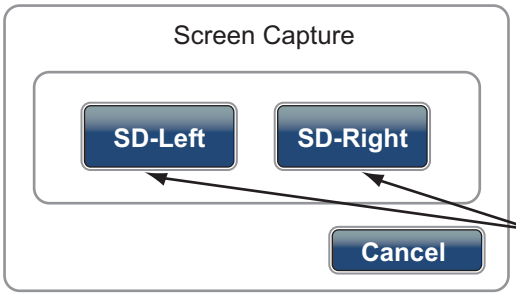
1.15 Function Gesture on the Main Menu

You can easily access a function by tapping the screen with two fingers. Select the function as below.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [General] - [Function Gesture] menu.

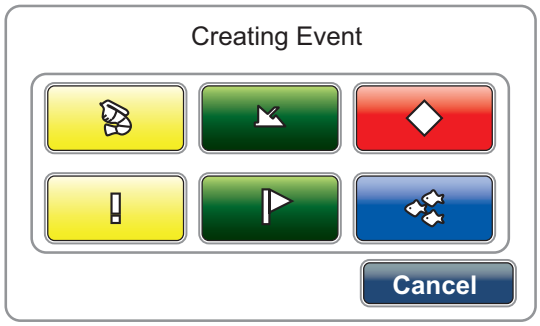


3. Select the function among the following:
   [None]: Nothing happens.
   [Screen Capture]: Capture a screenshot. The following window appears. Select [SD-Left] or [SD-Right] where to save the screenshot.



If either left or right SD card is not inserted, its option is grayed out.

[Event]: Record an event to the logbook. The selected mark is put at the position at the time the screen was tapped to open the [Creating Event] window (see subsection 4.2.2)



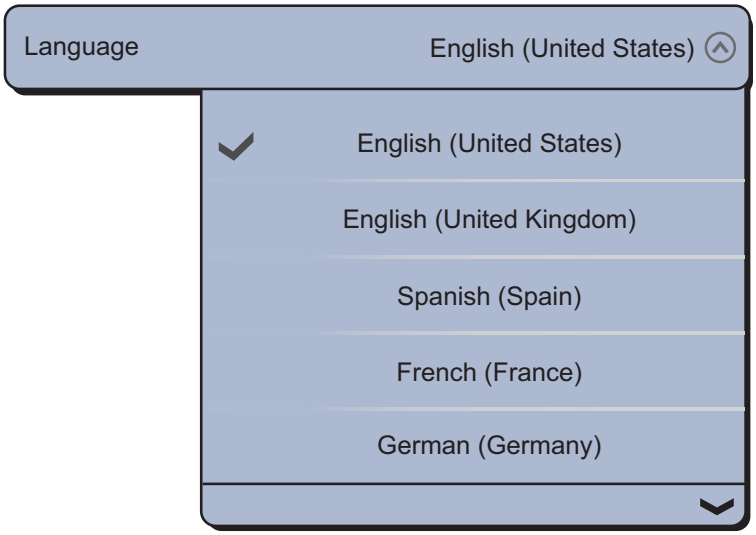
[MOB]: Record MOB position to the logbook (see section 1.18).
[Home]: Open the display selection window (see section 1.5) and display the menu icon bar (see section 1.13).
[Menu]: Open the main menu (see section 1.13).
[Lists]: Open the lists menu (see section 1.13 and section 4.8).
[Tide]: Open the tide graph (see section 1.13 and subsection 3.2.4).
[Fusion]: Open the full FUSION screen (see section 10.7).
[Fusion Ctrl]: Open the control bar for FUSION menu (see section 10.7).

4. Select [Close] to exit the menu.

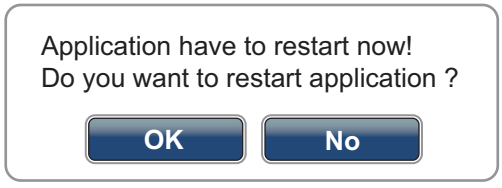
1.16 Language

The default interface language is English (United States). You can select a language to use as follows:

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [General] - [Language] menu.



3. Select the desired language to use. The confirmation message appears.

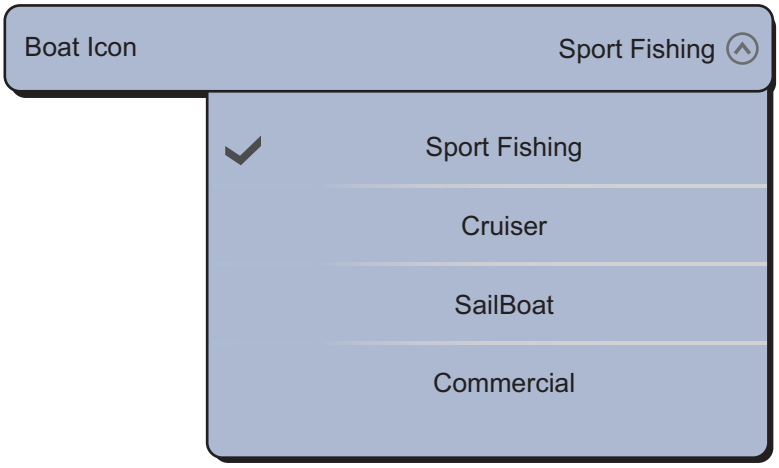


4. Select [Yes] then this equipment restarts.

1.17 Boat Icon

The boat icon marks current position. In the 3D display, you can change the shape of the boat icon to match your ship. In the 2D display, the boat icon can not be changed and is red.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Initial Setup] - [Boat Icon] menu.



3. Select [Sport Fishing], [Cruiser], [SailBoat] or [Commercial] to match your ship.
4. Select [Close] to exit the menu.

1.18 Man Overboard (MOB)

Use the MOB function if a person or object falls overboard. You need either position data from a navigation device, or heading and speed data to calculate position by dead reckoning. You can activate the MOB from the chart plotter and radar displays and MOB position is marked on both the chart plotter and radar displays.

How to mark the MOB position

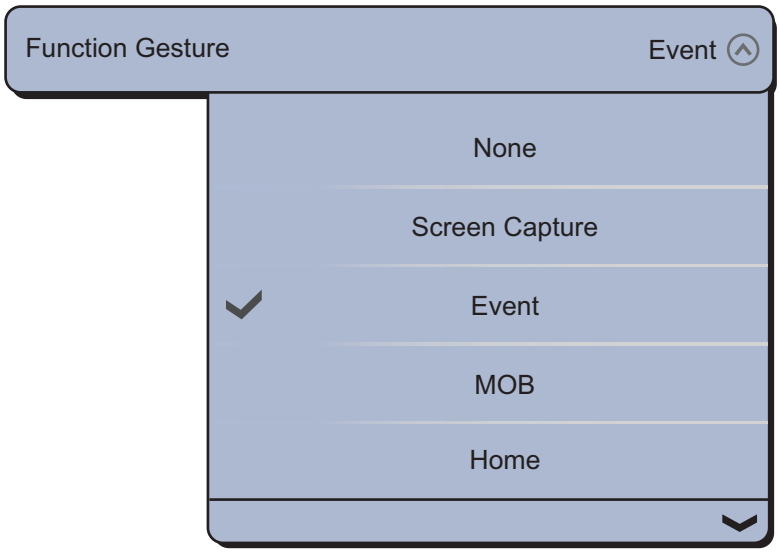
There are two methods by which you can enter the MOB mark: two fingers tap on the screen, or the [MOB] icon on the menu icon bar.

Method 1: Tap two fingers on the screen

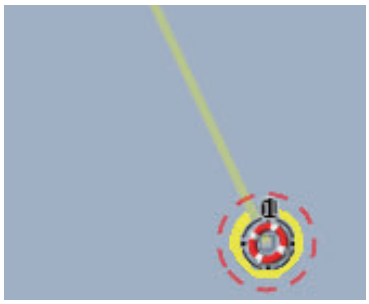
Preset the Function Gesture for MOB mark. Once you have done this preset, simply tap the screen with two fingers to enter the MOB mark.

1. Select [Menu] on the menu icon bar to open the main menu.

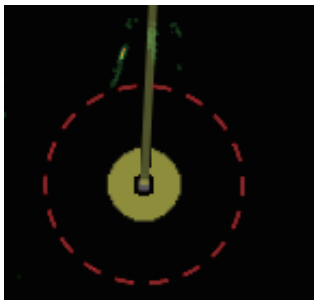
2. Select the [General] - [Function Gesture] menu.



3. Select [MOB].
4. Select [Close] to exit the menu.
5. Tap the screen with two fingers on the chart plotter display or the radar display. The area around the boat icon is zoomed in. (The scale is automatically set to 1.25 nm for the chart plotter and 0.5 nm for the radar.) The MOB mark is entered and flashes. A yellow line runs between the MOB position and your ship. This line is the course to take to go to the MOB position.



MOB mark on the chart plotter display



MOB mark on the radar display

The MOB marks entered are automatically saved to the points lists.

Method 2: [MOB] icon on the menu icon bar

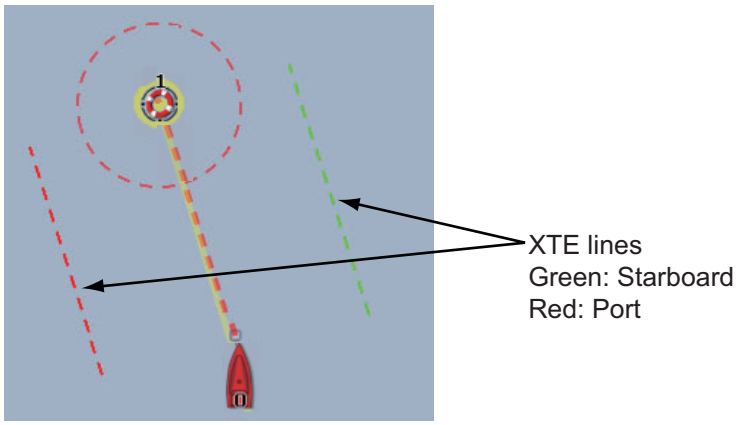
Select the [MOB] icon on the menu icon bar. The chart plotter display opens and the MOB mark position is zoomed in.

MOB information

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

How to go to a MOB mark

Select a MOB mark to go to then select [Go To] from the pop-up menu.



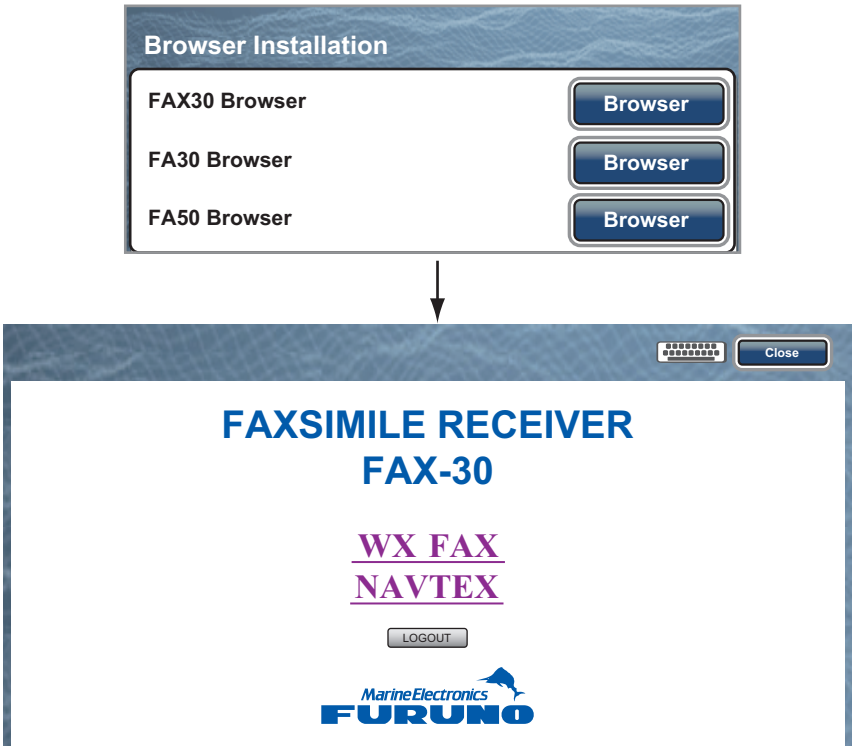
How to delete a MOB mark

Open the pop-up menu, then select [Stop Nav]. Select the MOB mark to display the pop-up menu, then select [Delete].

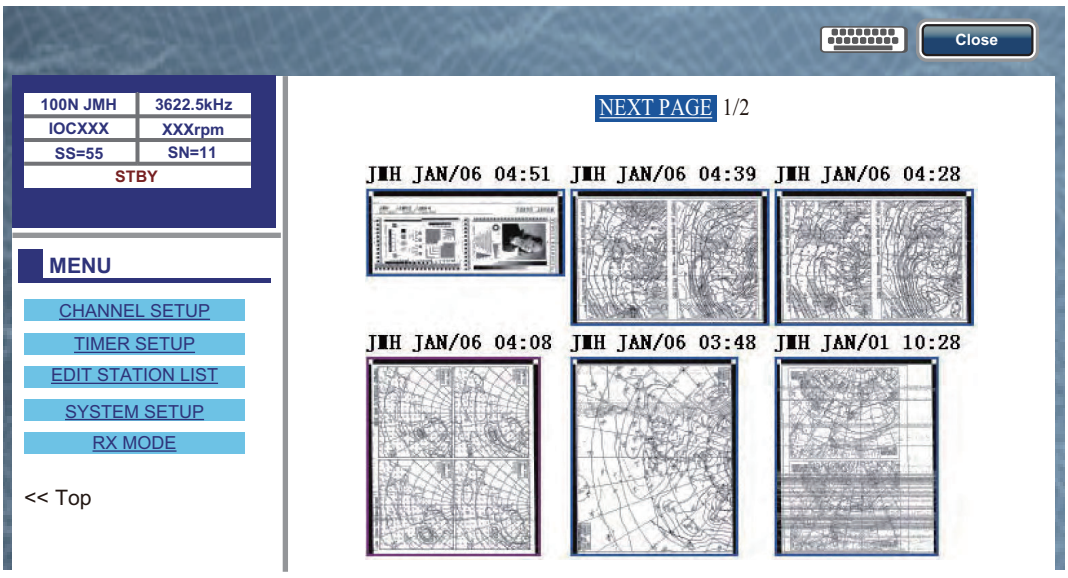
1.19 Facsimile Receiver FAX-30

The FURUNO Facsimile Receiver FAX-30 installs in the TZT network and can be controlled from a TZT display. Below are the steps to start fax operation.

1. At the installation of this equipment, connect the FAX-30 to the TZT.
2. Select [Menu] on the menu icon bar to open the main menu.
3. Select the [Initial Setup] - [FAX30 Browser] menu.



4. Select [WX FAX] or [NAVTEX].



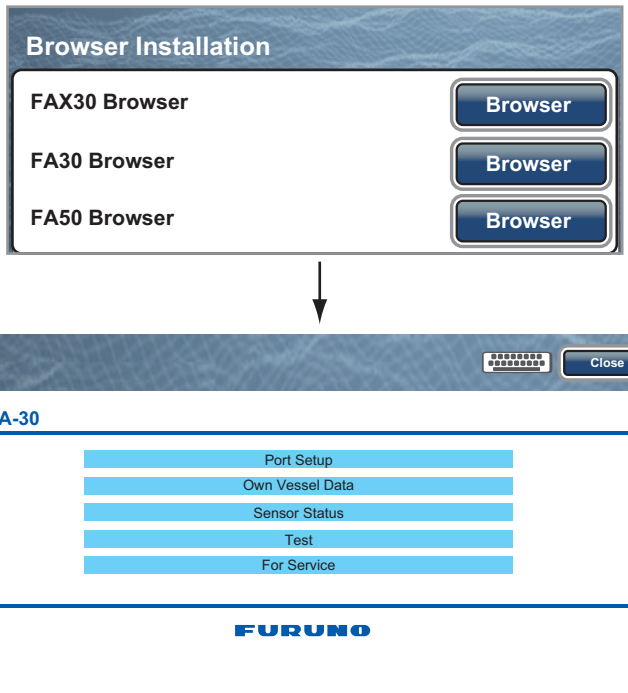
5. Refer to the Operator's Manual of the FAX-30 for operation information.

The FAX-30 display can be accessed only by one TZT display. When another TZT display accesses the FAX-30, control of the FAX-30 is given to that display after the picture is stopped completely. This sequence takes approximately one minute.

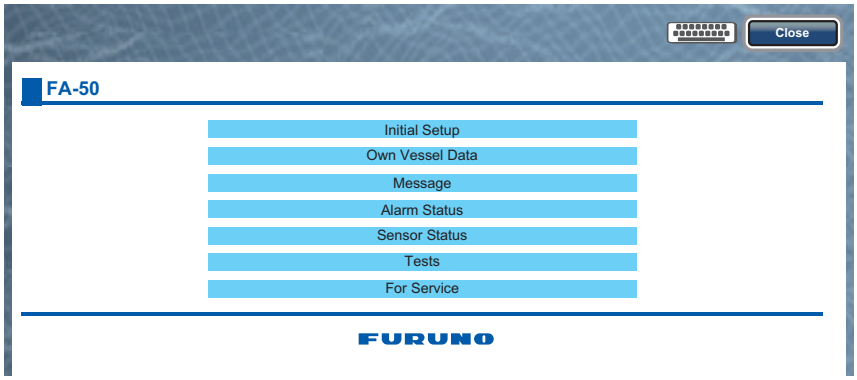
1.20 AIS Transponder FA-30, FA-50

The FURUNO AIS Transponder FA-30 (or FA-50) installs in the TZT network and can be controlled from a TZT display. To access the main menu of the transponder, do the following:

1. At the installation of this equipment, connect the FA-30 (or FA-50) to the TZT.
2. Select [Menu] on the menu icon bar to open the main menu.
3. Select the [Initial Setup] - [FA30 Browser] or [FA50 Browser] menu.



or

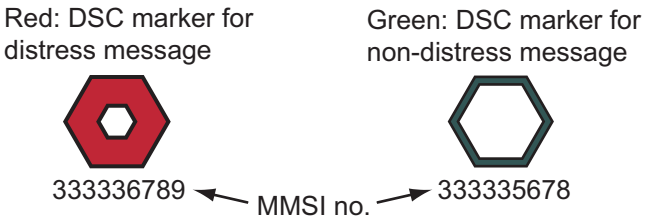


4. Refer to the Operator's Manual for FA-30 or FA-50 for operation information.

1.21 DSC Message Information

The DSC (Digital Selective Calling) message information feature provides, on the chart 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 a ship's position. 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.



This feature requires connection of a DSC capable radiotelephone that outputs the DSC sentence in NMEA 0183 format.

1.21.1 DSC notification

When a DSC message (other than a distress message), such as position of the ship is received, the message "DSC Position Report Received" appears in yellow on the status bar at the top of the screen (see subsection 2.10.7).

When a DSC message for distress is received, the message "DSC Distress Call Received" appears in red on the status bar at the top of the screen. To delete the distress message, tap the status bar.

1.21.2 How to show or hide the DSC message information

On the chart plotter or radar display, select [Targets] from the RotoKey menu then select [AIS/DSC]. The DSC information appears. To hide the DSC information, deselect [AIS/DSC].

Note: On the chart plotter display, the [AIS/DSC] menu with the **RotoKey**^{TM} is available in the [Full] mode (see section 14.1).

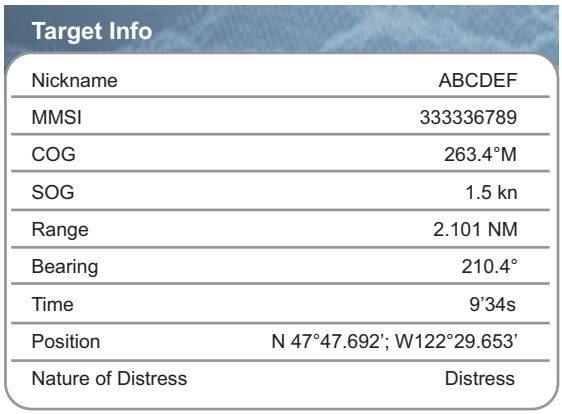
When you receive a DSC message, the appropriate DSC marker and the MMSI no. of the transmitting ship appear on the chart plotter and radar displays.

1.21.3 How to go to a DSC point

Select the DSC marker to go to. The pop-up menu appears. Select [Go To].

1.21.4 How to display the DSC information

Select a DSC marker to display the simple information (position, MMSI no. of the ship that transmitted a DSC message and so on). To get the detailed information, select a DSC marker to display the pop-up menu then select [Info].



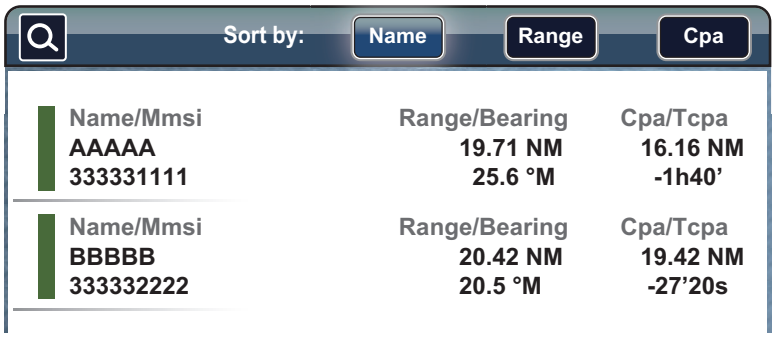
Detailed information

1.21.5 The DSC list

When you receive a DSC message, it is automatically registered to the DSC list. To help you identify a ship quickly on the chart plotter and radar displays, you can replace the MMSI no. indication with the name of your choice; for example, ship's name.

How to open the DSC list

1. Select [Lists] on the menu icon bar to open the lists menu.
2. Select [DSC List].

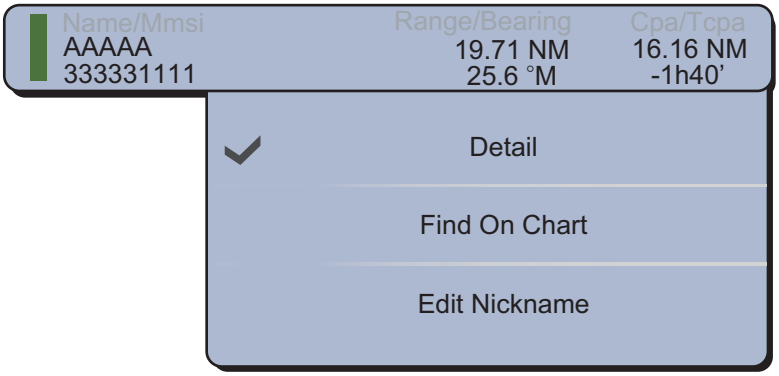


3. Select [Name], [Range] or [Cpa] in the [Sort by] area at the top of the list.
   [Name]: DSC sorted in alphanumeric order
   [Range]: DSC sorted by range in ascending order
   [Cpa]: DSC sorted by CPA in ascending order

To see the detailed information for a DSC, select a DSC then select [Detail].

To center a DSC marker on the screen, select the DSC then select [Find On Chart].

To edit DSC nickname, select the DSC then select [Edit Nickname] (refer to "How to edit an AIS nickname" on page 13-6).



1.22 Wireless LAN Settings

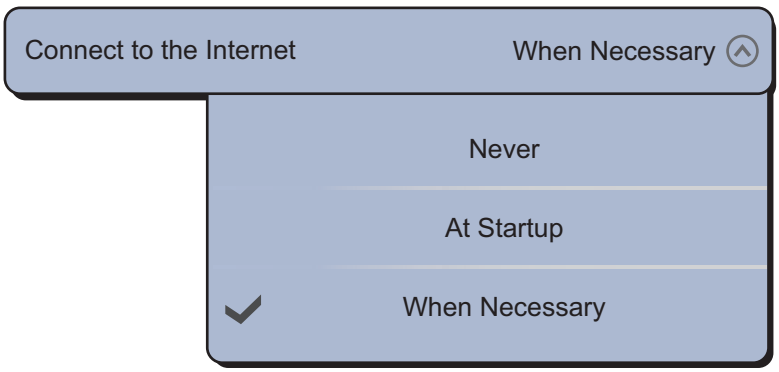
You can connect to the internet with the wireless LAN signal to download weather information (see chapter 12) and to connect to an iPhone, iPod or iPad. To download weather information, connect the existing LAN network. To connect to an iPhone, iPod or iPad, create a local wireless network.

Notes about the wireless LAN

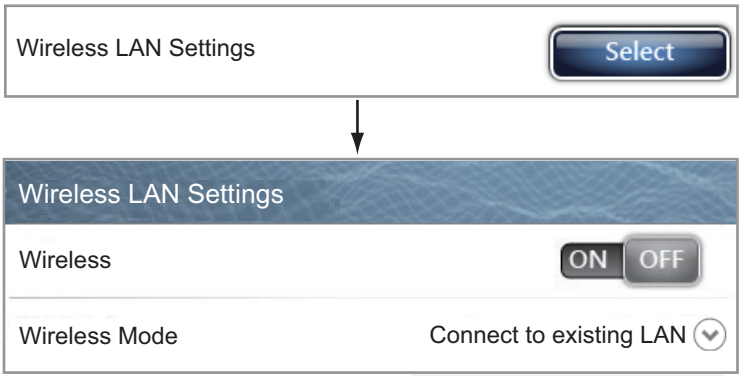
- The wireless LAN function is available only in the countries which have acquired radio wave certification. Turn this function off in countries which do not have radio wave certification. Ocean-going vessels that have radio wave certification can use the wireless LAN function in any country that has 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 January, 2015): USA, Canada, New Zealand, Australia, 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.

How to connect the existing LAN network

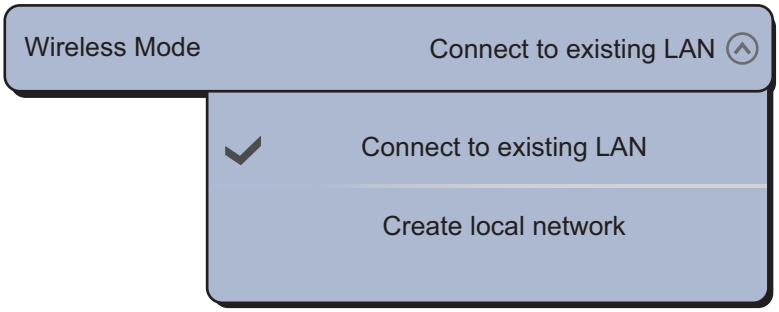
1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [General] - [Connect to the Internet] menu.



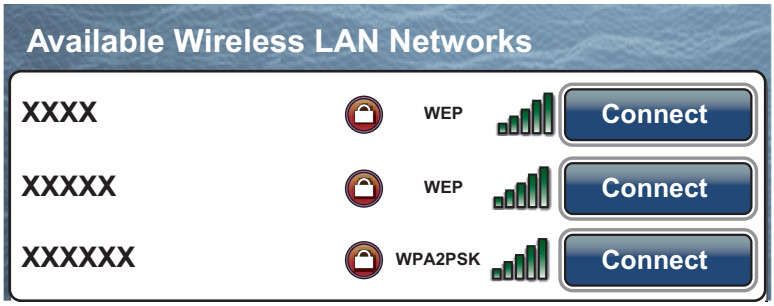
3. Select [When Necessary].
4. Select [Wireless LAN Settings].



5. Select the [ON] icon in [Wireless].
   Note: You can use the wireless LAN function when the internal temperature of the equipment inside is detected with the temperature sensor and is over 0°C. The [ON] icon in [Wireless] is grayed out if the equipment does not meet the above requirement.
6. Select [Wireless Mode].



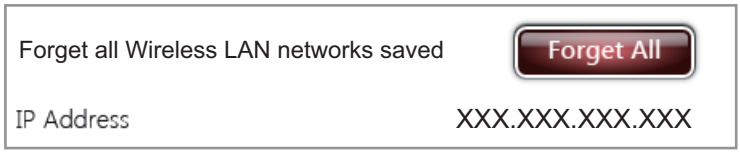
7. Select [Connect to existing LAN]. The available wireless networks are listed.



8. Select [Connect] in the desired network.



9. Select the password field to open the software keyboard.
10. Enter the password then select [Ok]. The IP address is displayed.



How to create a local wireless network

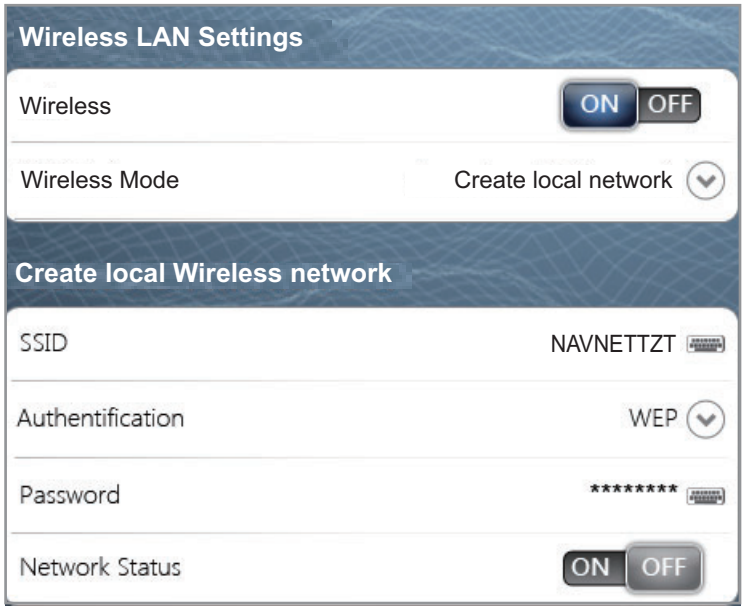
When you connect wireless LAN network without access to the existing LAN network, do the following to create a new local network.

Note 1: Do the following steps 1 to 7 with [OFF] in [Network Status].

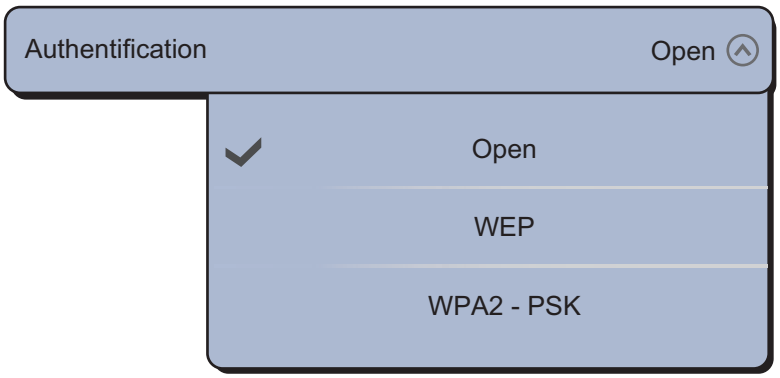
Note 2: Connection to a local network may not be possible if the network is unstable. In this case, select the [OFF] icon in [Wireless] then select the [ON] icon. Connect via existing LAN network.

Note 3: Confirm if [When Necessary] is selected in [Connect to the Internet] menu.

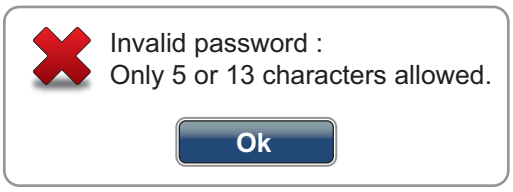
1. Select [Create local network] in [Wireless Mode].



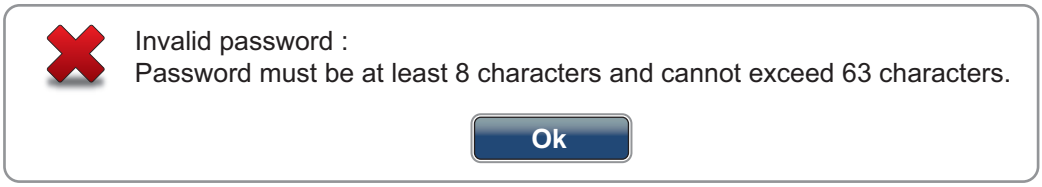
2. Select [SSID] to open the software keyboard.
3. Enter the SSID then select [Confirm].
4. Select [Authentification].



5. Select the security from [Open], [WEP] or [WPA2 - PSK]. For [Open], go to step 8. For others, go to the next step.
   Note: Select the security according to the equipment connected to the network. Select [WEP] to connect an iPhone or iPad to the network. ([WPA2-PSK] is not available for iOS.)
6. Select [Password] to open the software keyboard.
7. Enter the password then select [Confirm].
   Note: If you entered the invalid password, the following error message appears.



For [WEP]



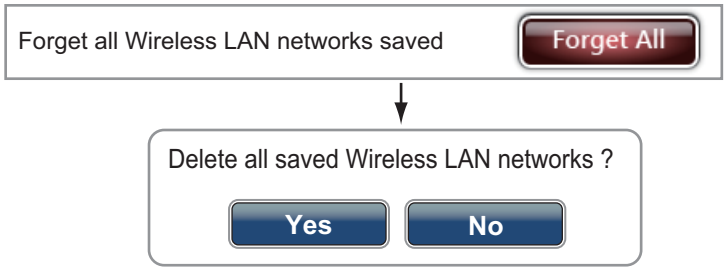
For [WPA2 - PSK]

Select [Ok] then reenter the correct password.

8. Select the [ON] icon in [Network Status] to connect the created network.

How to forget all wireless LAN networks

1. With [Connect to existing LAN] selected in [Wireless Mode], select [Forget all Wireless LAN networks saved]. The confirmation message appears.

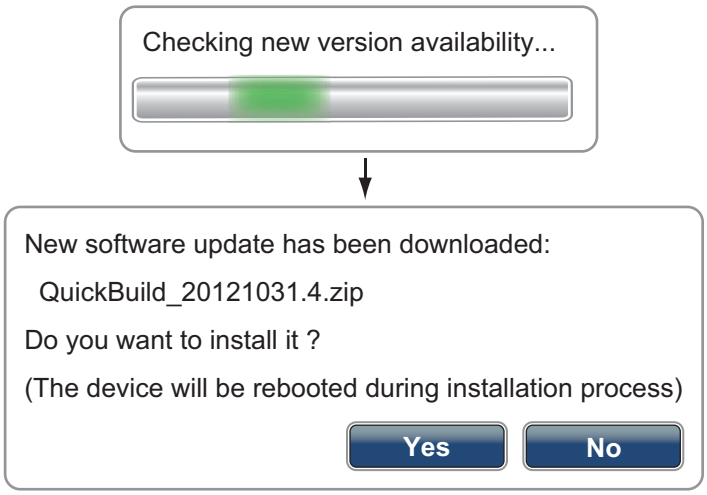


2. Select [Yes].

1.23 Software Update

You can update the software via the internet. See section 1.22 about the internet connection.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [General].
3. Select the [Update] icon in [Check for Software Update]. The following messages appear in order.

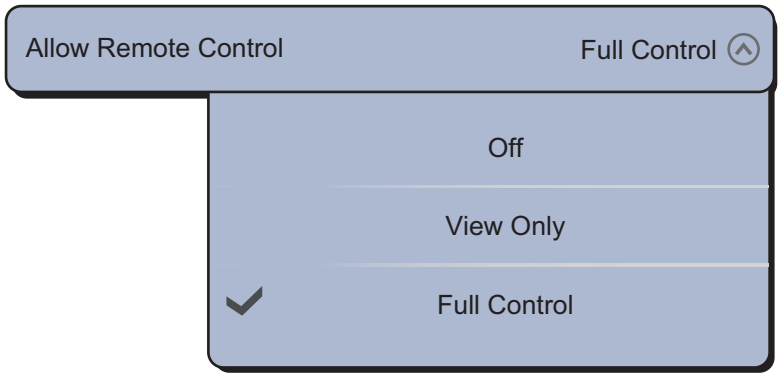


4. Select [Yes] then this equipment restarts.

1.24 Operation by Wireless Terminal

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

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [General] - [Allow Remote Control] menu.



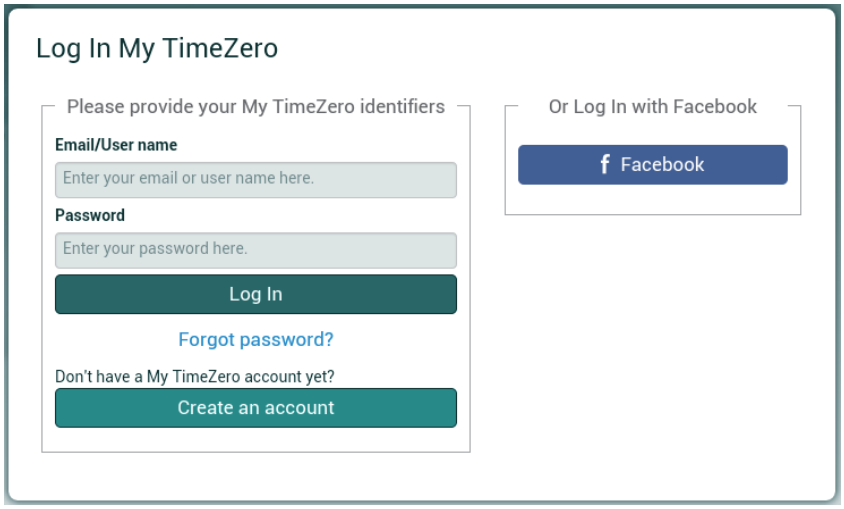
[Off]: Cannot operate this equipment by a wireless terminal.
[View Only]: Cannot operate this equipment but can display the data on the screen of the wireless terminal.
[Full Control]: Can fully operate this equipment by a wireless terminal.

3. Select [Close] to exit the menu.

1.25 How to Create a My TimeZero™ Account, Login to Your My TimeZero™ Account

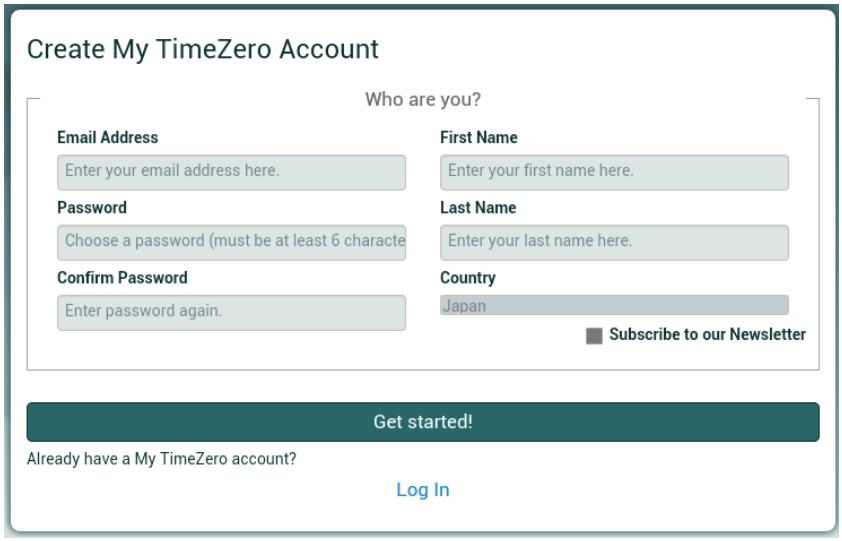
You will need to create a My TimeZero™ account to access the cloud and My Friends (social network) functions. Prepare a PC or mobile device to complete the registration.

1. Connect your unit to the internet. See section 1.22 for the procedure.
2. Open the main menu.
3. Open the [General] menu.
4. At the [Social Network] section, then tap [Login].



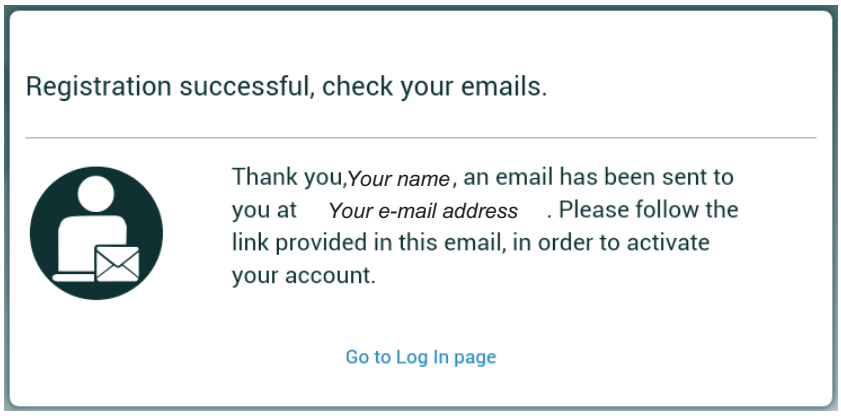
Note: You can also login to your TimeZero™ account from Facebook.

5. Tap [Create an account].

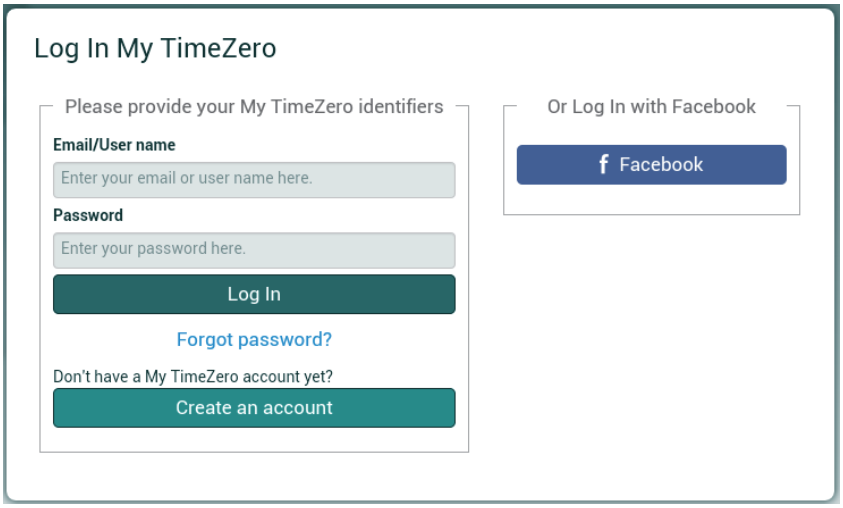


6. Fill in all fields. Check the checkbox if you want to subscribe to the Newsletter.

7. Click [Get started!] to finish.



8. From a PC or mobile device, follow the link provided in the e-mail to log into your account. At this time do not operate the equipment.
9. Tap [Go to Log in page] on this equipment.



10. Enter the e-mail address used to register the account, and your password.
11. Tap [Log in].

The name used to create the account appears in the [Logged As] field. The Status bar shows (in yellow) “You are logged as (your name)” and several beeps sound.

2. CHART PLOTTER

This chapter shows you how to do the following:

- Use and prepare the chart plotter
- Set chart 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 chart plotter as a navigational aid, have electronic charts (stored in the internal memory) for the area you navigate. Contact your dealer about charts for your area.

There are five types of chart format in this equipment: [Raster], [S-57], [C-MAP], [Navionics] or [Fishing].

[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.
[S-57]: S-57 formats are 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).
[C-MAP]: Vector chart (data by C-MAP)
[Navionics]: Vector chart (data by Navionics)
[Fishing]: Fishing charts are vector charts that show only detailed depth contours. These are available for US waters.

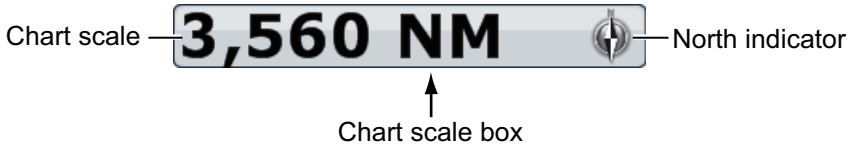
How to select a chart type

1. Select the plotter display on the display selection window (see section 1.5).
2. Select [Chart] from the RotoKey menu.
3. Select the chart type from [Raster], [S-57], [C-MAP], [Navionics], [Fishing] or [Auto]*.

*: [Auto] automatically switches the chart type according to availability and chart priority setting (priority setting: [Plotter Display] - [Chart Priority in Auto Mode] - [Vector] or [Raster]).

2.2 Chart Scale

You can change the chart scale to change the amount of information shown, or zoom in or out at the location you select. The selected chart scale appears in the chart scale box at the bottom right-hand corner of the screen. The value shown is the distance from the left of the screen to the right of the screen.

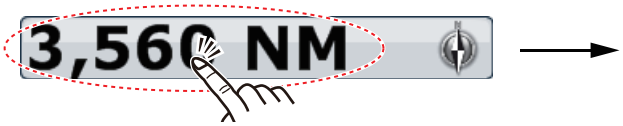


How to zoom in or out the chart scale

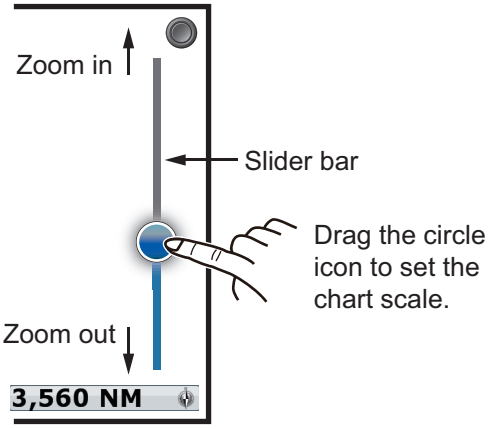
TZT9/TZT14: Rotate the **RotoKey**™ or pinch the chart screen.



TZTBB: Pinch the chart screen. Or tap the chart scale box at the bottom right-hand corner of the screen to display the slider bar. Drag the circle icon to set the chart scale.



Tap the area circled above to display the slider bar.
Note: The orientation mode can be changed by tapping the north indicator (see section 2.3).



Note 1: You can judge the suitability of the range by the color of the chart scale indication.
Black: Range is appropriate for chart accuracy.
Red: Range is inappropriate for chart accuracy. If you continue zooming in, the chart is not displayed and the background of the screen turns gray.

Note 2: You can zoom in or out the chart scale on the preview screen.

2.3 Orientation Mode

The chart can be shown in head-up or north-up orientation.

1. Select [Orientation] from the RotoKey menu.
2. Select [North Up] or [Head Up].
   [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.

Note: You can change the orientation mode by tapping the chart scale box at the bottom right-hand corner of the screen. Each time you tap the chart scale box, the orientation mode switches between north up and head up. The north indicator rotates accordingly.



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

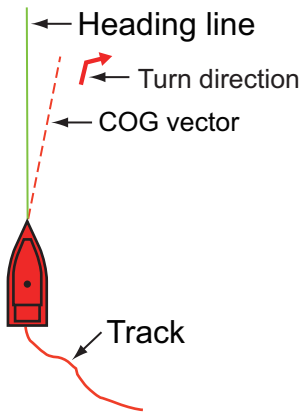
Do the following to move the chart:

- Change the chart scale with zoom in or zoom out (section 2.2).
- Select [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 dragging two fingers upward or downward.

2.5 The Boat Icon

The boat icon appears at the current position. You can change the icon shape in the 3D display from the menu (see section 1.17). The boat icon has the functions indicated below also.

- The **Heading line** is a straight line that runs from your position and this line shows the current heading.
- The **COG vector** is a vector line that runs from the boat icon. This vector points in the direction in which your ship is now moving. Also, a red arrow appears as the **turn direction**.
- The **Track** plots the movement of your ship.



Heading line

To display the heading line, do as follows:

1. Select the boat icon to display the pop-up menu.
2. Select [Heading Line].

COG vector

To display the COG vector and the turn direction, do as follows:

1. Select the boat icon to display the pop-up menu.
2. Select [COG Vector].

Track

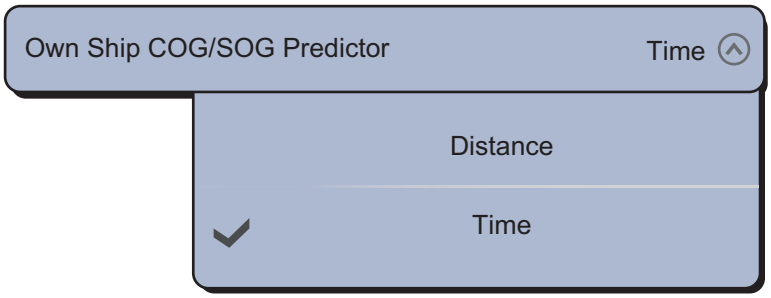
To display the track, do as follows:

1. Select [Overlay] from the RotoKey menu.
2. Select [Tracks].

COG/SOG predictor

The **COG/SOG predictor** shows estimated course and speed of your ship. This predictor is displayed as the COG vector. The top of the predictor 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/SOG predictor as follows. The greater the distance or the time, the longer the COG/SOG predictor.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Ship & Track] - [Own Ship COG/SOG Predictor] menu.

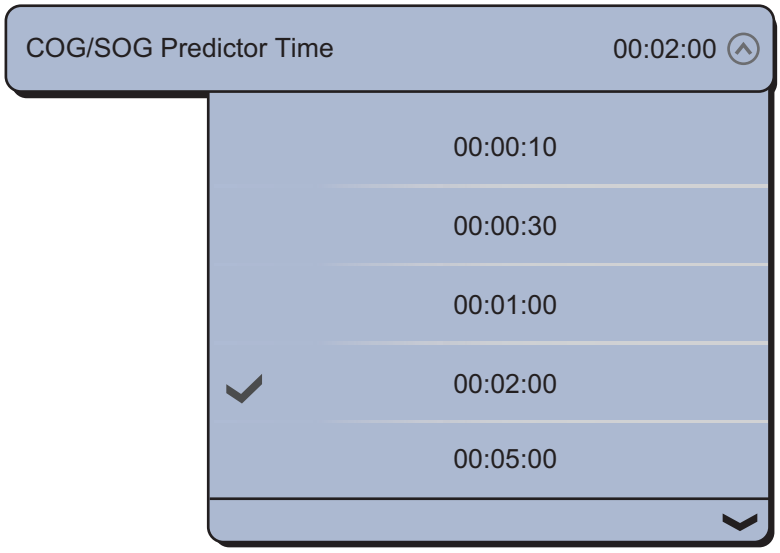


3. Select [Distance] or [Time]. For [Distance], go to the next step. For [Time], go to step 6.
4. Select [COG/SOG Predictor Length] to display the software keyboard.



5. Set the length for COG/SOG predictor then select [Confirm]. Go to step 7.

6. Select [COG/SOG Predictor Time] then select the time for COG/SOG predictor.

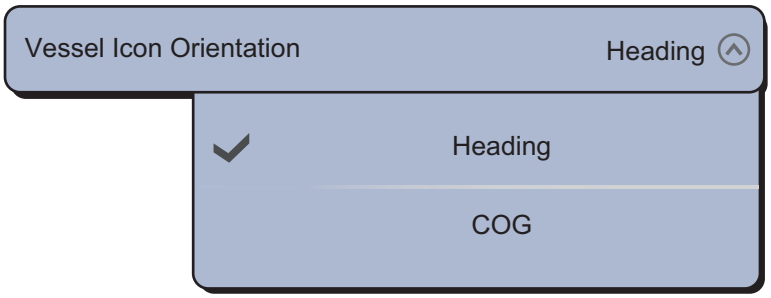


7. Select [Close] to exit the menu.

Orientation

You can select the orientation of the boat icon.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Ship & Track] - [Vessel Icon Orientation] menu.



3. Select [Heading] or [COG].

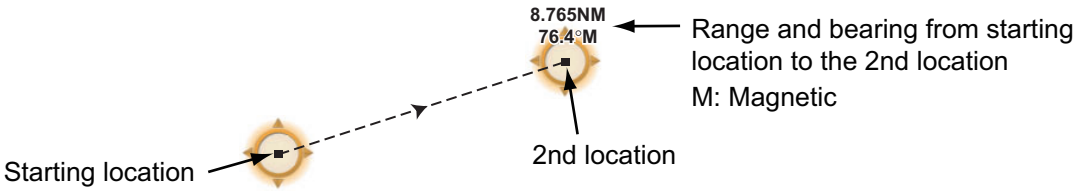
2.6 How to Find the Range and Bearing to a Location

Between any two locations

The [Measure] 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. This pop-up menu is available in [Full] RotoKey mode (refer to section 14.1).

1. Select the starting location then the pop-up menu appears.
2. Select [Measure].

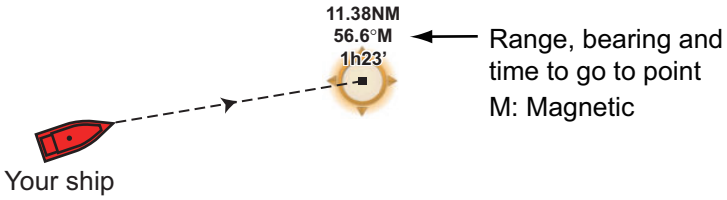
3. Select the 2nd location. A dashed line runs between the start location and the 2nd location. The range and bearing to the 2nd location are shown.



4. Select [Cancel Ruler] at the top right-hand corner of the screen to erase the indication.

From your ship to a location

1. Select the location then the pop-up menu appears.
2. Select [Dist. to Boat]. A dashed line runs between the boat icon and the selected location. The range, bearing and the time to go to the selected location are shown.

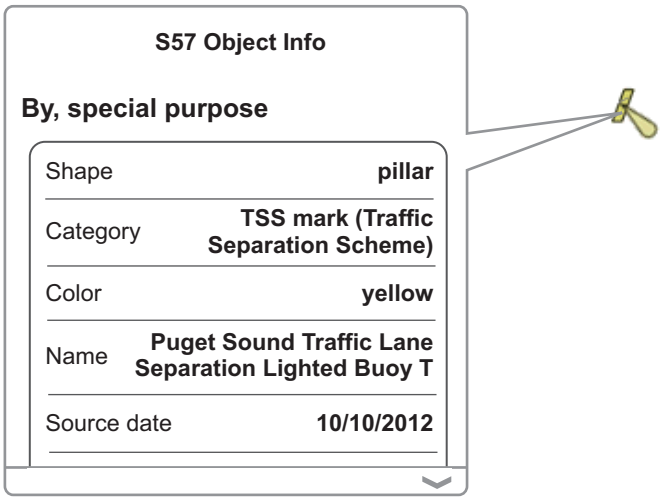


3. Select [Cancel Ruler] at the top right-hand corner of the screen to erase the indication.

2.7 Chart Object Information

Vector charts show many objects, like buoys and lighthouses, for which you can find the information. Port, tide and current information are available if the chart contains this information.

Select any chart object to find the information.



2.8 Multiple Chart Plotter Displays

A maximum of three chart plotter displays can be shown on one screen. The multiple chart plotter displays let you 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 2D and another in 3D.

The following features can be adjusted individually.

- AIS
- ARPA
- Chart scale
- Chart orientation
- Chart type
- Scroll the chart
- Overlays (radar, sat photo, depth shading, tide icon, tidal current, ACCU-FISH™ (see section 7.10), points, routes, tracks)
- 2D and 3D (For the 3D displays, the aerial view (pitch and orientation) are adjusted together, but different orientation modes (north up and head up) are possible.)

Chart plotter display 2
Chart type: Raster
Orientation: North-up
Chart scale: 1,717 NM
Perspective: 2D
Overlay: Sat photo

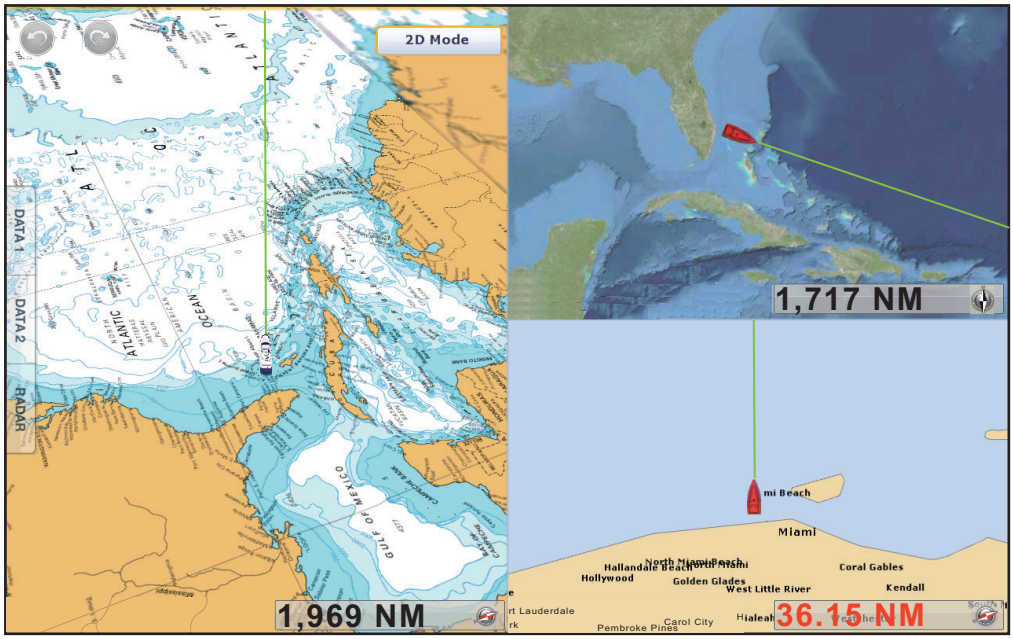


Chart plotter display 1
Chart type: Raster
Orientation: Head-up
Chart scale: 1,969 NM
Perspective: 3D

Chart plotter display 3
Chart type: S-57
Orientation: Head-up
Chart scale: 36.15 NM
Perspective: 2D

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

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



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

[Chart Color Palette]: Set the chart color pattern. [Standard] is the NAVNet TZtouch 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, 3.0, 6.0, 9.0, 12.0, 15.0, 18.0, 21.0, 24.0, 27.0, 30.0 ft). Show shallow depth contours in dark blue.

[Safety Contour]: Set the safety depth (setting range: 0.0, 3.0, 6.0, 9.0, 12.0, 15.0, 18.0, 21.0, 24.0, 27.0, 30.0, 50.0, 70.0, 100, 200 ft). Show safety depth contours in medium blue.

[Deep Contour]: Set the deep depth (setting range: 0.0, 3.0, 6.0, 9.0, 12.0, 15.0, 18.0, 21.0, 24.0, 27.0, 30.0, 50.0, 70.0, 100, 200, 300, 500, 1,000, 2,000 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, 3.0, 6.0, 9.0, 12.0, 15.0, 18.0, 21.0, 24.0, 27.0, 30.0, 50.0, 70.0, 100 ft).

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

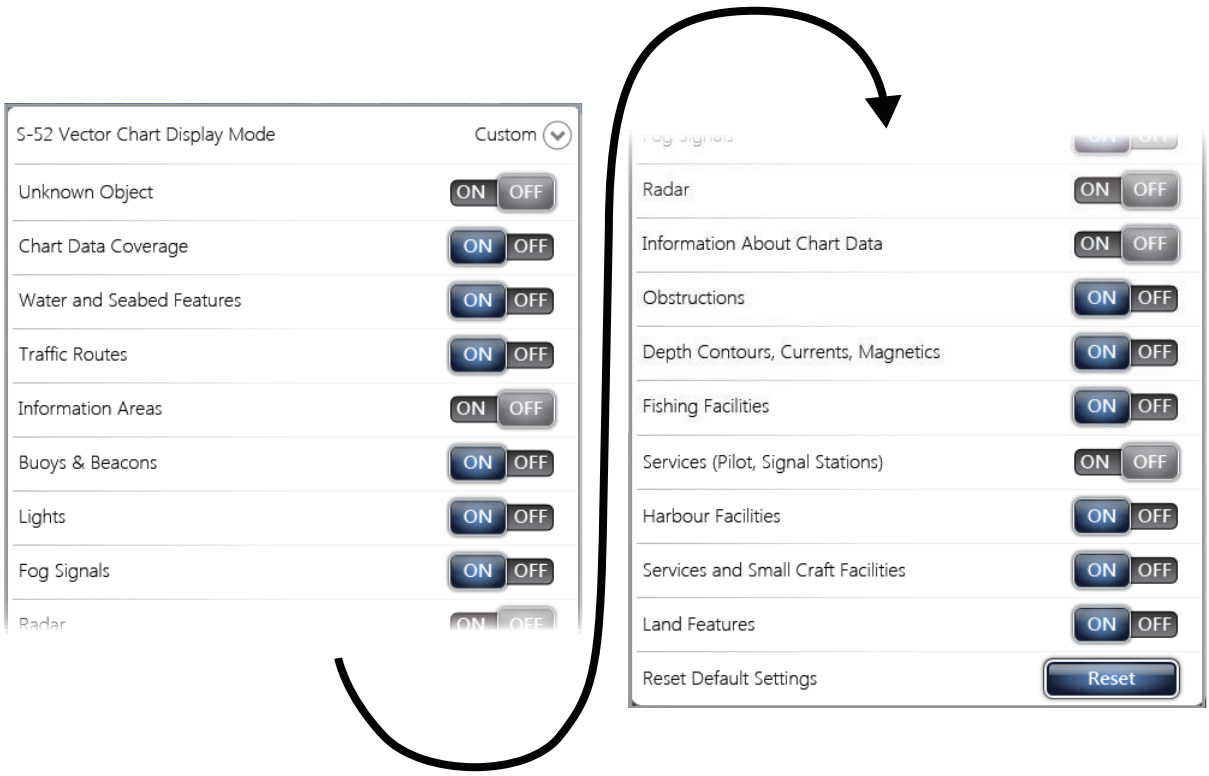
[Display Seabed]: Show or hide seabed composition indication, for example, mud, sand, rock.

[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

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



[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, Currents, Magnetics]: 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.

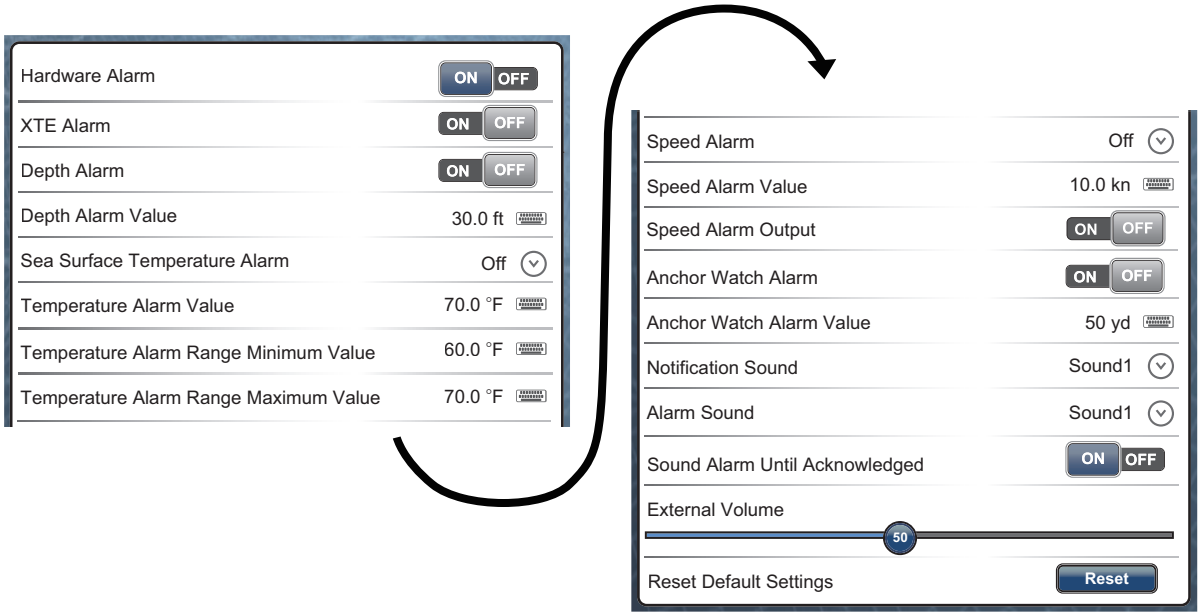
2.10 Alarms

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

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

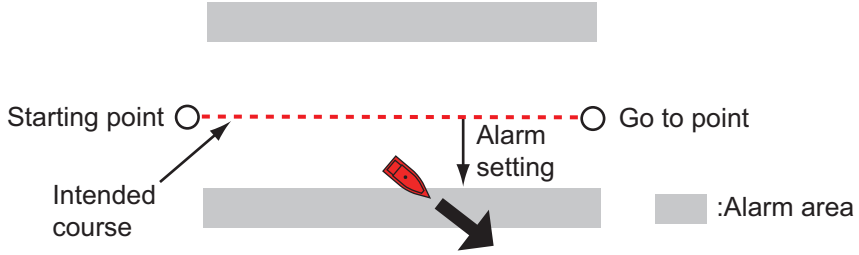
How to open the [Alarm] menu

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [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. Select the [ON] icon in [XTE Alarm] of the [Alarm] menu.
2. Select [XTE Value] from the [Route] menu to display the software keyboard.
3. Set the value then select [Confirm].
4. Select [Close].

2.10.2 Depth alarm

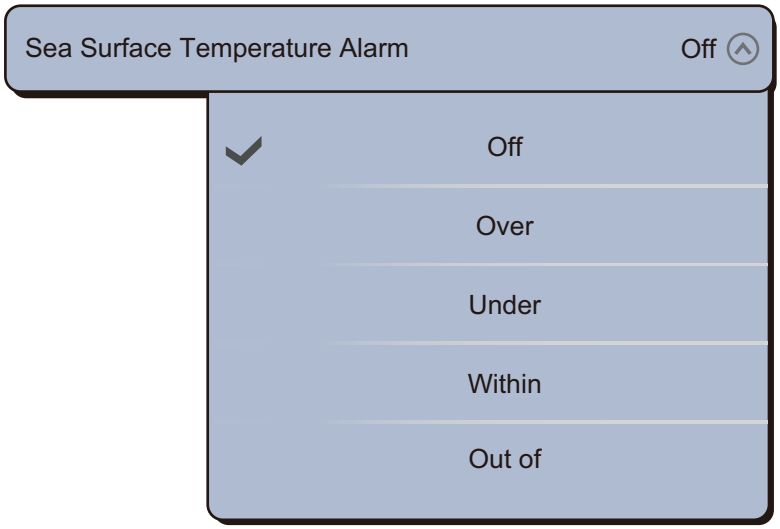
The depth alarm tells you when the depth to the bottom is shallower than the value you set. Requires depth data.

1. Select the [ON] icon in [Depth Alarm] of the [Alarm] menu.
2. Select [Depth Alarm Value] to display the software keyboard.
3. Set the value then select [Confirm].
4. Select [Close].

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. Select [Sea Surface Temperature Alarm] from the [Alarm] menu.

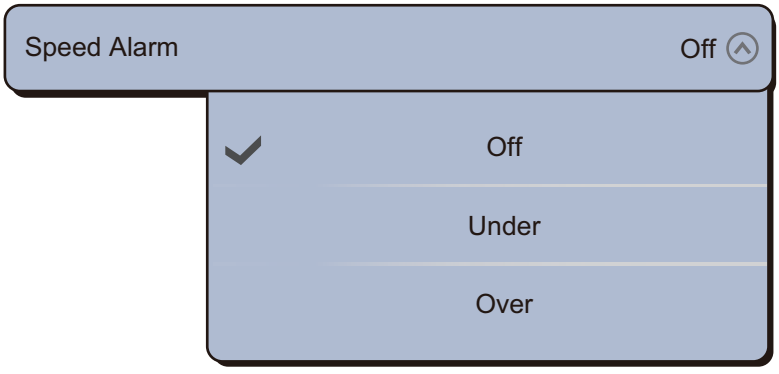


2. Select [Over], [Under], [Within] or [Out of]. For [Over] or [Under], go to the next step. For [Within] or [Out of], go to step 5.
3. Select [Temperature Alarm Value] to display the software keyboard.
4. Set the value for [Over] or [Under] then select [Confirm]. Go to step 9.
5. Select [Temperature Alarm Range Minimum Value] to display the software keyboard.
6. Set the minimum value for [Within] or [Out of] then select [Confirm].
7. Select [Temperature Alarm Range Maximum Value] to display the software keyboard.
8. Set the maximum value for [Within] or [Out of] then select [Confirm].
9. Select [Close].

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]. Requires a GPS navigator or speed sensor.

1. Select [Speed Alarm] from the [Alarm] menu.

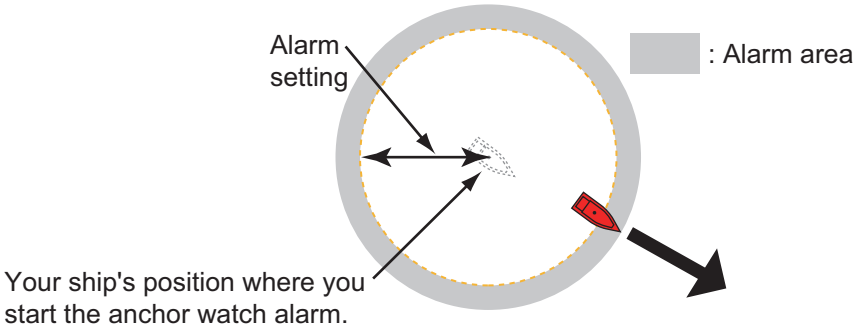


2. Select [Under] or [Over].

3. Select [Speed Alarm Value] to display the software keyboard.
4. Set the value for [Under] or [Over] then select [Confirm].
5. If you output the speed alarm from this equipment, select the [ON] icon in [Speed Alarm Output].
6. Select [Close].

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.



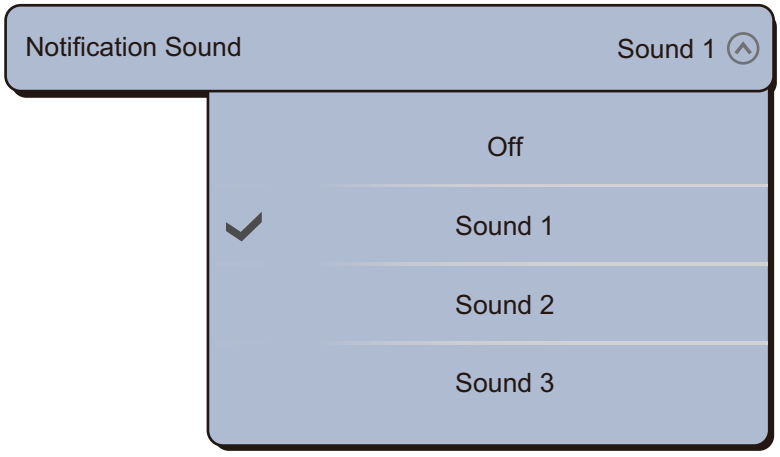
1. Select the [ON] icon in [Anchor Watch Alarm] of the [Alarm] menu.
2. Select [Anchor Watch Alarm Value] to display the software keyboard.
3. Set the value then select [Confirm].
4. Select [Close].

2.10.6 Alarm menus

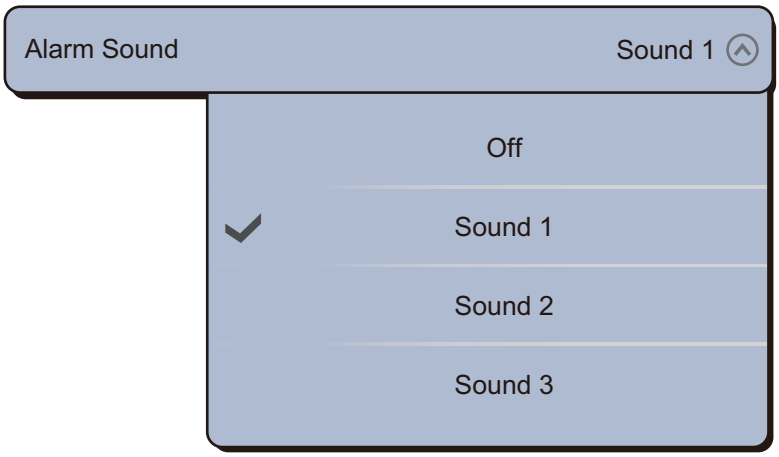
The followings are the alarm menus not previously mentioned.

[Hardware Alarm]: Select [OFF] to disable hardware alarms.

[Notification Sound]: Activate ([Sound 1 (2, 3)]) or deactivate ([Off]) the notification sound (for "Waypoint Crossing" (see section 5.9), "End of Route" (section 4.12) or fish finder alarms (section 7.9)).



[Alarm Sound]: Activate ([Sound 1 (2, 3)]) or deactivate ([Off]) the alarm buzzer.



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

[External Volume]: Set the level for the external volume output.

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

2.10.7 How to stop the alarm sound

When an alarm is generated, the name of the offending alarm appears on the status bar at the top of the screen and flashes. If [Alarm Sound] is active, the unit beeps. To stop the flashing and silence the alarm, tap the status bar.



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

2.11 Track

The track (or movement) of your ship is plotted on the screen with position data. Your track lets you see how your ship has moved.

The track is saved to the internal memory if the track is active. A line runs between each track point. The internal memory stores a maximum of 30,000 track points. When the memory for track points becomes full, the oldest track points are deleted to get space for new track points.

Your track remains on the screen when the power is turned off. You can delete the track that you do not need from the menu.

The saved track can be shown on the screen, and you can make a route with the saved track.

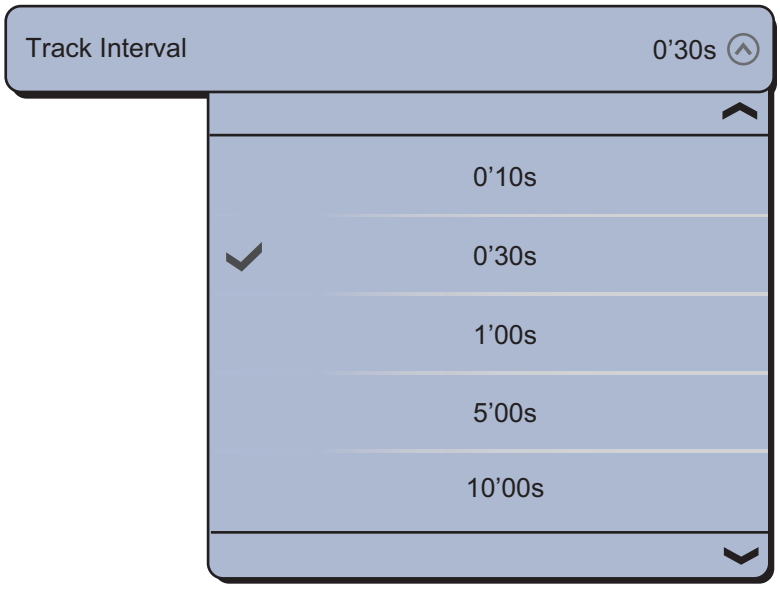
2.11.1 How to show or hide the track display

1. Select [Overlay] from the RotoKey menu.
2. To show the track, select [Tracks]. To hide the track, deselect [Tracks].

2.11.2 Track 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. When the track memory becomes full, the oldest track is erased to make room for the latest.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Ship & Track].
3. Select [Track Interval].



4. Select a time interval.
5. Select [Close] to exit the menu.

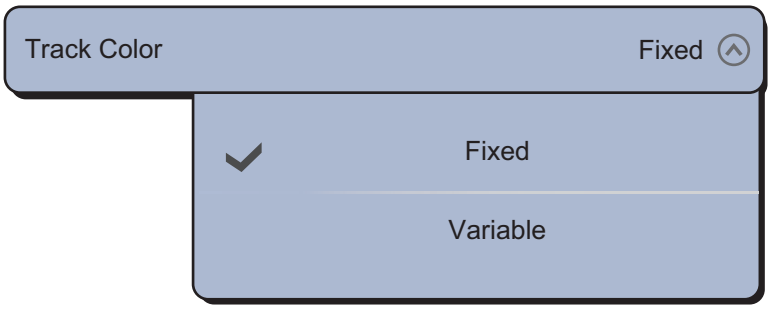
2.11.3 Track color

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

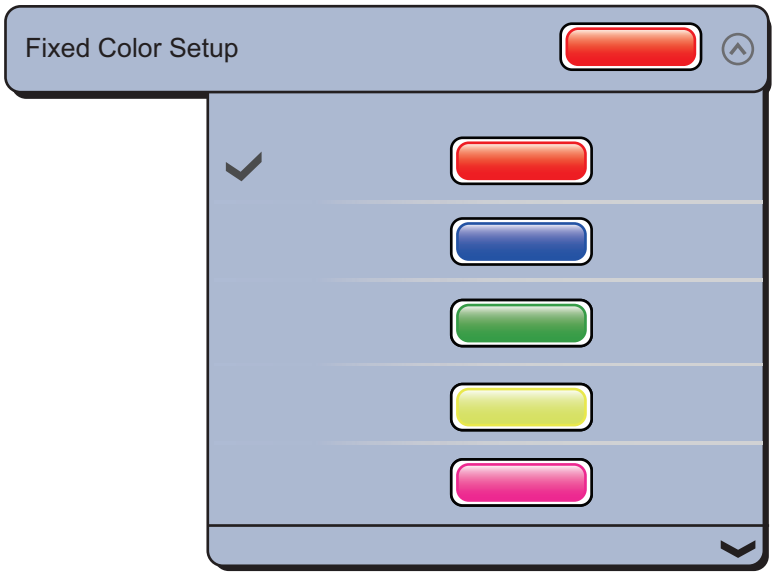
- SST (Sea Surface Temperature)
- Speed
- Depth
- Bottom sediment

From the main menu

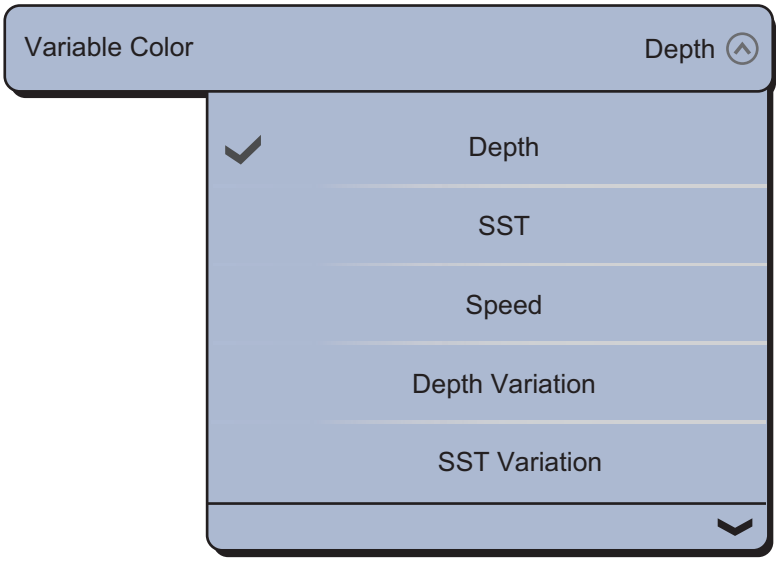
1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Ship & Track] - [Track Color] menu.



3. Select [Fixed] or [Variable]. For [Fixed], go to the next step. For [Variable], go to step 5.
4. Select [Fixed Color Setup] then select a color. Go to step 10.

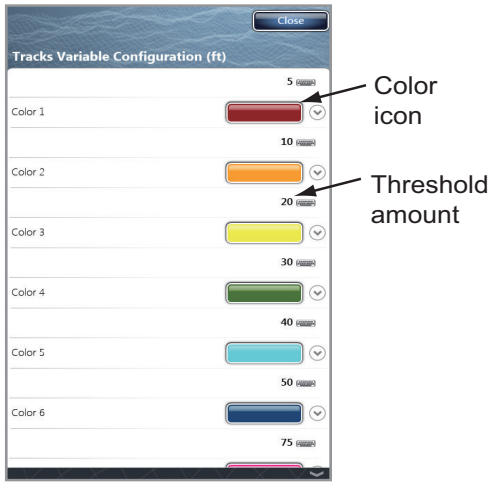


5. Select [Variable Color] then select an option.

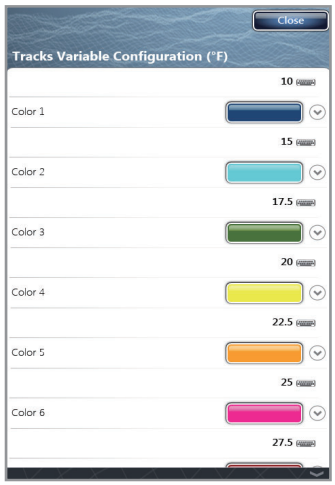


[Depth]: Set the color for each depth range. For example, when the red icon is selected in [Color 1], the track is red for depths from 5 to 10 ft.
[SST]: Set the color for each range of sea surface temperature. For example, when the blue icon is selected in [Color 1] (temperature range: 10 to 15°F), the track is blue for temperatures from 10 to 15°F.
[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.
[Depth Variation]: Set the color for each depth variation. Tap [2.0 ft], then set each color. Do the same for [20 ft], [200 ft].
[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].
[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] 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 ✓.

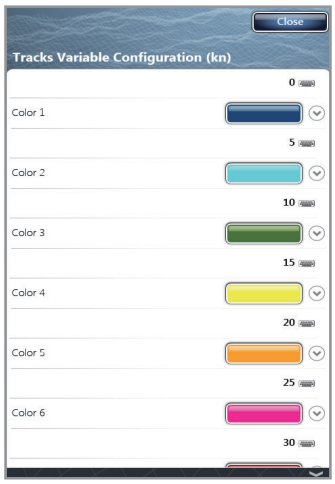
6. Select [Variable Color Setup].



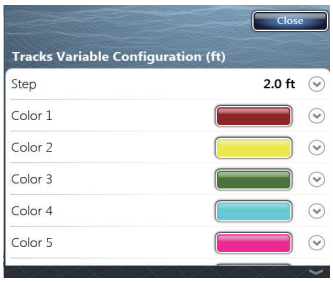
For [Depth]



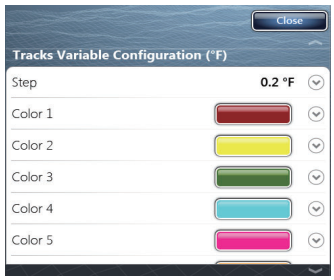
For [SST]



For [Speed]



For [Depth Variation]



For [SST Variation]



For [Bottom Discrimination]

7. For [Bottom Discrimination], select [Mud], [Sand], [Rock] or [Gravel]. For others, select [Color 1 (2, 3, 4, 5, 6, 7)].
8. Select 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]: 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.
[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.
[Depth Variation]: Set the color for each depth variation.
[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
[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] and [Speed], you can change the threshold amount for each color. Select a threshold amount to display the software keyboard. Set the value then select [Confirm].

9. Select [Close].
10. Select [Close] to exit the menu.

On the screen

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

2.11.4 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. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Ship & Track].
3. Drag the circle icon in [Track Thickness] to set the level.



4. Select [Close] to exit the menu.

2.11.5 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 the selected history track

You can delete the selected history track. You can not delete the track currently recorded.

1. Select the track to delete. The pop-up menu appears.
2. Select [Delete].

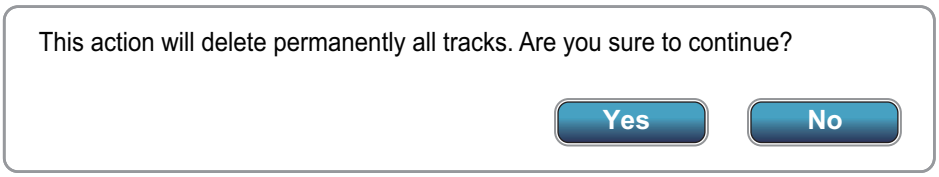
How to delete all tracks

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Ship & Track].

3. Select [Delete] in [Delete All Tracks].



The confirmation message appears.



4. Select [Yes].
5. Select [Close] to exit the menu.

2.11.6 How to turn on the automatic deleting of tracks

The internal memory stores a maximum of 30,000 track points. When the memory for track points becomes full, the equipment automatically deletes the oldest track points to get space for new track points.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Ship & Track].
3. Select the [ON] icon in [Automatic Track Deleting].

2.11.7 How to record tracks

You can record tracks as follows:

1. Select [Track Rec.] from the RotoKey menu. The track is plotted on the screen.
2. To stop plotting the track, select the track then select [Stop Track Rec.].

2.11.8 How to replay a saved track

You can replay a saved track on the screen to use the track to create a route.

1. Select the track to replay. The pop-up menu appears.
2. Select [Follow Track]. The route (blue) is created on the track (red).

2.11.9 How to remove a replayed track

After you have used a replayed track, you can remove the track from the screen as follows:

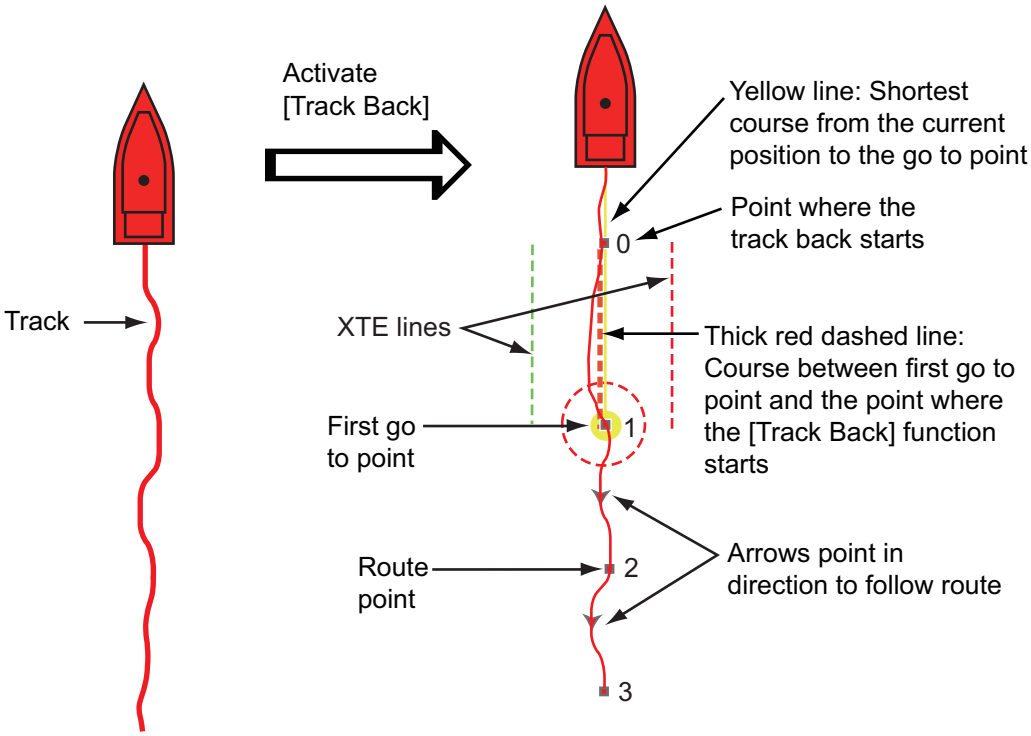
1. Select the replayed track to display the pop-up menu.
2. Select [Delete]. The red line is removed and the track remains as the route (blue line).

2.11.10 Trackback

The trackback feature creates a route with your current track. This feature helps you return along a previous track to get lobster pots, crab pots, and the like.

To use the trackback feature, select the active track to display the pop-up menu. Select [Track Back] to start operation as shown below.

- A yellow line runs between your ship and the destination (the shortest course).
- A thick red dashed line runs between first destination and point where the track back starts.
- Route points are automatically created.
- Arrows on the track point in the direction to follow the route.
- The XTE lines appear when you turn on these lines.



When you are following a route, you can do the following from the pop-up menu. Select the yellow line to display the pop-up menu.

- [Stop Nav.]: Stop following the route.
- [Restart Nav.]: Restart following the route.
- [Skip Wpt]: Skip a waypoint.
- [Rte Detail]: Open the [Route Detail] list.
- [Edit]: Open the [Editing Route] window.
- [Lists]: Open the lists.
- [Extend]: Extend a route from the last point on the route.

For additional information, see the chapter 5.

2.12 NAVpilot-700 Series Auto Pilot

The FURUNO NAVpilot-700 Series Auto Pilot installs in the TZT network. The following functions can be controlled from a TZT display:

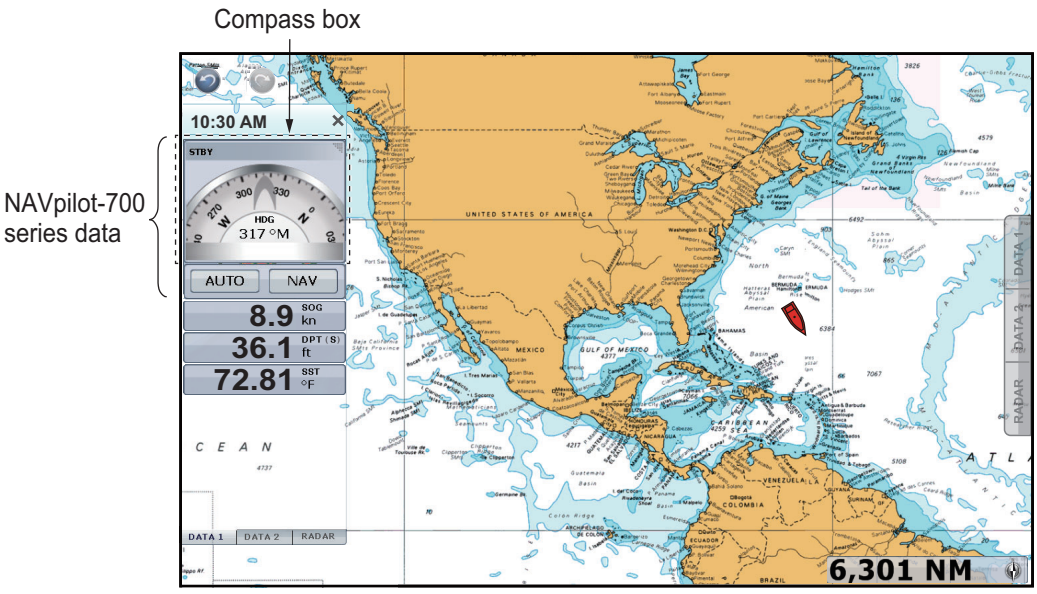
- Displaying the NAVpilot-700 series data in the data boxes.
- Selecting of steering mode (AUTO or NAV).

Note: When an alarm message for the NAVpilot-700 series appears, check the control unit of the NAVpilot-700 series.

2.12.1 How to show the NAVpilot-700 series data in the data boxes

For details, see section 1.12.

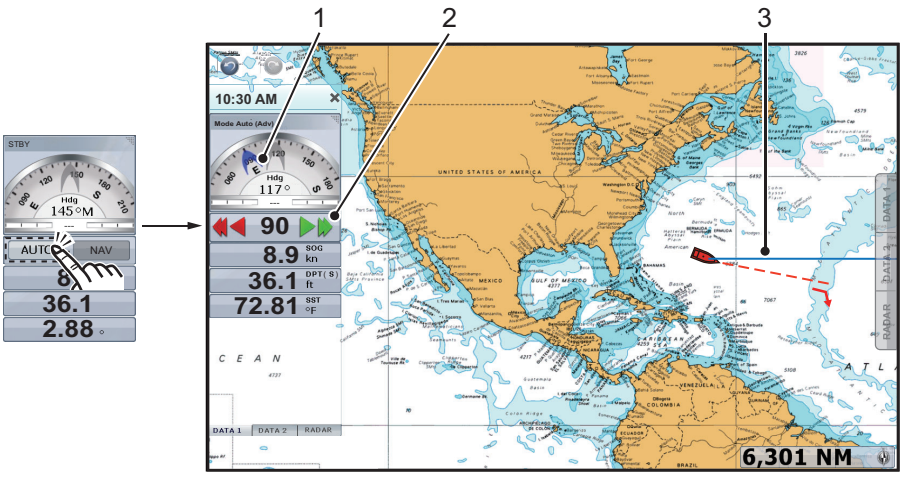
1. Select [DATA 1], [DATA 2] or [RADAR] of the side menu at the left or right of the screen to show a data box set.
2. Select a data box. The pop-up menu appears.
3. Select [Select Data].
4. Select [NAVPilot]. The NAVpilot-700 series data are displayed in the data boxes.



2.12.2 How to change the steering mode

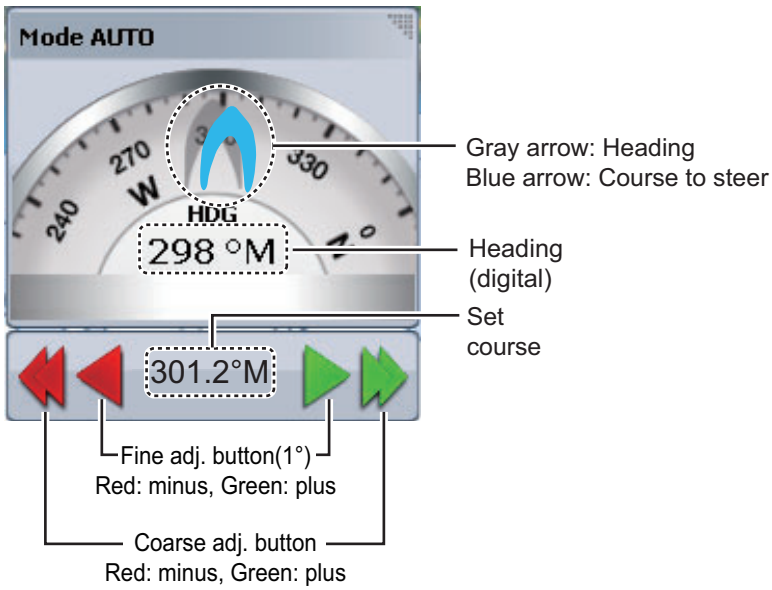
How to activate AUTO mode

1. Select [Auto] in the data box to activate AUTO mode. The followings occur:
   1) Two icons for the direction appear; the blue icon is for the set course, the gray for the heading.
   2) The indication for the steering modes ([Nav] and [Auto]) turns to the digital indication of the set course with the ◀ and ▶ marks.
   3) The blue line for CTS (course to steer) appears.

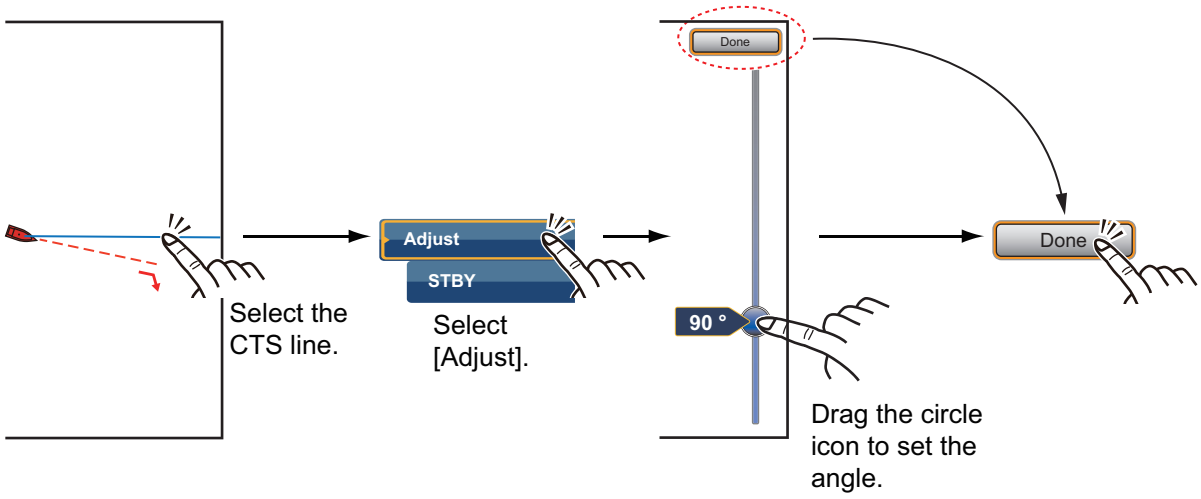


2. Adjust the CTS line by the following two methods:

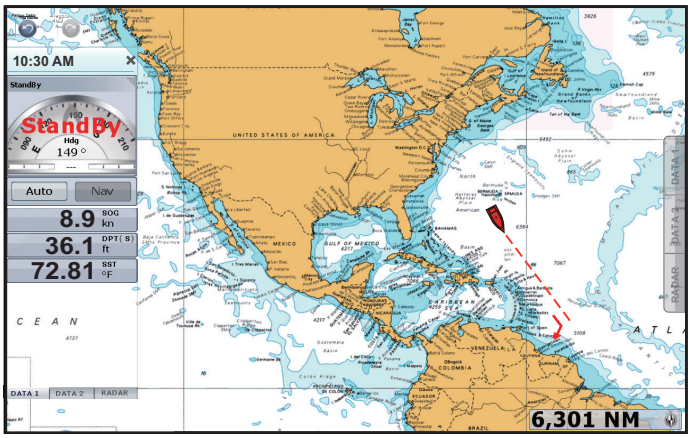
- Use the course adjustment buttons to adjust the CTS line. Tap the find adjustment buttons for 1° increments; coarse adjustment buttons for 2°-30°* increments. * Preset with [AutoPilot Navdata Increment] in the [Routes] menu.



- Select the CTS line to display the pop-up menu then select [Adjust]. Drag the circle icon to set the angle then select [Done] at the top right-hand corner of the screen. (You can also drag the CTS line to set the angle.)



3. Select the compass box to set the STBY mode. The blue line disappears and the indication for the steering modes ([Nav] and [Auto]) appears.



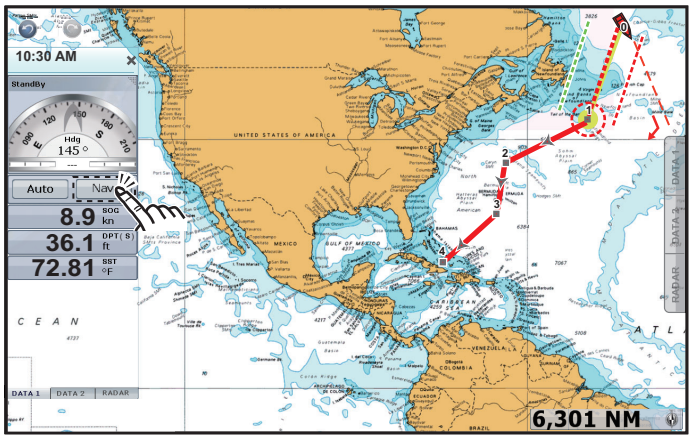
Note: You can change the steering mode from AUTO to STBY with the pop-up menu. Select the CTS line to display the pop-up menu then select [STBY].

How to activate NAV mode

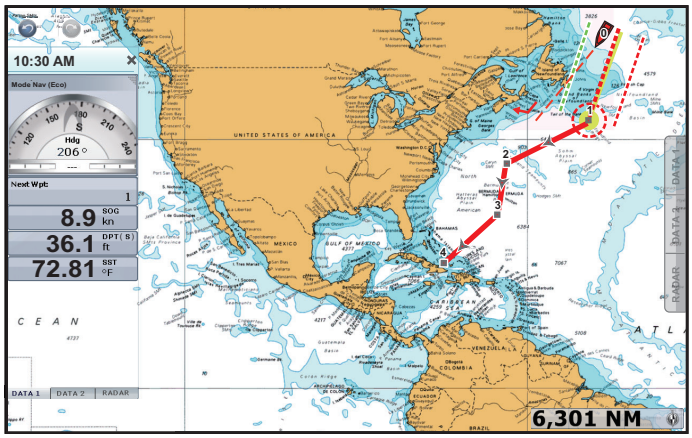
The [Nav] icon in the data box is grayed out without an active point or route. To activate NAV mode, activate a point or route (see sections 4.10 and 5.8). The message "Do you want to navigate using the NAVpilot?" appears on the screen (see the following note). Select [Yes]. The steering mode automatically changes to NAV.

Note: You can turn on or off this message by the [Routes] - [Navigate with AutoPilot] menu.
[ON]: When activating a point or route, the message appears.
[OFF]: When activating a point or route, the message does not appear.

1. Select [Nav] in the data box to activate NAV mode.



The COG vector points to the next route point. The indication for the steering modes ([Nav] and [Auto]) turns to the indication for Next Wpt (waypoint).



2. Select the compass box to STBY mode. The indication for the steering modes ([Nav] and [Auto]) appears.

2.13 Plotter Display Menu

This section describes the chart plotter menus. To open the following menus, select [Menu] on the menu icon bar then select [Plotter Display].



[Day/Night Mode]: Select the color mode for best viewing in the current environment. The options are [Automatic], [Day], [Dusk] and [Night].

[Chart Priority in Auto Mode]: Select the chart priority in auto mode from [Vector] and [Raster].

[Chart Boundaries]: Show or hide the chart boundaries.

[Display Raster Chart Unit Legend]: Show or hide the [Raster chart unit] box at the bottom left-hand corner of the screen. The unit for the depth values on the raster chart is displayed in the [Raster chart unit] box.

[Grid Interval]: Select the grid interval on the plotter display. The options are [Off], [Very Low], [Low], [Medium], [High] and [Very High].

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

[Transparencies]

[Tide Range for PhotoFusion]: Set the tide range to show in the satellite photo overlay. See subsection 3.2.2.

[PhotoFusion Transparency Offset]: Set the degree of transparency for the satellite photo overlay. See subsection 3.2.2.

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

[Depth Shading Transparency]: Set the degree of transparency for the depth shading on the water. See subsection 3.2.1.

[Radar Overlay]

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

[Radar Overlay Source]: Select the source for the radar echo from [Antenna Range1] or [Antenna Range2].

[Radar Overlay Range link]: Activate or deactivate matching the overlay with radar ranges.

[Echo Color for Overlay]: Select the color for the radar echo.

For the following menu items in the table, see chapter 3.

Menu item	Reference
[3D Display] • [Auto 3D Alti Exaggeration] • [3D Alti Exaggeration] • [Auto 3D Bathy Exaggeration] • [3D Bathy Exaggeration]	See subsection 3.1.3.
[Depth Shading Values] • [Auto Depth Shading Color Scale] • [Minimum Value] • [Maximum Value] • [Depth Color Shade]	See subsection 3.2.1.

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

3. 3D DISPLAY, OVERLAYS

3.1 3D Display

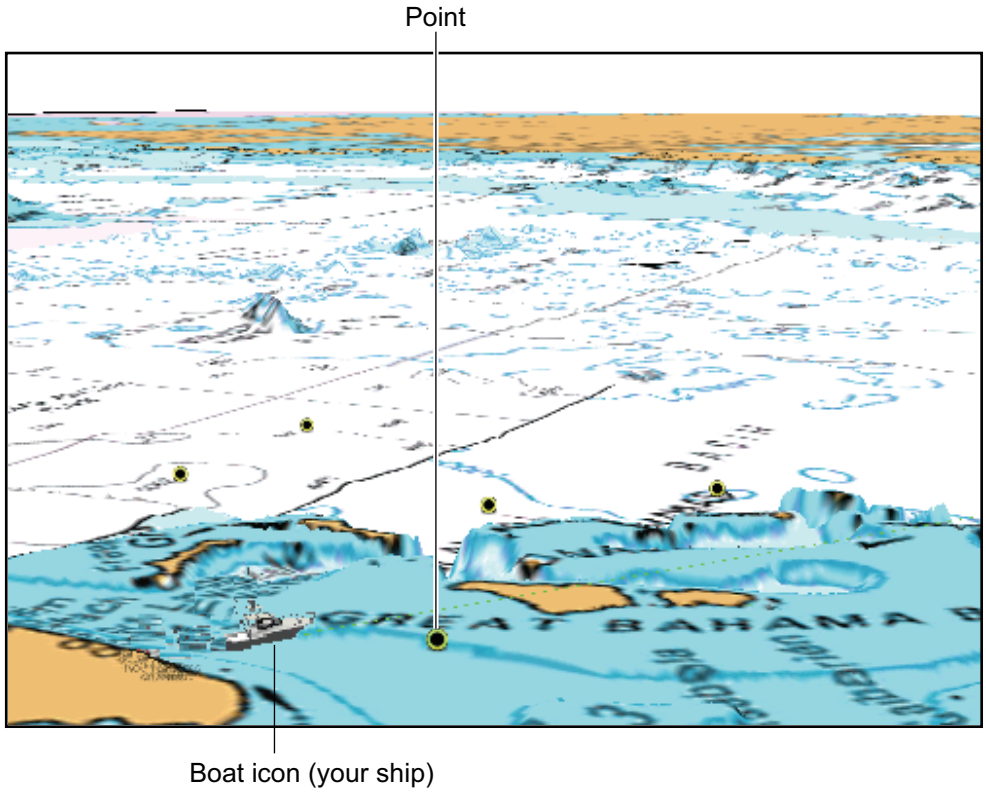
The 3D display has native 3D chart design that allows full time 3D presentation. This true 3D environment gives you all of the information you require with no restrictions on the information you can see. You can plan your routes, enter points, etc. like on the 2D chart.

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 Aerial view

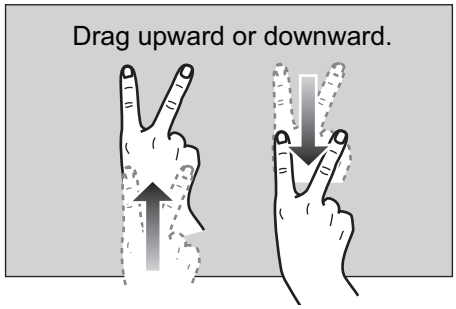
The aerial view is the view you get when you activate the 3D display. Your position is above and behind your ship, and your view is in the forward direction. The illustration shown below provides an example of how you can change the orientation of the aerial view display. This illustration shows the view from starboard side of the ship.



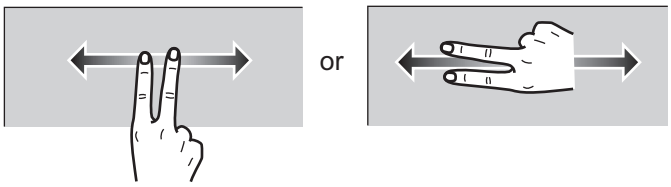
3D display, aerial view

3.1.2 How to activate the 3D display

1. Select [3D] from the RotoKey menu. You can also switch 2D to 3D by dragging two fingers upward or downward.



2. Orientate the 3D display by dragging sideways with two fingers.

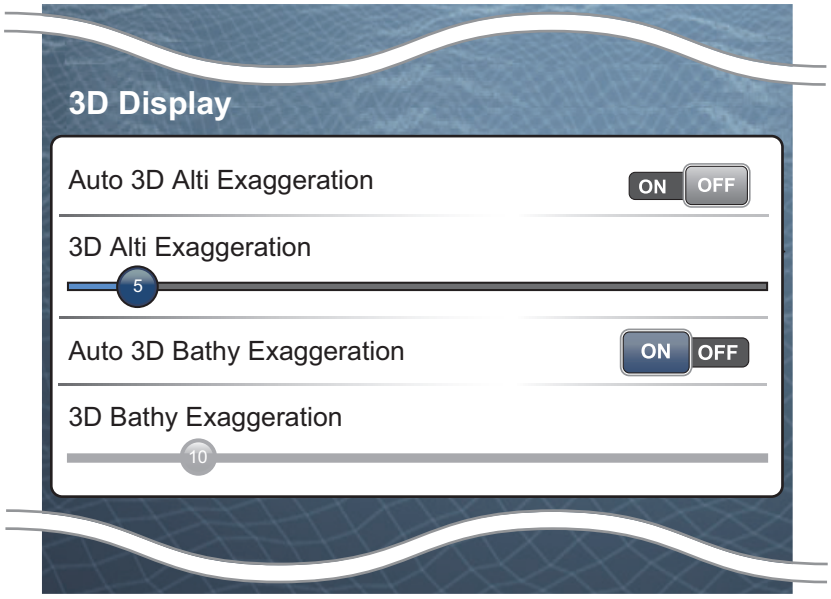


To switch to 2D, select [2D Mode] at the top right-hand corner of the screen.

3.1.3 How to make the 3D view clearer

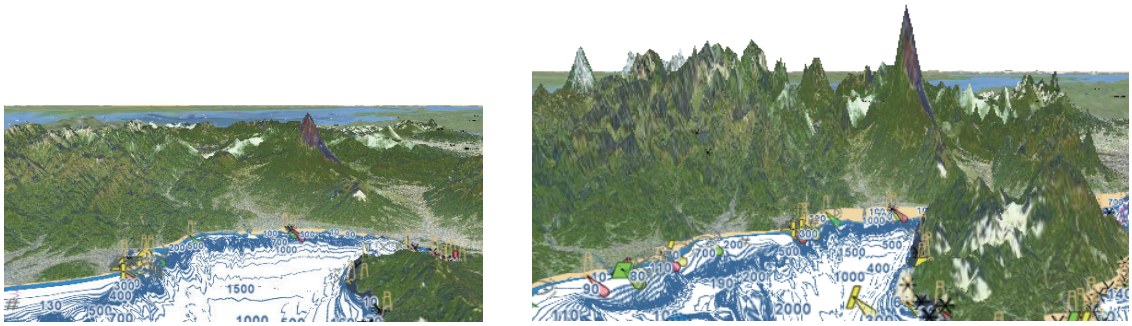
In the 3D display, some topographical features are easier to see if you use the 3D exaggeration feature. This feature expands both objects on the chart and the underwater vertically so that you can easily see the shape of the objects and position. There are two methods for 3D exaggeration: automatic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

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Plotter Display].



3. Automatic method:
   Select the [ON] icon in [Auto 3D Alti Exaggeration] or [Auto 3D Bathy Exaggeration].
   Manual method:
   Select [3D Alti Exaggeration] or [3D Bathy Exaggeration].
   [3D Alti Exaggeration]: Drag the circle icon to set the level for altitude.
   [3D Bathy Exaggeration]: Drag the circle icon to set the level for bathymetry.

High gives the highest level of exaggeration. The example below compares the same picture in low and high exaggerations.



Low exaggeration

High exaggeration

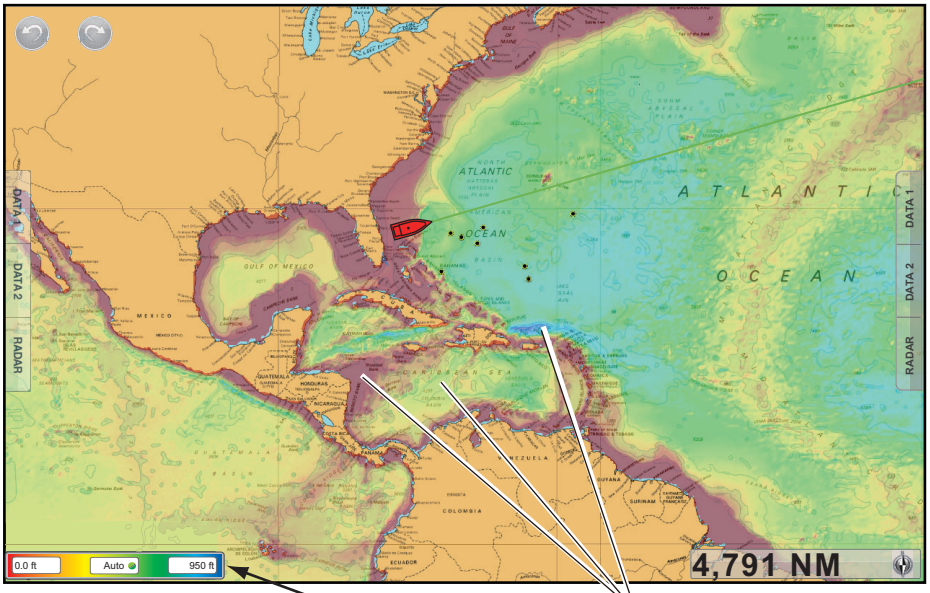
4. Select [Close] to exit the menu.

3.2 Overlays

Radar, satellite photo, depth shading, tide icons, tidal currents, etc. overlays are available on the chart plotter display.

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, select [Overlay] from the RotoKey menu then select [Dpth Shade]. To hide the depth shading overlay, deselect [Dpth Shade].



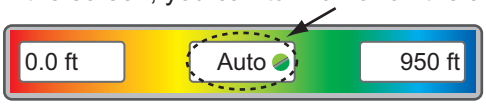
Depth shading settings

The depth shading settings are on the [Plotter Display] menu of the main menu. Set these menus by following the description shown below.

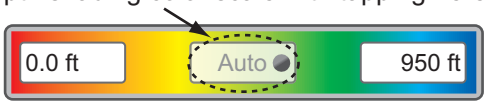


[Auto Depth Shading Color Scale]: Turn automatic depth shading color scale selection on or off.

On the screen, you can turn on or off the automatic depth shading color scale with tapping here.



ON

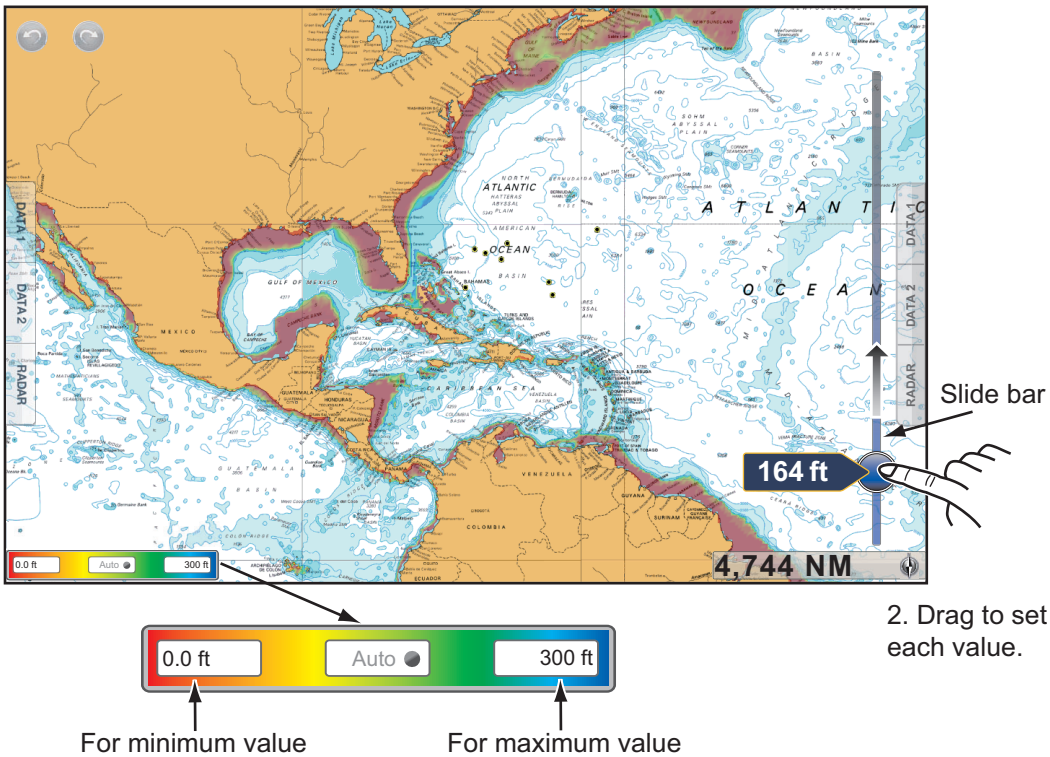


OFF: [Auto] is grayed out.

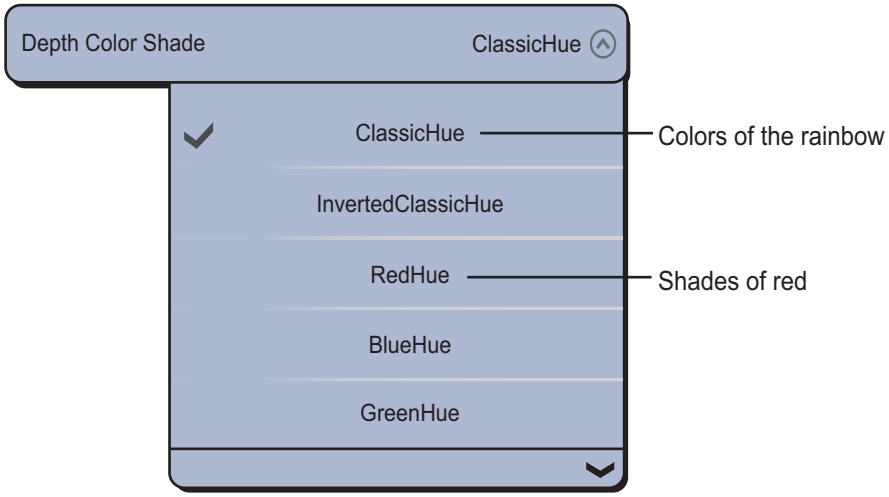
[Minimum Value]: Set the minimum depth range for which to show depth shading, with the software keyboard. This is available when [Auto Depth Shading Color Scale] is set to [OFF].

[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].

On the screen, you can set the minimum and maximum value.



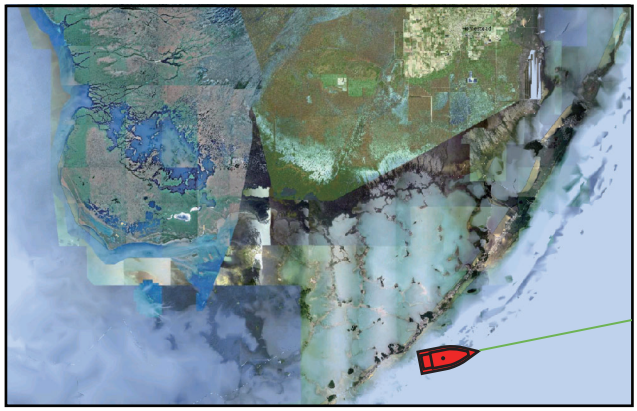
[Depth Color Shade]: Select how to display the depth colors among [ClassicHue], [InvertedClassicHue], [RedHue], [BlueHue], [GreenHue] and [YellowHue].



3.2.2 Satellite photo overlay

You can put the satellite photo for your area on the 2D and 3D displays. Select [Overlay] from the RotoKey menu then select [Sat Photo].

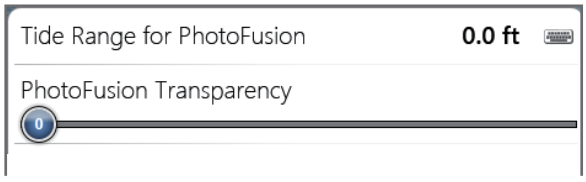
High resolution satellite images for the USA coastline are not provided standard, but are available at no cost (except shipping and handling). Users can install multiple satellite photos on the hard drive of the NavNet TZtouch. The illustration below shows the vector chart with the satellite photo overlay.



How to set up the satellite photo transparency

You can set the tide range to show and the degree of transparency for the satellite photo on the water.

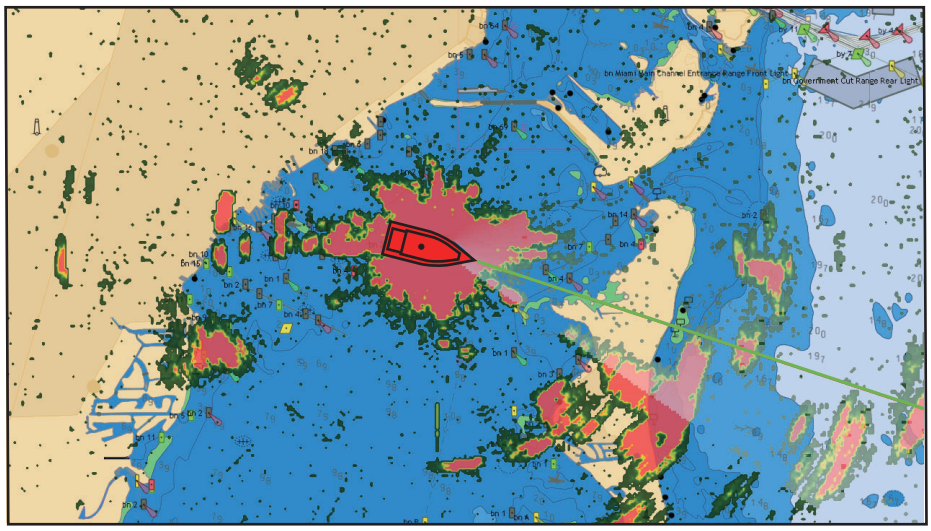
1. Select [Menu] on the menu icon bar to open the main menu, then select [Plotter Display].
2. Set the tide range with [Tide Range for PhotoFusion].



3. Set the transparency level of the satellite photo over water with [PhotoFusion Transparency Offset].
4. Select [Close] to exit the menu.

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, select [Overlay] from the RotoKey menu then select [Radar]. You can also activate display the radar overlay from the [RADAR] side menu.



How to switch between stand-by and TX

To transmit, select [Radar] from the RotoKey menu then select [Tx Radar]. To get stand-by, deselect [Tx Radar].

How to set the level of the radar echo transparency

RotoKey menu: Select the [Radar] - [Transparency] menu. Drag the circle icon to set the level.

Main menu: Select [Plotter Display]. Drag the circle icon to set the level in [Radar Overlay Transparency].

How to match the overlay and radar ranges

Select [Plotter Display] of the main menu. Select the [ON] icon in [Radar Overlay Range link].

How to adjust radar gain, sea, rain

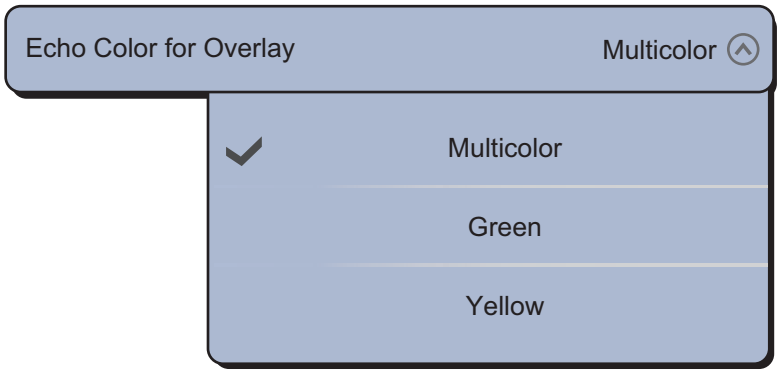
The gain and sea and rain clutters can be adjusted from the radar overlay. Select [Radar] from the RotoKey menu. For automatic adjustment, select [Auto Gain], [Auto Sea] or [Auto Rain]. For manual adjustment, select [Manual Gain], [Manual Sea] or [Manual Rain] then drag the circle icon to set each level. See section 6.3, section 6.4 or section 6.5.

How to display the echo trail

Select [Radar] from the RotoKey menu then select [Echo Trail] to display the echo trail. To hide the echo trail, deselect [Echo Trail].
To clear the echo trail, select [Radar] from the RotoKey menu then select [Clear Trail].

How to select the echo color

Select the [Plotter Display] - [Echo Color for Overlay] menu of the main menu. Select [Multicolor], [Green] or [Yellow].



How to acquire a target for ARPA

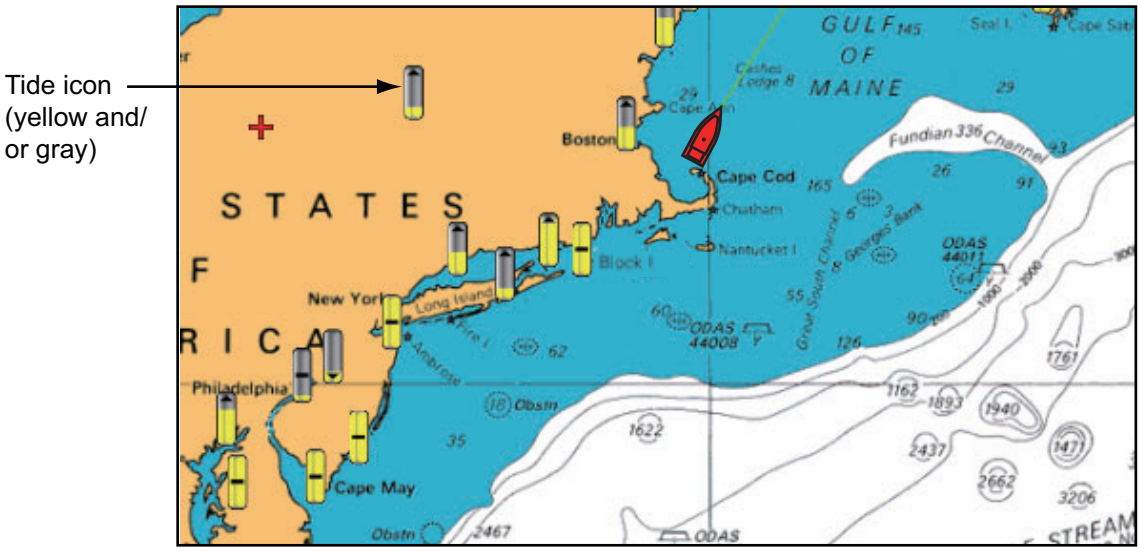
A target can be acquired for ARPA. See subsection 6.30.2.

3.2.4 Tide icon overlay

The NavNet TZtouch has worldwide tidal and tidal current information. You can overlay this information on the chart plotter display. The tide icon ( ) appears at the locations of tidal recording stations.

How to display the tide icon overlay

1. Select [Overlay] from the RotoKey menu.
2. Select [Tide Icons].



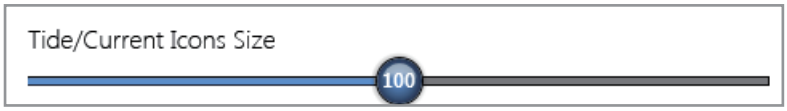
: Up arrow indicates the tide is going high. : Down arrow indicates the tide is going low.

: No arrow indicates no change in tide.

The arrow on the tide icon is up when the tide is high, or is 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.

How to change the size of the tide icon

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Plotter Display].
3. Drag the circle icon in [Tide/Current Icons Size] to set size (setting range: 50 to 150%).



4. Select [Close] to exit the menu.

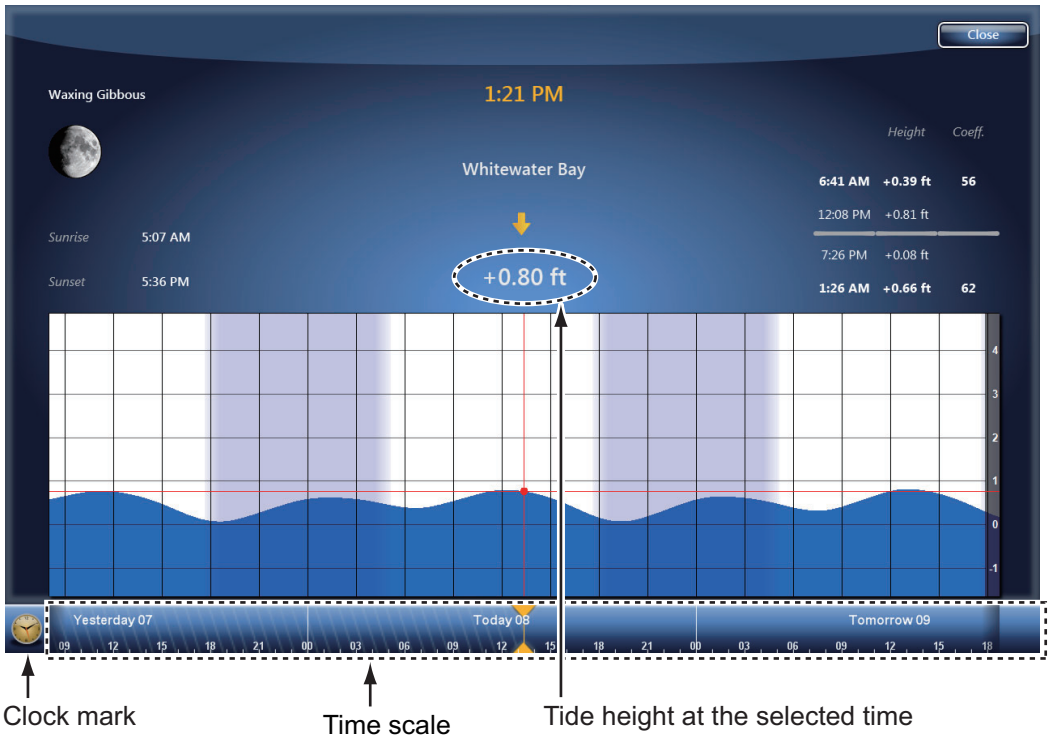
How to show the tide information

Select a tide icon to display the information (name, date, tide height and tide status) about a tide.



How to display the tide graph

- On the screen: Select a tide icon then select [Info] from the pop-up menu. You can display the tide graph to select the call-out for the tide information instead of the [Info] pop-up menu.
- From the [Tides] menu: Select [Tides] on the menu icon bar. The tide graph for the closest tidal station to the current position opens.



How to understand 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, select the clock mark at the bottom left-hand corner of the screen. The color of the clock mark turns gold.



Clock mark for the current time



Clock mark except the current time

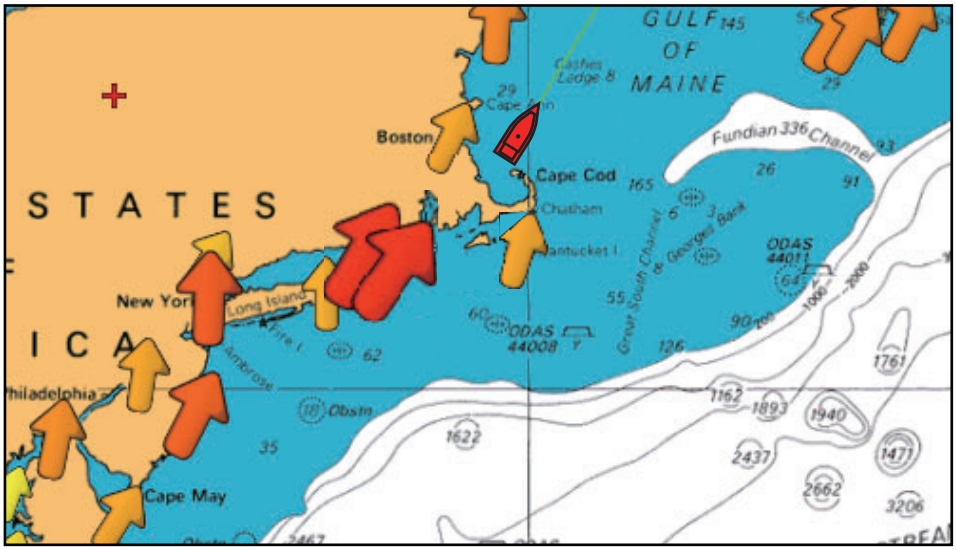
- To return to the chart plotter display, select [Close] at the top right-hand corner of the screen.

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

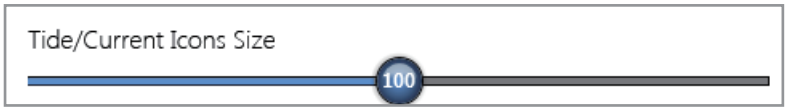
1. Select [Overlay] from the RotoKey menu.
2. Select [Currents].
   Arrows of more than one color and size appear on the screen and are pointing in different directions.



The arrow indicates the movement of the tidal current. The size and color of the arrow indicate the tidal current speed (yellow: slow, orange: medium, red: fast).

How to change the tidal current icon size

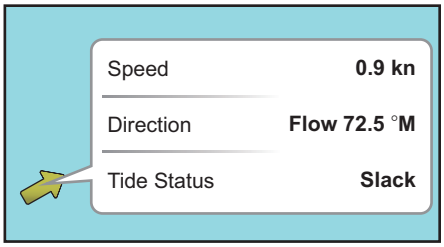
1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Plotter Display].
3. Drag the circle icon in [Tide/Current Icons Size] to set size (setting range: 50 to 150%).



4. Select [Close] to exit the menu.

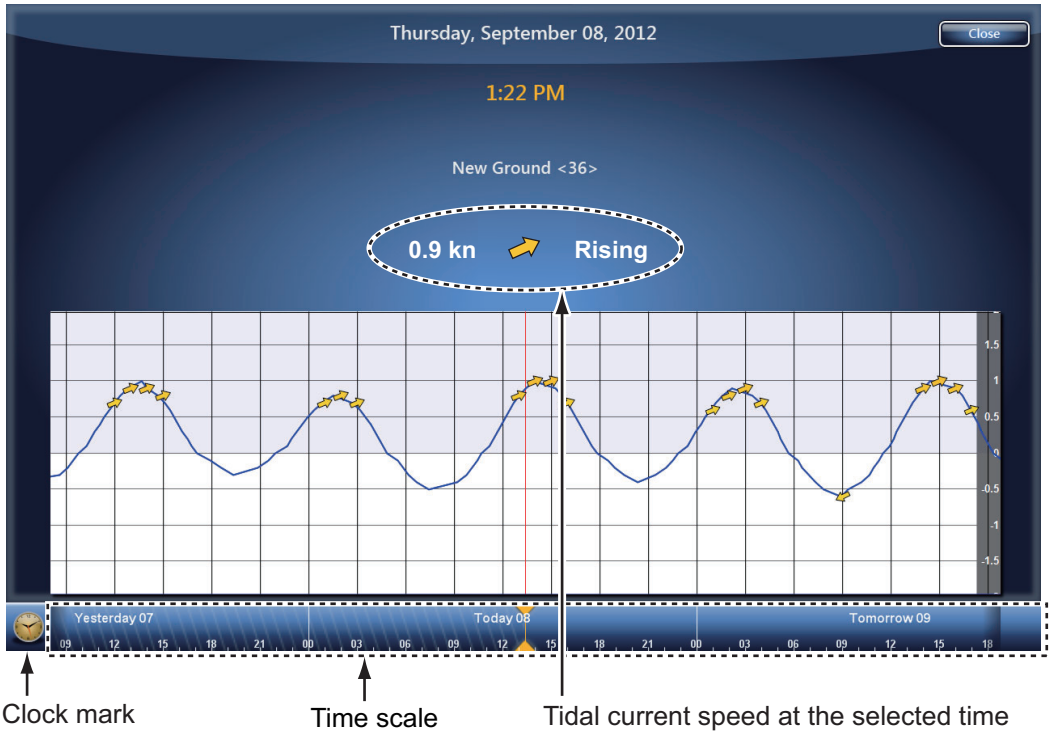
How to show the tidal current information

Select a tidal current icon to display the information (speed, direction and tide status) about a tidal current.



How to display the tidal current graph

Select a tidal current icon then select [Info] from the pop-up menu. You can display the tidal current graph to select the call-out for the tidal current information instead of the [Info] pop-up menu.



How to understand 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, select the clock mark at the bottom left-hand corner of the screen. The color of the clock mark turns gold.



Clock mark for the current time



Clock mark except the current time

- To return to the chart plotter display, select [Close] at the top right-hand corner of the screen.

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4. POINTS

4.1 About Points

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

This unit has 30,000 points into which you can enter position information.

When you enter a point, 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) 

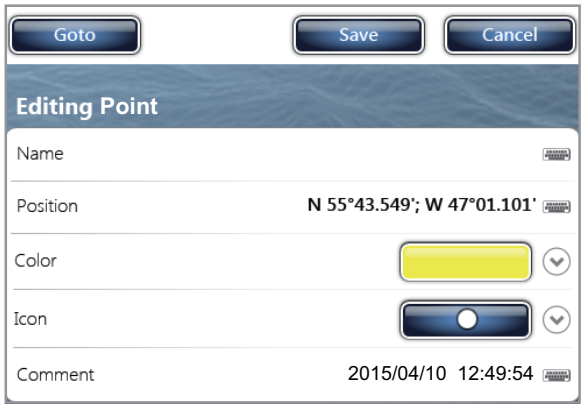
You can edit a point on the screen or the points list.

Note: Points can be shared with other NavNet TZtouch (or NavNet TZtouch2) via LAN. Data is shared automatically; no operation is required. Units of measurement (range, depth, etc.) also are shared.

4.2 How to Put a Point or an Event Mark

4.2.1 How to put a point

1. Select the position to display the pop-up menu.
2. Select [New Point] or [Lat/Lon]. To set the position accurately , select [Lat/Lon] then go to the next step.
3. Set the position referring to steps 2 and 3 in subsection 4.8.1.
4. Select [Confirm]. The [Editing Point] window appears.



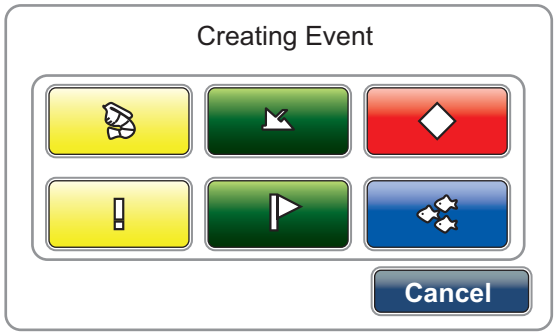
5. Select [Save]. The following occurs.

- The default point symbol is put at the selected position.
- The date and time of entry is automatically recorded as the [Comment].
- The point is saved to the points list.

4.2.2 How to put an event mark

This function is available by touch control when you select [Event] in [General] - [Function Gesture] of the main menu (see section 1.15).

1. Tap the screen with two fingers.



You can open the above window from the [Event] RotoKey menu.

2. Select a desired mark.

The following occurs.

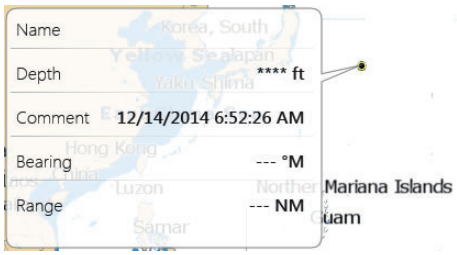
- The selected mark is put at the position, at the time the **RotoKey**TM was pushed or the screen was tapped to open the [Creating Event] window.
- The event mark is saved to the points list.

Most of the operations are common in points and event marks.

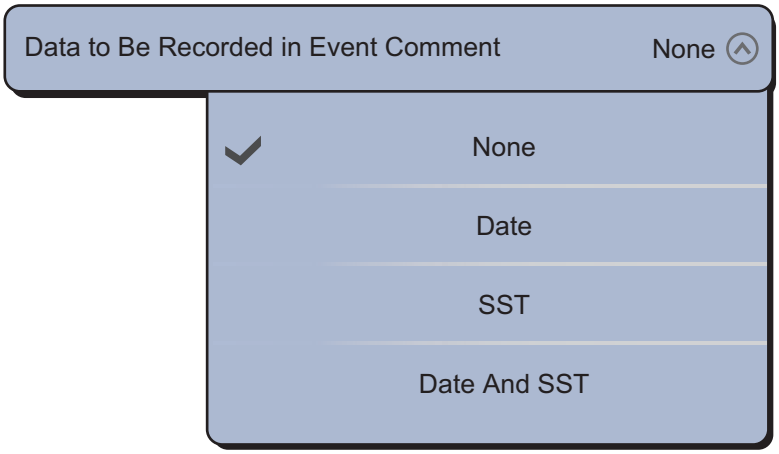
4.3 How to Display the Point Information

Select a point to display the information (name, depth, comment, bearing and range) about a point.

For an event mark, the comment is automatically entered according to the setting in the [Points] menu.



1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Points] - [Data to Be Recorded in Event Comment] menu.



3. Select an option.
   [None]: No comment
   [Date]: Date
   [SST]: Sea surface temperature
   [Date And SST]: Date and sea surface temperature
4. Select [Close] to exit the menu.



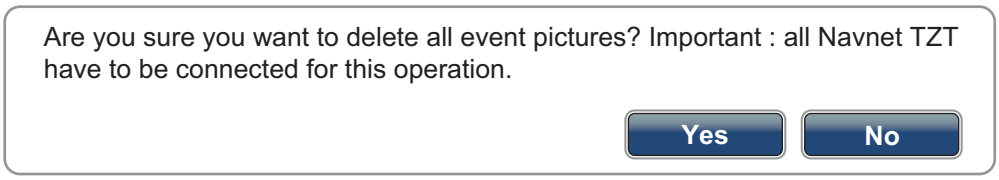
Example: [Date And SST]

Screenshot in the information area

You can display a screenshot, at the time when tapping the screen with two fingers to put an event mark, in the information area. Select [Points] of the main menu. Select the [ON] icon in [Add Screen Capture to Event].

To delete all screenshots for event marks in the information area, do the following:

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Points] - [Delete All Event Pictures] menu. The confirmation message appears



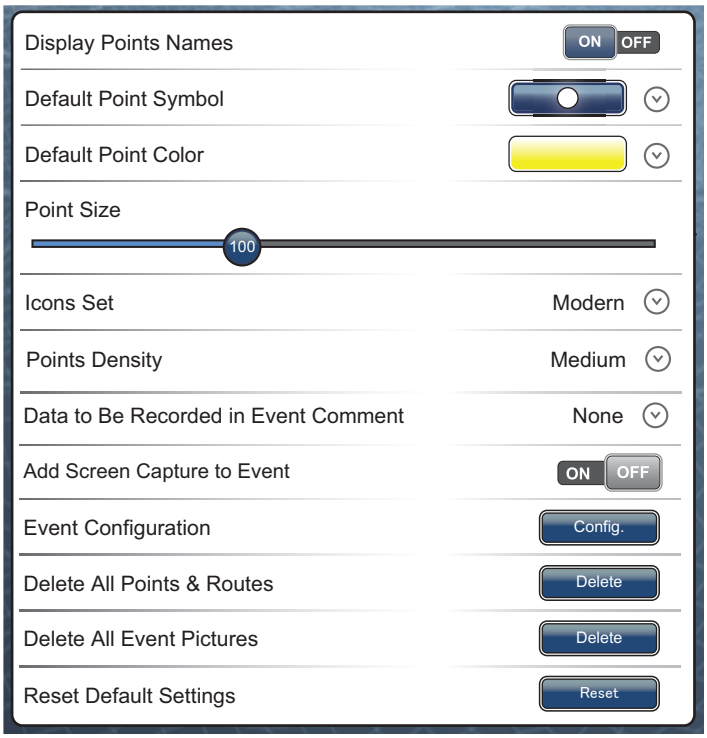
3. Select [Yes].
4. Select [Close] to exit the menu.

4.4 Default Point Settings

When you save a point, the equipment saves the point according to the shape, color, size and type set on [Points] of the main menu. If those settings do not meet your requirements, you can change the settings as shown below.

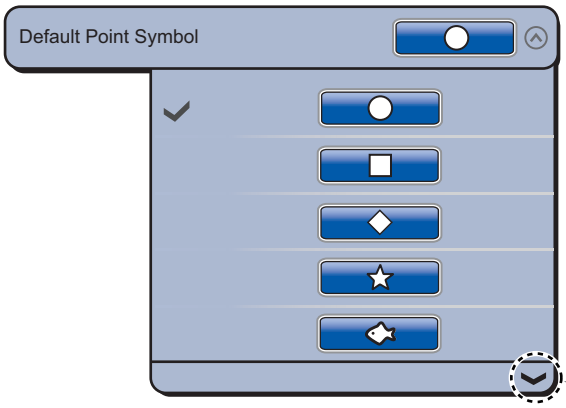
1. Select [Menu] on the menu icon bar to open the main menu.

2. Select [Points].

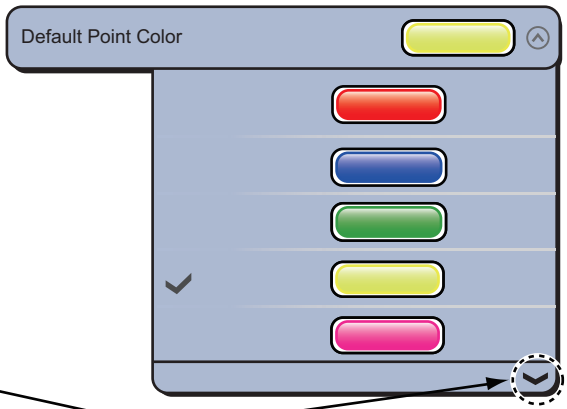


3. Select [Default Point Symbol], [Default Point Color], [Point Size] or [Icons Set]. Below are the options for [Default Point Symbol], [Default Point Color] and [Icons Set].

[Default Point Symbol]



[Default Point Color]



Scroll marks (Indicate options currently not shown in the window. You can see the options currently not shown by dragging.)

[Icons Set]



4. Select an option or set the level.
5. Select [Close] to exit the menu.

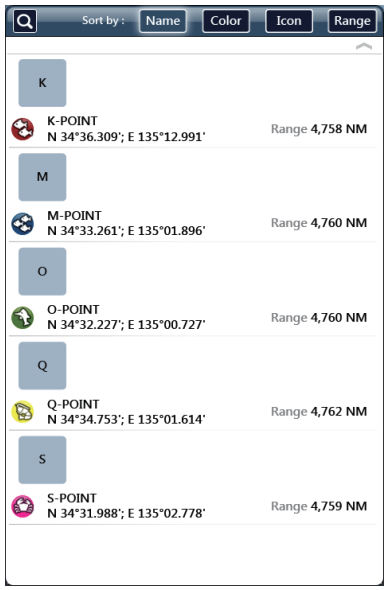
4.5 Points List

You can check and edit all created points in the points list. The following point data is saved for each point.

- Name
- Icon
- Location (latitude/longitude)
- Comment
- Color
- Distance from own ship.

4.5.1 How to show the points list

1. Select [Lists] on the menu icon bar to open the lists menu.
2. Select [Points List]to open the points list.
   Note: You can also open the lists menu from the [Display] - [Lists] section of the RotoKey menu, or tap a point then select [Lists] from the pop-up menu.



4.5.2 How to sort the points list

The points list can be sorted by [Name], [Icon], [Color] or [Distance] (from own ship).

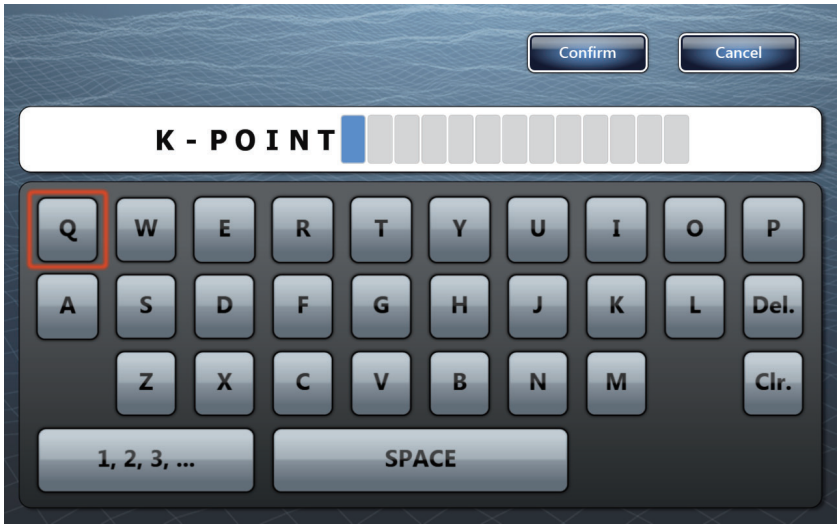
1. Select [Lists] on the menu icon bar to open the lists menu.
2. Select [Points List] to open the points list.
3. Select [Name], [Color], [Icon] or [Range] in the [Sort by] area at the top of the list.
   [Name]: Points sorted in alphanumeric order
   [Color]: Points sorted by color in order of red, green, blue, cyan, magenta, black & white, yellow, orange
   [Icon]: Points sorted by symbol shape order
   [Range]: Points sorted by range in ascending order

4.5.3 How to search the points list

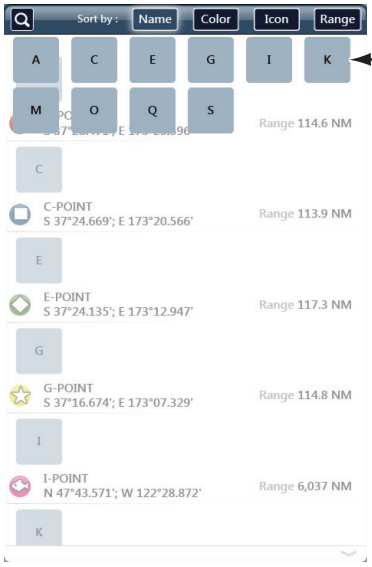
You can search the points list by [Name], [Icon], [Color].

1. Select [Lists] on the menu icon bar to open the lists menu.
2. Select [Points List] to open the points list.
3. Select [Name], [Color], [Icon] or [Range] in the [Sort by] area at the top of the list.

4. **For searches by name,** tap the letter above any point in the list to show the alphabetical options (the first letter of the name of all saved points appears) or tap the search icon ( ) to show the software keyboard.To search with the software keyboard, enter the name (or part of the name) of the point you want to find, then tap [Confirm]. The example below shows a search for "K-POINT".

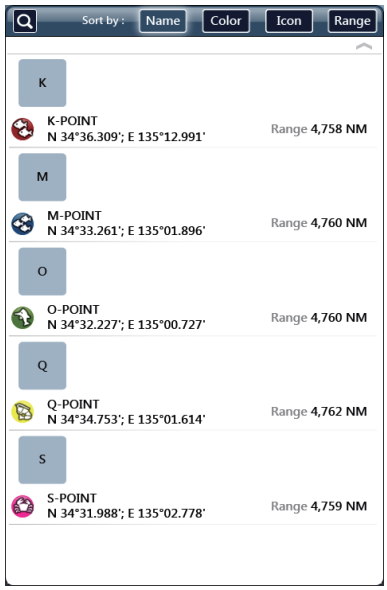


For searches by icon or color, tap the color or icon above any point to show the available search options.



Points which start with a particular letter have the first letter highlighted in the search options. In this example, the points list has points which start with the letter highlighted in gray.

5. The list moves to show the results for your search.
   The example figure below show the search results for "K-POINT".



4.6 How to Move a Point

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

4.6.1 How to move a point on the screen

1. Select the point to move. The pop-up menu appears.
2. Select [Move]. The selected point is highlighted.



3. Move the point to the new position by dragging the point or tapping the new position.
4. Select [End Move] at the top right-hand corner of the screen.

4.6.2 How to move a point from the points list

1. Select [Lists] on the menu icon bar to open the lists menu.
   You can also open the lists menu from the [Display] - [Lists] of the RotoKey menu.
2. Select [Points List] to open the points list.
3. Select [Name], [Color], [Icon] or [Range] in the [Sort by] area at the top of the list.
   [Name]: Points sorted in alphanumeric order
   [Color]: Points sorted by color in order of red, green, blue, cyan, magenta, black & white, yellow, orange
   [Icon]: Points sorted by symbol shape order
   [Range]: Points sorted by range in ascending order
4. Select the point to move then select [Edit] to display the [Editing Point] window.
   You can also open the [Editing Point] window on the screen. Select the point to move then select [Edit] from the pop-up menu.
5. Select [Position] to display the software keyboard.

6. Enter the position then select [Confirm].
7. Select [Save]. If you opened the [Editing Point] window on the screen, you do not need to do step 8.
8. Select [Close] to exit the menu.

You can also open the points list from the RotoKey menu instead of steps 1 and 2. See section 1.14.

4.7 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.

4.7.1 How to delete a point on the screen

1. Select the point to delete. The pop-up menu appears.
2. Select [Delete].

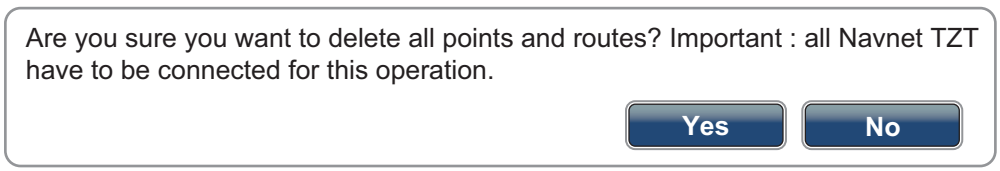
4.7.2 How to delete a point from the points list

1. Select [Lists] on the menu icon bar to open the lists menu.
2. Select [Points List] to open the points list.
3. Select [Name], [Color], [Icon] or [Range] in the [Sort by] area at the top of the list.
   [Name]: Points sorted in alphanumeric order
   [Color]: Points sorted by color in order of red, green, blue, cyan, magenta, black & white, yellow, orange
   [Icon]: Points sorted by symbol shape order
   [Range]: Points sorted by range in ascending order
4. Select the point to delete then select [Delete]. The point disappears from both the screen and the points list.
5. Select [Close].

4.7.3 How to delete all points

You can delete all points from the [Points] menu. When there is an active route, this function is not available.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Points] - [Delete All Points & Routes] menu. The confirmation message appears.



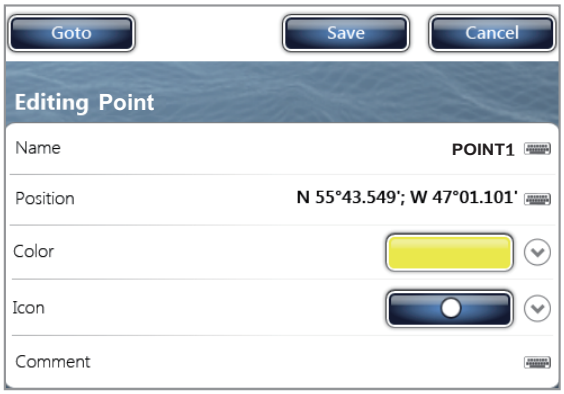
3. Select [Yes].
4. Select [Close] to exit the menu.

4.8 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.

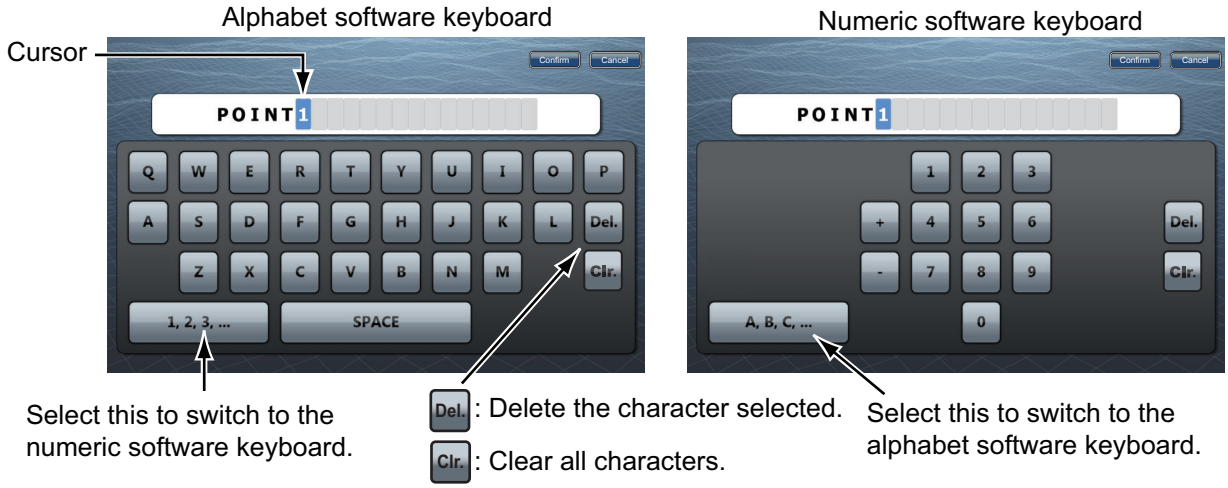
4.8.1 How to edit a point on the screen

1. Select the point to edit then select [Edit] from the pop-up menu. You can display the [Editing Point] window to select the call-out for the point information instead of the [Edit] pop-up menu.



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

   1) Select the character to edit. For example, "1" is selected in the following figure.



   2) Select an alphanumeric character from the software keyboard.

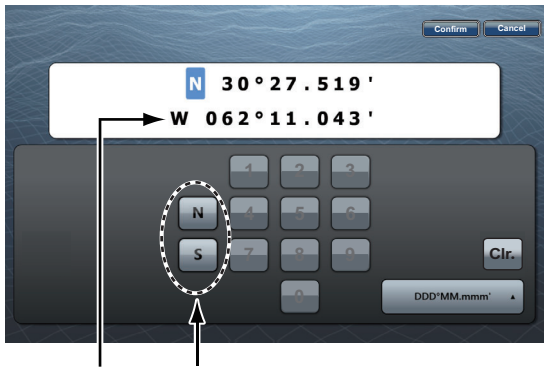
   3) Repeat steps 1) and 2) to complete the name. The maximum length of the name is 20 alphanumeric characters.

   4) Select [Confirm].

3. To change the position, select [Position] to display the software keyboard. Set the position referring to step 2.



Select position format.

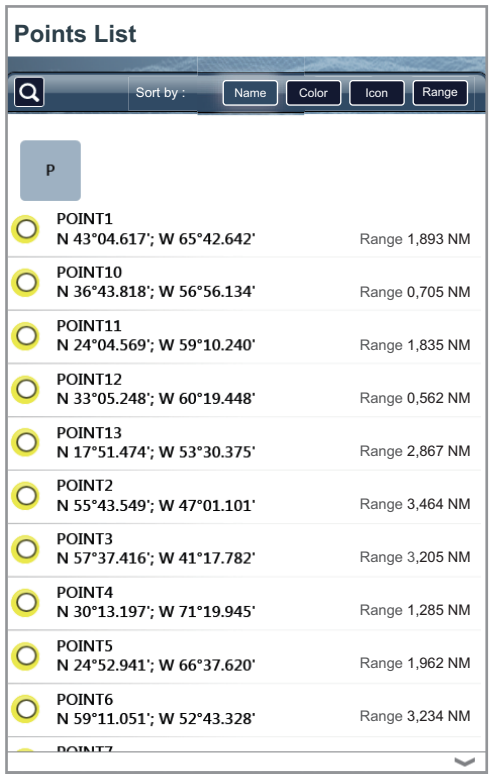


"N" and "S" appear when the cursor is on "N". When you select "W", "N" and "S" are replaced with "E" and "W".

4. Select [Color] to change the color of the point symbol.
5. Select a color.
6. Select [Icon] to change the point symbol.
7. Select a symbol.
8. Select [Comment] to display the software keyboard.
9. Enter the comment for the point.
10. Select [Confirm].
11. Select [Save].

4.8.2 How to edit a point from the points list

1. Select [Lists] on the menu icon bar to open the lists menu.
2. Select [Points List] to open the points list.
3. Select [Name], [Color], [Icon] or [Range] in the [Sort by] area at the top of the list.
   [Name]: Points sorted in alphanumeric order
   [Color]: Points sorted by color in order of red, green, blue, cyan, magenta, black & white, yellow, orange
   [Icon]: Points sorted by symbol shape order
   [Range]: Points sorted by range in ascending order

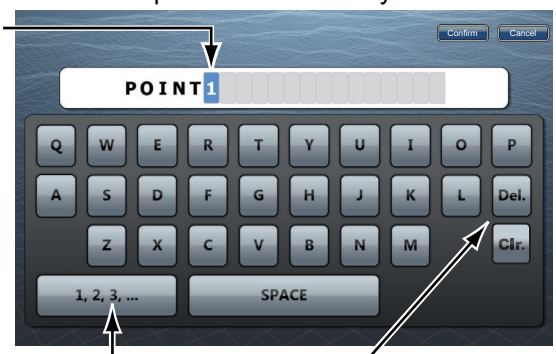


4. Select the point to edit then select [Edit].



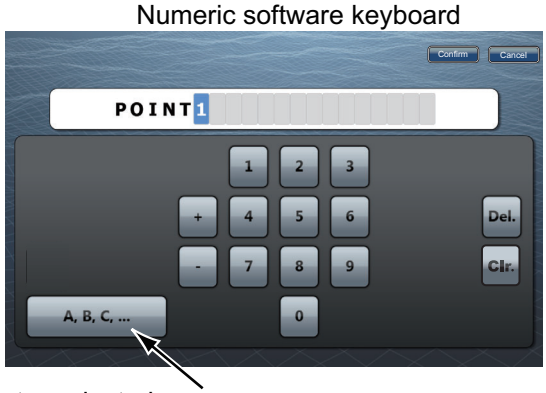
5. To change the name of the point, select [Name] to display the software keyboard. Change the name as follows:
   1) Select the character to edit. For example, "1" is selected in the following figure.

Alphabet software keyboard



Select this to switch to the numeric software keyboard.

Numeric software keyboard

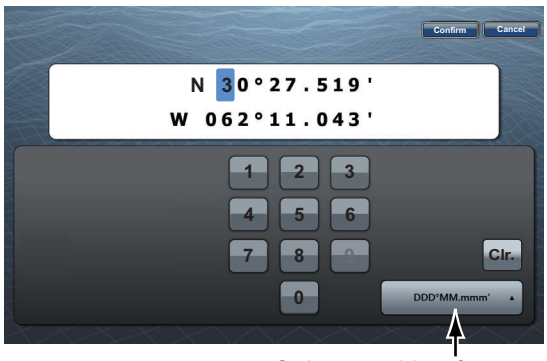


Select this to switch to the alphabet software keyboard.

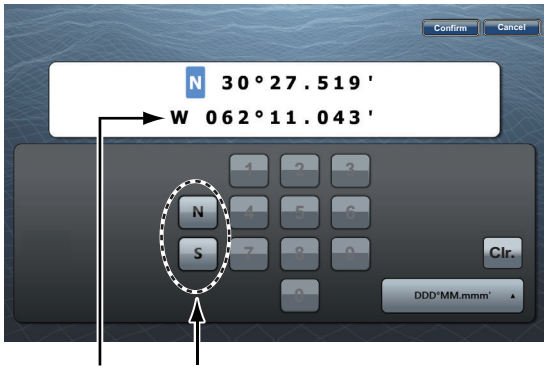
Del.: Delete the character selected.

Clr.: Clear all characters.

   2) Select an alphanumeric character from the software keyboard.
   3) Repeat steps 1) and 2) to complete the name. A name can have a maximum of 20 alphanumeric characters.
   4) Select [Confirm].
6. To change the position, select [Position] to display the software keyboard. Set the position referring to step 5.



Select position format.



"N" and "S" appear when the cursor is on "N". When you select "W", "N" and "S" are replaced with "E" and "W".

7. Select [Color] to change the color of the point symbol.
8. Select a color.
9. Select [Icon] to change the point symbol.
10. Select a symbol.
11. Select [Comment] to display the software keyboard.
12. Enter the comment for the point.
13. Select [Confirm].
14. Select [Save].
15. Select [Close] to exit the menu.

4.9 How to Find a Point

You can easily move a point to the center of the screen from the points list.

1. Select [Lists] on the menu icon bar to open the lists menu.
2. Select [Points List] to open the points list.
3. Select [Name], [Color], [Icon] or [Range] in the [Sort by] area at the top of the list.
4. Select the point to find then select [Find On Chart]. The menu closes and the selected point is put at the center of the screen on the active chart plotter display.
   Note: When you use this function in the split-screen display, the split-screen display is replaced with the full-screen display.

4.10 How to Show or Hide All Points or Points Names

Points

You can show or hide all points.

1. Select [Overlay] from the RotoKey menu.
2. To show all points, select [Points]. To hide all points, deselect [Points].

Points Names

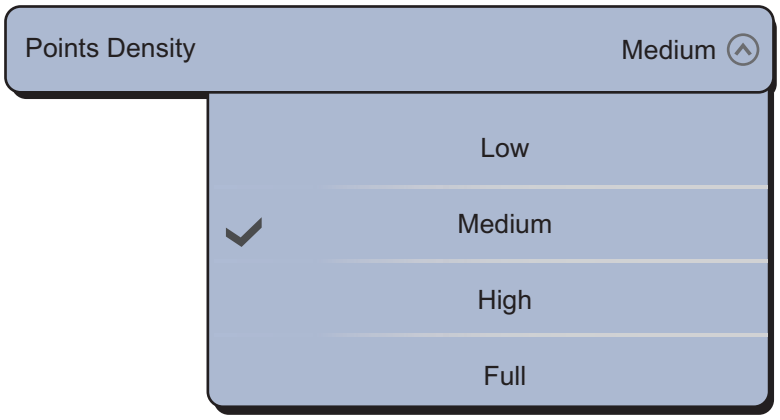
You can show or hide all points names.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Points].
3. To show all points names, select the [ON] icon in [Display Points Names]. To hide all points names, select the [OFF] icon.

4.11 How to Set Point Density

The screen can become cluttered if all points are shown. To prevent this, set the degree of point limitation to use as shown below.

1. Open the main menu.



2. Open the [Points] menu, then select [Points Destiny].
3. Select the degree of limitation for points, among [Low], [Medium], [High] and [Full]. [Low] displays the minimal number of points; [Full] displays all points.

4.12 How to Go to a Point

Select the point 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

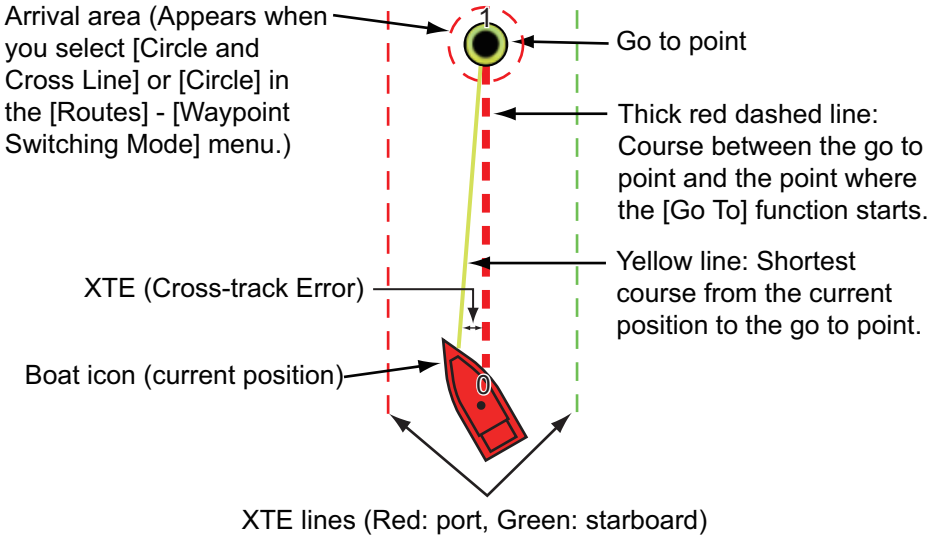
After you have selected a point, you can do the following.

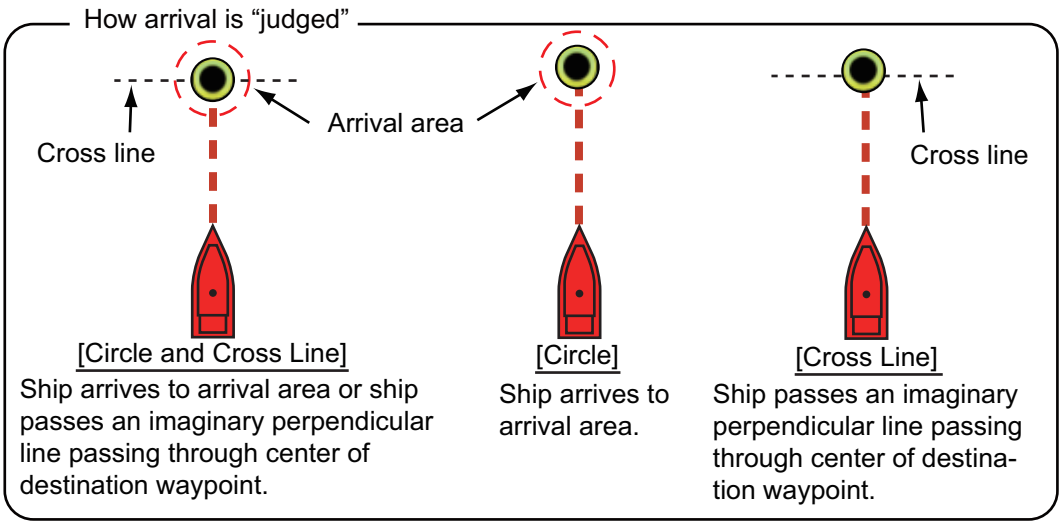
- Restart the cross-track error (XTE) indication.
- Stop and restart Go To. (Select the boat icon to display the pop-up menu. Select [Stop Nav.] and [Restart Nav.] respectively.)

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. Select the point to display the pop-up menu.
2. Select [Go To].





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 go to point is numbered "1" and the position where the [Go To] function starts is numbered "0".
- The arrival area marker appears if activated on the menu (see subsection 5.10.5).
- The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines with [Display XTE Lines] on [Routes] of the main menu.

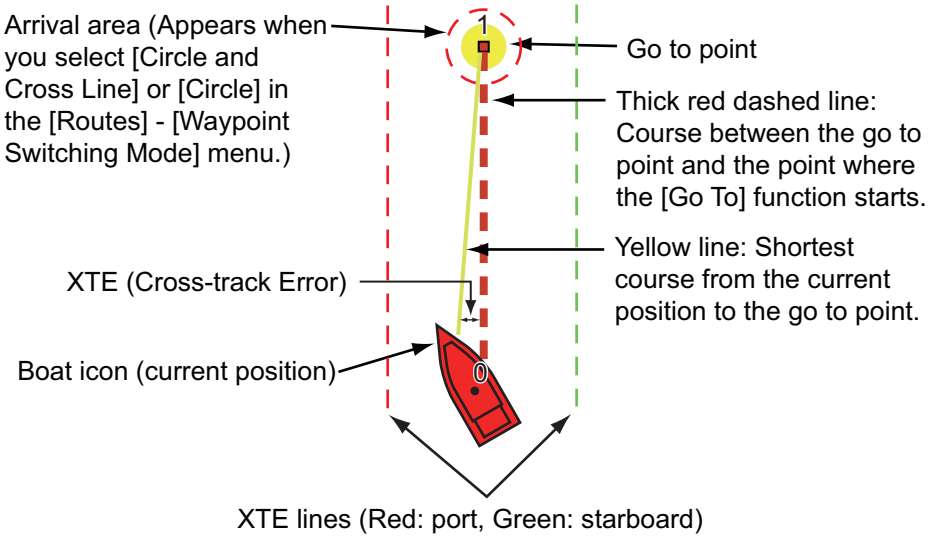
Note: If you want to be notified when you reach the go to point (the end of a route), turn on [End of Route Notification] on [Routes] of the main menu (see subsection 5.10.9). Then the message "End of Route" appears when you reach the end of a route. For the arrival timing, see subsection 5.10.5.

The route is saved to the routes list.

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 cancelled or the power is turned off.

1. Select the position to set as a point to go to. The pop-up menu appears.
2. Select [Go To].



The following occurs:

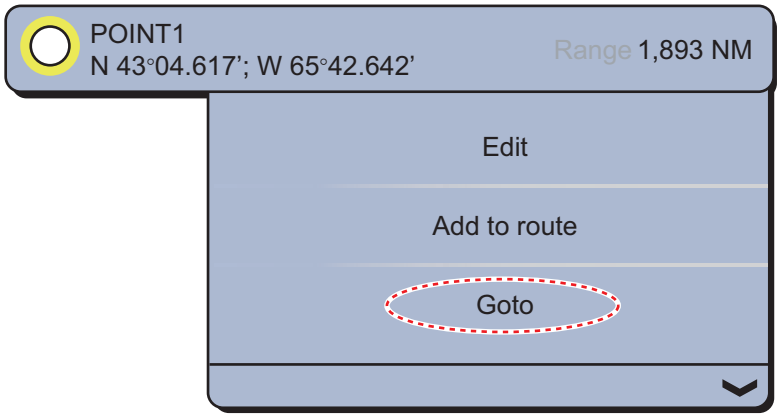
- The go to point is highlighted.
- A thick red dashed line and a yellow line appear. The thick red dashed line is the course to follow to get to the point. The yellow line is the shortest course from the current position to the go to point.
- The go to point is numbered "1" and the position where the [Go To] function starts is numbered "0".
- The arrival area marker appears if activated on the menu (see subsection 5.10.5).

- The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines with [Display XTE Lines] on [Routes] of the main 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] on [Routes] of the main menu (see subsection 5.10.9). Then the message "End of Route" appears when you reach the end of a route. For the arrival timing, see subsection 5.10.5.

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

1. Select [Lists] on the menu icon bar to open the lists menu.
2. Select [Points List] to open the points list.
3. Select [Name], [Color], [Icon] or [Range] in the [Sort by] area.
4. Select the point to go to then select [Goto].



5. Select [Close] to close the points list.

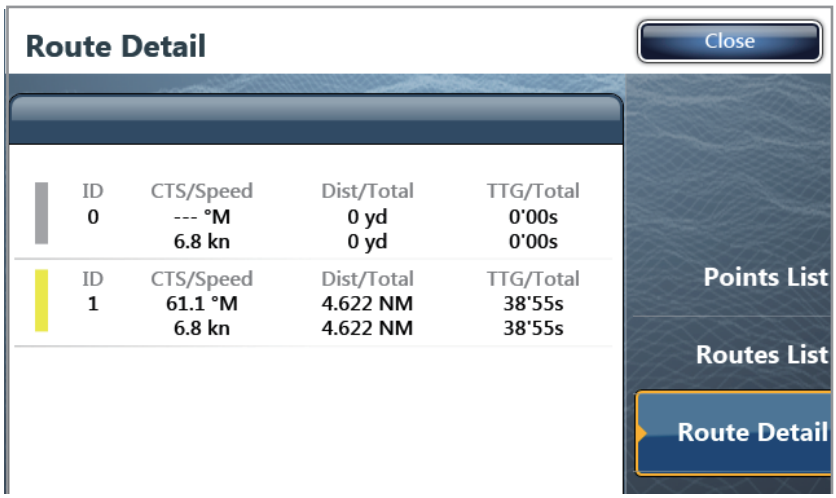
The following occurs:

- 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 go to point is numbered "1" and the position where the [Go To] function starts is numbered "0".
- The arrival area marker appears if activated on the menu (see subsection 5.10.5).
- The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines with [Display XTE Lines] on [Routes] of the main 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] on [Routes] of the main menu (see subsection 5.10.9). Then the message "End of Route" appears when you reach the end of a route. For the arrival timing, see subsection 5.10.5.

4.12.4 How to display the point information for the active route

1. Select the yellow line to display the pop-up menu.
2. Select [Rte Detail]. The [Route Detail] window appears.



CTS: Course To Steer, TTG: Time To Go

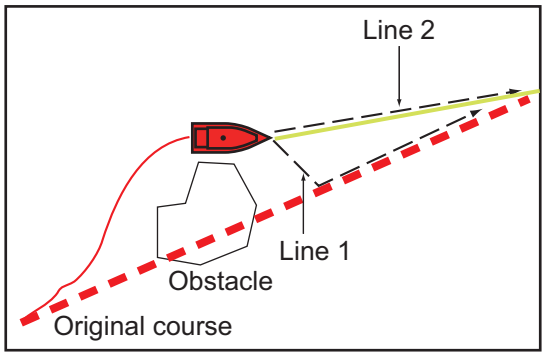
3. Select [Close] to close the route detail list.

4.13 How to Restart and 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. Select the red dashed line or the yellow line of the route to display the pop-up menu.
2. Select [Restart Nav.]. The route start position for the route moves to the current position.

4.13.2 How to cancel navigation to a point

1. Select the go to point, red dashed line or the yellow line of the route, to display the pop-up menu.
2. Select [Stop Nav.].

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

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5. ROUTES

5.1 What is a Route?

A route is a series of route points entered in the order to use for navigation. A route can contain up to a maximum of 500 route points, and this equipment stores 200 routes.

Note: When connecting NavNet 3D units on the LAN network, a route can contain up to a maximum of 100 route points.

You create a route by selecting geographical positions on the screen. Each point on the route is marked with a white circle that has point number inside it. (The point numbers may not be visible depending on the chart scale.)

You can follow a route that you have created, with the [Go To] feature. When you follow a route, the current leg is shown as a red dashed line and the previous leg is shown as a light gray line.

The routes on the screen can be edited from the pop-up menu. With this pop-up menu, you can

- 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

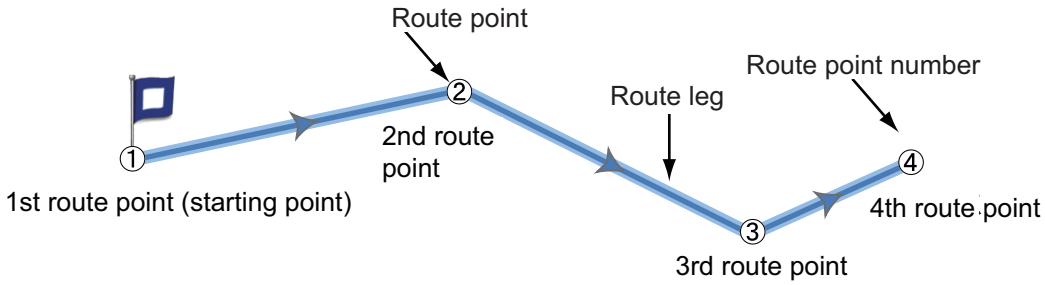
Note: Active routes can be shared with other NavNet TZtouch (or NavNet TZtouch2) units via LAN. Data is shared automatically; no operation is required. Units of measurement (range, depth, etc.) also are shared.

5.2 How to Create a Route

5.2.1 How to create a new route

Select geographical points on the display to create a chart. Each marked is marked with a route point mark (circle).

1. Select the 1st route point for the route to display the pop-up menu.
2. Select [New Route]. The flag mark appears on the selected position.
3. Select the next route point in the route. A 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. Select 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, select [End Route] at the top right-hand corner of the screen to complete the route. The flag mark disappears and the following window appears.



The route is automatically named. The default route name is “RTE” plus the date (e.g. RTE 2012-03-01). Select [Save]. If necessary, select [Rename] to change the route name. The route is saved to the routes list.

5.2.2 How to create a new route from a point

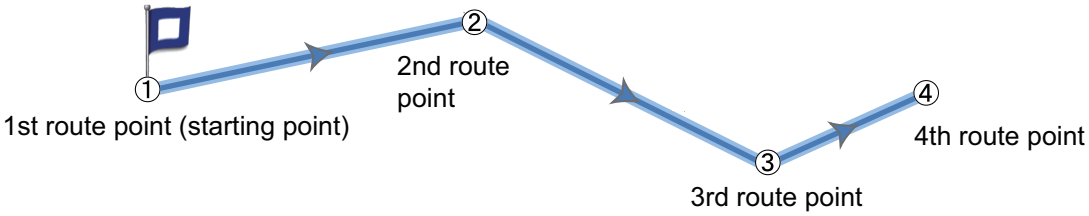
You can create a route from a point.

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



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

4. Select 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, select [End Route] at the top right-hand corner of the screen to complete the route. The flag mark disappears and the following window appears.

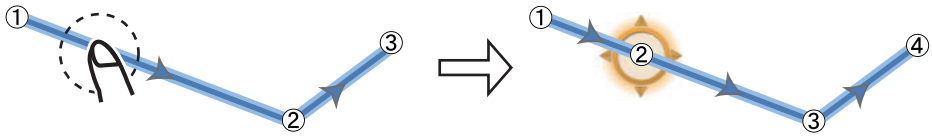


   The route is automatically named. The default route name is “RTE” plus the date (e.g. RTE 2012-03-01). Select [Save]. If necessary, select [Rename] to change the route name. The route is saved to the routes list.

5.2.3 How to insert a route point on a route

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

1. Select a position on a route leg to insert a route point.
2. Select [Insert] from the pop-up menu. The blue square marks the position selected and is highlighted. The route point is numbered according to its position in the route, and the succeeding route points are renumbered.

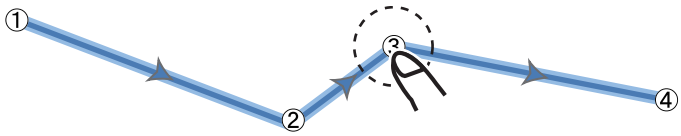


3. Select [End Move] at the top right-hand corner of the screen.

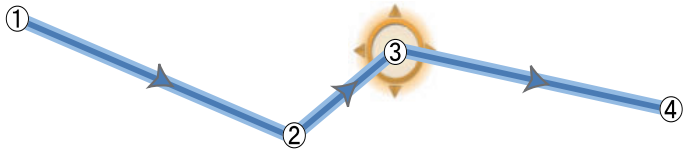
5.2.4 How to move a route point on a route

You can move a route point on a route.

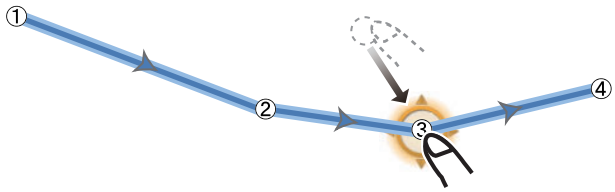
1. Select a route point on a route to display the pop-up menu.



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

5.2.5 How to delete a point or route point on a route

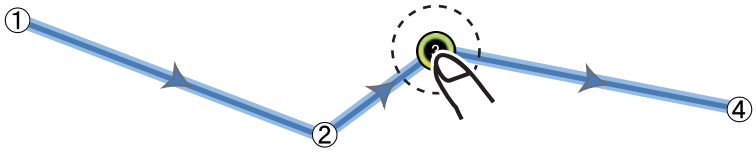
You can delete a point or route point on a route.

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

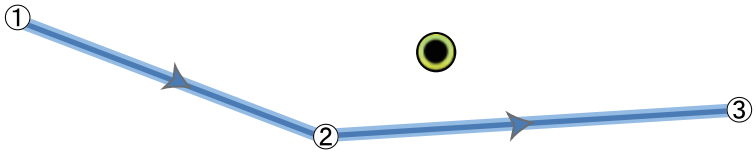
5.2.6 How to remove a point from a route

You can remove a point from a route.

1. Select the point to remove. The pop-up menu appears.



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



5.2.7 How to extend a route

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

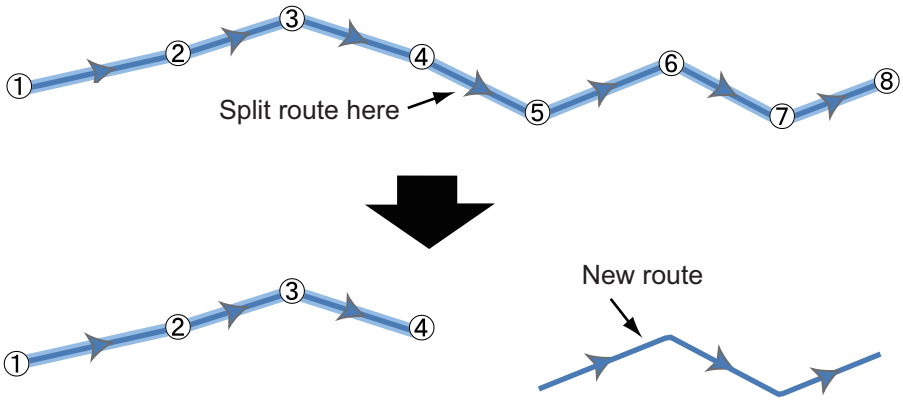
1. Select a route leg to display the pop-up menu.
2. Select [Extend].
3. Select a position. A blue line with arrow runs from the last route point to the selected position.
4. Repeat step 3 to enter more route points, if necessary.
5. At the last route point, select [End Route] at the top right-hand corner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

5.2.8 How to split a route

You can divide a route in two to make two routes.

1. Select the route leg where to divide the route. The pop-up menu appears.
2. Select [Split].

The selected route leg is deleted and the route is divided. The new route is given the new route name and saved to the routes list.

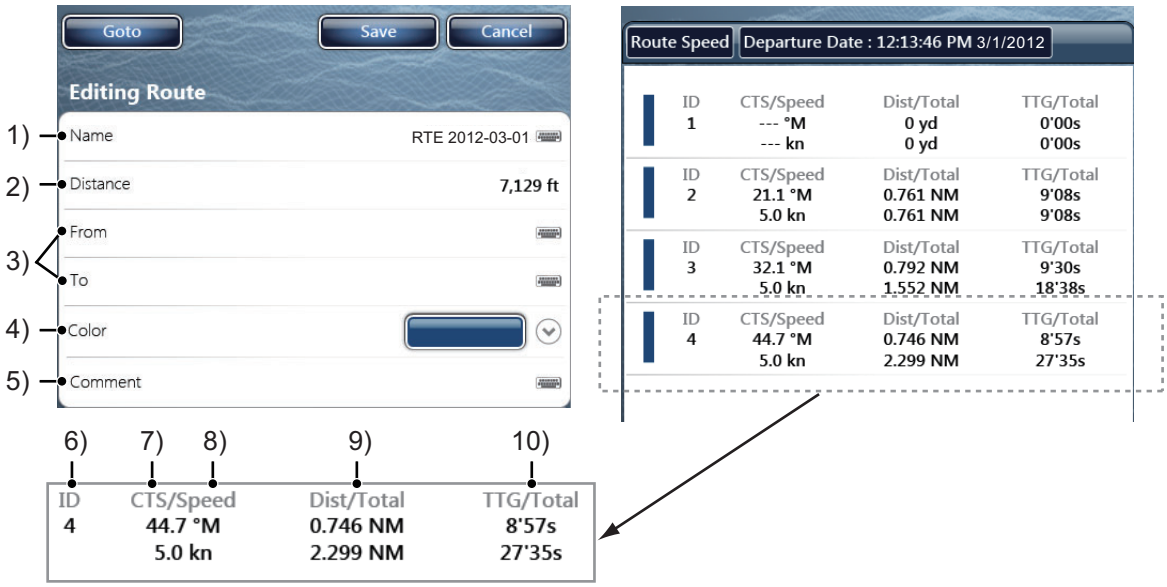


5.3 Routes List

The created routes are stored in the routes list, where you can edit or see the route data.

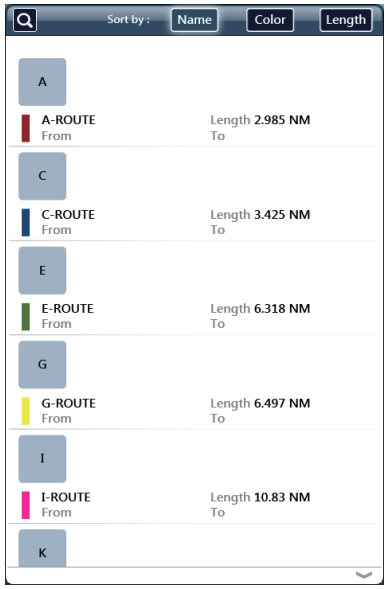
The list stores the following route data for each route:

1) Name of a route
2) Length of a route
3) Names of starting route point and last route point (Enter them with the software keyboard.)
4) Color of a route
5) Comment for a route
6) Each number of each route point
7) Bearing to steer
8) Planning route speed (see section 5.12)
9) Distance between legs and total distance
10) TTG between legs and total TTG



5.3.1 How to show the routes list

1. Select [Lists] on the menu icon bar to open the lists menu.
2. Select [Routes List] to open the routes list.



5.3.2 How to sort the routes list

Tap the appropriate sort button, at the top of the list.

[Name]: sorts the routes in alphabetical order

[Color]: sorts the routes by color

[Length]: sorts the routes by total length, in ascending order

5.3.3 How to search the routes list

You can search the routes list by route name, or by color.

To search the list by name, tap the [Name] sort button, then tap the search icon ( ). The software keyboard appears. Enter the name of the route (or part of the name), then tap [Confirm]. The list scrolls to show the routes that match your search.

Note: You can also search the list based on the first letter of a route. Tap the letter above any listed route to show a list of available alphabetical search options, then tap the letter you want to search for. The list scrolls to show the routes whose name begins with the selected letter.

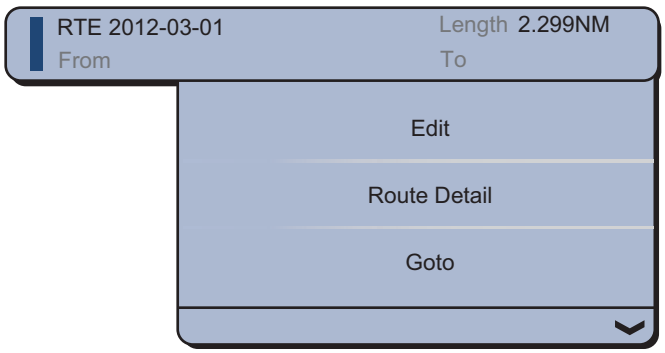
To search the list by color, tap the [Color] sort button, then tap any color shown above a listed route. The available search options appear and you can tap the desired color to search by. the list then scrolls to show the routes assigned with the selected color.

5.4 How to View and Edit Route Details

You can view and edit the details of saved routes.

You can edit the route data in the [Editing Route] window. For detailed information of the editing procedures, refer to section 4.8.

You can open the routes list from the screen. Select a route to get route information. The pop-up menu appears.

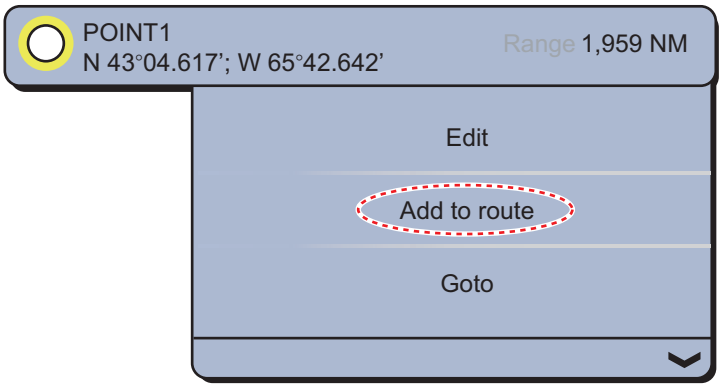


To open the routes list, select [Lists] then select [Routes List]. To open the [Route Detail] window, select [Route Detail]. To open the [Editing Route] window, select [Edit].

5.5 How to Join Points to Create a Route

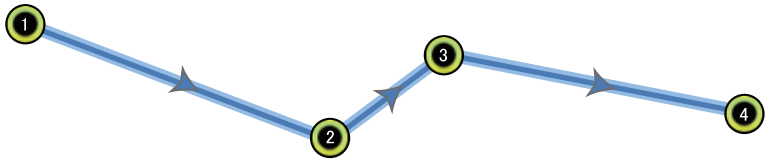
You can join points which you have entered to create a route from the points list.

1. Select [Lists] on the menu icon bar to open the lists menu.
2. Select [Points List] to open the points list.
3. Select a point to add a route.



4. Select [Add to route].
5. Select the next point to add a route.
6. Select [Add to route].

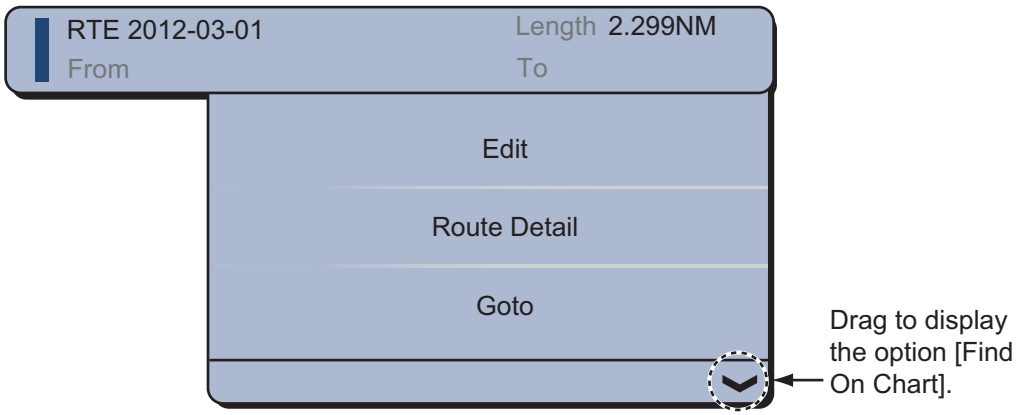
7. Repeat these steps to add all points then select [Close]. The route is created and automatically named. Each point is numbered and the route is saved to the routes list.



5.6 How to Find a Route on the Chart

You can easily find the location of a route from [Routes List]. The selected route is put at the center of the active chart plotter display.

1. Select [Lists] on the menu icon bar to open the lists menu.
2. Select [Routes List] to open the routes list.
3. Select a route then select [Find On Chart] from the options. The menu closes then the selected route is displayed at the center of the chart plotter display.



5.7 How to Delete a Route

You can delete routes separately or together. An active route cannot be deleted.

5.7.1 How to delete a route on the screen

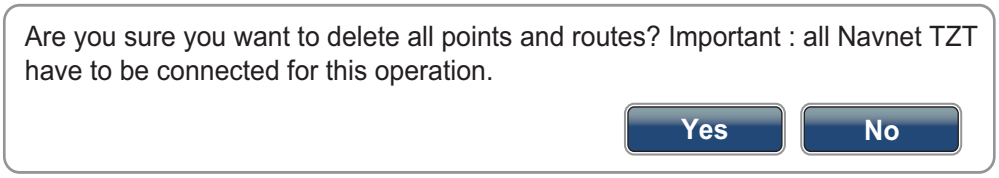
1. Select a route leg of a route to delete. The pop-up menu appears.
2. Select [Delete].

5.7.2 How to delete a route from the routes list

1. Select [Lists] on the menu icon bar to open the lists menu.
2. Select [Routes List] to open the routes list.
3. Select the route to delete then select [Delete] from the options. The route disappears from both the screen and the routes list.
4. Select [Close].

5.7.3 How to delete all routes

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Routes] - [Delete All Points & Routes] menu. The confirmation message appears.



3. Select [Yes].
4. Select [Close] to exit the menu.

5.8 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.

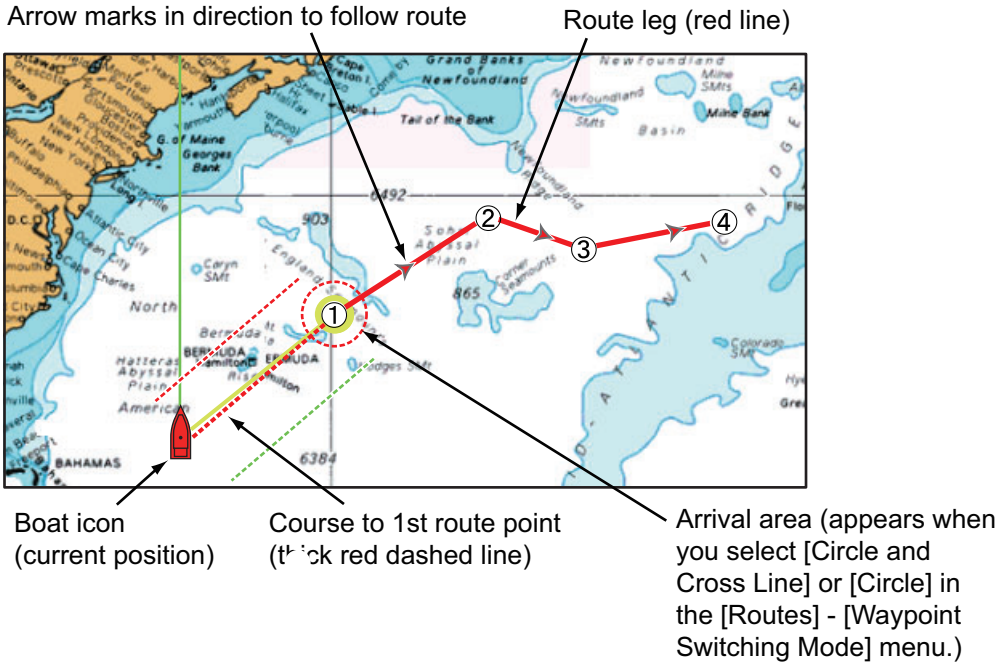
1. Select [Overlay] from the RotoKey menu.
2. To show all routes, select [Routes]. To hide all routes, deselect [Routes].

5.9 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.

5.9.1 How to follow an on-screen route

1. Select a route leg of the route to follow. The pop-up menu appears.
2. Select [Activate].



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 as "1".
- The arrival area marker appears if activated on the menu (see subsection 5.10.5).
- The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines with [Display XTE Lines] on [Routes] of the main menu.

Note: If you want to be notified when you reach a go to point, turn on [Waypoint Crossing Notification] on [Routes] of the main menu (see subsection 5.10.8). Then the message "Waypoint Crossing" appears when you reach a go to point. For the arrival timing, see subsection 5.10.5.

5.9.2 How to follow a route selected from the routes list

1. Select [Lists] on the menu icon bar to open the lists menu.
2. Select [Routes List] to open the routes list.
3. Select the route to follow then select [Goto] from the options.
4. Select [Close] to exit the menu.

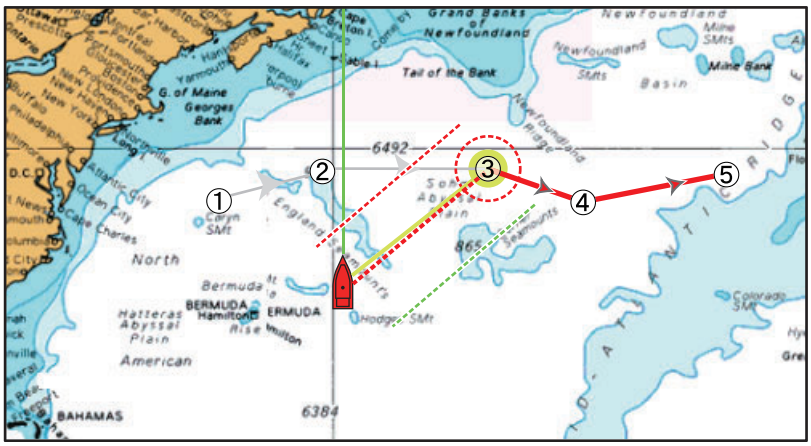
The following occurs:

- 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 as "1".
- The arrival area marker appears if activated on the menu (see subsection 5.10.5).
- The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines with [Display XTE Lines] on [Routes] of the main menu.

Note: If you want to be notified when you reach a go to point, turn on [Waypoint Crossing Notification] on [Routes] of the main menu (see subsection 5.10.8). Then the message "Waypoint Crossing" appears when you reach a go to point. For the arrival timing, see subsection 5.10.5.

5.9.3 How to start navigation from a route point

1. Select the route point of the route from where to start navigation. The pop-up menu appears.
2. Select [Activate From].



In the above example, the following occurs:

- The route point "3" is selected to start navigation from, and is highlighted.
- The current position is numbered "2" and the numbers of the previous route points decrease one by one.
- 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 subsection 5.10.5).
- The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines with [Display XTE Lines] on [Routes] of the main menu.

Note: If you want to be notified when you reach a go to point, turn on [Waypoint Crossing Notification] on [Routes] of the main menu (see subsection 5.10.8). Then the message "Waypoint Crossing" appears when you reach a go to point. For the arrival timing, see subsection 5.10.5.

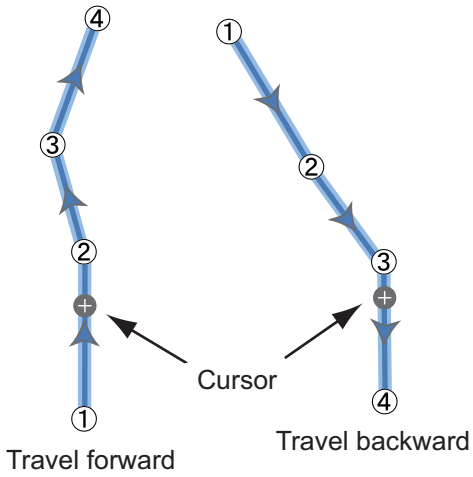
5.9.4 How to show the detailed information about a route

1. Select a route leg of the route to get the detailed information. The pop-up menu appears.
2. Select [Rte Detail]. The [Route Detail] window for the selected route opens (see section 5.3).

5.9.5 Flyover

The flyover feature lets you view an entire route from overhead, with the display automatically scrolled as the flyover progresses.

1. Select a route leg to display the pop-up menu.
2. Select [Fly Over]. The cursor travels back and forth between the first route point and the last route point on the selected route.
   The picture rotates with the cursor movement and the cursor moves upward on the screen.
3. To stop the flyover feature, select [End Fly Over] at the top right-hand corner of the screen.

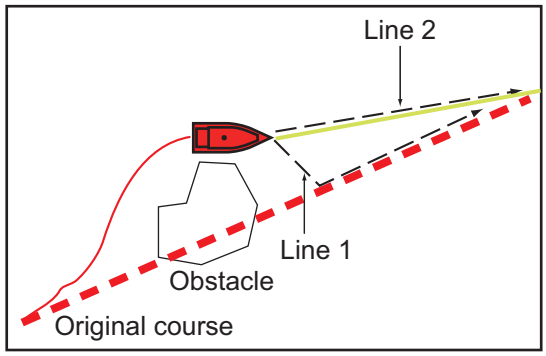


5.10 Operations When You Follow a Route

5.10.1 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.



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

5.10.2 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.

1. Select a route leg to display the pop-up menu.
2. Select [Reverse]. The arrows on the route legs are in reverse direction and the numbers of the route points are in reverse order.

5.10.3 How to stop following a route

1. Select a route leg, a route point or a thick red dashed line on an active route to display the pop-up menu.
2. Select [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.

5.10.4 How to skip a go to point on a route

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

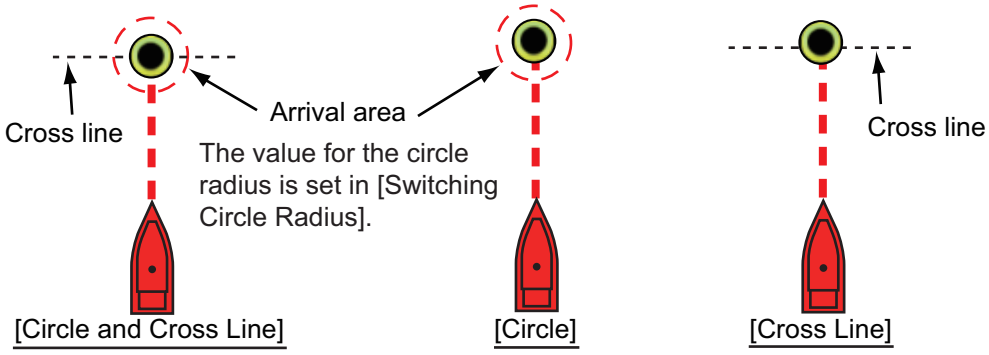
- **When you select the go to point of the active route,** select [Skip] from the pop-up menu. The selected go to point is skipped then the next route point is marked as the go to point.
- **When you select a route leg of the active route,** select [Skip Wpt] from the pop-up menu. The go to point on the route is skipped then the next route point is marked as the go to point.

5.10.5 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.

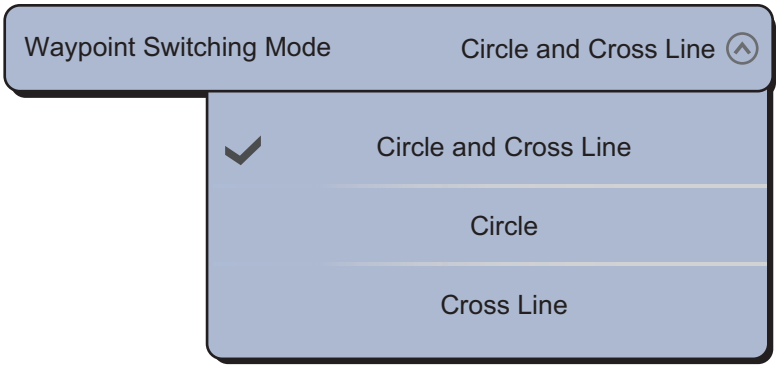
[Cross Line]: Change the waypoint when the ship moves through an imaginary cross line (vertical line) that passes through the center of the destination point.
[Circle]: Change the waypoint when the ship comes within the circle.
[Circle and Cross Line]: Change the waypoint when one of the above two conditions is met.

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



1. Select [Menu] on the menu icon bar to open the main menu.

2. Select the [Routes] - [Waypoint Switching Mode] menu.



3. Select [Circle and Cross Line], [Circle] or [Cross Line]. For [Circle and Cross Line] or [Circle], go to the next step. For [Cross Line], go to step 6.
4. Select [Switching Circle Radius] to display the software keyboard.
5. Set the arrival area (circle radius) then [Confirm].
6. Select [Close] to exit the menu.

5.10.6 Route auto zoom

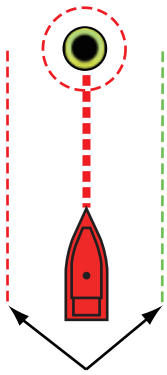
You can get automatic range change after you have moved past the go to point. Use this feature to find the next go to point in the route when the next go to point is not within the current display range.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Routes].
3. Select the [ON] icon in [Route Auto Zoom] to activate the route auto zoom, or the [OFF] icon to deactivate the route auto zoom.
4. Select [Close] to exit the menu.

5.10.7 XTE lines

The XTE line for port side is red, for starboard side it is green. You can show or hide these lines.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Routes].
3. Select the [ON] icon in [Display XTE Lines] to show the XTE lines, the [OFF] icon to hide the XTE lines. For [ON], go to the next step.
4. Select [XTE Value] to display the software keyboard.
5. Set the length of the XTE lines (the distance from your ship) to display then select [Confirm].
6. Select [Close] to exit the menu.



XTE lines
(Red: port,
Green: starboard)

5.10.8 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 subsection 5.10.5. The notification message "Waypoint Crossing" appears. Activate or deactivate this feature as follows.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Routes].
3. Select the [ON] icon in [Waypoint Crossing Notification] to activate this feature, the [OFF] icon to deactivate this feature.
4. Select [Close] to exit the menu.

5.10.9 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 subsection 5.10.5. The notification message "End of Route" appears. Activate or deactivate this feature as follows.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Routes].
3. Select the [ON] icon in [End of Route Notification] to activate this feature, the [OFF] icon to deactivate this feature.
4. Select [Close] to exit the menu.

5.10.10 How to change the autopilot's operation once you arrive

When you arrive at the route destination, you can either keep the destination, or stop autopilot navigation.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Routes].
3. Select [End of Route Operation].
4. Select [Stop Navigation] or [Continue Navigation], as required.
5. Select [Close] to exit the menu.

5.11 Fuel Level

You can display the fuel level on the screen. The fuel flow or fuel level data is required.

Fuel Max Range

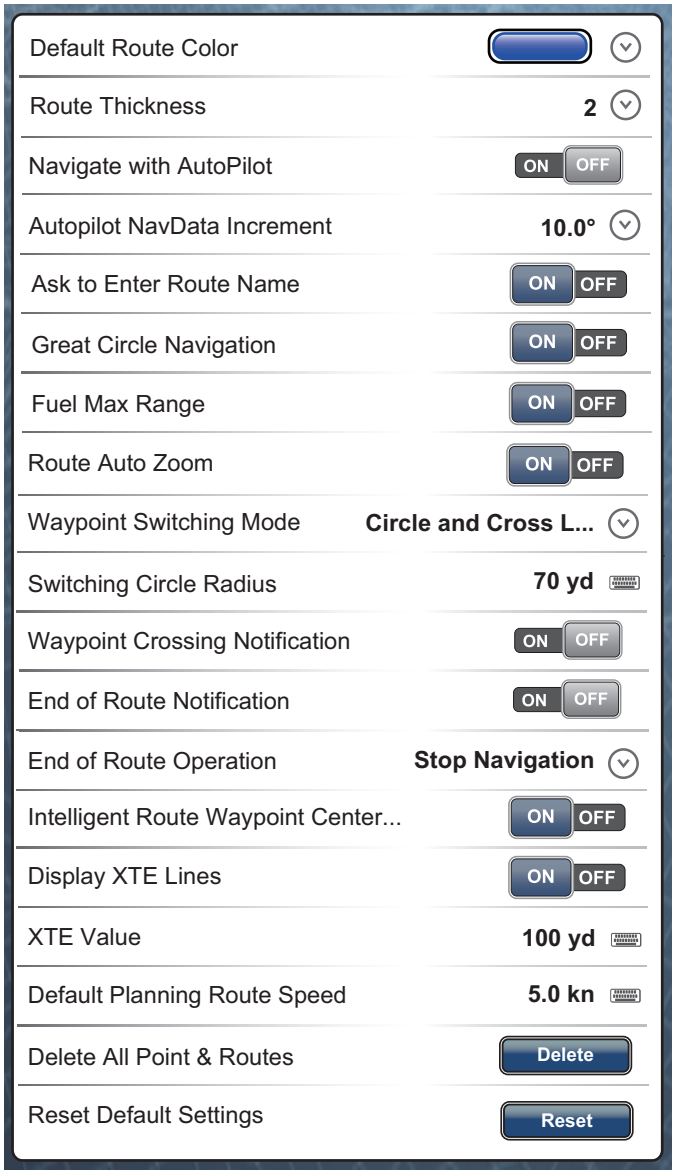
You can display a pump icon on the route where it is predicted that the fuel supply will be exhausted. Select [Routes] of the main menu. Select the [ON] icon in [Fuel Max Range].

Fuel range ring

You can display a circle, within which you can navigate with the remaining fuel, around your ship. Select [Ship & Track] of the main menu. Select the [ON] icon in [Fuel Range Ring].

5.12 Routes Menu

This section provides descriptions for the menu items in [Routes] of the main 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]: See "How to activate NAV mode" on page 2-23.
[AutoPilot NavData Increment]: See "How to activate AUTO mode" on page 21.
[Ask to Enter Route Name]: Show or hide the window for the route name (see the illustration at step 5 in subsection 5.2.1) when you create a new route.
[Great Circle Navigation]: Great circle is the shortest line that joins two points on the surface of the earth. Select the [ON] icon to automatically enter the waypoint with great circle line when you create the route.
[Intelligent Route Waypoint Centering]: When you create a route, center a route point each time it is selected on the screen.
[Default Planning Route Speed]: Set the planning route speed (see section 5.3).
[Reset Default Settings]: Select this menu item to restore default settings for the [Routes] menu.

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6. RADAR

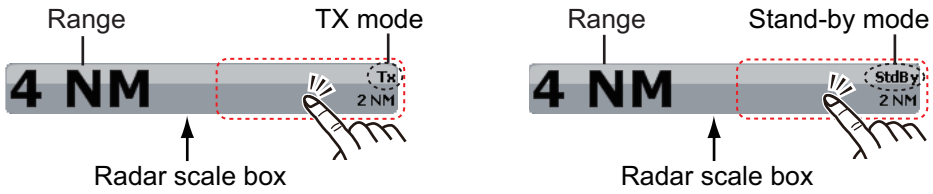
This chapter provides the information necessary for radar operation.

6.1 Transmit, Stand-by

Press the **Home** key (or tap the **Home** icon) to show the display selection window then select the radar display. Push the **RotoKey**™ (or tap the screen) to show the RotoKey menu then select [Tx Radar] to transmit.

If you do not require the radar for some time, set the radar in stand-by to save the magnetron from unnecessary use. Push the **RotoKey**™ (or tap the screen) to show the RotoKey menu then deselect [Tx Radar] to set the radar in stand-by.

You can switch the radar between transmit and stand-by by tapping the radar scale box at the bottom left-hand corner of the screen.



For ***TZTBB***, tap the area circumscribed above to switch between TX and Stand-by.
Note: You can set the range from the radar scale box by tapping the range indication (see section 6.5).

TX channel (solid state radar sensors only)

Your TZT is compatible with the following FURUNO solid state radars: DRS4D-NXT, DRS12A-NXT, DRS25A-NXT. In the default setting, the best TX channel is automatically selected at random among three channels. However, if interference is received from the radar of a nearby ship, open the [Radar] menu, then set [TX Channel] to [1], [2] or [3], the channel where the interference is smallest.

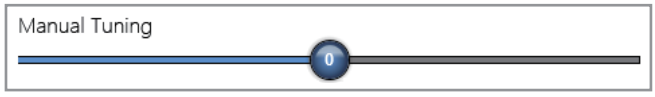
6.2 Tuning

In default, the radar receiver is tuned automatically after turning the radar to TX. If you require fine tuning, do the following to tune manually:

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Radar].
3. In default, the automatic tuning turns on. First turn off the automatic tuning. Select the [OFF] icon in [Auto Tuning].



4. Drag the circle icon in [Manual Tuning] to set the value.



5. Select [Close] to exit the menu.

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.

Automatic gain adjustment

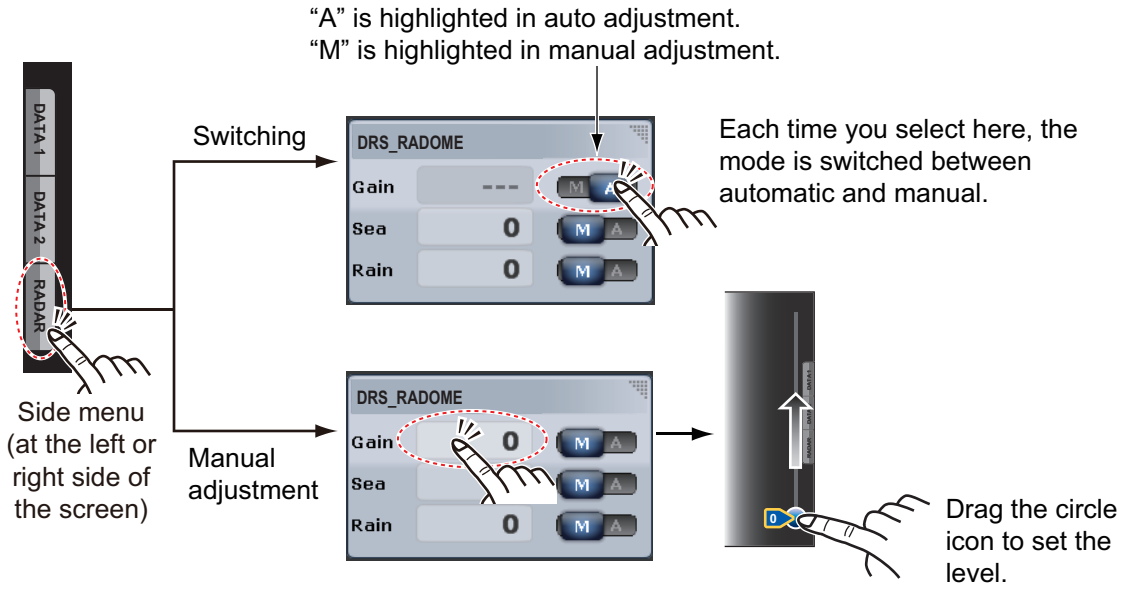
1. Select [Radar Adjust] from the RotoKey menu.
2. Select [Auto Gain].

Manual gain adjustment

1. Select [Radar Adjust] from the RotoKey menu.
2. Select [Manual Gain].
   Note: If [Auto Gain] is checked, first deselect [Auto Gain].
3. Drag the circle icon to set the level (see the figure below).

[RADAR] side menu

You can switch the method of the gain adjustment between automatic and manual with the [RADAR] side menu at the left or right side of the screen. You can also manually adjust the gain from this side menu.



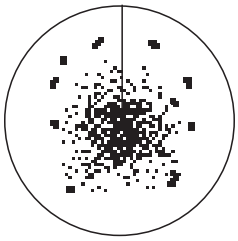
6.3.1 Automatic Clutter Elimination (FAR-15xx connection only)

If the connected radar is a FAR-15xx series, you can access the Automatic Clutter Elimination (ACE) feature. This function detects sea and rain clutter from received echoes' and automatically reduces sea and rain clutter according to the Automatic Clutter Elimination (ACE) threshold setting.

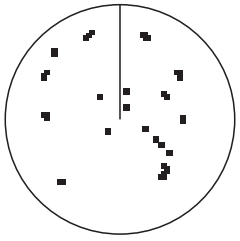
Note: Use this function with caution. Weak target echoes may disappear from the screen.

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.



Sea clutter at screen center



Sea control adjusted; sea clutter suppressed

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.

Automatic sea clutter adjustment

1. Select [Radar Adjust] from the RotoKey menu.
2. Select [Auto Sea].

There are two methods of sea clutter suppression; [Advanced] and [Coastal]. [Advanced] provides for standard suppression of sea clutter and is intended for normal use. When you are cruising along a coastline with [Advanced], if [Advanced] does not reduce sea clutter very well, switch to [Coastal] to try and reduce sea clutter. Also note that [Coastal] can be used for allowing weaker targets to be displayed when [Advanced] suppresses too many echoes.

To use the automatic sea clutter adjustment, select [Auto Sea Mode] from the RotoKey menu followed by [Advanced] or [Coastal].

Manual sea clutter adjustment

1. Select [Radar Adjust] from the RotoKey menu.
2. Select [Manual Sea].
   Note: If [Auto Sea] is checked, first deselect [Auto Sea].
3. Drag the circle icon to set the level.

You can switch the method of the sea clutter adjustment between automatic and manual with the [RADAR] side menu at the left side of the screen. You can also adjust the sea clutter from this side menu (see "[RADAR] side menu" in section 6.3).

6.5 How to Reduce the Rain Clutter

When your ship is in or near rain or snow, the reflections from the 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.

Automatic rain clutter adjustment

1. Select [Radar Adjust] from the RotoKey menu.
2. Select [Auto Rain].

Manual rain clutter adjustment

1. Select [Radar Adjust] from the RotoKey menu.
2. Select [Manual Rain].
   Note: If [Auto Rain] is checked, first deselect [Auto Rain].
3. Drag the circle icon to set the level.

You can switch the method of the rain clutter adjustment between automatic and manual with the [RADAR] side menu at the left side of the screen. You can also adjust the rain clutter from this side menu (see "[RADAR] side menu" in section 6.3).

6.6 Range Scale

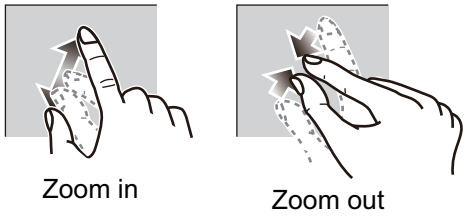
The range setting controls the size of the area (in nautical miles, kilometers or statute miles) that appears on your screen. The range and range ring interval appear at the bottom left-hand corner of the screen.



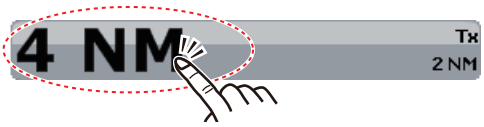
Note: For FAR-15xx series radars, the range unit is fixed at [NM].

How to zoom in or out the range scale

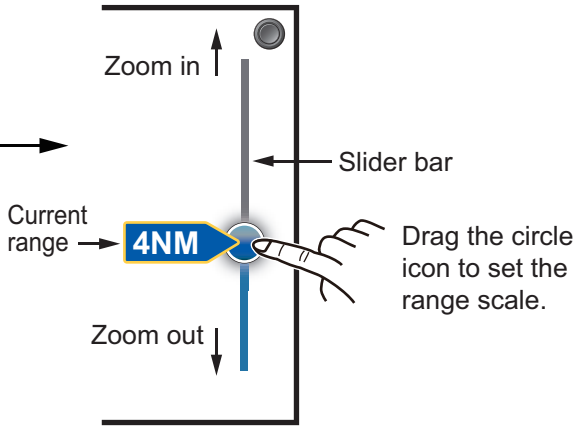
TZT9/TZT14: Rotate the **RotoKey**™ or pinch the radar screen.



TZTBB: Pinch the radar screen. Or tap the radar scale box at the bottom left-hand corner of the screen to display the slider bar. Drag the circle icon to set the range scale.



Tap the area circled above to display the slider bar.
Note: You can toggle between transmit and stand-by by tapping the right side of the radar scale box (see section 6.1).



6.7 Orientation Mode

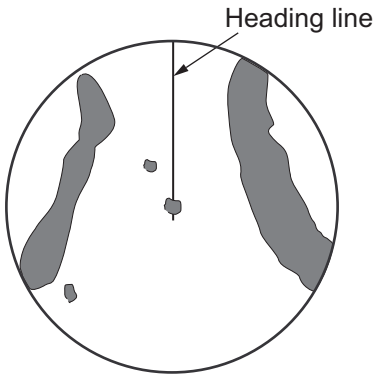
The orientation mode controls the relationship between your ship and all the other targets.

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, select [Orientation] from the RotoKey menu then select [Head Up] or [North Up]. (You can also select an orientation mode with the Radar pop-up menu.)

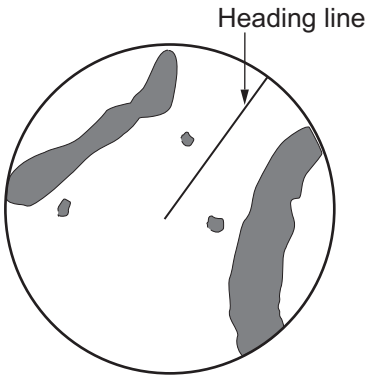
Head-up

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

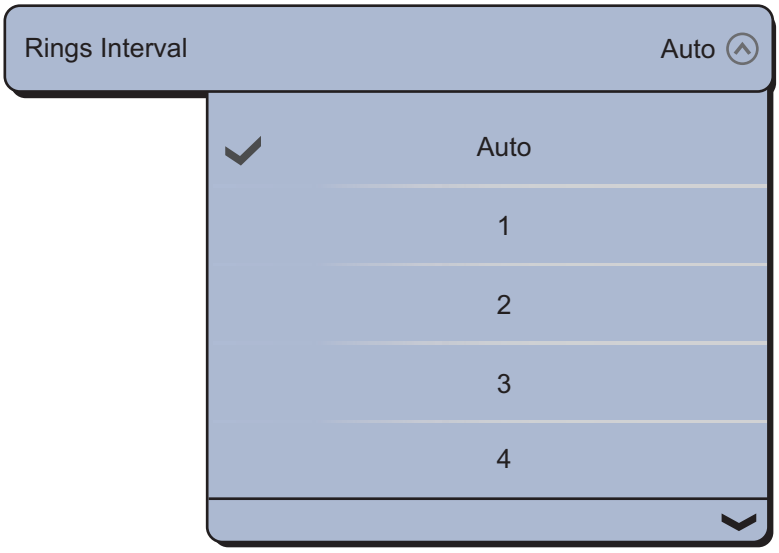
Use the fixed range rings to get a rough estimate of the range to a target. These rings are the concentric solid circles about your ship.

To display the range rings, select [Rings] from the RotoKey menu. To hide the range rings, deselect [Rings].

The interval is displayed at the bottom left-hand corner of the screen. 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

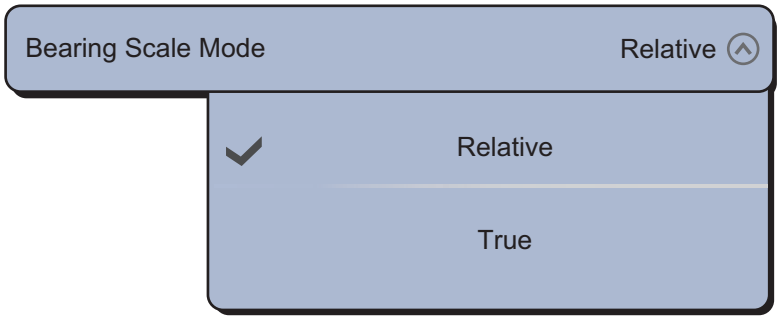
1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Radar] - [Rings Interval] menu.



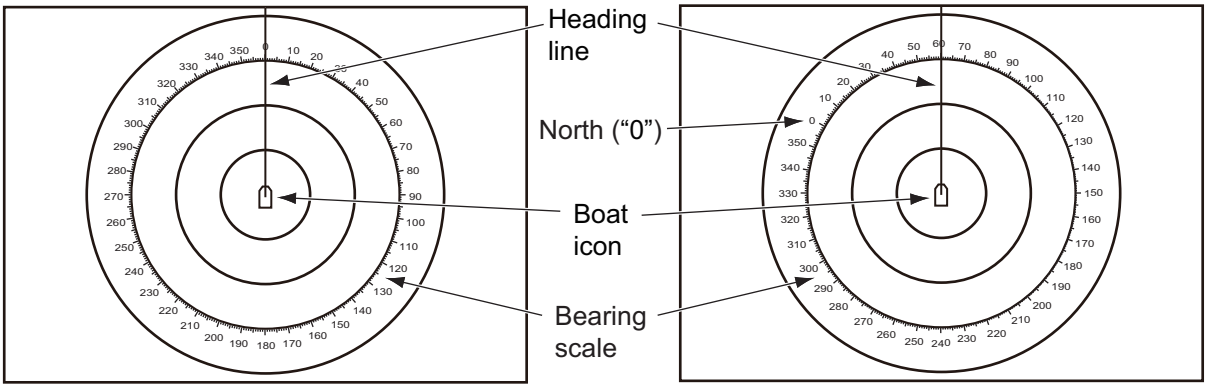
3. Select the number. [Auto] automatically selects the number of rings according to the range scale.
4. Select [Close] to exit the menu.

6.8.3 How to select the range rings mode

To select the range rings mode, select the [Radar] - [Bearing Scale Mode] menu of the main menu then select [Relative] or [True].



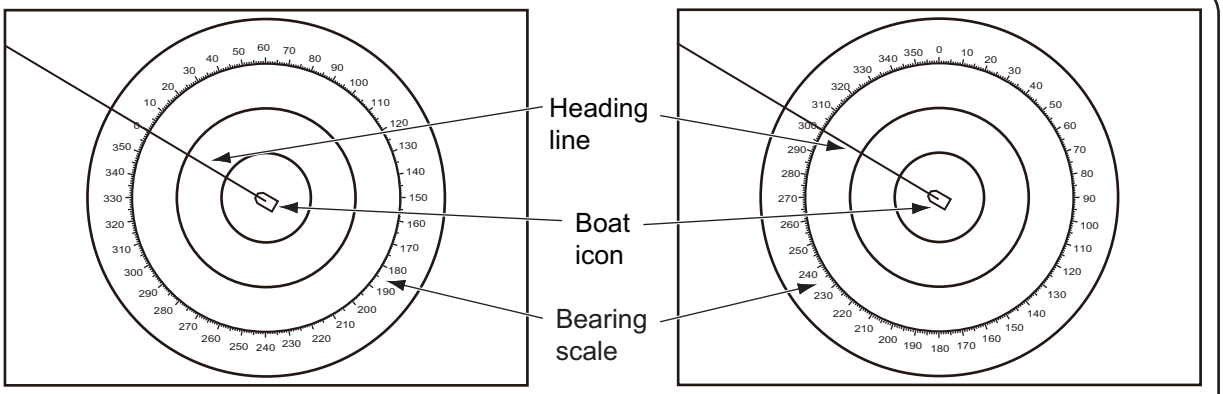
Head-up mode



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.

North-up mode

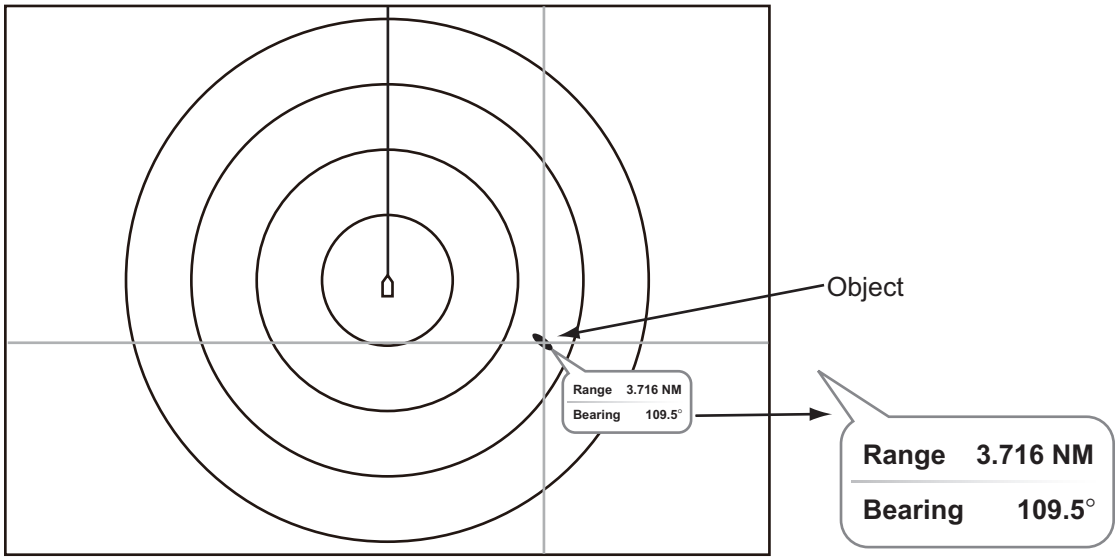


Relative: Bearing scale rotates according to the movement of your ship.

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

6.8.4 How to measure the range and bearing with the ruler

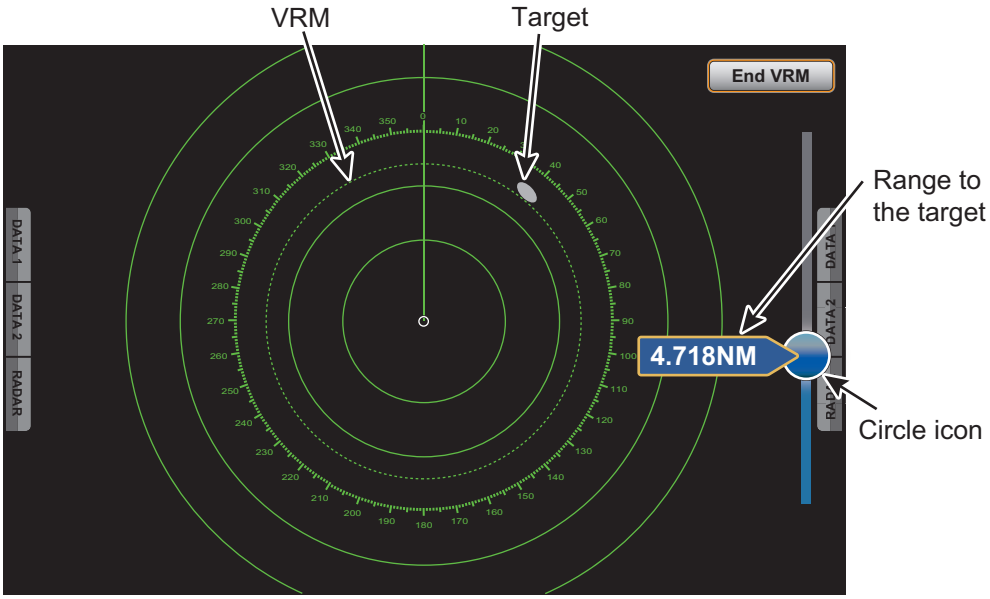
Select an object to get the range and bearing. Read the range and bearing in the box.



6.8.5 How to measure the range with the VRM

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

1. Select [VRM] from the RotoKey menu.
2. Select [Adjust].



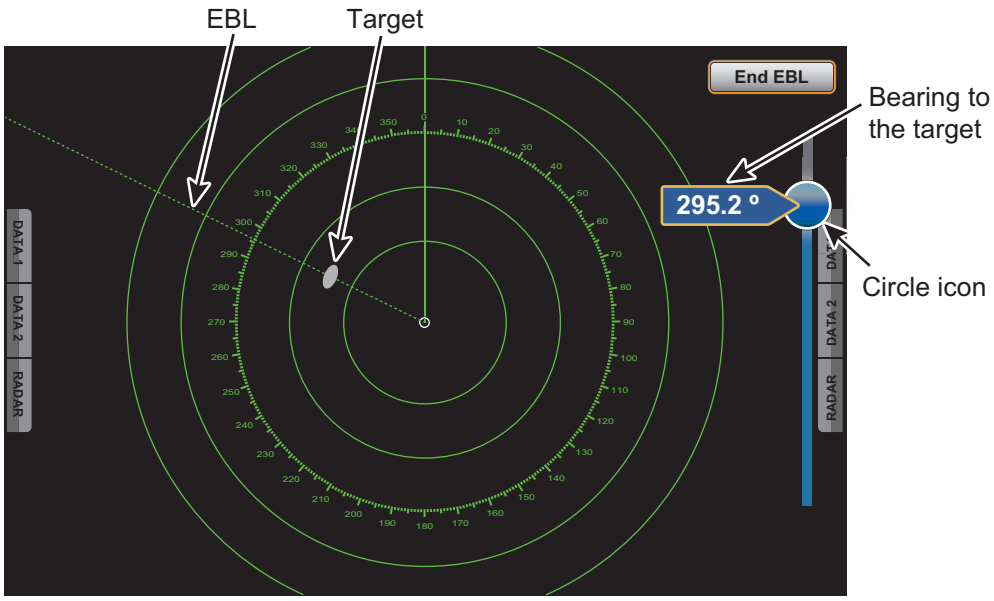
3. Drag the circle icon to put the VRM on the inner edge of the target. Read the range to the target at the left side of the circle icon.
4. Select [End VRM] at the top right-hand corner of the screen to erase the slider bar. To delete the VRM, select [VRM] - [Clear] from the RotoKey menu.

You can operate the VRM from a pop-up menu.

6.8.6 How to measure the bearing with the EBL

The EBL is a straight dashed line from the center of the screen to the edge.

1. Select [EBL] from the RotoKey menu.
2. Select [Adjust].



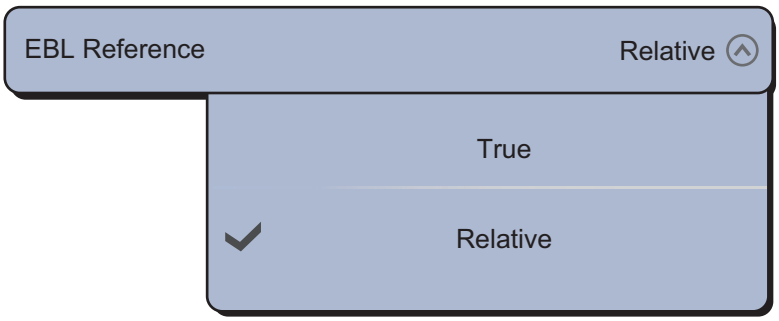
3. Drag the circle icon to put the EBL on the center of the target. Read the bearing to the target at the left side of the circle icon.
4. Select [End EBL] at the top right-hand corner of the screen to erase the slider bar. To delete the EBL, select [EBL] - [Clear] from the RotoKey menu.

You can operate the EBL from a pop-up menu.

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. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Radar] - [EBL Reference] menu.

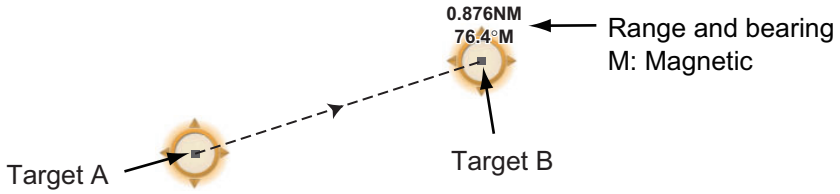


3. Select [True] or [Relative].
4. Select [Close] to exit the menu.

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 [Measure] menu.

1. Select the center of the target A to display the pop-up menu.
2. Select [Measure].
3. Select the center of the target B. A dashed line runs between the target A and the target B. The range and bearing between the targets A and B are shown.

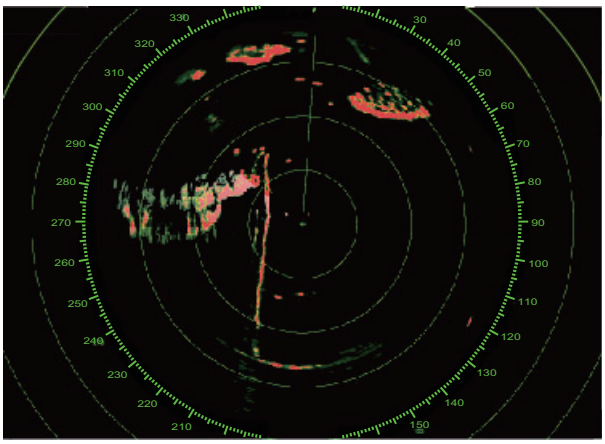


4. Select [Cancel Ruler] at the top right-hand corner of the screen to erase the indication.

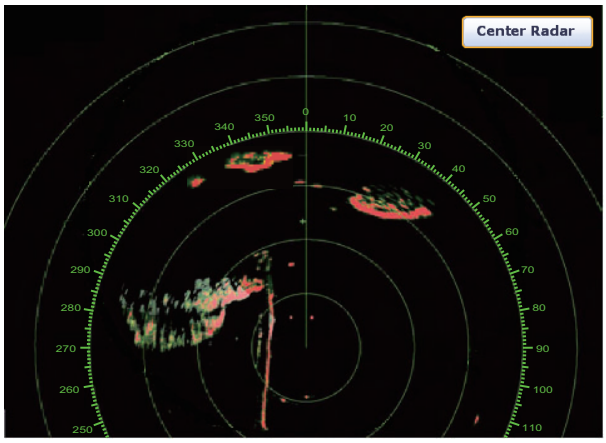
6.10 How to Off-center the Picture

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, select [Center Radar] at the top right-hand corner of the screen.



Normal picture

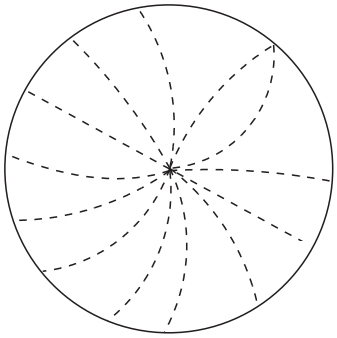


Picture off-centered in stern direction

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. Select [Hdg Ln Off] from the RotoKey menu to activate this function.

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. Select [Radar Filters] from the RotoKey menu.
2. Select [Int Reject].

To deactivate the interference rejector, deselect [Int Reject] at step 2.

6.13 Guard Zone

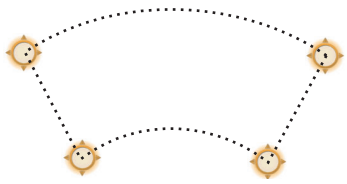
The purpose of the guard zone is to provide audio and visual warnings against targets (ships, islands, landmasses, etc.) that enter the area you set.

6.13.1 How to set the guard zone

Note 1: You can not set the guard zone with the MCU-002/004. Use the touch operation to set the guard zone. The setting range for the guard zone is 0 to 16 NM for DRS6A X-Class/DRS12A X-Class/DRS25A X-Class; 0 to 24 NM for DRS4D-NXT.

Note 2: For configurations with a FAR-15xx series radar, set the guard zone with heading stabilization from the [ACQUISITION ZONE] menu on the FAR-15xx. For setting details, see the FAR-15xx operator's manual.

1. Select [Guard Zone] from the RotoKey menu.
2. Select [Visible]. The guard zone with dotted lines appears on the screen.
3. Select [Guard Zone] from the RotoKey menu.
4. Select [Resize]. Four circles appear at the four corners of the guard zone.
5. Move the circles to set the guard zone.
   Note: To set a 360-degree guard zone, set the same bearing for all four circles.



6. Select [End Resize] at the top right-hand corner of the screen. Four circles disappear.

6.13.2 How to activate or deactivate the guard zone

1. Select [Guard Zone] from the RotoKey menu.
2. Select [Alarm]. The dotted lines for the guard zone turn to solid lines.

If a target enters the zone, the alarm sounds. The audio alarm continues until the target leaves the guard zone or the guard alarm is deactivated. To deactivate the guard zone, deselect [Alarm] at step 2.

You can mute the audio alarm by selecting [Off] in the [Alarm] - [Alarm Sound] menu of the main menu (subsection 2.10.6).

6.13.3 How to hide the guard zone

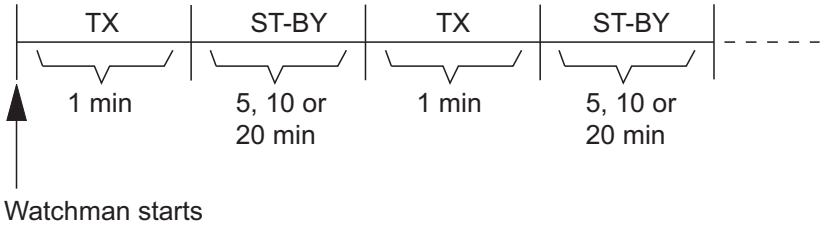
1. Select [Guard Zone] from the RotoKey menu.
2. Deselect [Visible]. The guard zone disappears from the screen.
   Note: This operation is available when the guard zone is deactivated.

6.13.4 Guard zone menus

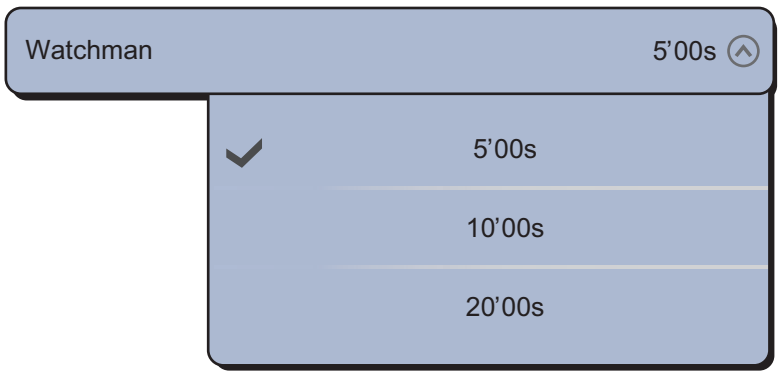
There are four sub menus in [Guard Zone]; [Visible], [Alarm], [Auto Acquire] (see subsection 6.30.3) and [Resize]. When the guard zone is visible, you can select these sub menus from both the RotoKey menu and pop-up menu. To display the pop-up menu, select anywhere on the lines of the guard zone.

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 cancelled 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. You can set Watchman when the radar is in transmit state.)
2. Select [Menu] on the menu icon bar to open the main menu.
3. Select the [Radar] - [Watchman] menu.



4. Select a watchman rest interval.
5. Select [Close] to exit the menu.

6. Select [Watchman] from the RotoKey menu to activate the watchman function.

6.15 Echo Trails

Echo trails show the movements of radar targets relative or true to your ship in imitation afterglow. This function helps alert you to possible collision conditions.

6.15.1 How to show or hide echo trails

To show the echo trails, select [Echo Trail] from the RotoKey menu. To hide the echo trails, deselect [Echo Trail].

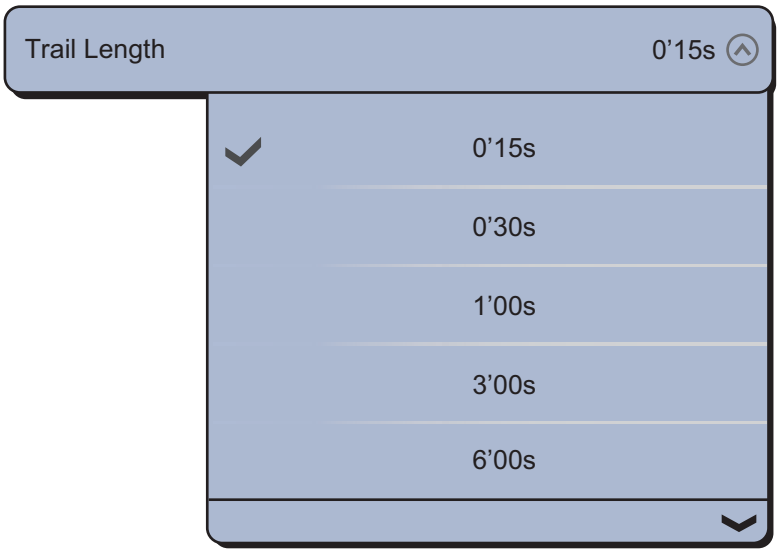
6.15.2 How to clear echo trails to restart new echo trails

Select [Clear Trail] from the RotoKey menu to clear echo trails and restart with new echo trails.

6.15.3 Echo trail time

You can set the trail time. Trails are shown on the screen until the end of the selected trail time then the trails are erased and restarted.

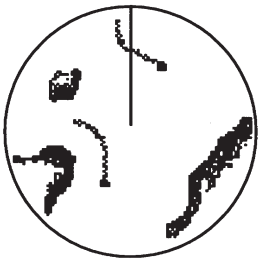
1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Radar] - [Trail Length] menu.



3. Select a time interval.
4. Select [Close] to exit the menu.

6.15.4 Echo trail mode (reference)

Trail movement can be set for relative or true. The relative trails show the relative movements between targets and your ship. True motion trails show the movements of targets according to the targets over-the-ground speeds and courses. True trails require position and heading information.

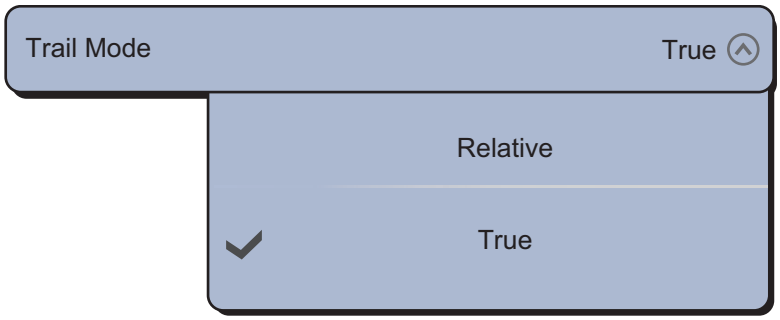


(a) True target trials
(No smearing of stationary targets)



(b) Relative target trials
(Targets moving relative to your ship)

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Radar] - [Trail Mode] menu.

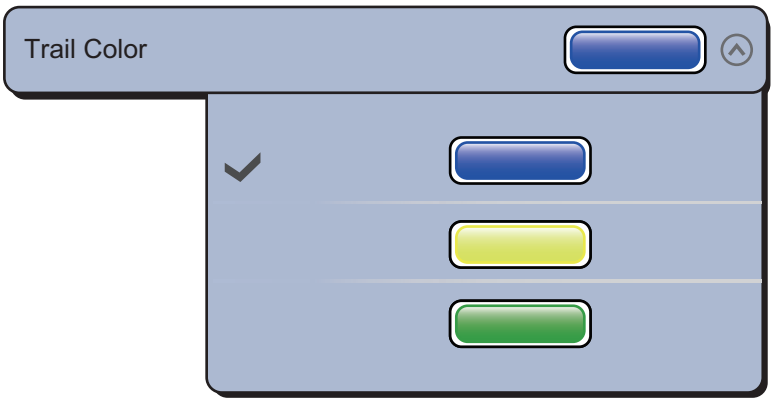


3. Select [Relative] or [True].
4. Select [Close] to exit the menu.

6.15.5 Echo trail color

Trail color can be selected to blue, yellow or green.

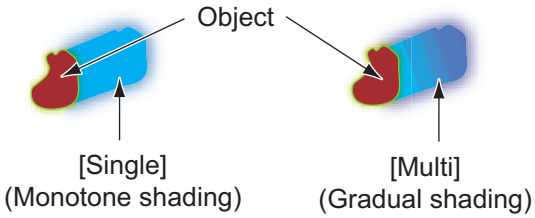
1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Radar] - [Trail Color] menu.



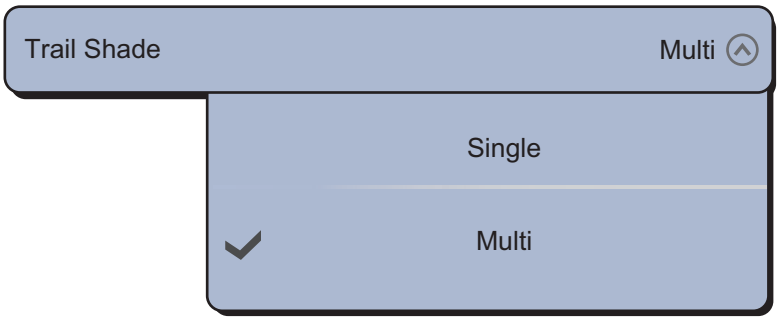
3. Select a color desired.
4. Select [Close] to exit the menu.

6.15.6 Echo trail shading

The echo trail can be shown in gradual shading or monotone (single shade). The figure below is an example when you select blue in the [Radar] - [Trail Color] menu.



1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Radar] - [Trail Shade] menu.



3. Select [Single] or [Multi].
4. Select [Close] to exit the menu.

6.16 Echo Stretch

The radar adjusts the reflected echoes from long-range targets, but the echoes are normally displayed weak and small. If you have a weak, long-range target that requires closer inspection, use the echo stretch to magnify the target.

This function magnifies the targets and sea clutter and radar interference. For this reason, correctly adjust the sea clutter and radar interference before you activate the echo stretch.

1. Select [Radar Filters] from the RotoKey menu.
2. Select [Stretch].

To deactivate the echo stretch, deselect [Stretch] at step 2.

6.17 Echo Average

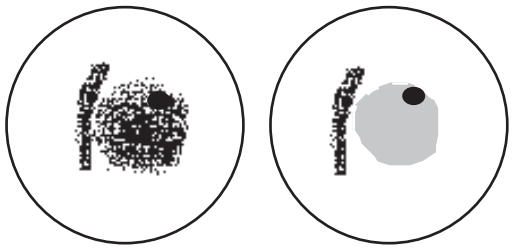
The echo average feature effectively suppresses sea clutter. Echoes received from stable targets such as ships appear on the screen at almost the same position during every rotation of the antenna. On the other hand, unstable echoes such as sea clutter appear at random positions.

To distinguish real target echoes from sea clutter, echo average performs scan-to-scan correlation. Correlation is made by storing and averaging echo signals over successive picture frames. If an echo is solid and stable, it is presented in its normal intensity. The sea clutter is averaged over successive scans resulting in the reduced brilliance, making it easier to discriminate real targets from the sea clutter.

To properly use the echo average function, first suppress the sea clutter.

1. Select [Radar Filters] from the RotoKey menu.
2. Select [Average].

To deactivate the echo average, deselect [Average] at step 2.



a) Echo average OFF b) Echo average ON

6.18 Sweep Fade

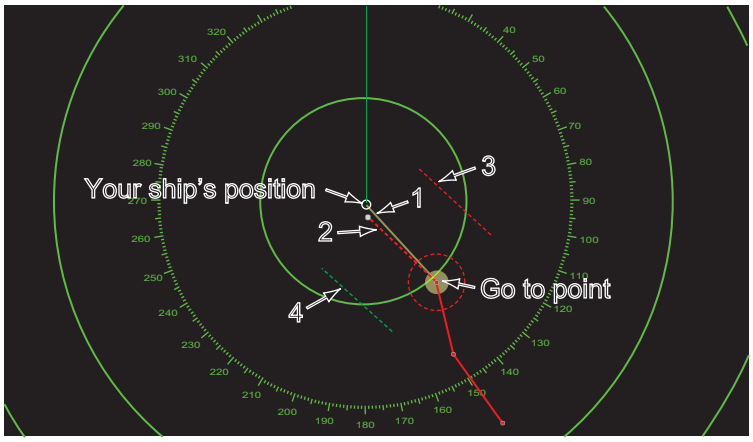
The sweep fade feature automatically reduces the brilliance of weak signals (noise, sea clutter, rain clutter, etc.) and unnecessary echoes like radar interference to clear the picture. Use the sweep fade when unnecessary echoes cannot be reduced by other methods.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Radar].
3. Select the [ON] icon to activate the sweep fade, the [OFF] icon to deactivate the sweep fade in [Sweep Fade].
4. Select [Close] to exit the menu.

6.19 How to Show, Hide or Cancel an Active Route

You can show or hide the active route from the radar display. To show the active route, select [Active Rte] from the RotoKey menu. To hide the active route, deselect [Active Rte].

To cancel route navigation, select the go to point, boat icon or any of the lines (no. 1 to 4 in the figure below) which appear when [Active Rte] turns on, then select [Stop Nav.] from the pop-up menu.



6.20 How to Show or Hide the Boat Icon

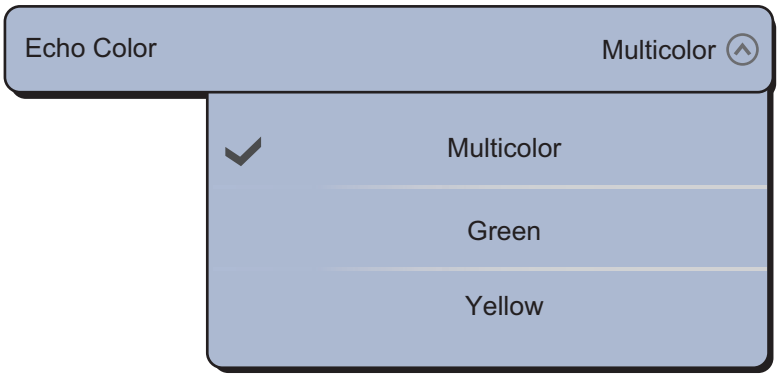
You can show or hide the boat icon on the radar display.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Radar].
3. Select the [ON] icon to show the boat icon, the [OFF] icon to hide the boat icon in [Own Ship Icon].
4. Select [Close] to exit the menu.

6.21 Echo Color

Echo color is available in colors of green, yellow or multicolor.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Radar] - [Echo Color] menu.

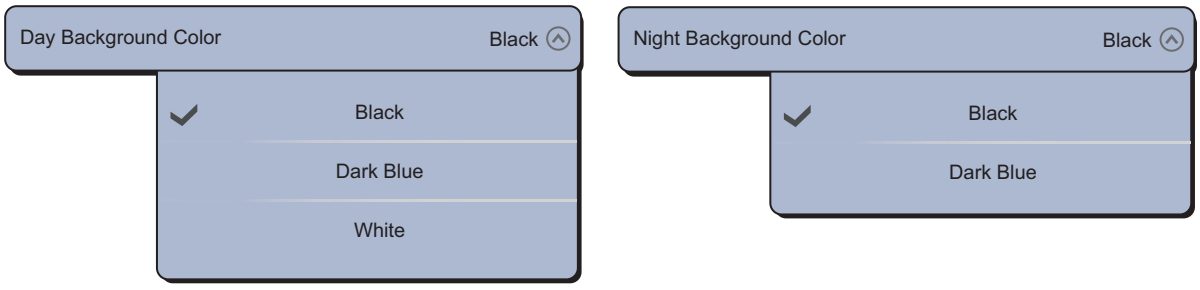


3. Select a color.
4. Select [Close] to exit the menu.

6.22 Background Color

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

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Radar] - [Day Background Color] or [Night Background Color] menu.



3. Select [Black], [Dark Blue] or [White] (daytime only).
4. Select [Close] to exit the menu.

6.23 Radar Overlay Range Link

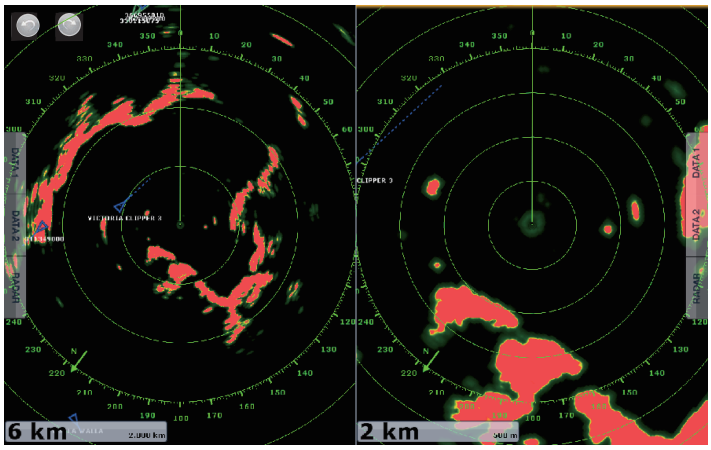
The radar overlay range link automatically keeps the chart scale and radar range in sync. This feature helps you understand the relation between the radar and the chart. You can activate or deactivate this feature from [Plotter Display]. See subsection 3.2.3.

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.

6.24 Dual-Range Display

Note: The DRS4DL does not have the 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, with the magnetron radar, you have separate control of each picture. (The solid state radar has some restrictions. See the table below for details.) This feature lets you keep a close watch on close-range targets and far targets.



Long range display Short range display

To get the dual-range display, set dual-range displays in the display selection window. See section 14.2 for the procedure. You can put the dual-range displays in the two-way and three-way split screens.

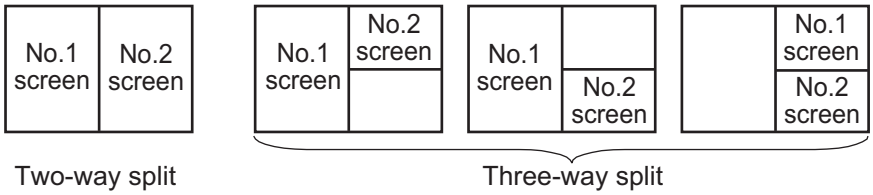
Most radar functions can be adjusted independently. The table below shows radar function and operability in the dual range mode, for both the magnetron radar and the solid state radar. Note that, in the worst case, the maximum detection range may decrease by approx. 10 dB with the solid state radar.

Radar function	Availability in dual range mode	
	Magnetron radar	Solid state radar
Route (show, hide)	Independent	Independent
AIS/DSC (show, hide)	Independent	Independent
Auto sea mode ([Advanced] or [Coastal])	Independent	Interlocked
Echo average*	Interlocked	Interlocked
Echo stretch*	Interlocked	Interlocked
Echo trail	Interlocked	Interlocked
Gain	Independent	Interlocked
Heading line (hide temporarily)	Independent	Independent

Radar function	Availability in dual range mode	
	Magnetron radar	Solid state radar
Interference rejector	Independent	Interlocked
Orientation mode (head-up or north-up)	Independent	Independent
Rain clutter	Independent	Interlocked
Range scale control	Independent	Independent
Range max. range scale	36 NM	12 NM
Range rings (show, hide)	Independent	Independent
RezBoost	-	Independent
Sea clutter	Independent	Interlocked
Clear Trail	Independent	Independent

* Cannot be adjusted when the Target Analyzer (radar sensor DRS4D-NXT) is active.

The no.1 screen is independent of the no.2 screen when the no.2 screen is in standby. However, when the no.2 screen goes to transmit state, so does the no.1 screen.



6.25 Target Analyzer

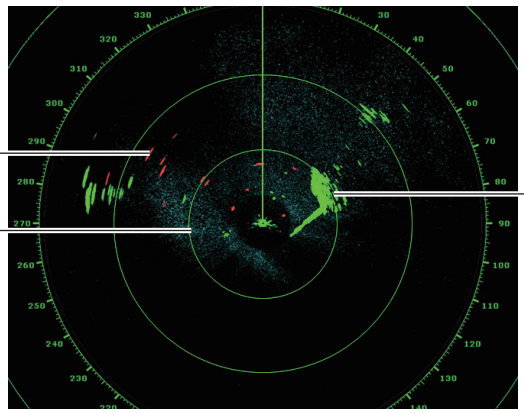
The target analyzer paints radar echoes in the colors shown in the table below, to help you distinguish approaching targets from all other radar echoes. Requires GPS position data. Radar Adjust (Gain, Sea, Rain) and Auto Sea Mod cannot be adjusted when the Target Analyzer is active.

Target analyzer is available with the DRS4D/6A/12A/25A-NXT and FAR-15xx series radar sensors.

Target type and color painted by the target analyzer

Target type	Color
Approaching target	Red
Rain clutter	Blue ([Target Analyzer Mode] ([Radar] menu) set to [Rain].)
Targets other than mentioned above	Green

The figure below shows an actual radar image with the target analyzer activated.



How to activate or deactivate the target analyzer

Turn [Target Analyzer] on or off from the RotoKey menu or the pop-up menu.

How to emphasize rain clutter or target echoes

You can emphasize rain clutter or target echoes when the target analyzer is active. Open the [Radar] menu, then set [Target Analyzer Mode] to [Rain] or [Target] as appropriate. For [Rain], rain clutter is shown in blue color.

6.26 RezBoost™

The azimuth resolution of the radar echoes can be switched in the range of 1-2 times. Four settings are available, [Standard], [Enhanced1], [Enhanced2], or [Enhanced3]. Select [Enhanced3] for better echo resolution.

RezBoost™ is available with the DRS4D-NXT radar sensor.

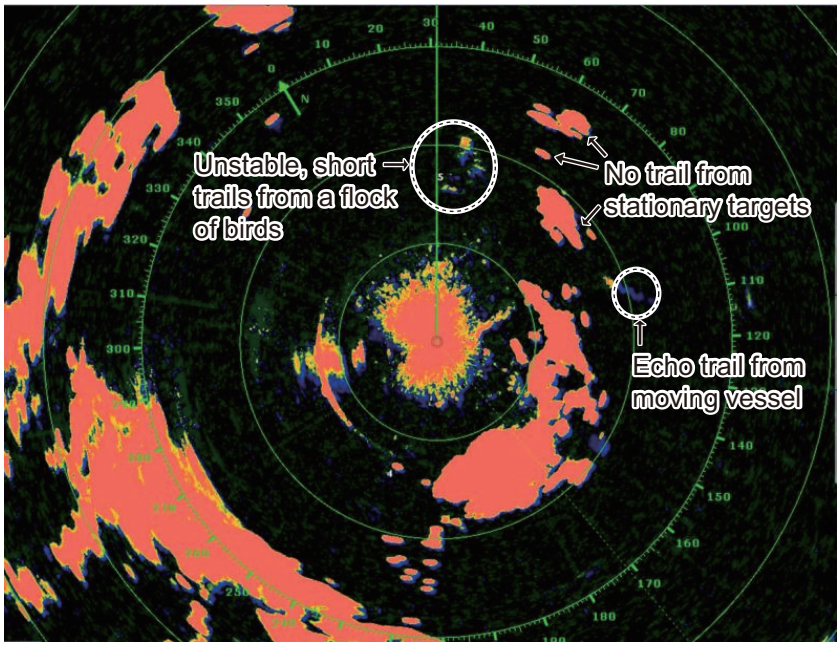
1. Select [Radar Filters] from the RotoKey menu.
2. Select [RezBoost].
3. Use the **RotoKey**™ to select desired setting.

6.27 Bird Mode

The Bird mode sets up the radar for optimal detection of a flock of birds, which can indicate the presence of schools of fish. Automatic adjustment of gain, sea clutter and rain clutter is suspended, and the equipment optimally adjusts those items according the bird mode setting.

The radar settings are automatically adjusted to detect flocks of birds. Gain, sea clutter and rain clutter are automatically adjusted to distinguish birds from noise, to help you locate schools of fish more easily. Additionally the bird mode can be used to detect distant rain clouds.

The use of echo trail and echo average functions together with the bird mode make it easier to distinguish bird echoes from other echoes. With echo average, echoes from birds are emphasized. With true echo trails, moving vessels show long, steady trails. Unlike those targets, bird echoes appear randomly and show random, short trails.



The bird mode has three settings according to the current level of sea clutter:

[Calm]: Suitable in calm conditions where sea clutter is weak. Applies low sea clutter reduction to show weak bird echoes. When sea clutter is strong, bird echoes may be hidden inside the sea clutter.

[Moderate]: Suitable where sea clutter is moderate. Applies medium sea clutter reduction.

[Rough]: Suitable in rough weather conditions where sea clutter is strong. Applies high sea clutter reduction. Weak bird echoes may be suppressed in this setting.

To select the bird mode setting, tap the display to open the pop-up. Select [Bird Mode] and desired setting option, [Calm], [Moderate], [Rough], or [Off].

Usage precautions

- The Bird mode is available with the radar sensor DRS2D/4D/4A/6A/12A/25A, software version 01.18 or after. The Bird mode is also available with the X-Class radar sensors (DRS6A X-Class, DRS12A X-Class, DRS25A X-Class). The radar sensor DRS4DL does not support the Bird mode.
- Do not use the Bird mode in rough weather.
- Do not use the Bird mode during a voyage. The Bird mode settings are not suitable in a voyage.
- ARPA performance may be reduced when the Bird mode is active.
- Radar Adjust (Gain, Sea, Rain) and Auto Sea Mode cannot be adjusted when the Bird mode is active.
- Schools of fish that attract birds tend to dive suddenly, which may result in unstable or disappearing echoes.

6.28 FAR-2xx7/FAR-15xx Radar Series and NavNet TZtouch

The FAR-2xx7 radar series* and FAR-15xx radar series can be connected to your NavNet TZtouch, and some functions can be controlled from the NavNet TZtouch. The table below shows which features can be controlled from the NavNet TZtouch. Note that you should turn off Guard Polygon at the radar to control the radar from the NavNet TZtouch.

*: B type, and IMO type program no. 02.50 or before and 3.13 or later.

Function	Controllable from NavNet	Remarks
AIS data (LAN)	No	
AIS data (NMEA 0183)	No	
AIS data display	Yes	
ARPA acquisition, cancellation	Yes	
Auto Gain	No	
Auto Rain	No	
Auto Sea	Yes	Value of Auto Sea is “0”.
Automatic ARPA target acquisition	No	
Dual range mode	No	
Echo average	No	
Gain	Yes	Manual only.
Installation setting (tuning, antenna rotation speed, etc.)	No	
Manual ARPA target acquisition, cancel	Yes	Max no. of targets is 100.
Position, time data	Yes	Shared via LAN
Range scale	Yes	0.0625, 1, 2, 4, 8, 16, 32, 36, 64, 72, 120 not available with IMO type. 72 nm not available with B type.
Selection of range unit	No	Fixed at “NM”.
Source selection, picture display	Yes	
TX/STBY	Yes	
Watchman	No	

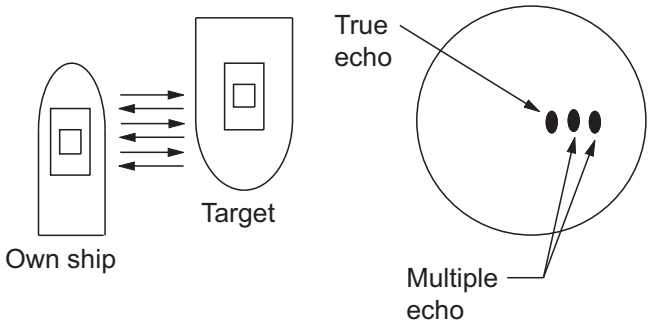
6.29 How to Understand the Radar Display

6.29.1 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.

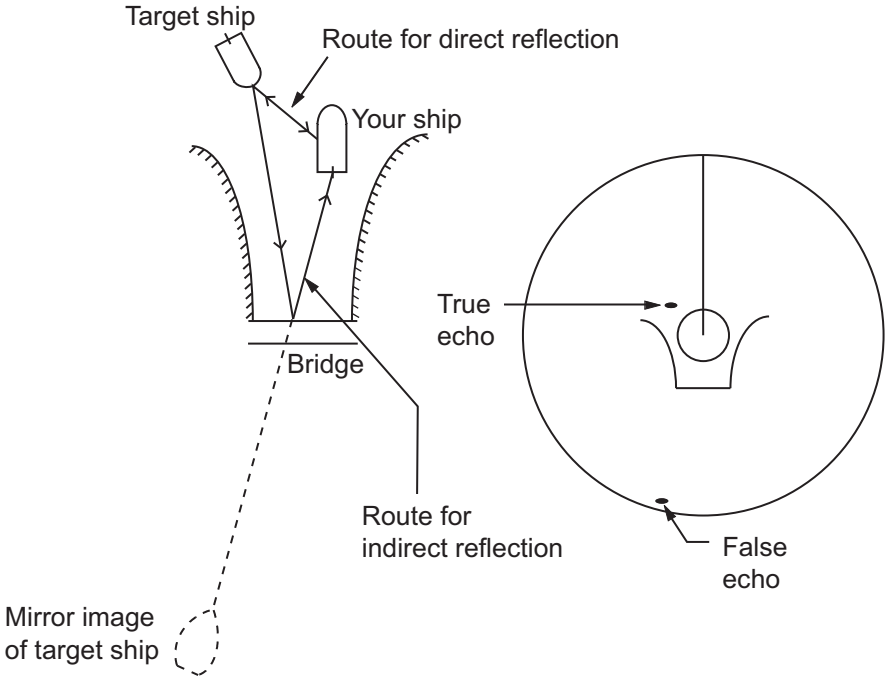
Multiple echoes

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.



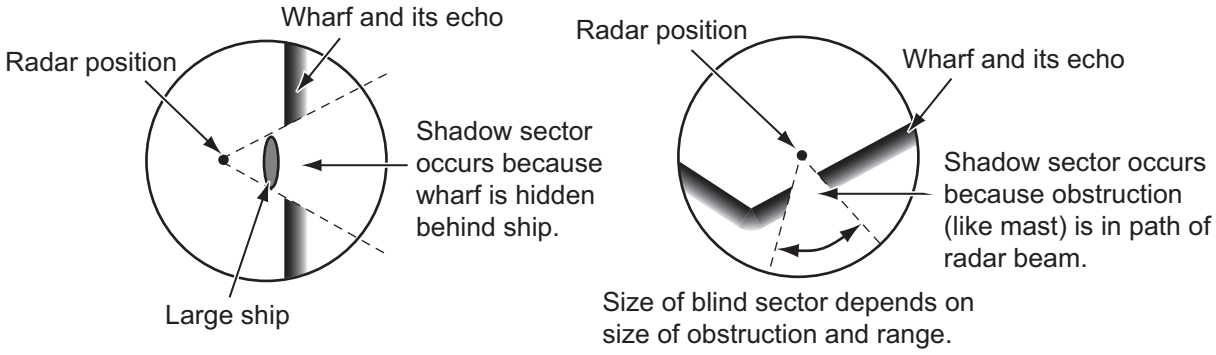
Virtual image

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.



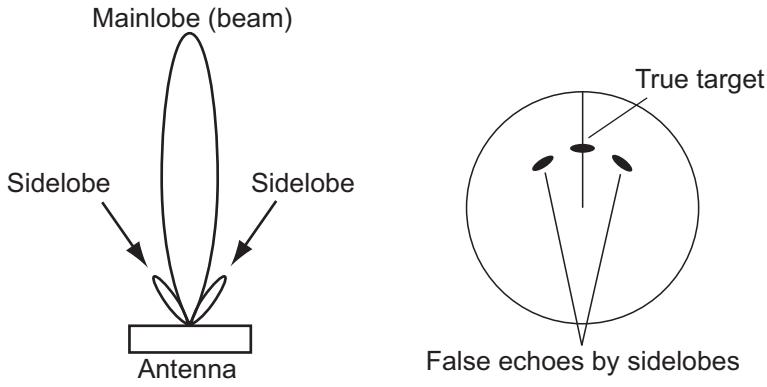
Shadow sector

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.

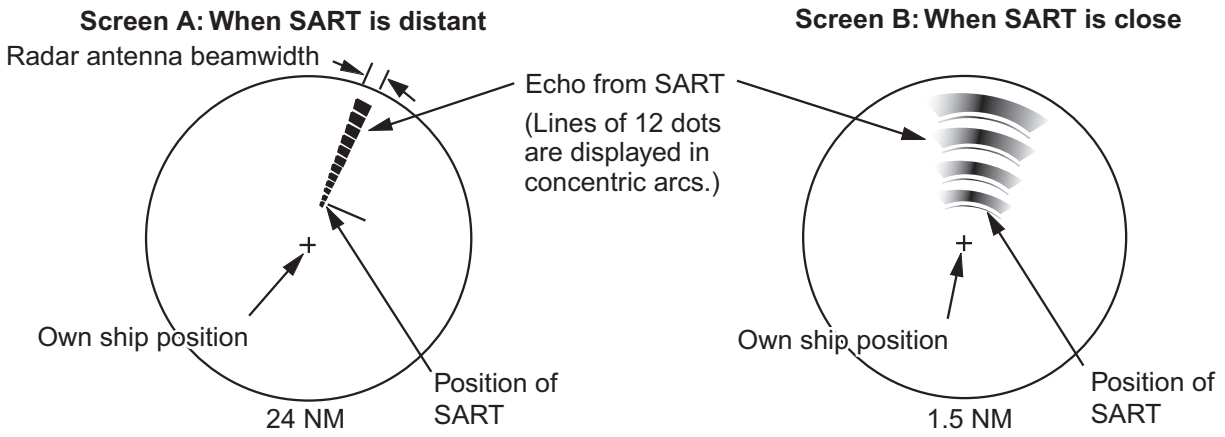


6.29.2 Search And Rescue Transponder (SART), Racon

Note: With the DRS4D-NXT, RACON (RAdar beaCON) and SART (Search And Rescue Transponder) within 0.5 to 1.5 NM (Range dependant) can be displayed. The signal from RACON and SART will be shown as a line.

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.

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

SART, Racon and the solid state radar

A SART or Racon at a distance of one or more nautical miles from own ship cannot be correctly displayed by a solid state radar. With the conventional magnetron radar, the signal from a SART or Racon is displayed on the radar screen with 12 points in the distance direction. With the solid state radar, however, the points connect to one another to form a single line, which cannot be recognized as the signal from a SART or Racon.

6.30 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 antenna unit DRS4DL does not have the ARPA function. With the DRS4D-NXT, a maximum of 100 targets (Manual: 30, Automatic: 30, Doppler: 40) can be acquired.

⚠ WARNING

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.

· 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

The plotting accuracy and response of this auto plotter meets IMO standards. Tracking accuracy is affected by the following:

· 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 is on the order of 15 - 30 seconds for high relative speed; 30 - 60 seconds for low relative speed.

Display accuracy is affected by the following:

· Echo intensity
· Radar transmission pulsewidth
· Radar bearing error
· Gyrocompass error
· Course change (your ship or target)

6.30.1 How to show or hide the ARPA display

1. Select [Targets] from the RotoKey menu on the chart plotter or radar display.
2. Select [ARPA] to show the ARPA display.

To hide the ARPA display, deselect [ARPA] at step 2.

6.30.2 How to manually acquire a target

You can manually acquire a target from both the radar display and the radar display overlay.

1. Select an object to acquire. The pop-up menu appears.
2. Select [Acquire].

After you acquire a target, the radar marks the target with a broken square and a vector appears within 30 seconds. The vector indicates the direction of the target. Within 90 seconds after you acquire the target, the first tracking step is completed 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.
Acquisition range for DRS4D-NXT: S1, S2 pulse lengths, 12 NM, M1 - L2 pulse lengths, 24 NM

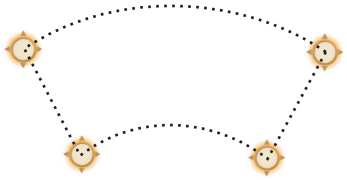
Note 2: When the capacity for manual acquisition is reached, you cannot acquire more targets. Cancel tracking of non-threatening targets to acquire additional targets manually.

6.30.3 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.

Note:

1. Select [Guard Zone] from the RotoKey menu.
2. Select [Visible]. The guard zone with dotted lines appears on the screen.
3. Select [Guard Zone] from the RotoKey menu.
4. Select [Resize]. Four circles appear at the four corners of the guard zone.



5. Move the circles to set the guard zone.
   Note: To set a 360-degree guard zone, set the same bearing for all four circles.
6. Select [End Resize] at the top right-hand corner of the screen.
7. Select [Guard Zone] from the RotoKey menu.
8. Select [Auto Acquire]. The dotted lines for the guard zone turn the solid lines.
9. Select [Guard Zone] from the RotoKey menu.
10. Select [Alarm].

To erase the guard zone, deselect [Alarm], [Auto Acquire], [Visible] in the [Guard Zone] menu in order.

Auto acquire by Doppler (DRS4D/6A/12A/25A-NXT) antenna unit)

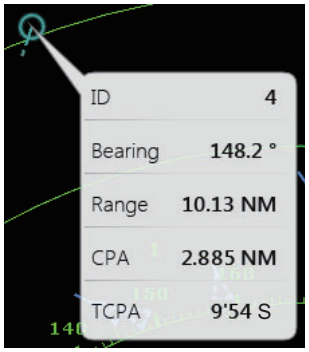
When automatic acquisition by Doppler is activated, approaching targets (ships, rain clutter, etc.) within 3 NM from own ship are automatically acquired by the Doppler calculated from the radar echo. A maximum of 40 targets can be acquired with auto acquire by Doppler. This feature, when active, runs in the background immediately after the start of transmission. Targets are acquired in order of distance from own ship, from nearest to furthest. Once a target is acquired, tracking continues regardless of subsequent Doppler behavior, even if the target becomes stationary. Targets can still be manually acquired provided that the capacity for automatic acquisition has not been reached.

Auto acquisition by Doppler is [OFF] in the default setting. To activate this feature, open the Radar menu, then turn on [Auto acquire by Doppler].

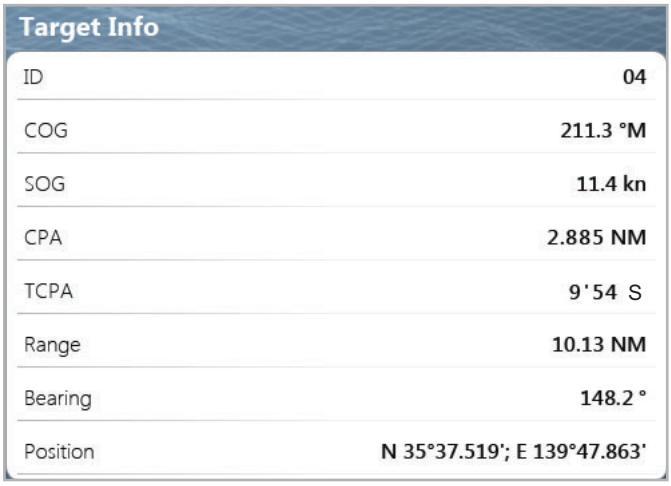
Position and heading data are required.

6.30.4 How to display target data

You can find the bearing, range, etc. of an ARPA target. Select the ARPA target to get its information. For detailed information, select the ARPA target to display the pop-up menu then select [Info]. The detailed information display can also be shown by selecting the simple information display.



Simple information



Detailed information

6.30.5 How to stop tracking targets

You can stop tracking ARPA targets separately or all together.

Individual target

1. Select the ARPA target to display the pop-up menu.
2. Select [Cancel] to delete the target from the screen.

All targets

1. Select [Targets] from the RotoKey menu.
2. Select [Cancel All] to delete all targets from the screen.

6.30.6 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

1. Select the lost target to display the pop-up menu.
2. Select [Clear] to delete the lost target from the screen.

All lost targets

1. Select [Targets] from the RotoKey menu.
2. Select [Clear Lost] to delete all lost targets from the screen.

6.30.7 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 the predicted CPA or TCPA is less than their set values, the alarm sounds and the message "CPA/TCPA Alarm" appears and flashes at the top of the screen.

The CPA or TCPA value can be set for “0”, however, the one with the value greater than “0” triggers the audiovisual alarm. For example, if the CPA is set for 0 NM and the TCPA for 3 minutes, the audiovisual alarm is released when the TCPA of the target is under 3 minutes.

Correctly adjust the gain, sea and rain controls before using 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. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Targets].
3. Select the [ON] icon in [CPA/TCPA Alarm].
4. Select [CPA Alarm Value] or [TCPA Alarm Value] to display the software keyboard.
5. Set the value then select [Confirm].

6. Select [Close] to exit the menu.

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, select (tap) the indication "CPA/TCPA Alarm" (see subsection 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

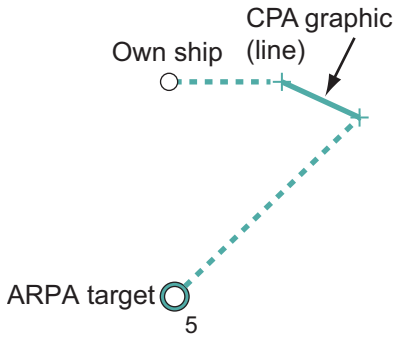
1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Targets].
3. Select the [OFF] icon in [CPA/TCPA Alarm].
4. Select [Close] to exit the menu.

6.30.8 CPA graphic display

The CPA graphic display shows the CPA between own vessel and the selected AIS target with a line, called the “CPA line.” You can use the line to monitor speed and heading changes of another vessel, which makes it useful as an anti-collision aid, especially in congested waters. Requires own ship and position data.

To activate or deactivate the CPA graphic display, open the [Targets] menu and turn [CPA Graphic Display] on or off.

To find the CPA of a ARPA target on the radar or plotter display, tap the ARPA target. The CPA line connects with the position of your vessel and the CPA of the ARPA target. The line is the same as the color of the target symbol. To find the CPA of another ARPA target select it, and the CPA line moves to the newly selected target. (Only one line can be displayed at a time between ARPA and AIS targets.) The example below shows the appearance of the CPA line on the radar display.



If the CPA/TCPA alarm is generated while the CPA line is in use, the CPA line and the selected target symbol turn red.

The CPA graphic display feature is not available in the following conditions:

- The CPA line is turned off. The line can be turned off by selecting the CPA line (or own ship icon), then selecting [Hide CPA line] from the pop-up menu.
- The feature is turned off.
- The TCPA is a minus (-) value.
- The target is a lost target.
- The CPA and TCPA of the target cannot be calculated (no speed or heading data for own ship).

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7. FISH FINDER

This chapter describes the functions of the fish finder, which requires the Bottom Discrimination Sounder BBDS1, Network Sounder DFF series or Color LCD Sounder FCV-1150.

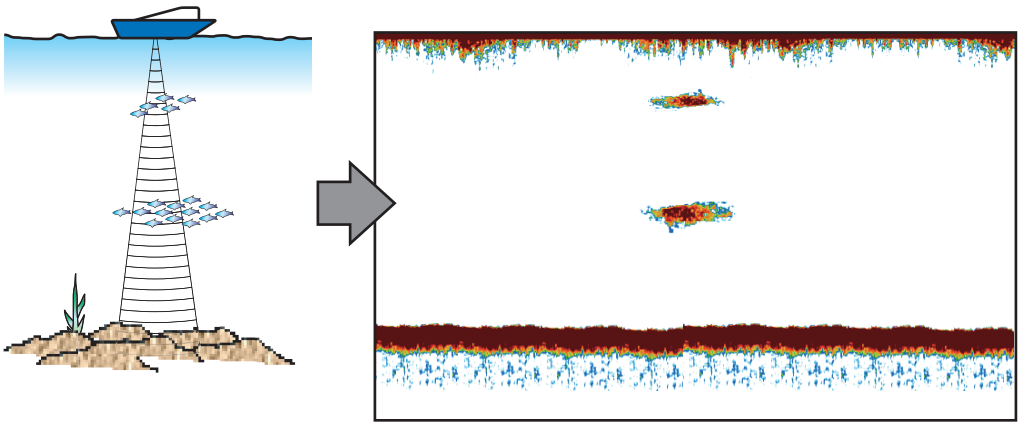
Note: When connecting the FURUNO Color LCD Sounder FCV-1150, do not select [USER-1] or [USER-2] with the **MODE** control. The echoes on the TZT display appear with scan lines.

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.



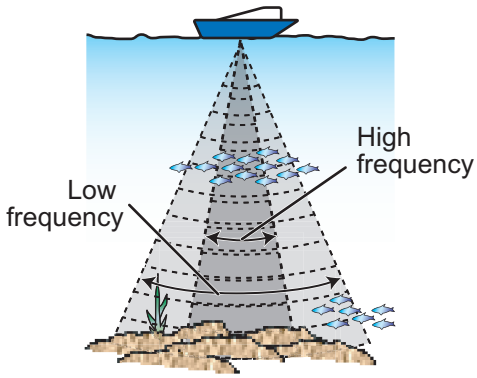
7.2 How to Select a Display

Your fish finder has six display modes. These modes are single frequency, dual frequency, bottom zoom, bottom lock, A-scope, and bottom discrimination (requires Bottom Discrimination Sounder BBDS1 or Network Fish Finder DFF1-UHD and specified transducer).

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.

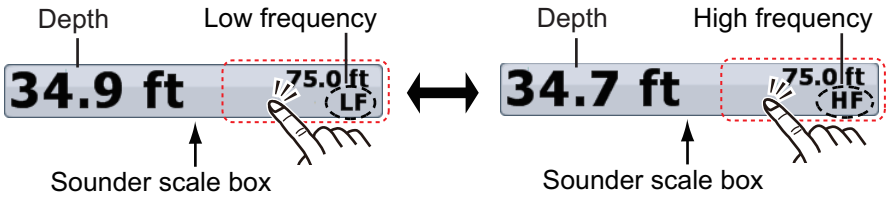


Detection area

How to select a single frequency display

1. Select [Mode] from the RotoKey menu.
2. Select [Single Freq.].
3. Select [Frequency] from the RotoKey menu.
4. Select [HF] (high frequency) or [LF] (low frequency).

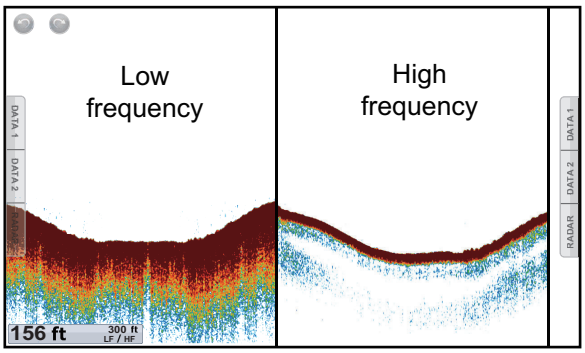
You can switch the frequency between high and low by tapping the sounder scale box at the bottom left-hand corner of the screen.



For ***TZTBB***, tap the area circumscribed above to switch between high and low frequencies.
Note: You can change the range by tapping the depth (see paragraph 7.4.2).

7.2.2 Dual frequency display

The dual frequency display provides both low and high frequency pictures. Use the dual frequency display to compare the same picture with two different sounding frequencies.



Freq. (kHz)	Beamwidth	Resolution	Detection range	Bottom tail
Low	Wide	Low	Deep	Long
High	Narrow	High	Shallow	Short

How to select the dual frequency display

Select [Mode] from the RotoKey menu then select [Dual Freq.].

How to reverse the display pictures between low and high frequencies

In the default setting, the low frequency picture is on the left, and the high frequency is on the right. To reverse the pictures between low and high frequencies, select [Frequency] from the RotoKey menu then select [LF]. The picture for the frequency option ([HF] or [LF]) selected here is displayed on the right.

7.2.3 Zoom displays

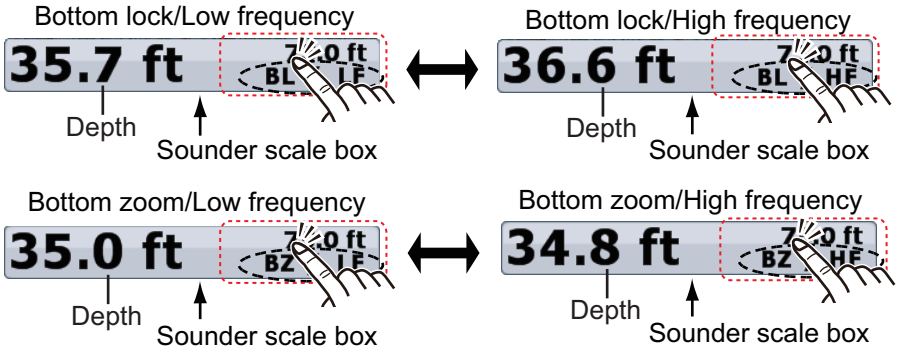
Zoom mode expands selected area of the single frequency picture. Two modes are available: bottom lock and bottom zoom.

How to activate a zoom display

1. Select [Mode] from the RotoKey menu.
2. Select [Btm Lock] or [Btm Zoom].

To quit the zoom display and go to the single frequency display, select [Mode] from the RotoKey menu then select [Single Freq.].

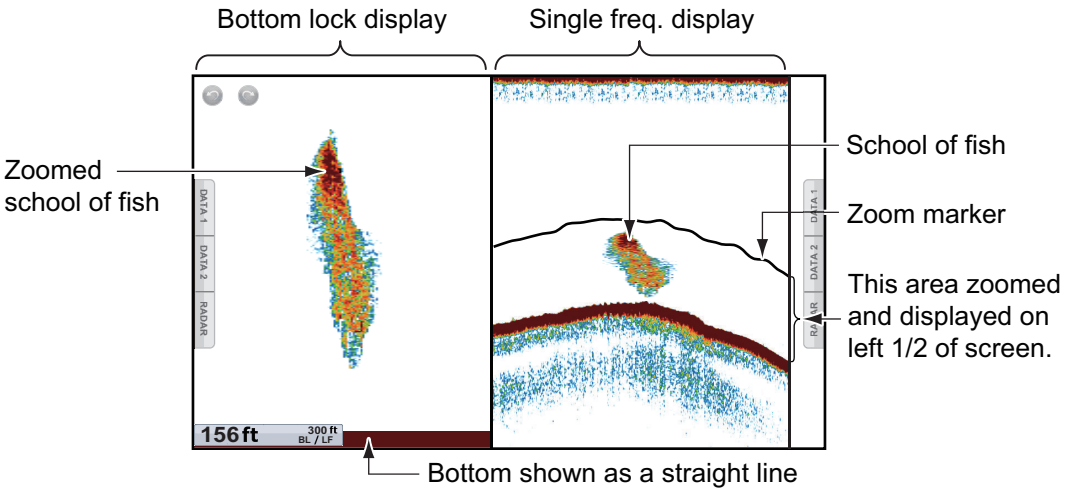
You can switch the frequency for the zoom displays by tapping the sounder scale box at the bottom left-hand corner of the screen.



For ***TZTBB***, tap the area circumscribed above to switch between high and low frequencies.
Note: You can change the range by tapping the depth (see paragraph 7.4.2).

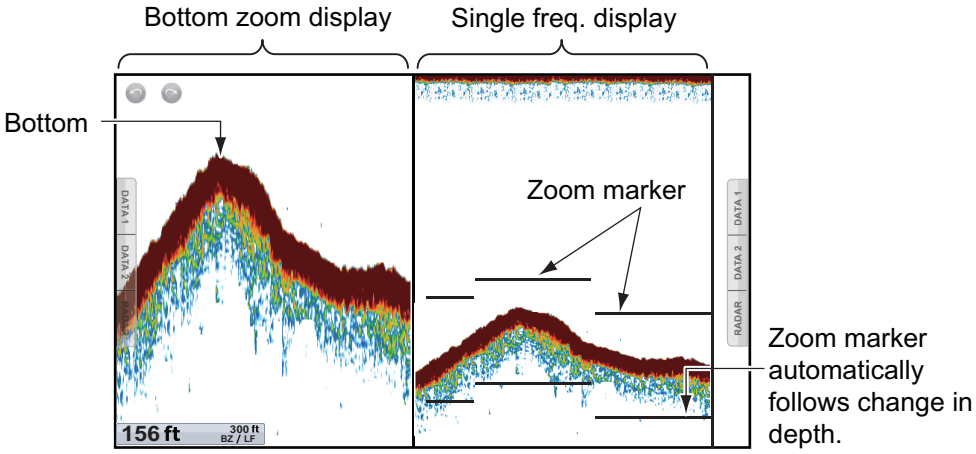
Bottom lock display

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 [Sounder] of the main menu.



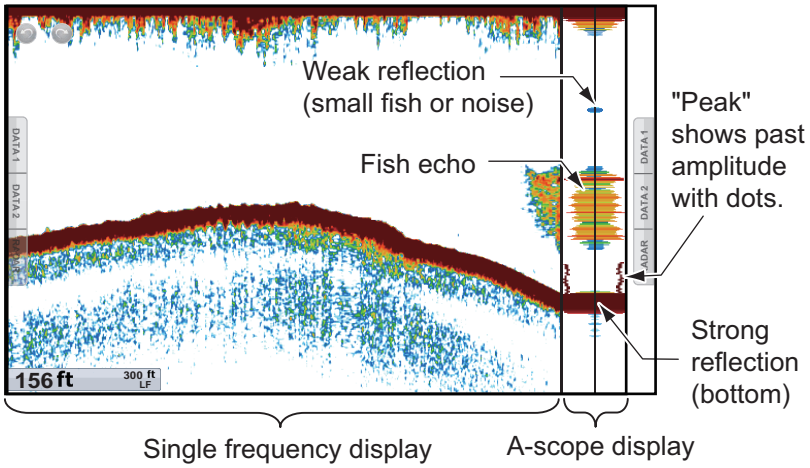
Bottom zoom display

The bottom zoom display expands the bottom and the fish near the bottom according to the zoom range selected on [Zoom Range Span] in [Sounder] of the main 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

To show the A-scope display, select [A-scope] from the RotoKey menu. To hide the A-scope display, deselect [A-scope].

A-scope peak hold

You can show the peak-hold amplitude image on the A-scope display. With [A-Scope Peak Hold] turned on, the image is slowly erased to help you easily discern amplitude condition.

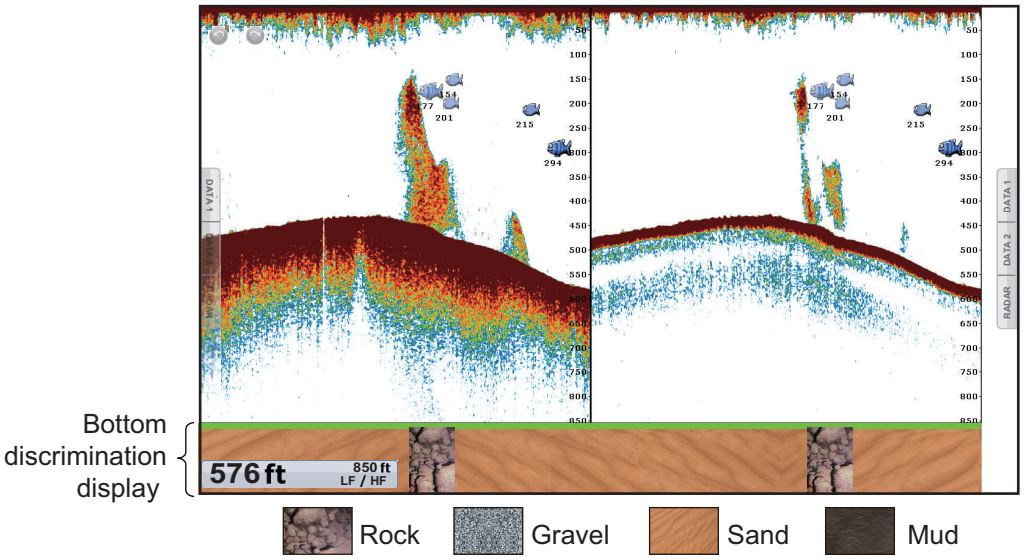
1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Sounder].
3. Select the [ON] icon in [A-Scope Peak Hold].



4. Select [Close] to exit the menu.

7.2.5 Bottom discrimination display

The bottom discrimination display, available with the Bottom Discrimination Sounder BBDS1 or Network Fish Finder DFF1-UHD and appropriate transducer, 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. The illustration below is the example display for the BBDS1.



Sand and rock are the most likely bottom type in this example.

How to active or deactivate the bottom discrimination display

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Sounder] - [Fish Finder Source] menu.
3. Select [BBDS1] or [DFF1-UHD].
4. Select [Close] to exit the menu.
5. To activate the bottom discrimination display, select [Bottom Type] from the RotoKey menu on the sounder display.

To deactivate the bottom discrimination display, deselect [Bottom Type].

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:

1. Select [Adjust] from the RotoKey menu.
2. Select [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

1. Select [Adjust] from the RotoKey menu.
2. Select [Manual].

7.4.2 How to select the display range

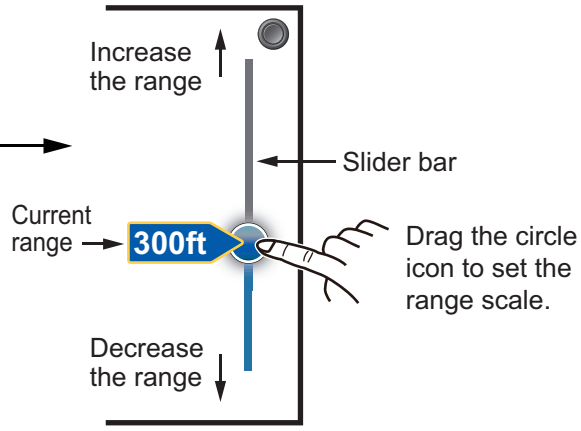
Manual range setting

TZT9/TZT14: Rotate the **RotoKey**™ to select the range. The range can not be changed in the auto mode or the bottom discrimination display.

TZTBB: Pinch the fish finder screen. Or tap the sounder scale box at the bottom left-hand corner of the screen to display the slider bar. Drag the circle icon to set the range scale.



Tap the area circled above to display the slider bar.
Note: You can switch between low and high frequencies by tapping the right side of the sounder scale box (see paragraph 7.2.1).



How to turn on or off the auto range

The range can be selected automatically or manually. Select [Auto Range] from the RotoKey menu for auto range. To turn off the auto range, deselect [Auto Range].

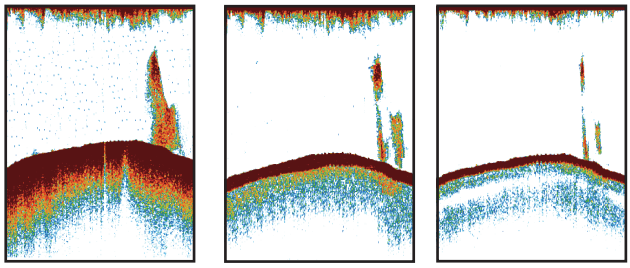
7.4.3 How to Shift the Range

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. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Sounder].
3. Select [Range Shift] to open the software keyboard.
4. Set the range then select [Confirm].
5. Select [Close] to exit the menu.

7.4.4 How to adjust the gain

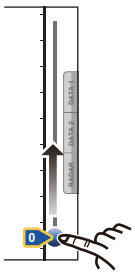
The gain controls how echoes of different strengths are displayed. Set the gain to show a slight amount of noise on the screen. Increase the gain for greater depths and lower the gain for shallow waters.



Gain too high | Gain proper | Gain too low

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

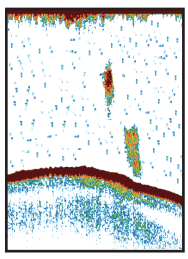
1. Select [Adjust] from the RotoKey menu.
2. Select [HF Gain] or [LF Gain].
3. Drag the circle icon to set the gain (see the figure below).



Drag the circle icon to set the gain.

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.

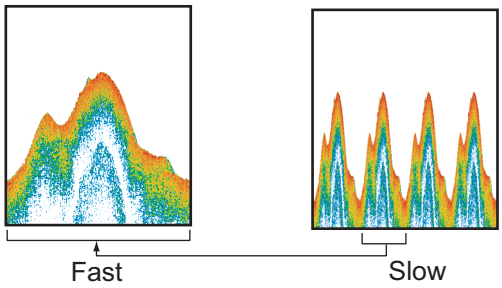


Note: This function is not available in the auto mode.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Sounder].
3. Drag the circle icon in [Clutter] to set the level. The larger the setting value, the greater the degree of reduction.
4. Select [Close] to exit the menu.

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. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Sounder].
3. Select [Picture Advance] menu.
4. Select 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.
5. Select [Close] to exit the menu.

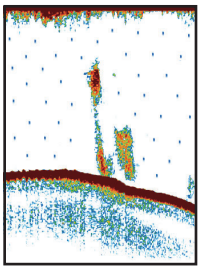
⚠ CAUTION

The picture is not refreshed when picture advancement is stopped.

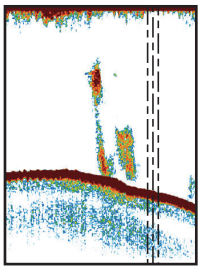
Maneuvering the vessel in this condition may result in a dangerous situation.

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

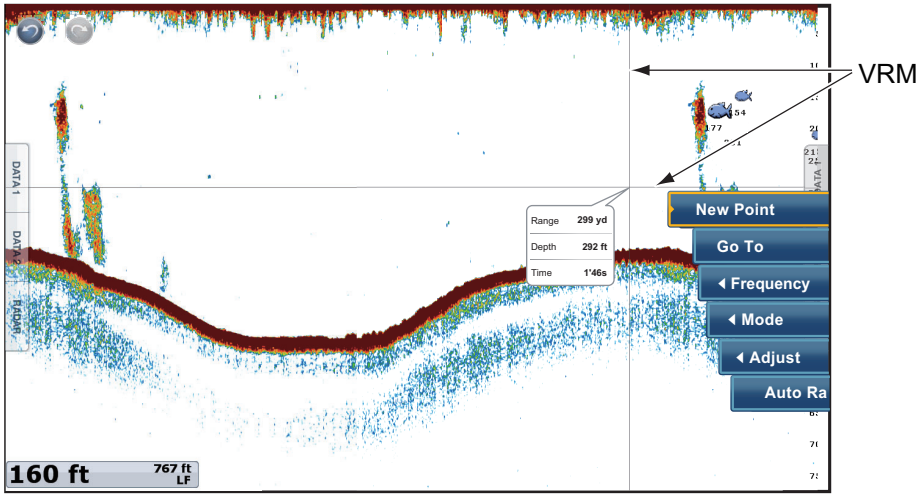
1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Sounder].
3. Select [Interference Rejection].
4. Select [Low], [Medium], [High] or [Auto]. [High] is the greatest interference rejection. [Auto] automatically selects suitable interference setting.
5. Select [Close] to exit the menu.

To deactivate the interference rejection, select [Off] at step 5.

7.7 How to Measure Range, Depth or Time to an Object

You can measure the depth to an object with the VRM. Also, you can measure the range and time from the right edge to a location. For example, you can measure how many minutes ago an echo appeared.

To measure the range, the depth or the time to an object, select an object to display the VRM. Read the range, the depth and the time in the box.

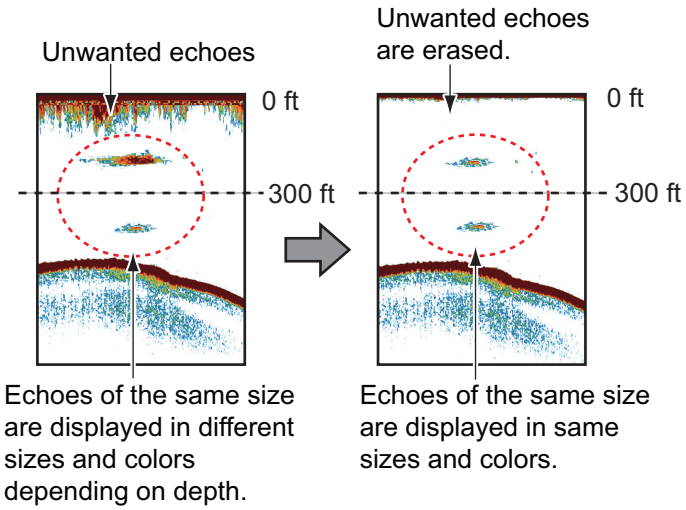


When you want to see the past echoes which are off the screen, drag the screen to right. To show the current display, select [Cancel Hist.] at the top right-hand corner of the screen.

7.8 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. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Sounder].
3. Drag the circle icon in [TVG HF] (high frequency) or [TVG LF] (low frequency) to set the level. Raise the TVG to increase the gain difference between near and far distances.

Connected echo sounder	TVG operation
DFF1, DFF1-UHD, BBDS1, DFF-3D	The larger the setting, the greater the gain on short ranges.
DFF3	The smaller the setting, the lower the gain on short ranges.

4. Select [Close] to exit the menu.

7.9 Fish Finder Alarms

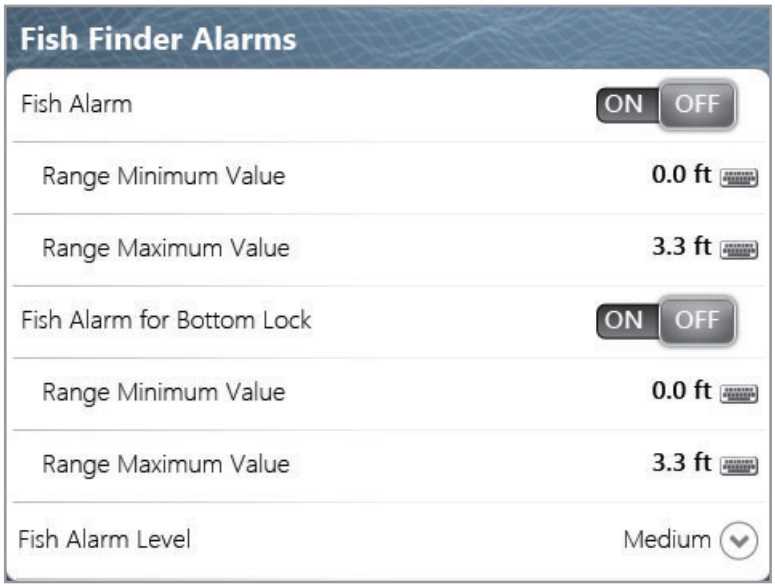
Two types of fish alarms release audio and visual alarms to tell you that echoes from fish are in the area you selected. These alarms are [Fish Alarm] and [Fish Alarm for Bottom Lock].

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

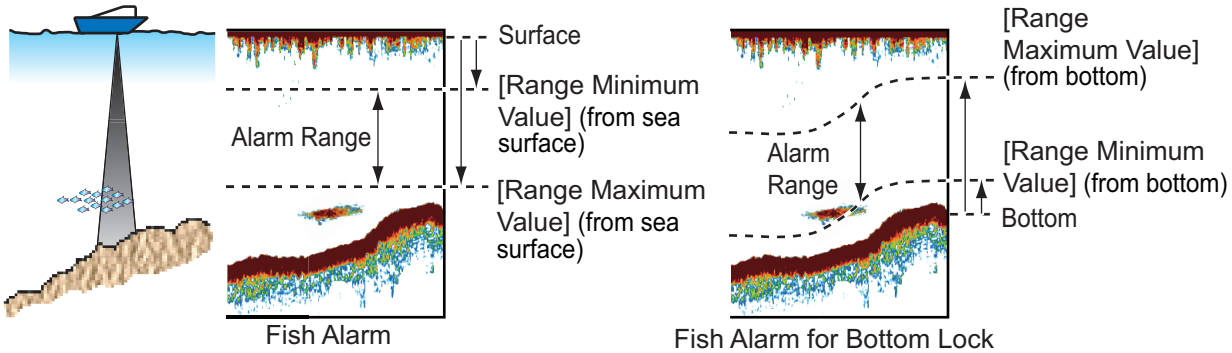
The [Fish Alarm for Bottom Lock] function tells you when fish are within some distance from the bottom. The bottom lock display must be active to use this alarm.

7.9.1 How to set an alarm

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Sounder].
3. For **fish alarm**, select [Range Minimum Value] or [Range Maximum Value] below [Fish Alarm] to display the software keyboard.
   For **bottom lock fish alarm**, select [Range Minimum Value] or [Range Maximum Value] below [Fish Alarm for Bottom Lock] to display the software keyboard.



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



5. Select [Close] to exit the menu.

7.9.2 How to activate or deactivate an alarm

Fish alarm

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Sounder].
3. To activate the fish alarm, select the [ON] icon in [Fish Alarm].
   To deactivate the fish alarm, select the [OFF] icon in [Fish Alarm].

You can activate or deactivate [Fish Alarm] from the RotoKey menu.

Bottom lock fish alarm

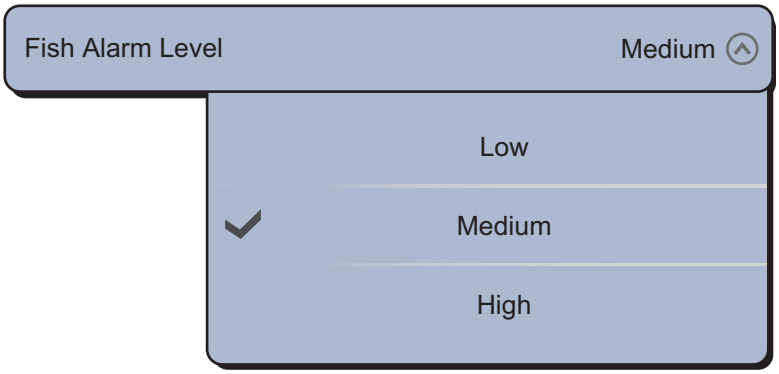
1. Select [Menu] on the menu icon bar to open the main menu.

2. Select [Sounder].
3. To activate the bottom lock fish alarm, select the [ON] icon in [Fish Alarm for Bottom Lock].
   To deactivate the fish alarm, select the [OFF] icon in [Fish Alarm for Bottom Lock].

7.9.3 Alarm sensitivity

You can select which strength of echoes release the fish alarms.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Sounder] - [Fish Alarm Level].



3. Select 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. Select [Close] to exit the menu.

7.10 ACCU-FISH™

The ACCU-FISH™ feature estimates the length of each fish and shows a fish symbol and depth value or fish length. This feature requires appropriate transducer and either Network Sounder BBDS1 or DFF series.

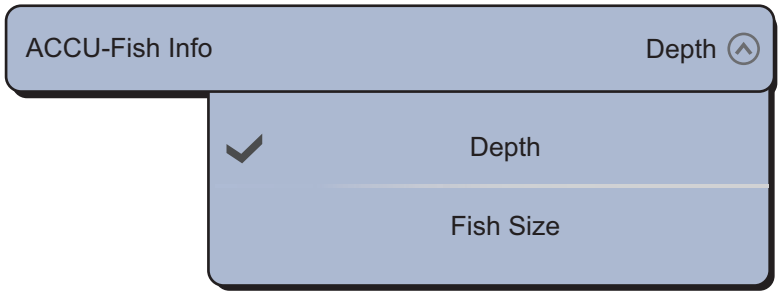
Application consideration

- 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 main menu.
- 50 kHz and 200 kHz beams are transmitted alternately without reference to the current display mode.
- To reduce the error, the detection area must be 2 to 100 meters from the surface.
- This feature cannot be used with inside-hull transducers since fish may not be detected, depending on the transducer's frequency. Even if fish are detected, the indicated fish length may be smaller than the actual length.

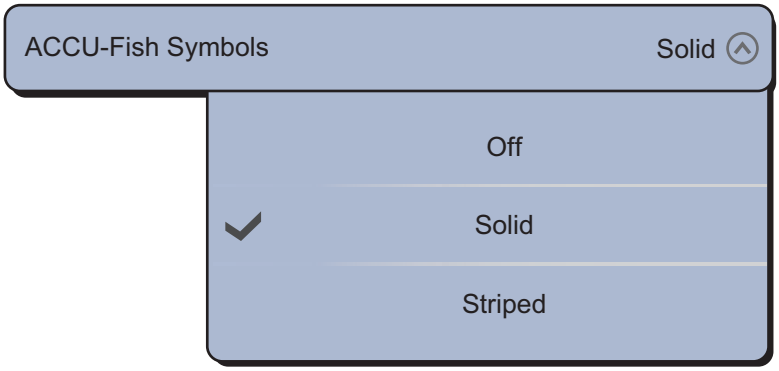
- Echoes from a school of fish can be in more than one layer, which can cause wrong length indication.
- The fish symbol indication is not shown when the bottom echo does not appear on the screen.

7.10.1 How to set ACCU-FISH™

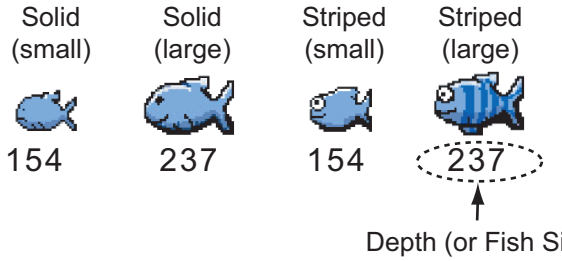
1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Sounder].
3. Select [ACCU-Fish Info].



4. Select [Depth] or [Fish Size].
   Note: The size can be shown in inch or centimeter, with [Fish Size] in the [Units] menu.
5. Select [ACCU-Fish Symbols].



6. Select [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))		

7. Select [Close] to exit the menu.

7.10.2 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. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Sounder].
3. Drag the circle icon in [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

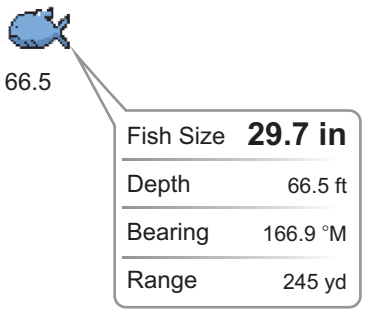
4. Select [Close] to exit the menu.

7.10.3 How to turn the fish symbol indication on

Select [Accu Fish] from the RotoKey menu. Fish symbols and their depth values or fish lengths appear on the screen. If you selected [Off] at step 7 in subsection 7.10.1, the fish symbols are hidden and only the depth values or fish lengths appear.

7.10.4 How to display the fish information

Select a fish symbol (only in ACCU-FISH^{TM} mode) to display the information (size, depth, bearing and range) about a fish.



7.11 How to Put a Point, Go To a Point or a Position

You can put a point on the sounder display. The point also appears on the chart plotter display. You can set a point or a position as a go to point.

How to put a point

1. Select a fish symbol (only in ACCU-FISH^{TM} mode), a position, etc. to put a point.
2. Select [New Point] from the pop-up menu. The [Creating Event] window appears (see subsection 4.2.2).

3. Select a mark. In the example below, a shrimp mark is put on the fish symbol.

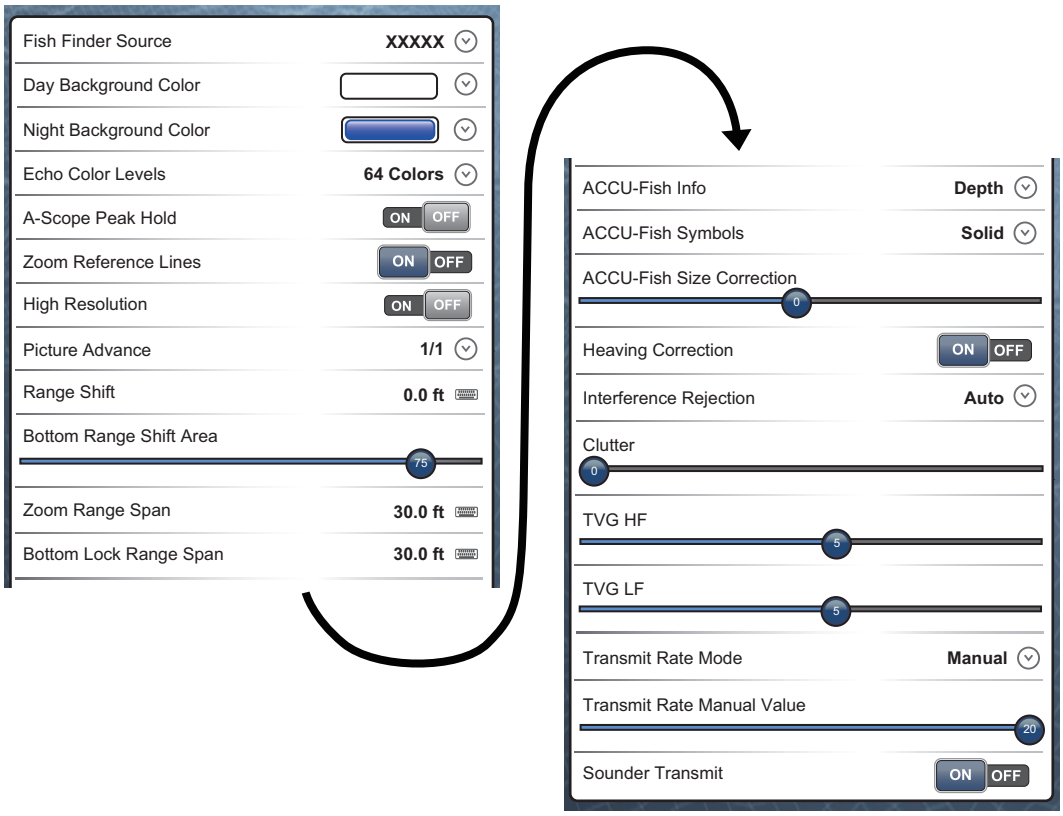


How to go to a point or a position

1. Select a fish symbol (only in ACCU-FISH^{TM} mode), a point or a position to display the pop-up menu.
2. Select [Go To]. The selected symbol*, point* or position is highlighted on the chart plotter display. For details, see section 4.12.
   *: When [Accu Fish] or [Points] is turned on in the [Overlay] RotoKey menu.

7.12 Fish Finder Menu Operation

This section describes the fish finder functions not described in previous sections. To open the following menus, select [Menu] on the menu icon bar then select [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].

[Zoom Reference Lines]: Show or hide the zoom marker, which appears in the bottom lock and bottom zoom modes.

[High Resolution]: When you select [OFF], smoothed echoes are displayed, however, the screen resolution is lower. To get higher screen resolution and greater detail, select [ON].

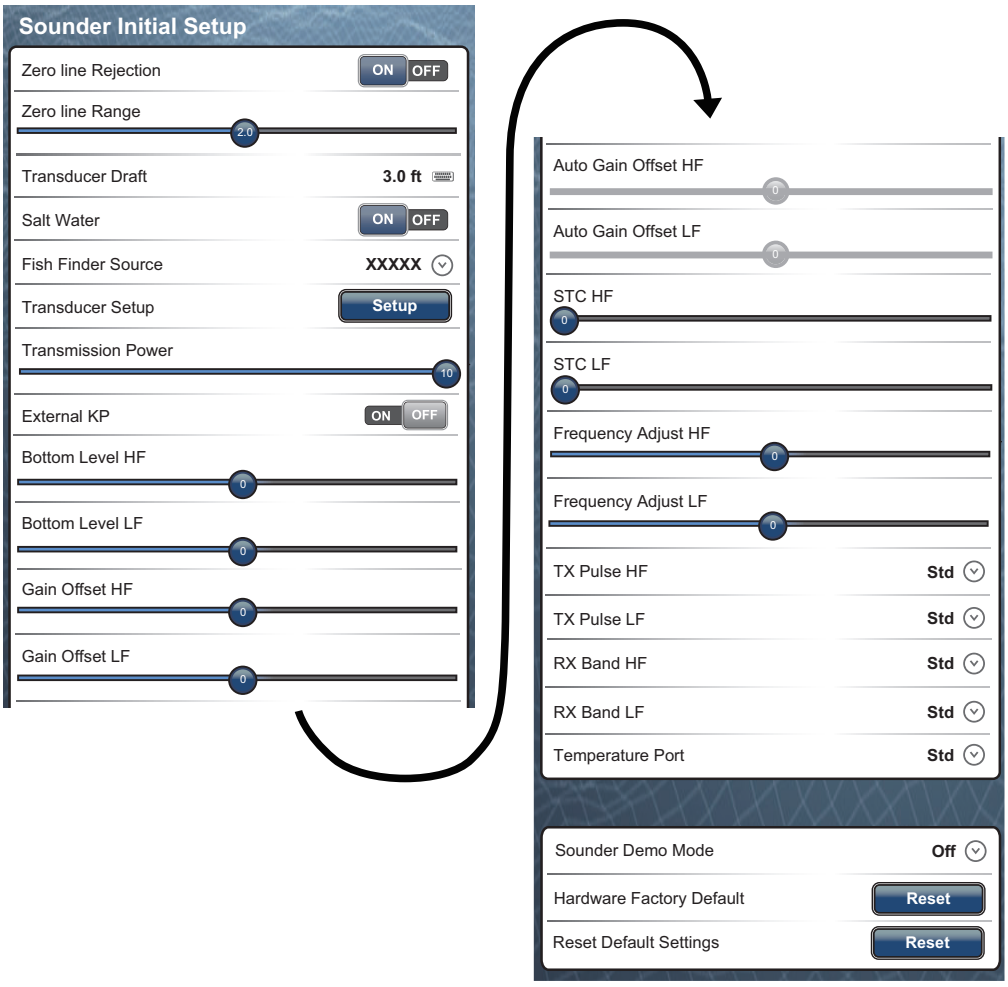
[Bottom Range Shift Area]: Select the area where to show the bottom echo, when [Auto Range] is active. For example, setting 75% would place the bottom echo at a position equivalent to 75% from the top of the screen. This feature is disabled when the bottom discrimination mode is active.

[Heaving Correction]: When the ship is in rough seas, the bottom echo and the echoes from fish are not stable, because the distance to the bottom changes. To remove this problem, the satellite compass sends pitch and roll data to the fish finder to adjust the TX and RX beams. This function requires a FURUNO Satellite Compass.

[Transmit Rate Mode]: Select how to set the transmit rate, [Manual], [Auto], or [Max]*. *Available with DFF3, FCV-1150 only.

[Transmit Rate Manual Value]: With [Transmit Rate Mode]:set for [Manual], you can change the TX pulse repetition rate in 21 levels (0-20, 20 is the 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.



[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 in-

stallation characteristics. If the width of the transmission line is 2.0 or more, set the transmission line width with [Zero Line Range], as shown on the next page.

[Zero Line Range]: This feature adjusts the transmission line so that the line disappears when [Zero Line Rejection] is turned on. The effective range is 1.4 to 2.5. For a long tail, increase the value. If the transmission line does not disappear, lower the TX power (DFF3 only).

[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, FCV-1150 or DFF1-UHD.

[Transducer Setup]: Select the method to setup the transducer, manually or by selecting the model number.
[Manual]: Enter high/low frequencies and TX power.
[Model Number]: Select the type of the transducer connected.

[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. The setting range is 0 to10. 0 is off and 10 provides the highest TX power. For DFF1-UHD, the setting range is [OFF], [Minimum], or [Auto].

[External KP]: Turn on to sync with external keying pulse.

[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. If vertical lines appear from the bottom echo in the bottom lock display, lower the bottom level to erase the vertical lines. If you can not identify the fish near the bottom from the bottom echo, increase the bottom level.

[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 (DFF3 only).

[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 (DFF3 only).

[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 im-

portant. 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) (DFF3 only).

[RX Band HF (LF)]: The RX bandwidth is automatically set according to pulse length. To decrease noise, select [Narrow]. For better resolution, select [Wide] (DFF3 only).

[Temperature Port]: Select the data source for water temperature (DFF1-UHD, DFF3).
[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

[Sounder Demo Mode]: The demonstration mode provides, with connection of the transducer, simulated operation of the equipment, using internally generated echoes.
[Off]: Turn demo mode off.
[Shallow]: Shallow depth demonstration
[Deep]: Deep depth demonstration

[Hardware Factory Default]: Select this menu item to restore default settings for the unit selected in [Fish Finder Source]. Not available with FCV-1150.

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

7.13 LCD Color Sounder FCV-1150 and NavNet TZtouch

The FCV-1150 can be connected to your NavNet TZtouch, and some functions can be controlled from the NavNet TZtouch. The table below shows those features that can be controlled from the NavNet TZtouch. This feature is available with the FCV-1150 software version 0252359-03.01 or higher. TLL is output from the NMEA183 port of the FCV-1150 and fed to the TZT via the interface unit IF-NMEA2K2.

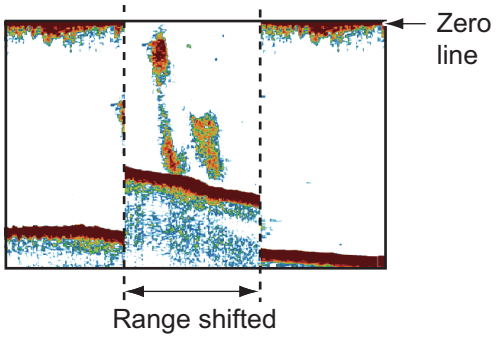
Function	Controllable from NavNet	Remarks
A-scope	Yes	
ACCU-FISH^{TM}	Yes	
ACCU-Fish info	Yes	
ACCU-Fish size correction	Yes	
ACCU-Fish symbols	Yes	
Auto gain offset	No	Set at FCV-1150.
Auto mode	Yes	
Auto range	Yes	
Background color	Yes	
Bottom detection level	No	Set at FCV-1150.
Bottom lock range span	Yes	
Bottom range shift area	No	Set at FCV-1150.
Clutter	No	Set at FCV-1150.
Color erase	No	Set at FCV-1150.

Function	Controllable from NavNet	Remarks
Depth unit	Yes	
Echo color levels	Yes	
Fish alarm	Yes	
Fish alarm level	Yes	
Fish info size	No	Set at FCV-1150.
Frequency adjustment	Yes	
Gain	Yes	According to Gain/Mode setting at FCV-1150.
Gain offset	No	Set at FCV-1150.
Heaving correction	Yes	
High resolution	Yes	
Interference rejection	Yes	
Manual pulse length	No	Set at FCV-1150.
Mode	Yes	According to Gain/Mode setting at FCV-1150. NavNet does not have Auto Shift.
Picture advance	Yes	
Range shift	Yes	
RX band	Yes	
Speed of sound (Salt water)	Yes	
Split range	No	Set at FCV-1150.
STC	No	Set at FCV-1150.
TLL (Target Lat/Lon)*	Yes	Requires NMEA Data Converter IF-NMEA2K2.
Transducer draft	No	Set at FCV-1150.
Transmission power	Yes	On/Off only.
Transmit rate	Yes	FCV-1150, DFF3 additionally has [Max] power setting.
TVG	No	Set at FCV-1150.
TX pulse	Yes	
Water temp. graph	No	Set at FCV-1150.
White marker	No	Set at FCV-1150.
Zero line rejection, Zero line range	No	Set at FCV-1150.
Zoom mode	Yes	
Zoom range span	Yes	
Zoom reference lines	Yes	

7.14 Interpreting the Display

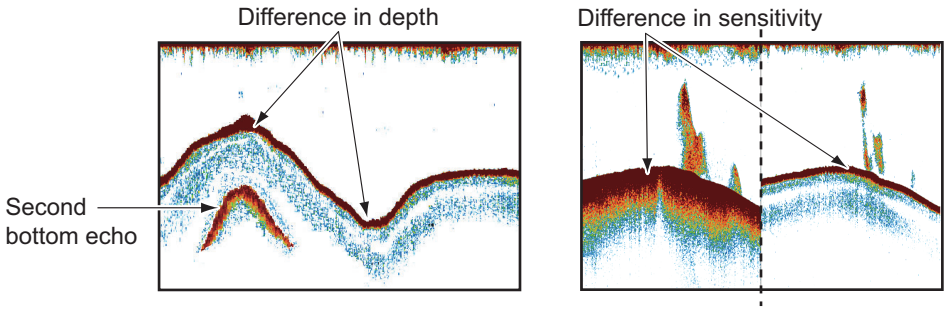
Zero line

The zero line (transmission line) shows the position of the transducer. The line disappears from the screen when the range is shifted.



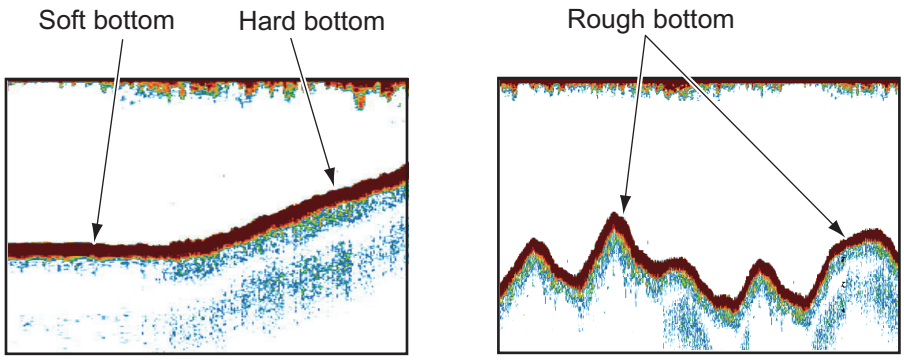
Bottom echoes

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.



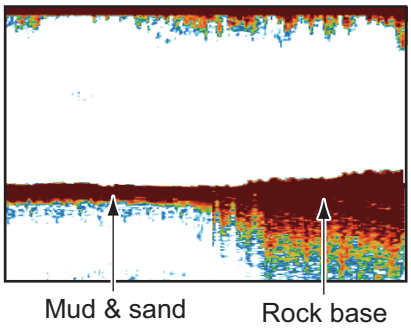
Bottom contour

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.



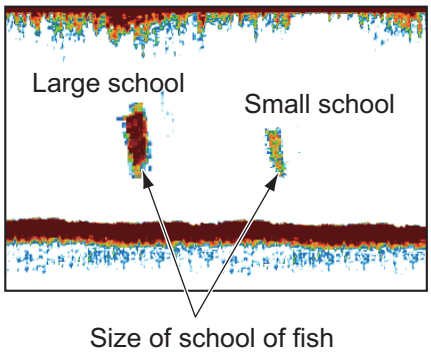
Nature of a bottom

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.



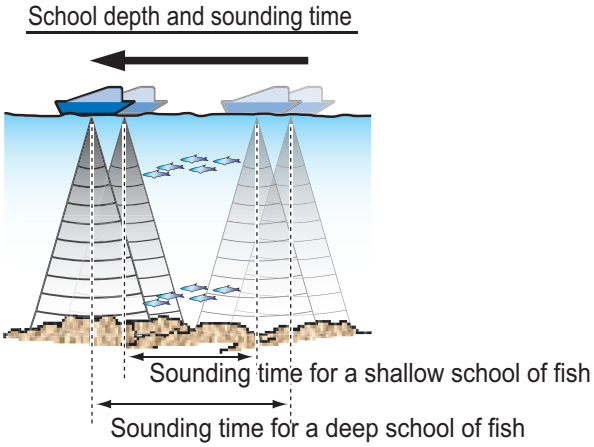
Fish quantity

The size and density of a school of fish are indicators of the quantity of fish.



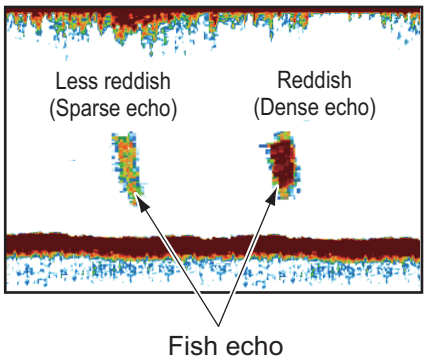
Size of a school of fish

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.

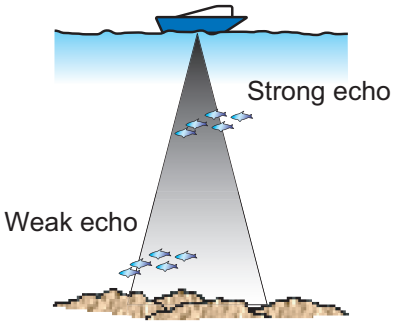


Density of a school of fish

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.

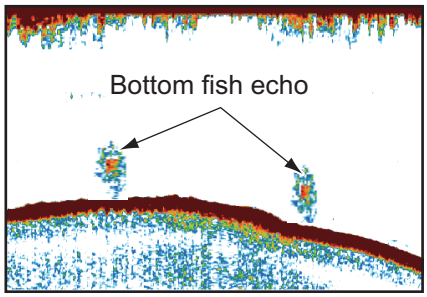


Difference in signal strength



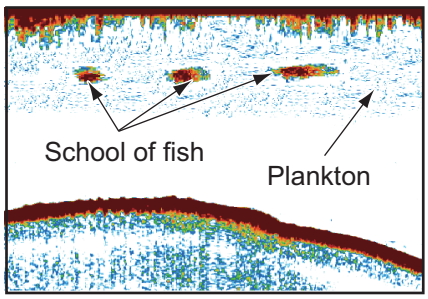
Bottom fish

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.



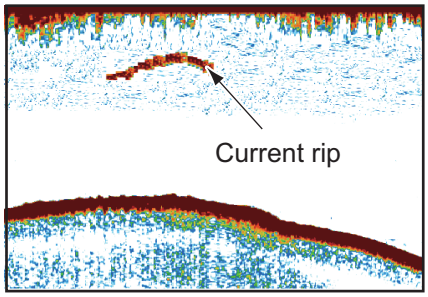
Plankton

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.



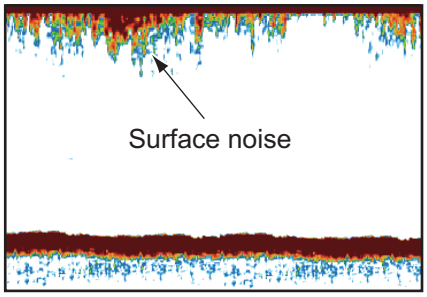
Current rip

When two ocean currents of different speeds directions and water temperatures meet, a current rip occurs. A current rip appears on the screen as shown in the right illustration.



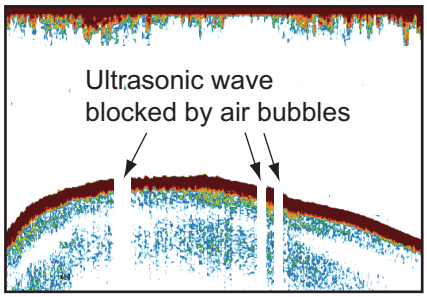
Surface noise

When the sea is rough or the ship moves over a wake, surface noise can appear at the top of the screen.



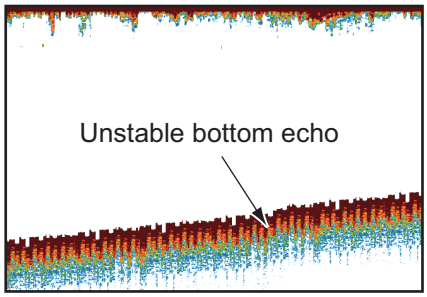
Air bubbles in the water

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.



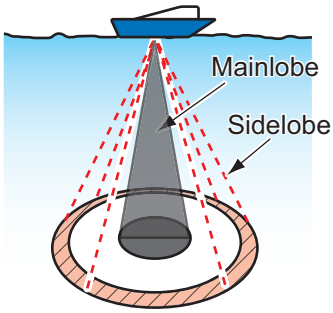
Unstable bottom echo

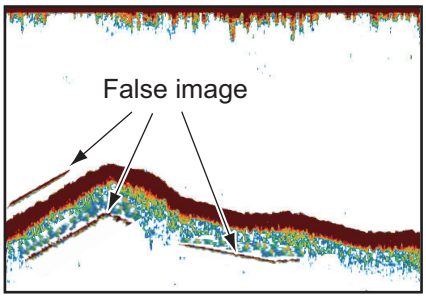
The bottom echoes can have a saw-tooth appearance. This occurs in heavy weather because pitching and rolling changes the direction of the ultrasonic pulses and the vertical motion of the ship causes the distance to the bottom to change.



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. MULTI BEAM SONAR DFF-3D

This chapter describes the display screens (modes) available with the Multi Beam Sonar DFF-3D, which displays images of the underwater and the ocean floor with high precision. Four display screens are provided, multi-sounder, side scan, cross section, and 3D sounder history.

8.1 Display Screens Overview

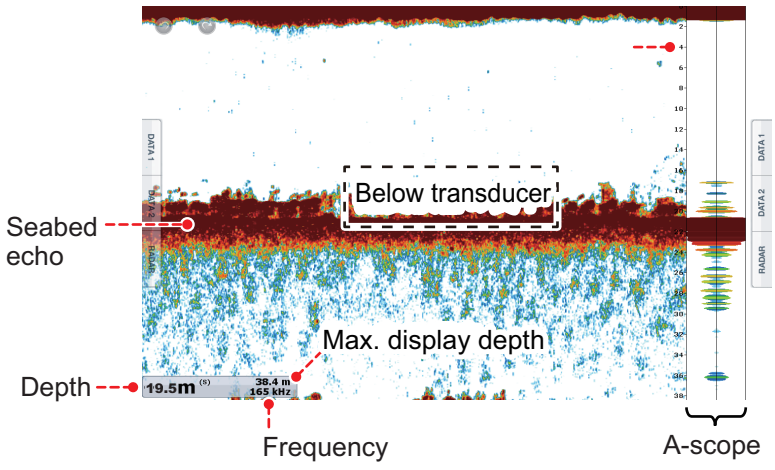
Multi-sounder display

The multi-sounder display operates similar to the conventional fish finder, providing information about the seabed and underwater conditions. The video display scrolls from the right to left with the passing of time.

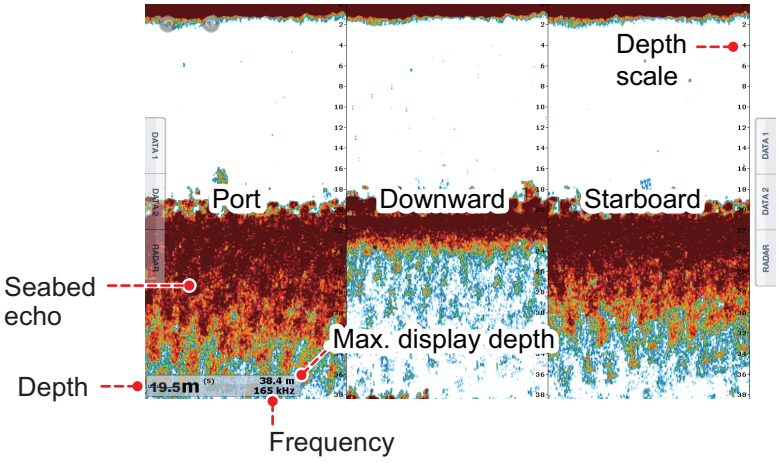
The echoes appearing at the right edge of the display are the latest echoes. Echoes from individual fish, schools of fish and the seabed are shown. With the gain set properly, the distance to the seabed appears on the screen.

The gain, clutter suppressor and TVG are adjusted according to the mode selected, auto fishing or auto cruising. Manual adjustment of those controls is also possible.

The single beam presentation displays the information detected by the downward-looking beam. The triple beam presentation displays the information detected by the port beam, starboard beam, and downward-looking beam.



Single beam display



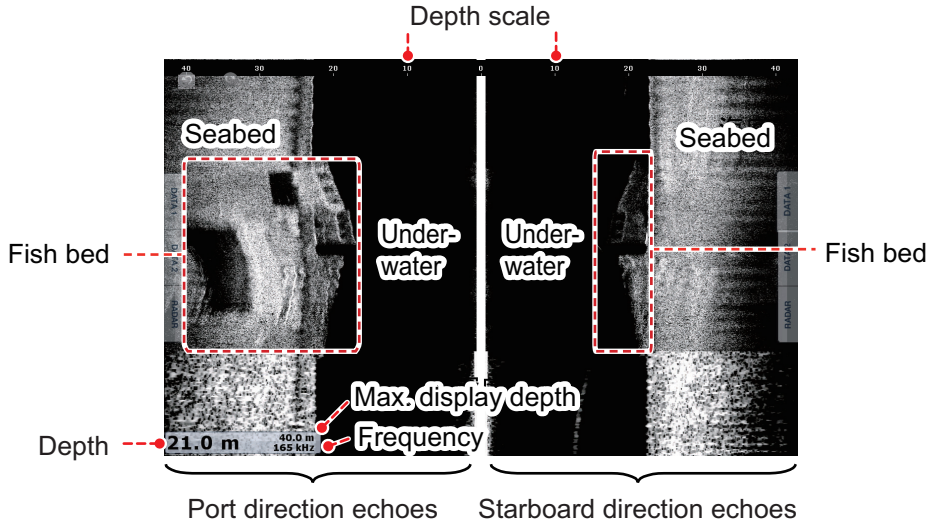
Triple beam display

Side scan display

The side scan display shows the echoes received from the port and starboard directions.

The side scan display starts from the center of the vessel, and traces in the port and starboard directions. The most recent echoes are at the top of the screen and the oldest are at the bottom of the screen.

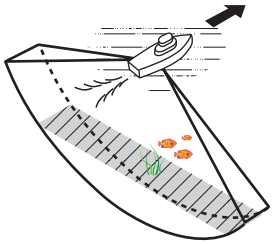
The side scan display is different from the other modes employed by this equipment - it clearly displays the shape of echoes (fish bed, etc.).

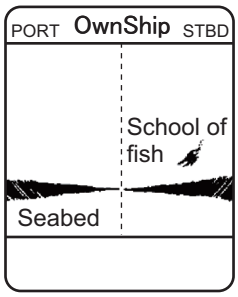


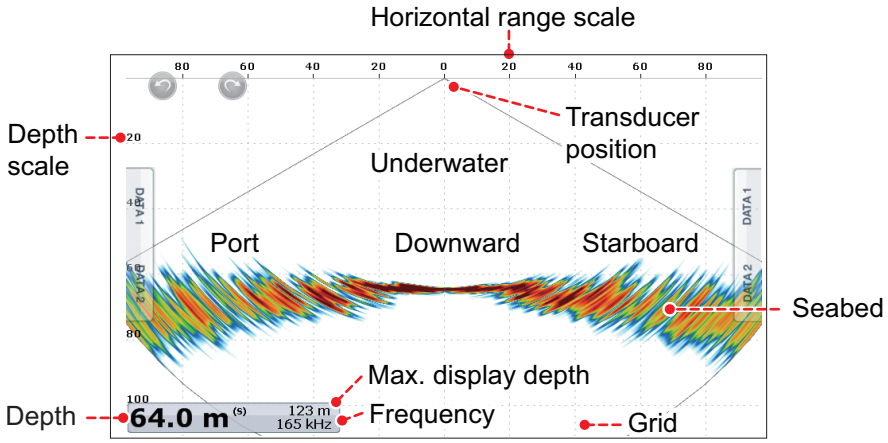
Cross section display

The cross section display, shows seabed and underwater conditions.

This multi beam sonar uses a 120° beam (downward to port 60°; downward to starboard 60°), providing highly accurate underwater images.

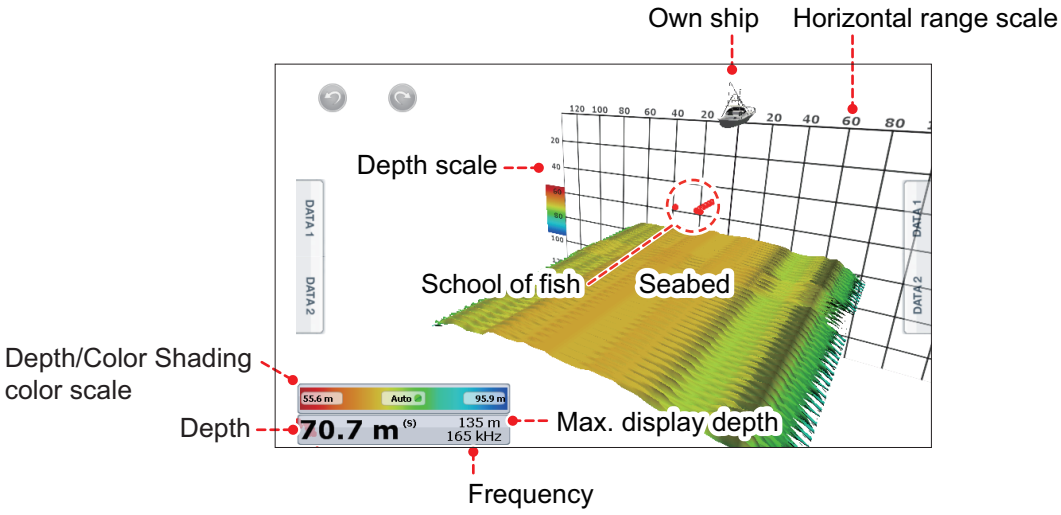






3D sounder history display

The 3D sounder history provides a 3D graphic of the past seabed and underwater echoes detected by your vessel. The display can be used to detect schools of fish.



8.2 Multi-Sounder Display Operations

This section covers the functions available with the multi-sounder display. For the menu items shared with the conventional fish finder, see chapter 7.

8.2.1 How to switch between TX and STBY

Tap the multi-sounder display to show the pop-up menu. Select [TX] to start transmitting. [ST-BY] appears at the center of the screen when transmission is stopped.

8.2.2 How to switch between single beam and triple beam presentations

1. Tap the multi-sounder display to show the pop-up menu.
2. Select [Mode].
3. Select [Single Beam] or [Triple Beam] as required.
4. Select [Close] to close the pop-up menu.

8.2.3 How to set the TX beam angle

You can set the TX beam angle for the port, starboard and downward beams.

1. Tap the multi-sounder display to show the pop-up menu.
2. Select [Beam Angle].
3. Set the beam angle as required.

8.2.4 How to set the TX beam width

You can set the TX beam width for the port, starboard and downward beams.

1. Tap the multi-sounder display to show the pop-up menu.
2. Select [Beam Width].
3. Set the beam width as required.

8.2.5 How to show or hide the scale box

The scale box, shown at the bottom left corner on the display, shows depth, current range, and TX frequency. You can show the box as follows.

1. Tap the multi-sounder display to show the pop-up menu.
2. Select [Scale Box] to show the scale box.

8.2.6 Availability of points and event marks registration, and go to a point

For operation, see chapter 7.

The table below shows function availability according to latitude/longitude, heading data presence or absence. If there is no latitude/longitude data, none of the functions below are available.

For a multi function display, input PGN data. The PGN data available is as shown below.

Latitude/longitude data

- 129025 Position, Rapid Update
- 129029 GNNS Position Data

Heading data

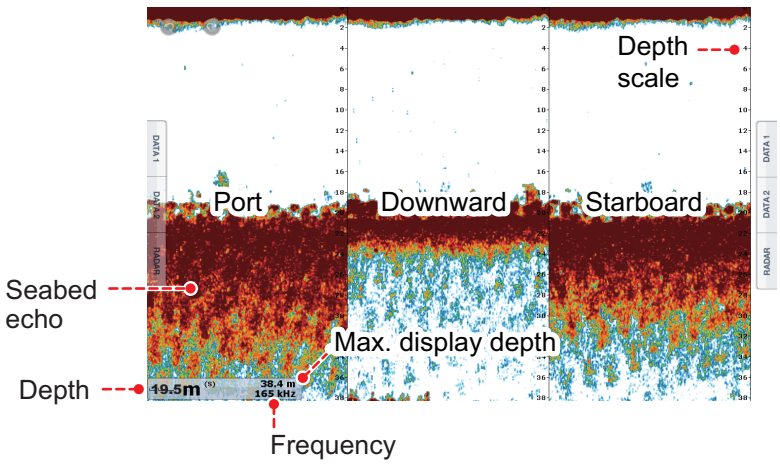
- 127237 Heading/Track Control
- 127250 Vessel Heading
- 130577 Direction Data

Latitude/Longitude / Heading data: YES

Item	Starboard	Downward	Port
Point registration	Yes	Yes	Yes
Go to point	Yes	Yes	Yes
Event mark registration	Yes	Yes	Yes

Latitude/Longitude: YES, Heading data: NO

Item	Starboard	Downward	Port
Point registration	No	Yes	No
Go to point	No	Yes	No
Event mark registration	Yes	Yes	Yes



8.3 Side Scan Display Operations

This section covers the functions available with the side scan display. For the menu items shared with the conventional fish finder, see chapter 7.

8.3.1 How to switch between TX and STBY

Tap the side scan display to show the pop-up menu. Select [TX] to start transmitting. [ST-BY] appears at the center of the screen when transmission is stopped.

8.3.2 How to change echo color

1. Select [Menu] from the menu icon bar to show the menu.
2. Select [Multibeam Sonar].
3. Select [Echo Color].
4. Select [White], [Blue] or [Brown] as required.
5. Select [Close] to close the pop-up menu.

8.3.3 How to show or hide the scale box

The scale box, shown at the bottom left corner on the display, shows depth, current range, and TX frequency. You can show the box as follows.

1. Tap the side scan display to show the pop-up menu.
2. Select [Scale Box] to show the scale box.

8.3.4 Availability of points and event marks registration, and go to a point

For how to register points and event marks, see chapter 7.

The table below shows function availability according to latitude/longitude, heading data presence or absence. If there is no latitude/longitude data, none of the functions below are available.

For NavNet TZtouch or NavNet TZtouch2, input PGN data. The PGN data available is as shown below.

Latitude/longitude data

- 129025 Position, Rapid Update
- 129029 GNNS Position Data

Heading data

- 127237 Heading/Track Control
- 127250 Vessel Heading
- 130577 Direction Data

Latitude/Longitude / Heading data: YES

Item	Starboard	Port
Point registration	Yes	Yes
Go to point	Yes	Yes
Event mark registration	Yes	Yes

Latitude/Longitude: YES, Heading data: NO

Item	Starboard	Port
Point registration	No	No
Go to point	No	No
Event mark registration	Yes	Yes

8.4 Cross Section Display Operations

This section covers the functions available with the cross section display. For the menu items shared with the conventional fish finder, see chapter 7.

8.4.1 How to switch between TX and STBY

Tap the cross section display to show the pop-up menu. Select [TX] to start transmitting. [ST-BY] appears at the center of the screen when transmission is stopped.

8.4.2 How to show or hide the grid

The grid, which is useful for measuring the distance to a target, can be shown or hidden as follows.

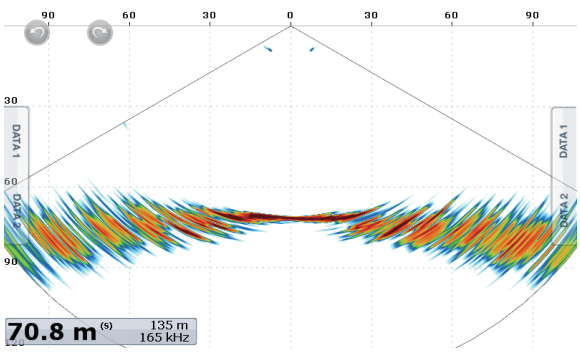
1. Tap the cross section display to show the pop-up menu.
2. Select [Grid] to show the grid.

8.4.3 Zoom display

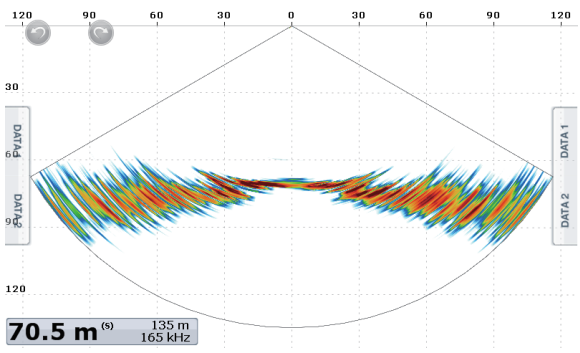
The seabed echo can be zoomed.

1. Tap the cross section display to show the pop-up menu.
2. Select [Zoom] to zoom the seabed echo. Select [Zoom] again to restore the normal display.

Zoomed display



Normal display



8.4.4 How to smooth echoes (distance)

If echoes are “disconnected” because of an undulating seabed, change the setting to [Low], [Medium] or [High] as necessary. Smoothing is done in the range direction to smooth the echo presentation.

1. Select [Menu] from the menu icon bar to show the menu.
2. Select [Multibeam Sonar].
3. Select [Echo Smoothing (Distance)].
4. Select [Low], [Medium] or [High] as required. The default setting is [Medium]. Select [OFF] to stop smoothing.
5. Select [Close] to close the pop-up menu.

8.4.5 How to smooth echoes (time)

If echoes are difficult to see because they appear “speckled,” use the echo smoothing feature to suppress the speckling by time.

1. Select [Menu] from the menu icon bar to show the menu.
2. Select [Multibeam Sonar].
3. Select [Echo Smoothing (Time)].
4. Select [Low], [Medium] or [High] as required. The default setting is [Medium]. Select [OFF] to stop smoothing.
5. Select [Close] to close the pop-up menu.

8.4.6 How to apply correction to the speed of sound

Even though the sea bottom is flat, the left or right edge, up or down may be distorted. To compensate for this problem, adjust the speed of sound.

Manual correction

1. Select [Menu] from the menu icon to show the menu.
2. Select [Multibeam Sonar].
3. Select [Sound Speed Correction], then enter a correction. The setting range is -200 to +200.
4. Select [Close] to close the menu.

Automatic correction

1. Select [Menu] from the menu icon to show the menu.
2. Select [Multibeam Sonar].
3. Select [Temp.-based Correction], then select [ON].
   Select [OFF] to remove the correction.
4. Select [Close] to close the menu.

8.4.7 How to show or hide the scale box

The scale box, shown at the bottom-left corner on the display, shows depth, current range, and TX frequency. You can show the box as follows.

1. Tap the cross section display to show the pop-up menu.
2. Select [Scale Box] to show the scale box.

8.4.8 Availability of points and event marks registration, and go to a point

For how to register points and event marks, see chapter 7.

The table below shows function availability according to latitude/longitude, heading data presence or absence. If there is no latitude/longitude data, none of the functions below are available.

For a multi function display, input PGN data. The PGN data available is as shown below.

Latitude/longitude data

- 129025 Position, Rapid Update
- 129029 GNNS Position Data

Heading data

- 127237 Heading/Track Control
- 127250 Vessel Heading
- 130577 Direction Data

Latitude/Longitude / Heading data: YES

Item	Cross section
Point registration	Yes
Go to point	No
Event mark registration	Yes

Latitude/Longitude: YES, Heading data: NO

Item	Starboard
Point registration	No
Go to point	No
Event mark registration	Yes

8.5 3D Sounder History Display Operations

This section covers the functions available with the 3D sounder history display. For the menu items shared with the conventional fish finder, see the applicable Operator's Manual.

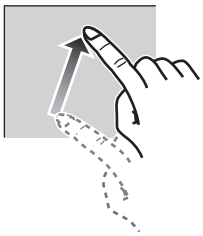
8.5.1 How to switch between TX and STBY

Tap the 3D sounder history display to show the pop-up menu. Select [TX] to start transmitting. [ST-BY] appears at the center of the screen when transmission is stopped.

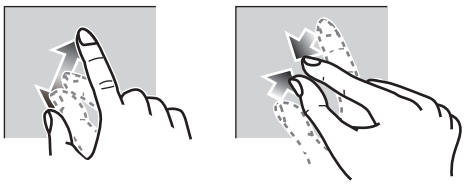
8.5.2 How to move, zoom in, zoom out the viewpoint position

How to move the viewpoint

The viewpoint can be moved by dragging.



How to zoom in, zoom out



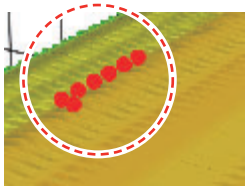
Zoom in Zoom out

How to restore default view

If you get lost in viewpoint or zoom, you can restore the default view as follows.

1. Tap the 3D sounder history display to show the pop-up menu.
2. Select [Default View] to show the depth/frequency box.

8.5.3 How to mark school of fish



A detected school of fish can be marked with a "dot" mark for easy identification.

1. Tap the 3D sounder history display to show the pop-up menu.
2. Select [Fish School Icon] to mark the detected school of fish with the dot mark.

8.5.4 How to stop advancement of the display

You can stop advancement of the history display to observe the distribution of sea floor topography and school of fish.

1. Tap the 3D sounder history display to show the pop-up menu.
2. Select [Pause] to stop the display.

8.5.5 How to adjust the echo detection level

Adjust the echo detection level if schools of fish are detected unstably.

1. Select [Menu] from the menu icon to show the menu.
2. Select [Multibeam Sonar].
3. Select [Fish Detection Level].
4. Select [Low], [Medium] or [High] as required. The default setting is [Medium]. If too many schools of fish are being detected, select [Low]. If too few schools are detected, select [High].
5. Select [Close] to close the menu.

8.5.6 How to calibrate the seabed echo

If schools of fish or a fish reef are detected and displayed as the seabed echo, adjust the strength of the seabed echo as shown below to correctly identify the seabed echo.

1. Select [Menu] from the menu icon to show the menu.
2. Select [Multibeam Sonar].
3. Select [Seabed Echo Calibration]. Drag the slider bar to adjust.
   The setting range is -15 to +15. A large figure helps distinguish bottom fish from the seabed echo; however, it is difficult to distinguish a fish bed. Use a small figure to distinguish a fish bed; however, it is difficult to distinguish bottom fish from the seabed echo.
4. Select [Close] to close the menu.

8.5.7 How to use the noise filter

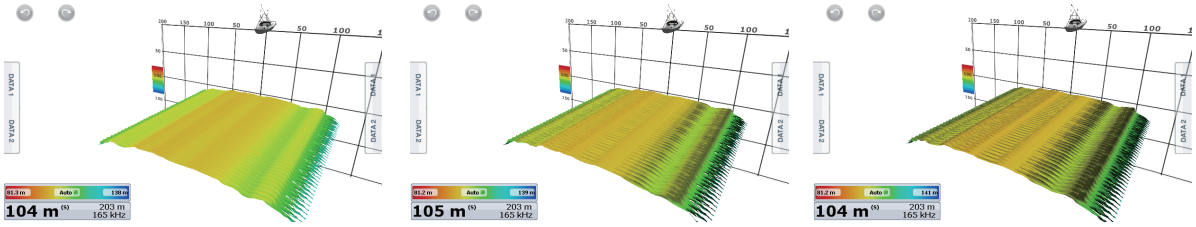
If the seabed echo is displayed with undulations, use the noise filter to smooth the seabed echo.

1. Select [Menu] from the menu icon to show the menu.
2. Select [Multibeam Sonar].
3. Select [Noise Filter].
4. Select [Low], [Medium] or [High] as required. The default setting is [Medium].
5. Select [Close] to close the menu.

8.5.8 How to use terrain shading

The thickness of the shading for the seabed terrain can be adjusted.

1. Select [Menu] from the menu icon to show the menu.
2. Select [Multibeam Sonar].
3. Select [Terrain Shading]. Drag the slider bar to adjust.
   The default setting is 50. See the figure below for setting and resulting terrain shading



Setting: 0 Setting: 50 Setting: 100

4. Select [Close] to close the menu.

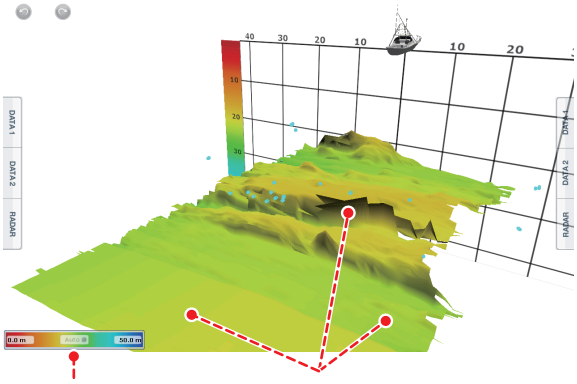
8.5.9 Depth/Color Shading display

The seabed echo and schools of fish can be shown in shades of colors according to depth, to help you see the differences in depths more easily.

Color shading display

Color shading can be applied to the seabed echo or schools of fish. For the seabed display, the seabed color can be multi tone or single tone, and schools of fish can be shown in single tone or single color. For the schools of fish display, schools can be shown in multi tone or single tone and the bottom color is in a single tone.

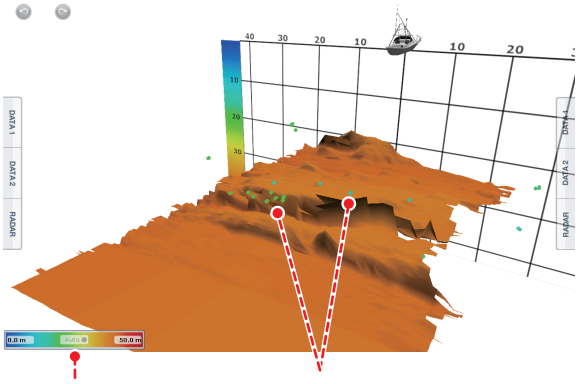
[Color Mode] selected to [Seabed]



Depth/Color Shading display Color Scale

Depth/Color Shading display

[Color Mode] selected to [Fish]



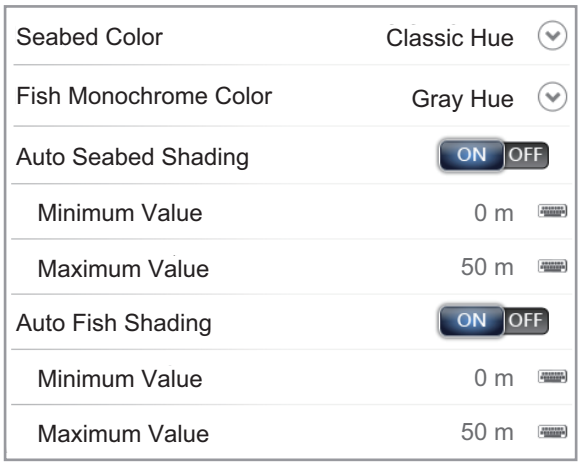
Depth/Color Shading display Color Scale

Depth/Color Shading display

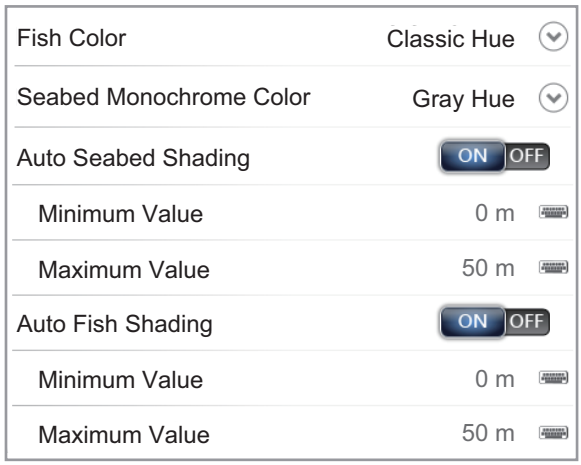
1. Tap the 3D sounder history display to show the pop-up menu.
2. Select [Color Mode].
3. Select [Seabed] or [Fish] as required.

How to set color shading

Open the menu, select Multi Beam to show the menu for setting color shading.

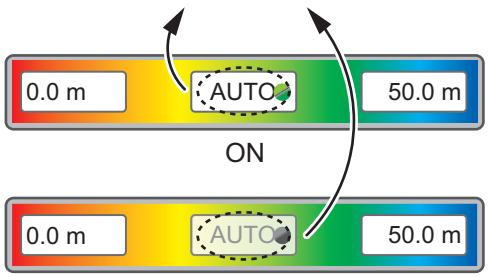


[Color Mode] selected to [Seabed]



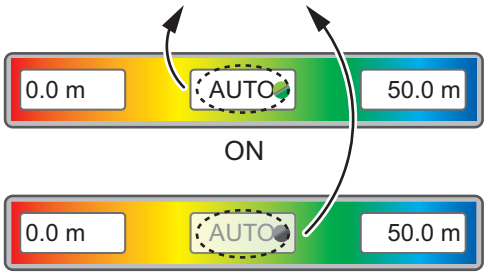
[Color Mode] selected to [Fish]

[Color Mode] selected to [Seabed]

Menu item	Description	Setting options
[Seabed Color]	For setting multi tone or single tone.	[Classic Hue] [Inverted Classic Hue] [Red Hue] [Blue Hue] [Green Hue] [Yellow Hue]
[Fish Monochrome Color]	For setting single tone or single color.	[Gray Hue] [Brown Hue] [Red] [Green] [Blue] [Cyan] [Magenta] [Black Or White] [Pink] [Light Green] [Yellow]
[Auto Seabed Shading]	Use automatic or manual seabed shading. Tap here to turn the automatic seabed shading scale [ON] or [OFF].  ON OFF (AUTO is greyed out)	[ON], [OFF]

Menu item	Description	Setting options
[Minimum Value]	Use the software keyboard to set the shallowest depth to use. [Auto Seabed Shading] must be OFF to enter depth. Alternatively, tap the minimum value indication on the color bar scale to show the slider bar. Drag the slider bar to set.  [Minimum Value] Shallowest depth value	0 to 1200 (m)
[Maximum Value]	Use the software keyboard to set the deepest depth to use. [Auto Seabed Shading] must be OFF to enter depth. Alternatively, tap the maximum value indication on the color bar scale to show the slider bar. Drag the slider bar to set.  [Maximum Value] Shallowest depth value	0 to 1200 (m)

[Color Mode] selected to [Fish]

Menu item	Description	Setting options
[Fish Color]	For setting multi tone or single tone.	[Classic Hue] [Inverted Classic Hue] [Red Hue] [Blue Hue] [Green Hue] [Yellow Hue]
[Fish Monochrome Color]	For setting single tone or single color.	[Gray Hue] [Brown Hue]
[Auto Fish Shading]	Use automatic or manual fish shading. Tap here to turn the automatic fish shading scale [ON] or [OFF].  OFF (AUTO is greyed out)	[ON], [OFF]

Menu item	Description	Setting options
[Minimum Value]	Use the software keyboard to set the shallowest depth to use. [Auto Fish Shading] must be OFF to enter depth. Alternatively, tap the minimum value indication on the color bar scale to show the slider bar. Drag the slider bar to set.  [Minimum Value] Shallowest depth value	0 to 1200 (m)
[Maximum Value]	Use the software keyboard to set the deepest depth to use. [Auto Fish Shading] must be OFF to enter depth. Alternatively, tap the maximum value indication on the color bar scale to show the slider bar. Drag the slider bar to set.  [Maximum Value] Shallowest depth value	0 to 1200 (m)

8.5.10 How to show or hide the scale box

The scale box, shown at the bottom left corner on the display, shows depth, current range, and TX frequency. You can show the box as follows.

1. Tap the 3D sounder history display to show the pop-up menu.
2. Select [Scale Box] to show the scale box.

8.5.11 Availability of points and event marks registration, and go to a point

For how to register points and event marks, see chapter 7.

The table below shows function availability according to latitude/longitude, heading data presence or absence. If there is no latitude/longitude data, none of the functions below are available.

For a multi function display, input PGN data. The PGN data available is as shown below.

Latitude/longitude data

- 129025 Position, Rapid Update
- 129029 GNNS Position Data

Heading data

- 127237 Heading/Track Control
- 127250 Vessel Heading
- 130577 Direction Data

Latitude/Longitude / Heading data: YES

Item	Fish	Seabed	Other than Fish or Seabed
Point registration	Yes	Yes	No
Go to point	Yes	Yes	No
Event mark registration	No	No	Yes

Latitude/Longitude: YES, Heading data: NO

Item	Fish	Seabed	Other than Fish or Seabed
Point registration	No	No	No
Go to point	No	No	No
Event mark registration	No	No	Yes

9. FILE OPERATIONS

This chapter covers the file operations shown below, using SD cards.

- How to export points, routes and tracks
- How to import points, routes and tracks

Note: DO NOT remove the card while the SD drive is being accessed, to prevent loss of data or damage to the card.

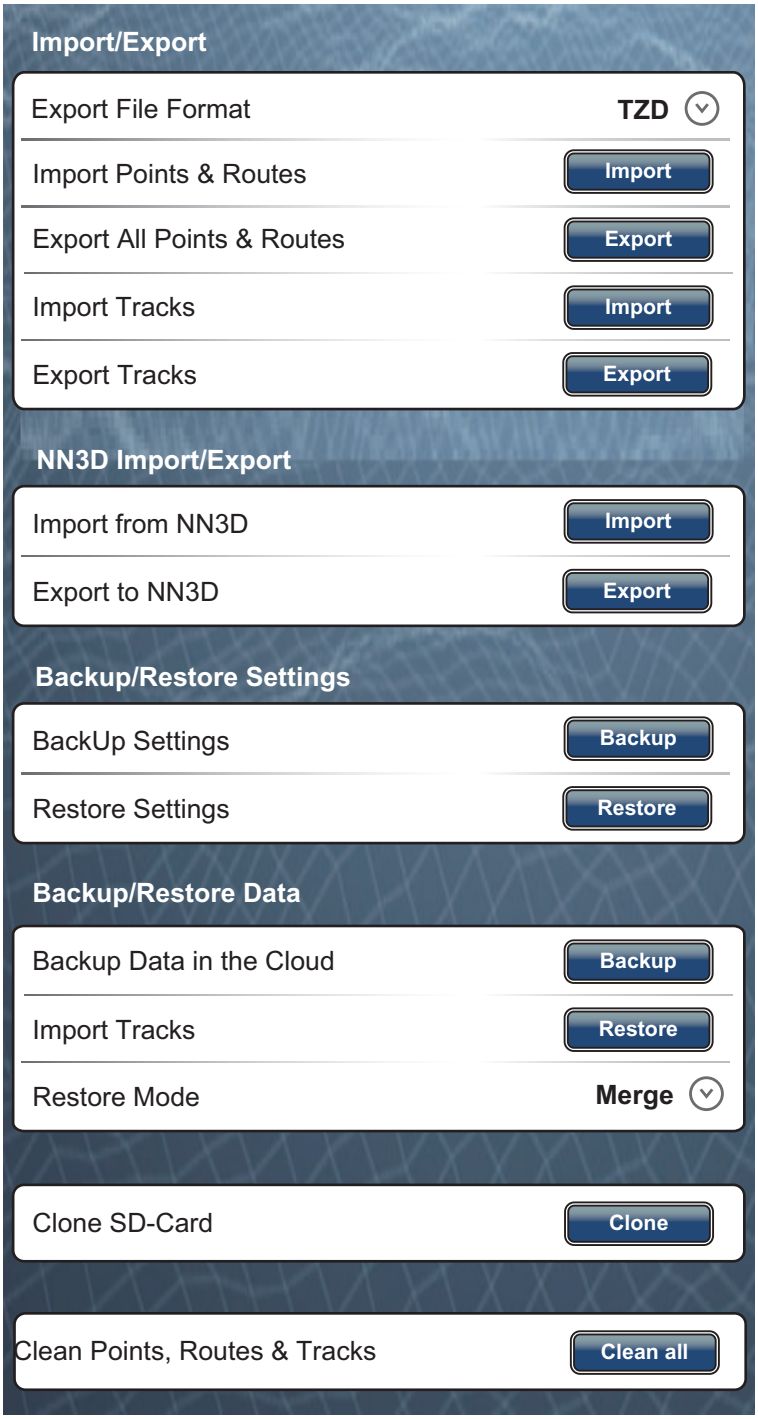
In addition to the above mentioned items, this chapter also covers how to use the My TimeZero™ cloud database service.

9.1 How to Format SD Cards

You do not need to format SD cards for use with the system. However, if you need to format a card to delete all data from the card, see section 1.6 "SD Cards".

9.2 Files Menu Operation

The [Files] menu of the main menu is where you import and export data.



[Export File Format]: Select the file format to use to export data, among [TZD], [CSV], [GPX] or [KML].

[Import Points & Routes]: Import points and routes from an SD card. When you import points and routes from an SD card, all points and routes currently stored in the TZT unit are replaced with those on the SD card.

[Export All Points & Routes]: This unit holds 30,000 points and 200 routes in its internal memory. When the capacity for points or routes is reached, a new point or route cannot be entered unless an unnecessary point or route is erased. For those reasons, you may want to export all points and routes to an SD card.

[Import Tracks]: Import tracks from an SD card. When you import tracks from an SD card, all tracks currently stored in the TZT unit are replaced with those on the SD card.

[Export Tracks]: This unit holds 30,000 tracks in its internal memory. When the capacity for tracks is reached, a new track cannot be entered unless an unnecessary track is erased. For those reasons, you may want to export all tracks to an SD card.

[Import from NN3D]: Import points and routes from NN3D.

[Export to NN3D]: Export points and routes to NN3D.

[BackUp Settings]: Backup the settings to an SD card. This feature helps you set another multi-function display with the same settings on the SD card.

[Restore Settings]: Load the saved settings from an SD card to this unit.

[BackUp Cloud Data]: Save all points, routes, and track to the cloud.

[Import Cloud Data]: Import data from the cloud.

[Import Method]: Select how to import data, [Add] or [Overwrite]. [Add] adds data to currently saved data. When the total data exceeds the data capacity, excess data is not imported.

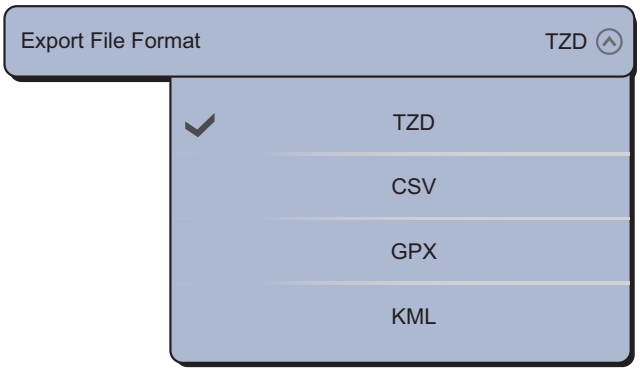
[Clone SD-Card]: Copy the data between SD cards.

[Clean Points, Routes & Tracks]: Delete all points, routes and tracks currently stored in the TZT unit.

9.3 File Format

You can select the file format to use to export data.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Files] - [Export File Format] menu.

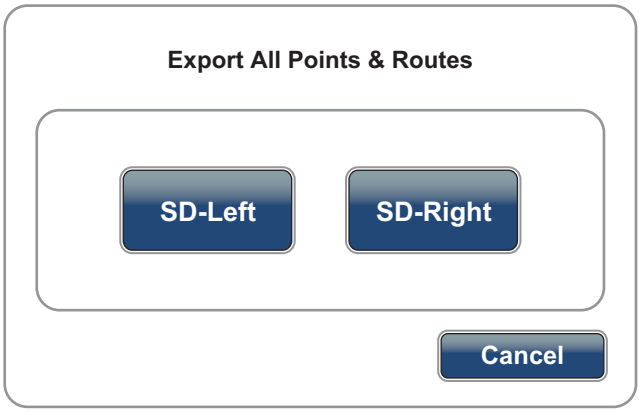


3. Select [TZD], [CSV], [GPX] or [KML].
   [TZD]: For TZT series
   [CSV]: For use with NavNet 3D series
   [GPX]: For use with PC plotter
   [KML]: For use with PC plotter
4. Select [Close] to exit the menu.

9.4 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 an SD card.

1. Put a blank formatted SD card in the right card drive.
2. Select [Menu] on the menu icon bar to open the main menu.
3. Select [Files].
4. Select [Export All Points & Routes].

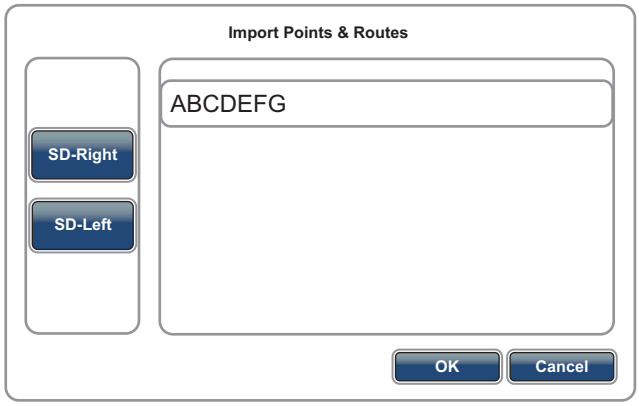


5. Select [SD-Right].
6. After the equipment has exported the data, select [Close] to exit the menu.

9.5 How to Import Points and Routes

You can import points and routes to the internal memory of a TZT unit.

1. Put the correct SD card in either card drive.
2. Select [Menu] on the menu icon bar to open the main menu.
3. Select [Files].
4. Select [Import Points & Routes].
5. Select [SD-Right] or [SD-Left].



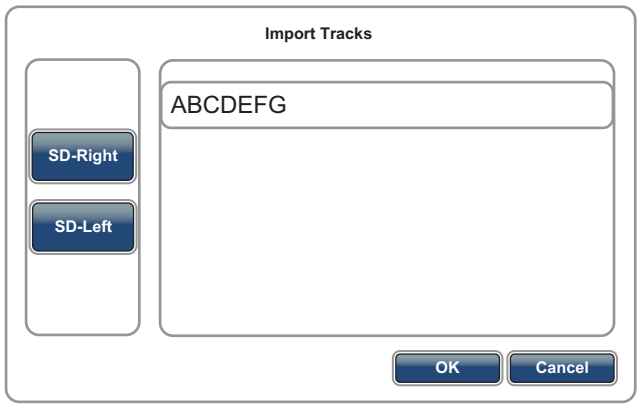
6. Select the data to import then select [OK].
7. After the equipment has imported the selected data, select [Close] to exit the menu.

9.6 How to Import or Export Tracks

How to import tracks

You can import tracks to the internal memory of a TZT unit.

1. Put the correct SD card in either card drive.
2. Select [Menu] on the menu icon bar to open the main menu.
3. Select [Files].
4. Select [Import Tracks].
5. Select [SD-Right] or [SD-Left].

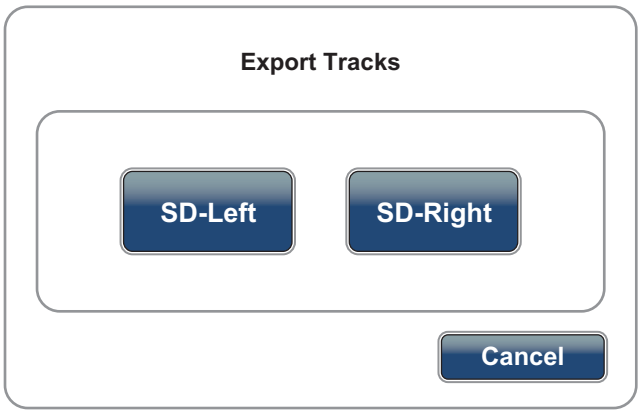


6. Select the data to import then select [OK].
7. After the equipment has imported the selected data, select [Close] to exit the menu.

How to export tracks

You can export tracks to an SD card.

1. Put a blank formatted SD card in the right card drive.
2. Select [Menu] on the menu icon bar to open the main menu.
3. Select [Files].
4. Select [Export Tracks].

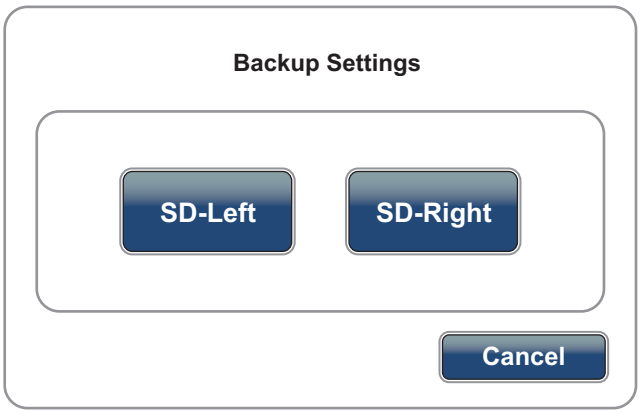


5. Select [SD-Right].
6. After the equipment has exported the data, select [Close] to exit the menu.

9.7 How to Backup the Equipment Settings

You can save the settings to an SD card to use the settings on other TZT units.

1. Put a blank formatted SD card in the right card drive.
2. Select [Menu] on the menu icon bar to open the main menu.
3. Select [Files].
4. Select [BackUp Settings].

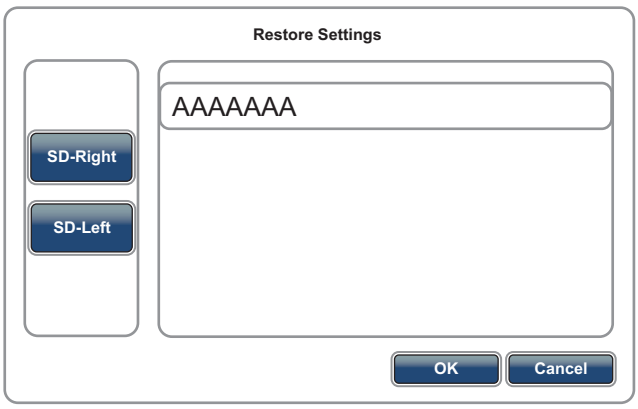


5. Select [SD-Right].
6. After the equipment has exported the settings, select [Close] to exit the menu.

9.8 How to Load the Equipment Settings

You can load the saved settings in an SD card to this unit.

1. Put the correct SD card in either card drive.
2. Select [Menu] on the menu icon bar to open the main menu.
3. Select [Files].
4. Select [Restore Settings].
5. Select [SD-Right] or [SD-Left].



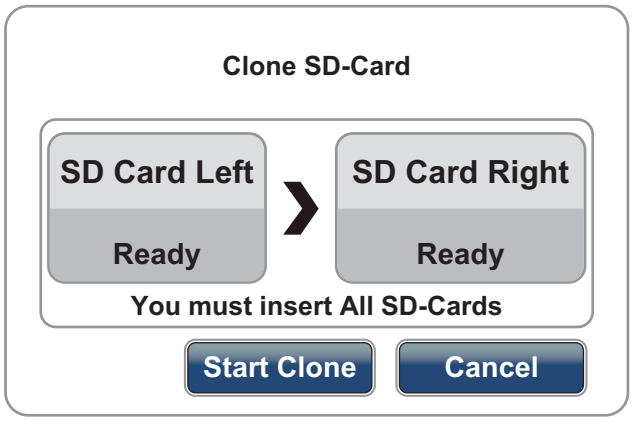
6. Select the settings to load then select [OK].
7. After the equipment has loaded the settings, the system automatically restarts.

9.9 How to Copy Files From an SD Card

You can copy the data from one SD card (left slot) to another (right slot).

Note: It takes approx. one hour to copy a 60 GB file.

1. Put the source SD card in the left card drive and the copy destination SD card in the right card drive.
2. Select [Menu] on the menu icon bar to open the main menu.
3. Select [Files].
4. Select [Clone SD-Card].

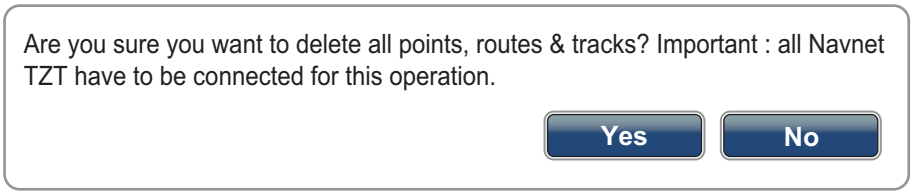


5. Select [Start Clone].
6. After the equipment has copied the data, select [Close] to exit the menu.

9.10 How to Delete Points, Routes and Tracks

You can delete all points, routes and tracks currently stored in a TZT unit.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Files].
3. Select [Clean Points, Routes & Tracks].



4. Select [Yes].
5. After the equipment has deleted the data, select [Close] to exit the menu.

9.11 My TimeZero™ Cloud Data Service

With the TimeZero™ cloud data service, you can share the data stored in yourTimeZero™ cloud account with another NavNet TZtouch (requires software version 5.01 or after). To use the TimeZero™ cloud data service, connect to the internet and create a TimeZero™ account. (See section 1.25 for how to create an account.)

9.11.1 How to backup data to the cloud

1. Select [Menu] on the menu icon bar to open the main menu.
2. Open the [General] menu.
3. Login at [Social Network] to access your TimeZero™ account.
4. Open the [Files] menu.
5. Select [Backup Data in the Cloud].
6. You are asked if you are sure to backup points, routes and track. Select [Yes] to backup data and erase the message.

9.11.2 How to retrieve data from the cloud

1. Select [Menu] on the menu icon bar to open the main menu.
2. Open the [General] menu.
3. Login at [Social Network] to access your TimeZero™ account.
4. Open the [Files] menu.
5. Select [Merge], then select [Merge] or [Replace].
   [Merge]: Add points, routes and track from the cloud to those currently saved to this unit. When the total data exceeds the data capacity, excess data is not retrieved.
   [Replace]: Replace current points, routes and track with those saved to the cloud.
6. Select [Restore Data from the Cloud].
7. You are asked if you are sure to backup points, routes and track. Select [Yes] to retrieve data and erase the message.

10. CAMERA/VIDEO/FUSION-Link

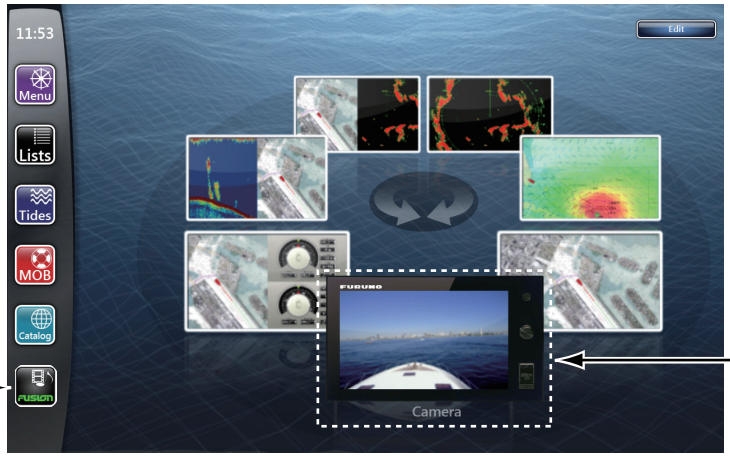
The camera/video function allows you to use your unit to play back images from a video player, on-board camera, network camera or DVD player. Network camera images can be seen across the TZT network. A video signal can be seen only on the TZT that receives the video signal.

You can also set the video application to show the display of each video in turns. Further, you can also adjust the brightness, contrast and color of each image.

FUSION-Link allows compatible TZT displays to interface and achieve control of specialized FUSION marine entertainment equipment.

10.1 How to Display a Video Image

The camera application is included in the default display selection window. Press the **Home** key (or tap the **Home** icon) to show the display selection window. Select the camera display to validate your selection.



See section 9.7.

Camera display

10.2 Video Signal Type

There are four types of video signals connected to this equipment.

- Analog: Images from a video player, on-board camera or DVD player
- Digital (IP): Images from a network camera
  Note: Turn on the network camera before powering the Multi Function Display.
- Axis Server: Images from an axis server. Available quad mode (Four images are displayed simultaneously).
- FLIR: Images from an infrared camera

10.3 How to Set the Video Display

10.3.1 How to select the input source

Select the input source from the RotoKey menu (see section 10.6).

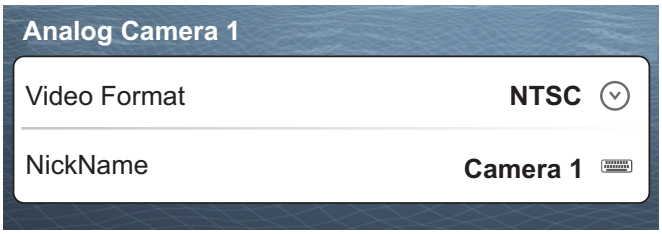
[Analog 1 (2)]: An analog signal
[IP 1 (2, 3, 4)]: A digital signal
[Quad]: All digital signals (maximum of four) from an axis server
[Input 1 (2, 3, 4)]: A digital signal from an axis server
[Quad 2]: All digital signals (maximum of four) from second axis server
[Input 1 (2, 3, 4)]: A digital signal from second axis server

Note: The default menu names are replaced with the nicknames set in the [Camera] menu. See subsection 10.3.2.

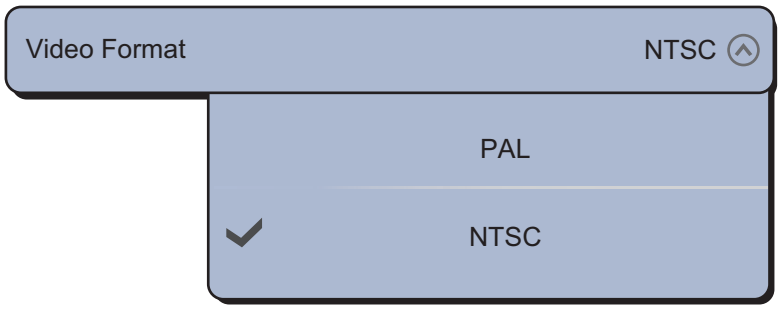
10.3.2 How to set each video signal

Analog camera

You can select video format for an analog camera and change its nickname. Select [Camera] - [Analog Camera 1] (or 2) of the main menu.



[Video Format]: Select the video format from [PAL] or [NTSC].



Note: The power must be reset to apply the setting. After you change the setting, the following message appears.

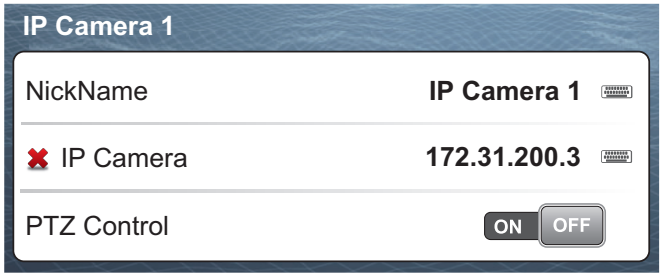


Select [Yes] to reset the power and apply the setting immediately, or select [No] to apply the setting at the next power on. The menu shows the new setting ([PAL] or [NTSC]) but change is not effected until the power is reset.

[NickName]: Enter (or change) the nickname (a maximum of 13 alphanumeric characters) with the software keyboard then select [Confirm].

IP camera

You can change the nickname and IP address for an IP camera. Also, you can turn on or off the PTZ (pan, tilt, zoom) function. Select [Camera] - [IP Camera 1] (or 2, 3, 4) of the main menu.



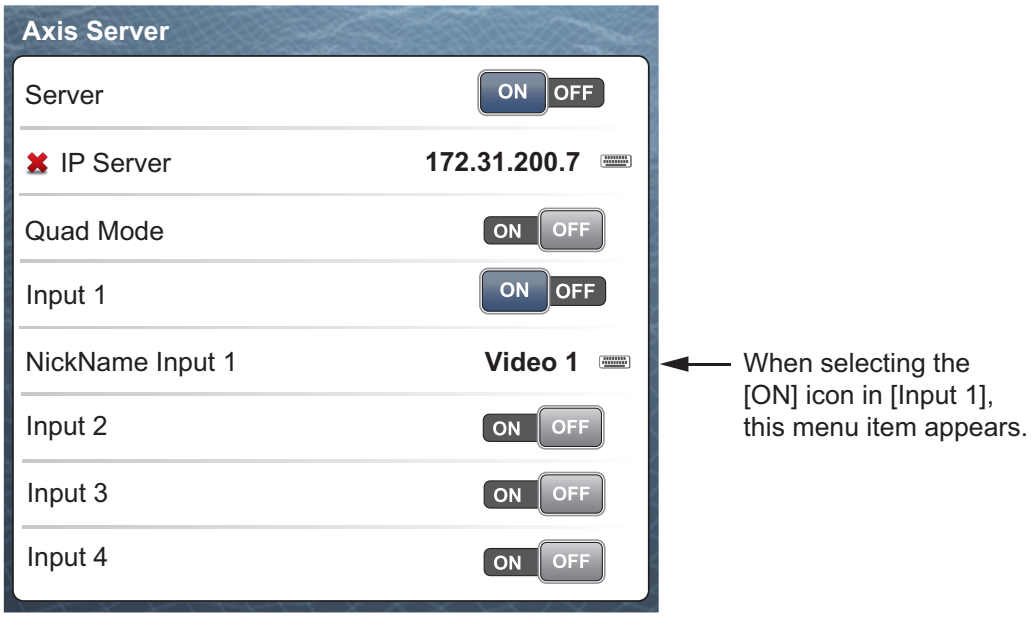
[NickName]: Enter (or change) the nickname (a maximum of 13 alphanumeric characters) with the software keyboard then select [Confirm].

[IP Camera]: Enter the IP address with the software keyboard then select [Confirm].

[PTZ Control]: Select the [ON] icon to turn on the PTZ function.

Axis Server

The axis server digitizes four analog video sources (IP cameras) and makes them available on the network. Two axis servers are available: [Axis Server] and [Second Axis Server]. Select [Camera] - [Axis Server] of the main menu.



[Server]: Select the [ON] icon to receive the signal from an axis server.

[IP Server]: Enter the IP address with the software keyboard then select [Confirm].

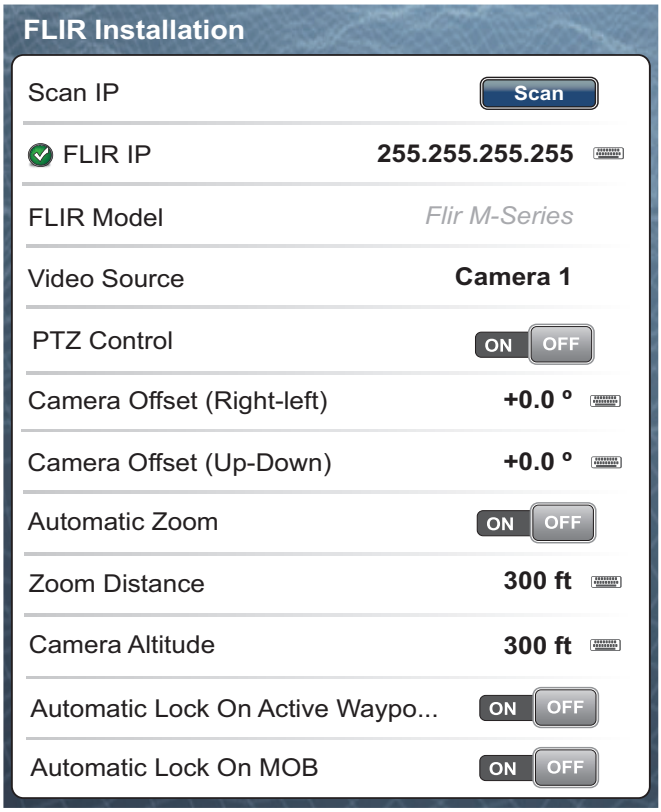
[Quad Mode]: Select the [ON] icon to display the four images from an axis server simultaneously.

[Input 1] (or 2, 3, 4): Select the [ON] icon to receive each signal from an axis server.

[NickName Input 1] (or 2, 3, 4): Enter (or change) the nickname (a maximum of 13 alphanumeric characters) with the software keyboard then select [Confirm].

FLIR camera

Images from an infrared camera allow you to navigate easily at night or in bad weather. Select [Camera] - [FLIR Installation] of the main menu.



Note: When connecting a FLIR M100/200, the IP address at the FLIR must be set as [172.31.200.3].

[Scan IP]: Select the [Scan] icon to scan the IP address automatically when connecting the FLIR camera.

[FLIR IP]: Enter the IP address manually with the software keyboard then select [Confirm]. A pop-up window showing FLIR camera models appears; select your camera model from the pop-up window

[FLIR Model]: Shows the camera currently connected.

[Video Source]: Select the input source for the FLIR.

[PTZ Control]: Select [ON] to activate control of the PTZ (Pan/Tilt/Zoom) functions. When activated, [Automatic Zoom], [Zoom Distance], [Camera Altitude], [Automatic Lock On Active Waypoint] and [Automatic Lock ON MOB] are operative in this menu.

[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]: Select the [ON] icon to turn on the automatic zoom.

[Zoom Distance]: Set the distance to zoom automatically.

[Camera Altitude]: Set the altitude for the FLIR camera.

[Automatic Lock On Active Waypoint]: Select the [ON] icon to automatically track the point currently set as a go to point.

[Automatic Lock ON MOB]: Select the [ON] icon to automatically track the MOB position.

10.3.3 How to adjust the image size

You can adjust the image size.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Camera] - [Video Display] menu.



3. Select [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.
4. Select [Close] to exit the menu.

10.3.4 How to cycle your video inputs

You can browse all the images that you receive. Use this feature to monitor the area around your ship, engine room, etc. with an on-board camera.

1. Select [Cycle Config.] from the RotoKey menu.
2. Select a menu item of an image which you want to display.
3. Repeat steps 1 and 2 to select all menu items which you want to display.
4. Select [Cycle] from the RotoKey menu.

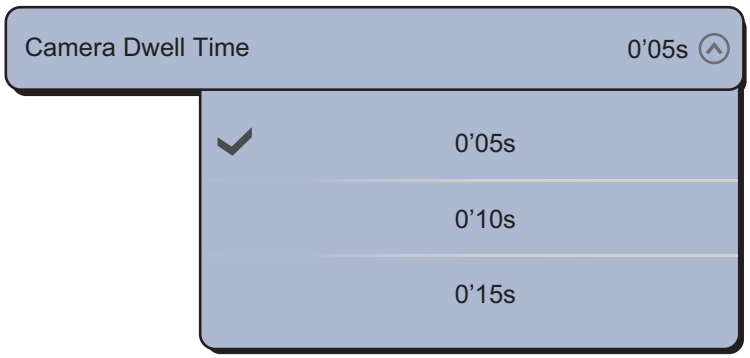
Note: If you tap the screen during the cycling of the video inputs, the cycling restarts after one minute.

10.3.5 How to set the dwell time

You can set the amount of time to show each video input before switching to the next.

1. Select [Menu] on the menu icon bar to open the main menu.

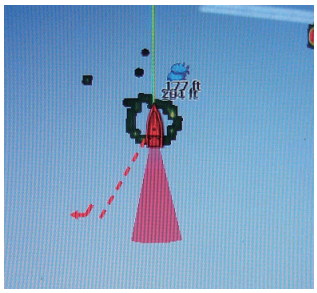
2. Select the [General] - [Camera Dwell Time] menu.



3. Select a dwell time.
4. Select [Close] to exit the menu.

10.4 Pop-up Menus by the FLIR Camera

[Camera FoV] menu



You can display the field of view by the FLIR camera on the plotter display.

1. Select the boat icon to display the pop-up menu.
2. Select [Camera FoV]. The circular sector in translucent red appears on the screen.

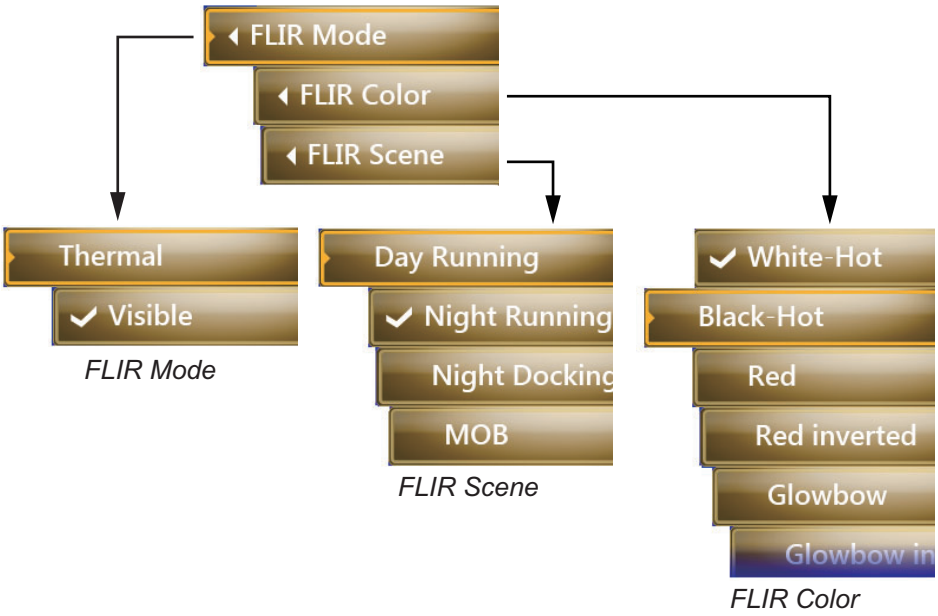
[Move Camera] and [Lock Camera] menus

You can rotate the FLIR camera about the position you select (touch) on the plotter or radar display. Select [Lock Camera] from the RotoKey menu. To track the position, select [Move Camera] from the RotoKey menu.

FLIR camera pop-up menu

The FLIR camera pop-up menu provides for selection of mode, color and scene. For detailed information, see the operator’s manual of your FLIR camera.

FLIR camera pop-up menu



FLIR Mode

FLIR Scene

FLIR Color

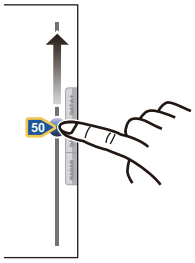
[FLIR Mode]: Select [Thermal] or [Visible].

[FLIR Color]: **Thermal color video is enabled**: Color palettes are available.
Thermal color video is disabled: White/black or red/black display.

[FLIR Scene]: The image and gain levels change according to the scene selected.

10.5 How to Adjust the Video Image

1. Select [Contrast] or [Brightness] from the RotoKey menu.
2. Drag the circle icon to adjust the setting (see the figure below).

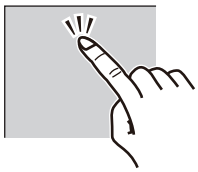
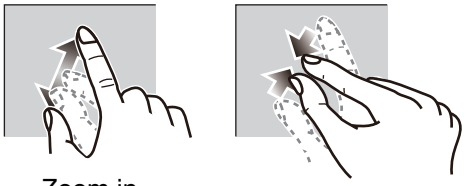


Drag the circle icon
to adjust the setting.

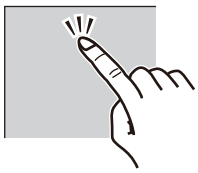
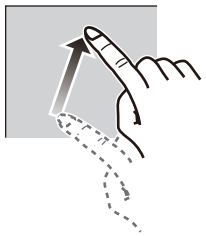
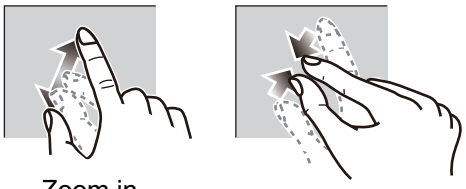
Note: This menu is not available when [Cycle] is on (see subsection 10.3.4).

10.6 Touch Control on the Camera Display

Analog and Axis Server 241Q

Operation		Function
Tap		Short tap: During zoom mode, scroll the camera image to the tapped position. Long tap (TZTBB only): Opens the pop-up menu.
Pinch	 Zoom in Zoom out	Zoom in or out the camera image.

FLIR

Operation		Function
Tap		Short tap: Scrolls the camera to direction tapped. Long tap (TZTBB only): Opens the pop-up menu.
Drag		Rotates camera while dragging.
Pinch	 Zoom in Zoom out	Zoom in/zoom out the camera image (infrared only).

10.7 FUSION-Link

FUSION-Link allows compatible TZT displays to interface and achieve control of specialized FUSION marine entertainment equipment.

10.7.1 How to access the FUSION screen and controls

The FUSION controls can be accessed in three methods:

- FUSION icon (full screen),
- RotoKey menu (minimized screen), and
- Function Gesture.

Note: For configurations with a MS-RA770, [TONE] settings cannot be changed from the TZT9/14/BB. To change the [TONE] settings, adjust them at the FUSION device.

Method 1: FUSION icon (for full window)

Select the [FUSION] icon on the menu icon bar.



Tap: Goto previous number.
Holding down: Rewind while holding down.

Play or pause.

Tap: Goto next number.
Holding down: Fast forward while holding down.

Turn down volume.

Mute or unmute.

Turn up volume.

Example1: iPod in the full screen



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.

Turn down volume.

Mute or unmute.

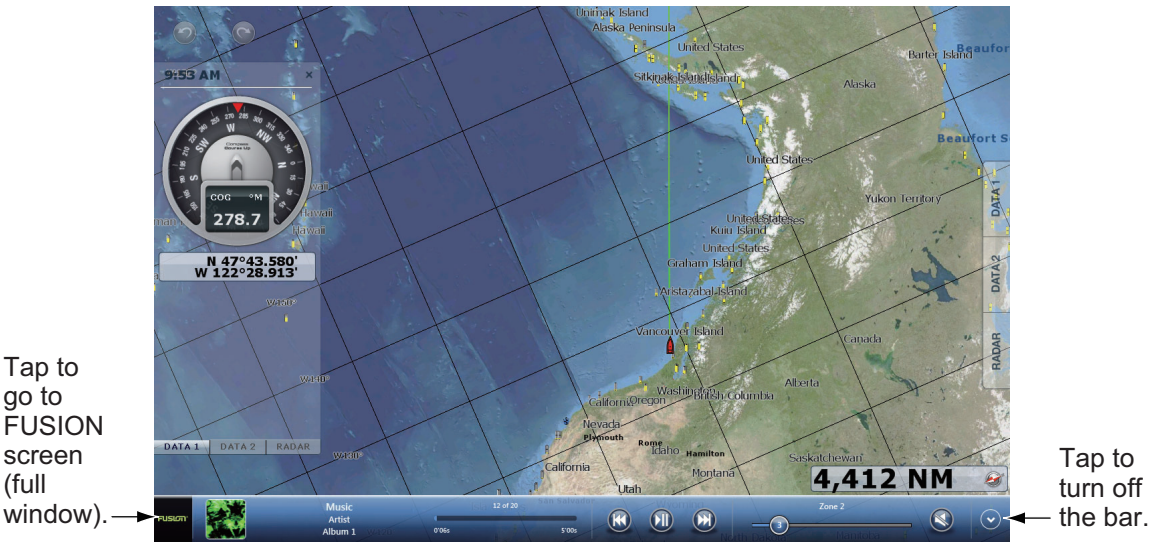
Turn up volume.

Example2: VHF in the full screen

Note: For details, see the manual for the FUSION-Link equipment.

Method 2: RotoKey menu (for minimized window)

Select [Fusion Ctrl] from the RotoKey menu to display the audio control bar on each display. The following is the example on the chart plotter.



For iPod



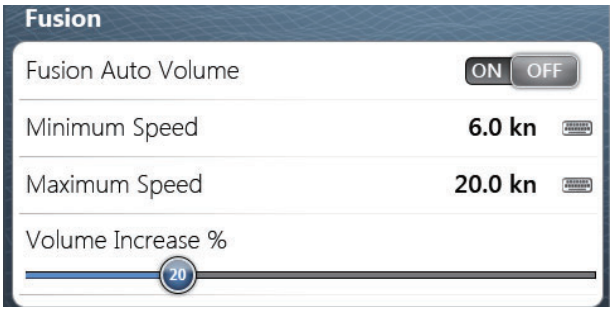
For VHF

Method 3: Tap two fingers on the screen

Preset [Function Gesture] for [Fusion] (for full window) or [Fusion Ctrl] (for minimized window) (see section 1.15). Once you have done this preset, simply tap the screen with two fingers to access the FUSION controls.

10.7.2 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.



[Fusion Auto Volume]: Set to [ON] to allow the NavNet TZtouch unit to control the FUSION volume.

[Minimum Speed]: Set the minimum speed threshold. Exceeding this speed activates volume auto control.

[Maximum Speed]: Set the maximum speed threshold.

[Volume Increase]: Set the amount of extra volume to output.

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11. INSTRUMENT DISPLAY

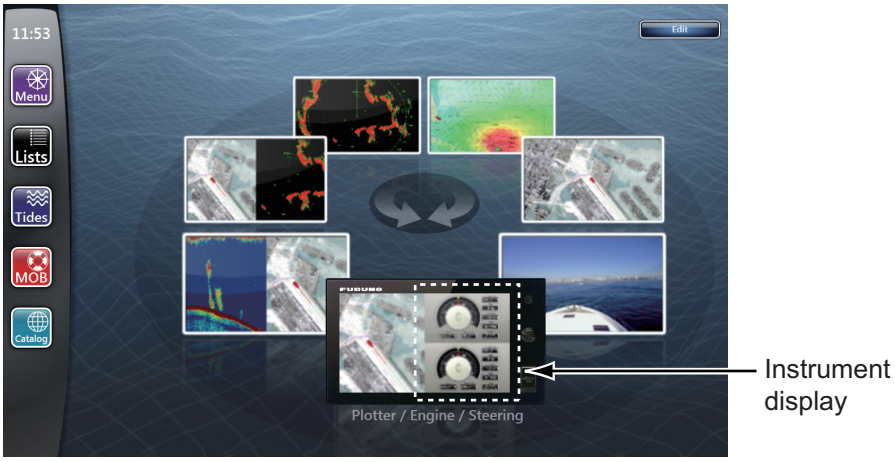
The instrument display gives you the following navigation and environment displays:

- Steering
- Engine
- Tank level (fuel)
- Weather
- Wind
- NAVpilot
- Highway

The instrument display can be programmed to a full screen or three-way split screen. In the full screen, four displays are shown at the same time. The size of any instrument display is fixed to the 1/4 screen.

11.1 How to Show the Instrument Display

Set the instrument display referring to section 14.2 then display the (combination) screen which contains the instrument display.



11.2 How to Select an Instrument Display

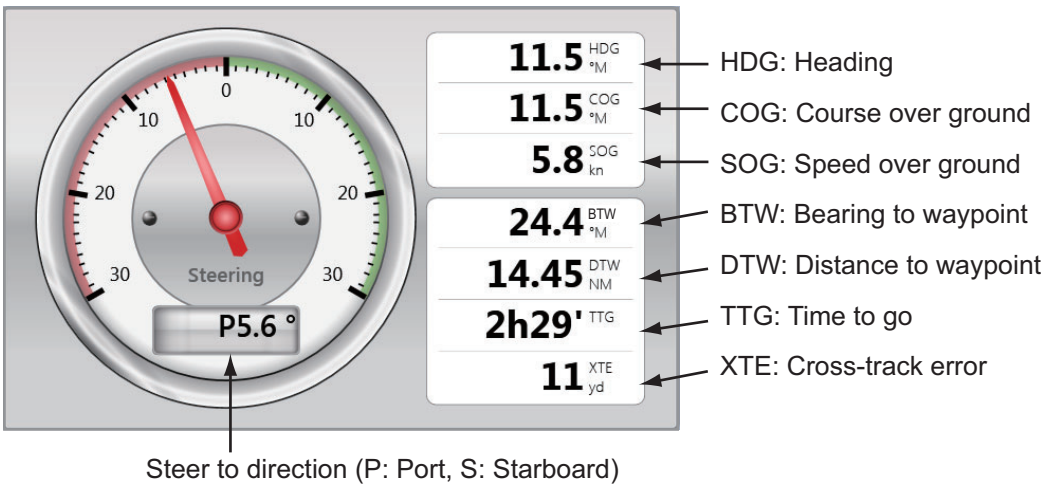
You can show steering, engine, tank level, weather or wind data in the instrument display if you have the related sensors. Select the data to display as follows:

1. Select the instrument display to activate. A orange line is displayed on the top of the selected instrument display.
2. Select a menu item from the RotoKey menu or the pop-up menu. (The options are the same in both the RotoKey and pop-up menus.) The data for the selected menu item is displayed. (See page 14-7 for the menu items.)

11.3 Instrument Displays

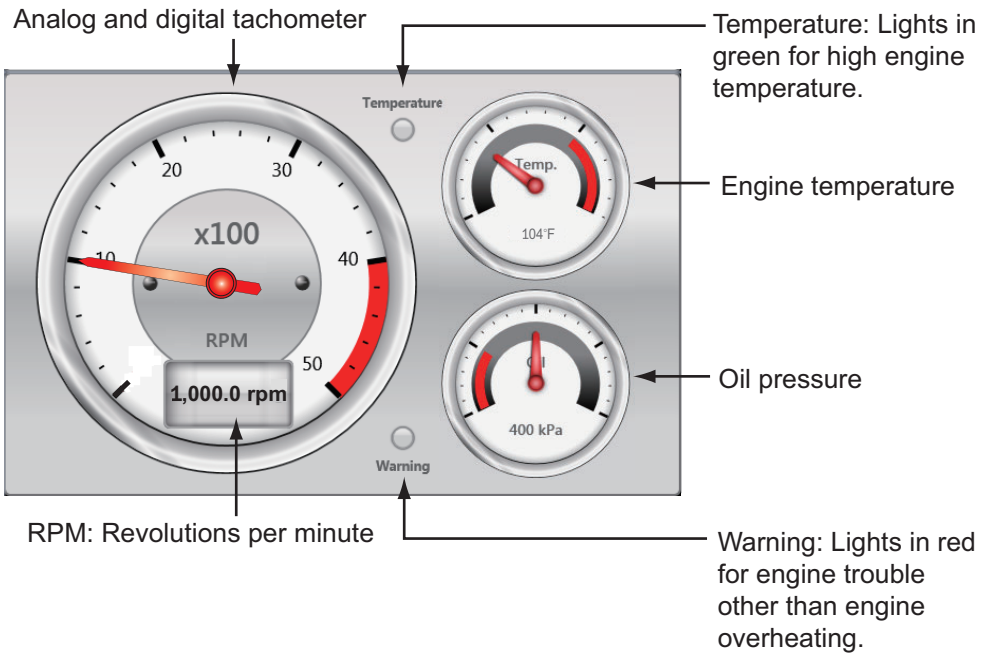
11.3.1 Steering display

The steering display provides the analog and digital indications shown below.



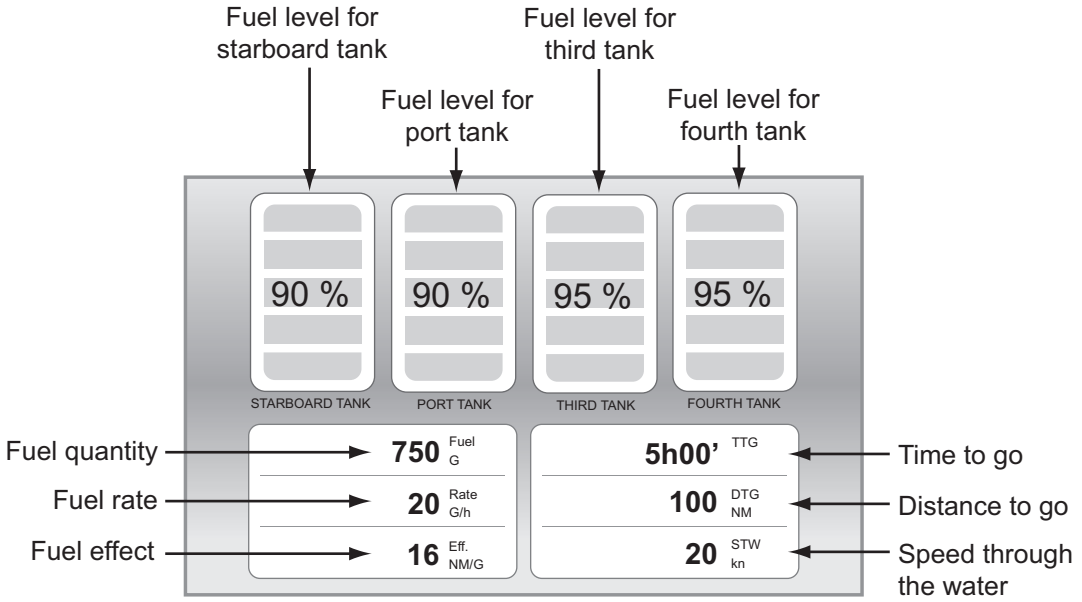
11.3.2 Engine display

The engine must output engine data in NMEA 2000 format to show the engine data. The data for a maximum of four engines can be displayed.



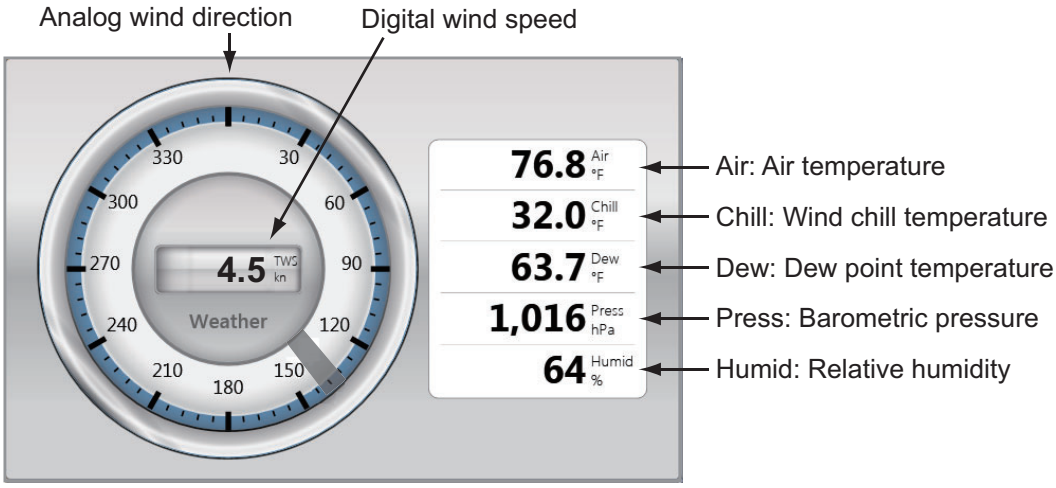
11.3.3 Tank level display

The tank level display provides the digital indications shown below. The data for a maximum of four tank levels can be displayed.



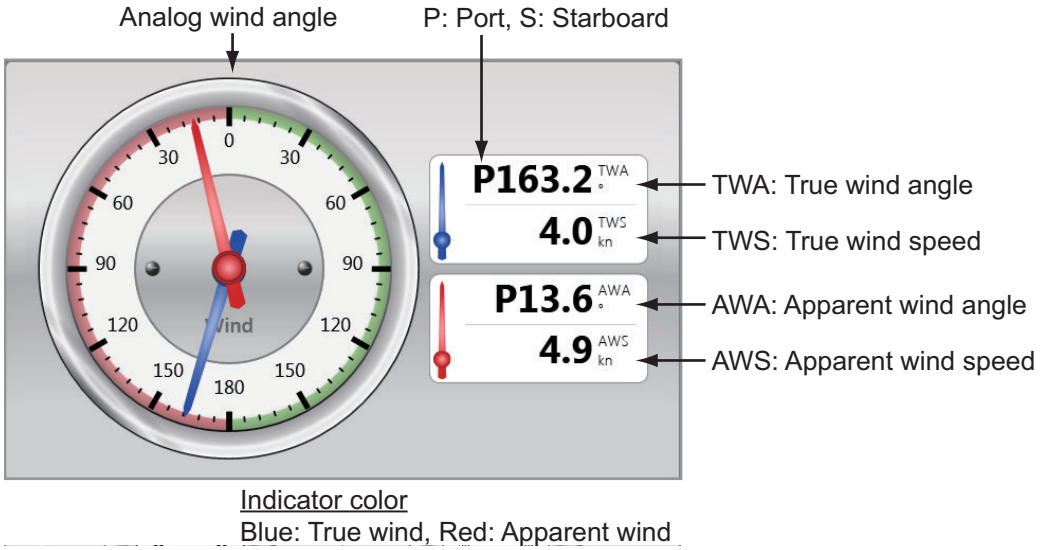
11.3.4 Weather display

The weather display provides the analog and digital indications shown below.



11.3.5 Wind display

The wind display provides digital and analog indications of wind speed and angle.

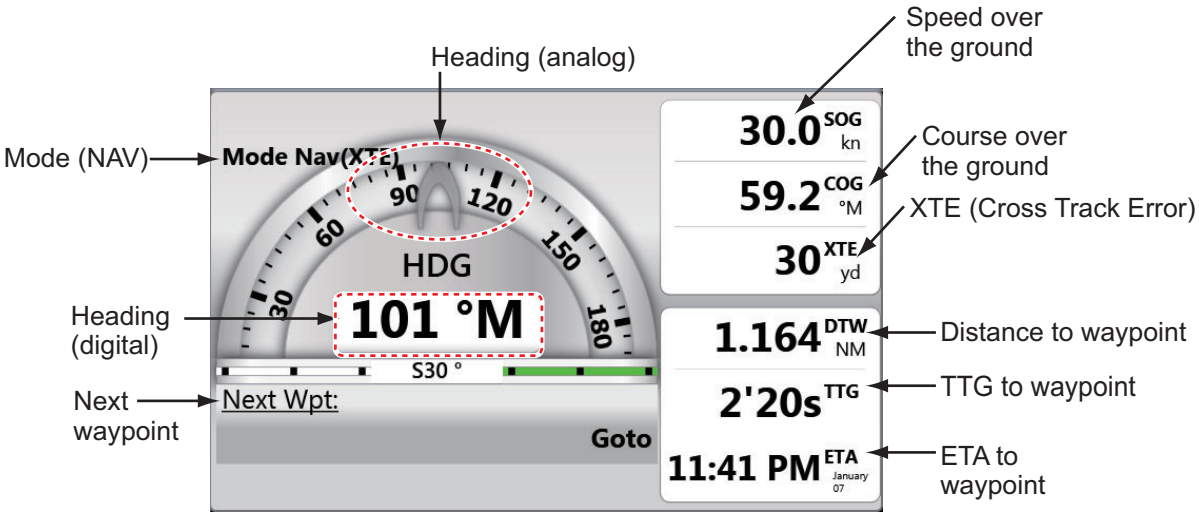


11.3.6 NAVpilot display

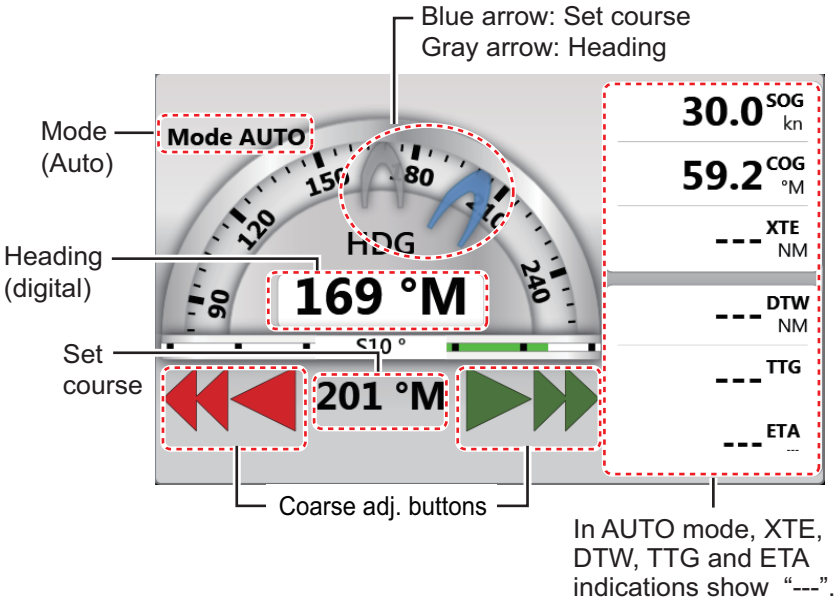
The NAVpilot displays provide heading, goto waypoint information, cross track error information, course to steer, course over the ground, and TTG to waypoint.

The NAVpilot display can be adjusted from the instrument display or the same display in the data area.

NAV mode

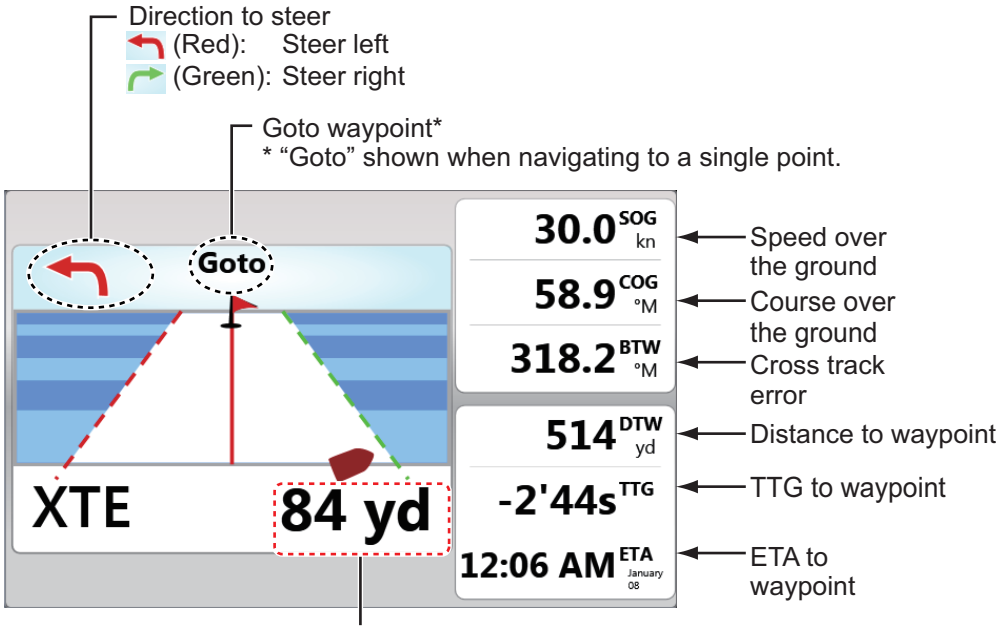


Auto mode



11.3.7 Highway display

The highway display provides a graphic presentation of your vessel's progress toward a waypoint. The example belows the highway display when following a route.



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12. WEATHER

This chapter describes how to operate the built-in weather feature, NavCenter, and the optional FURUNO BBWX SiriusXM weather receiver. Your weather receiver provides weather information (U.S.A only), in analog and digital forms. The SiriusXM satellite radio is also available with a SiriusXM satellite radio subscription.

12.1 Weather Display Introduction

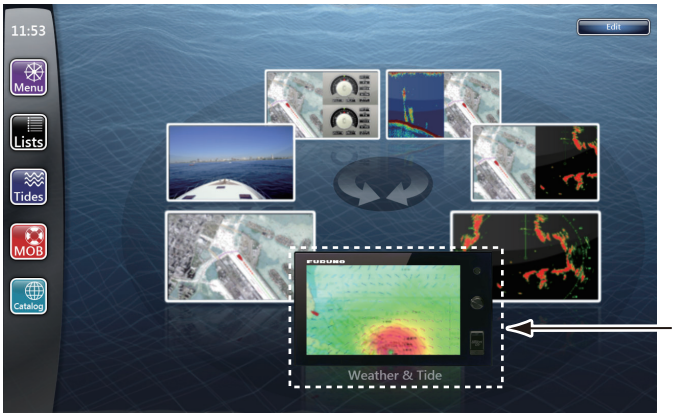
This TZT displays the current and forecasted weather information for your area. The weather information is updated in real time so that you have current weather information for your area and any area in the U.S.

You can enter a point from the RotoKey menu ([New Point]) on the weather display.

Note: For BBWX SiriusXM weather receiver operations, see section 12.3.

How to select the weather display

The weather display is overlaid on the 2D display. Select the weather display on the display selection window.



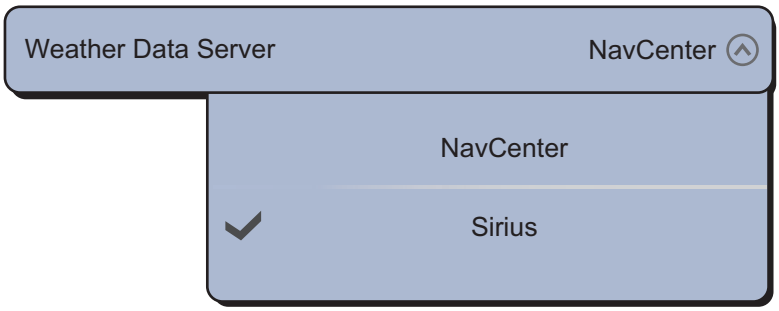
12.2 NavCenter Weather

You can download the NavCenter data from the internet via Wireless LAN. See section 1.22 for how to connect to the internet.

Note: Data which is downloaded by a TZT unit can be shared with other TZT units via the network. Data is shared automatically; no operation is required.

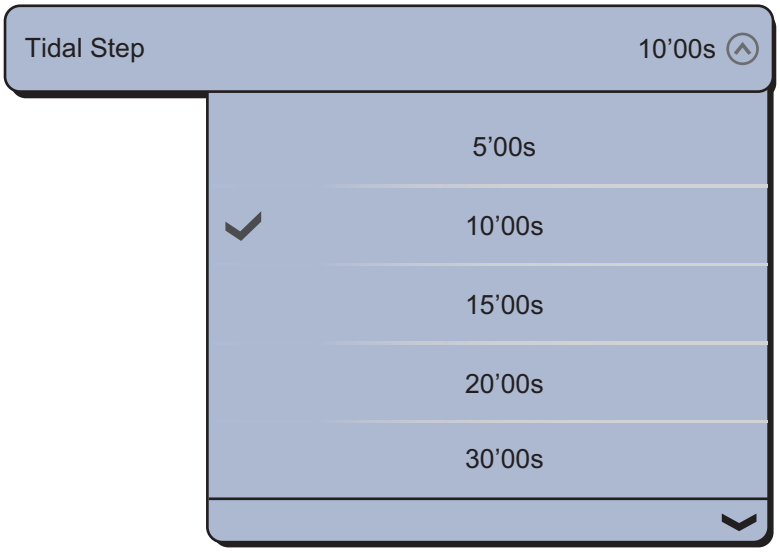
12.2.1 Pre-settings

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Weather].
3. Select [Weather Data Server].



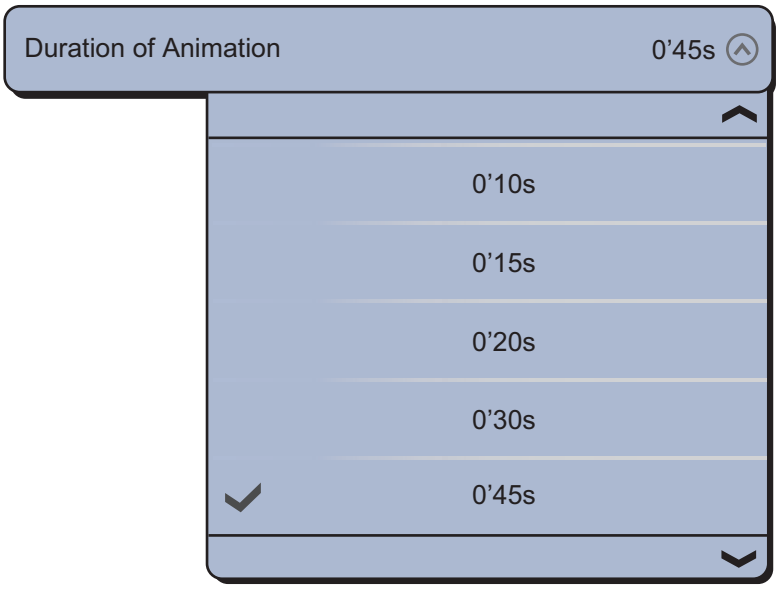
Note: The option [Sirius] appears when connecting a BBWX weather receiver.

4. Select [NavCenter].
5. Select [Tidal Step].



6. Select the update interval (which determines how often tidal data are captured) for the tide icon.

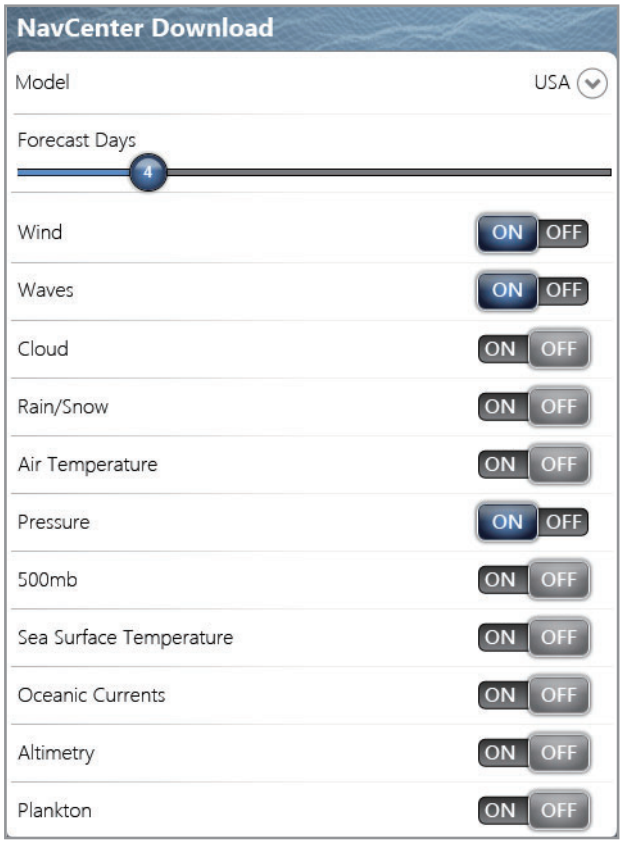
7. Select [Duration of Animation].



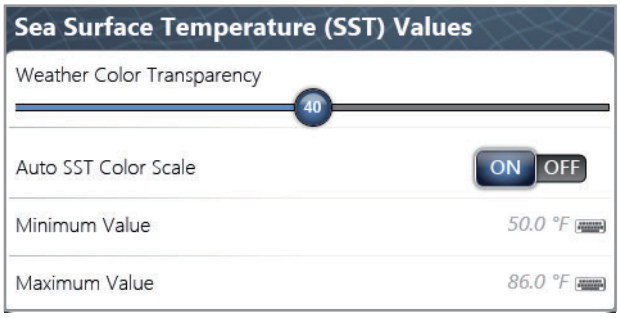
8. Select the update interval for the animation. The larger the time, the slower the animation moves.

12.2.2 How to download the NavCenter data

1. Select [General] of the main menu.
2. Select [Wireless LAN Settings].
3. Select the [ON] icon in [Wireless].
4. After the internet connection is established, select [Close] to close the [Wireless LAN settings] window.
5. Select [Weather] of the main menu to set how many days' data and which data to download in [NavCenter Download].
6. Select the data model from [Model]. (The options are [USA] and [Worldwide].)
7. Drag the circle icon in [Forecast Days] to select how many days' data to download.
8. Select the [ON] or [OFF] icon for each weather item as appropriate.

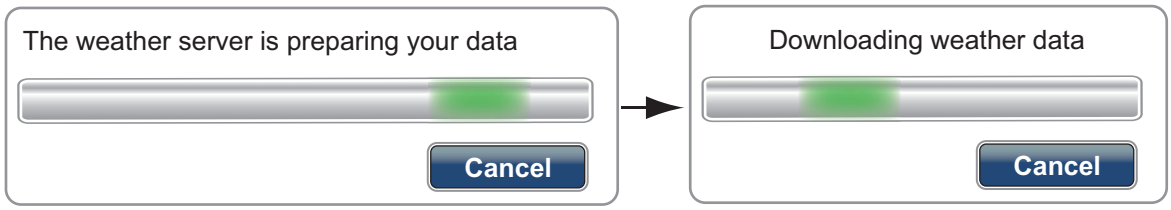


9. If you selected [ON] for [Sea Surface Temperature], set the following menu items.



[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.

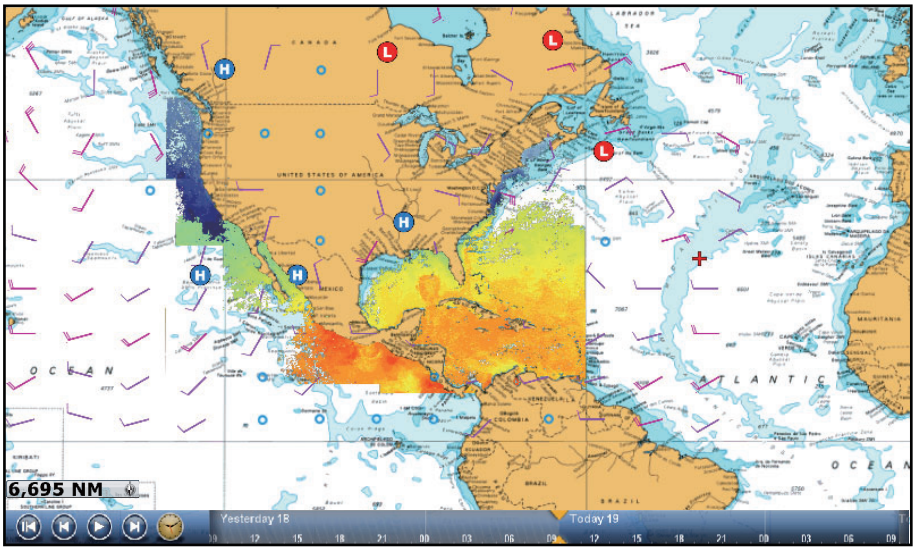
10. Select [Close] to exit the menu.
11. Select [Get Latest Wx] from the RotoKey menu on the weather display. The following dialogue boxes appear in order.



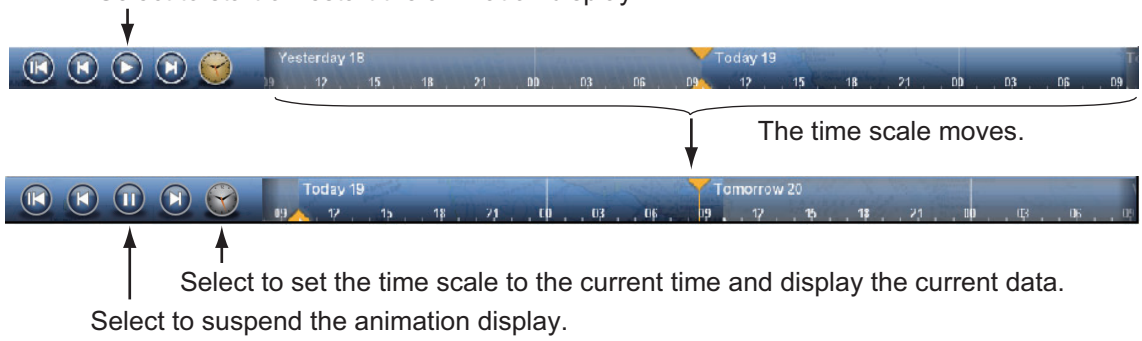
When the download is finished, the above dialogue box disappears and the unit beeps.

12.2.3 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].



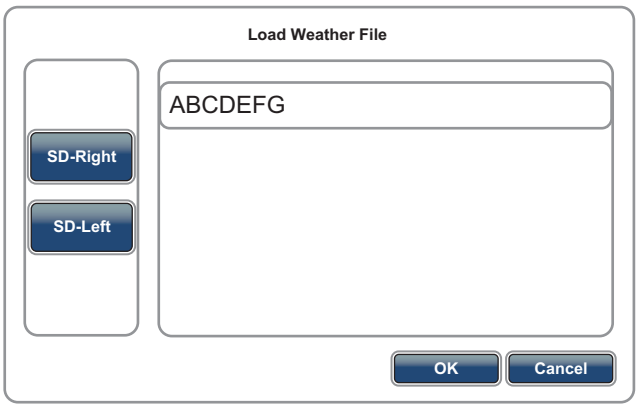
1. Select [Wx Data] from the RotoKey menu on the weather display.
2. Select a menu item to display its data.
3. Repeat steps 1 and 2 to select all menu items desired.
4. Select [Anim Forecast] from the RotoKey menu. The animation forecast is displayed for a specified-day period. To stop the animation display, select [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.



12.2.4 How to load a weather file

You can load a weather file saved on an SD card.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Weather].
3. Select [Load Weather File].
4. Select [SD-Right] or [SD-Left].



5. Select the data to load then select [OK].
6. After the equipment has loaded the selected data, select [Close] to exit the menu.

12.3 SiriusXM Weather

SiriusXM weather radar information and advanced weather information are available in North America with connection of the FURUNO BBWX SiriusXM weather receiver. SiriusXM satellite radio is also available with a SiriusXM satellite radio subscription.

Your system displays the current and forecasted marine 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 SiriusXM 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.

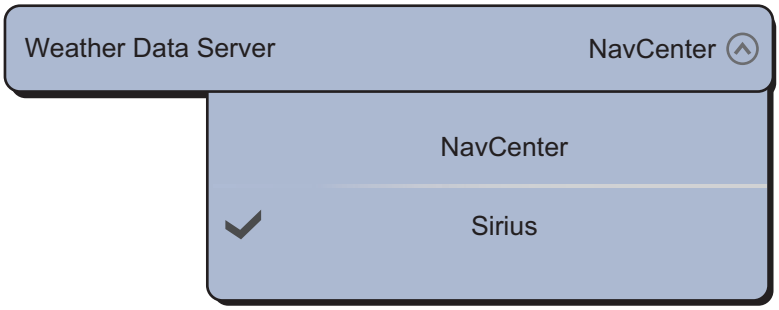
Note: Always turn the weather receiver on BEFORE turning the TZT9/14/BB on.

Before using your SiriusXM weather receiver...

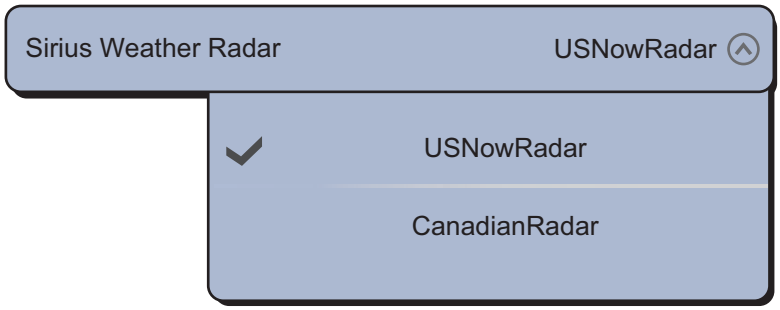
- Purchase a SiriusXM satellite weather service subscription. Contact Sirius Satellite Radio INC. for additional information.
- Purchase a SiriusXM satellite radio service subscription. Contact Sirius Satellite Radio INC. for additional information.

12.3.1 Pre-settings

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Weather].
3. Select [Weather Data Server].



4. Select [Sirius].
5. Select [Sirius Weather Radar].



6. Select the weather radar to use, [USNowRadar] (USA) or [CanadianRadar] (Canada). [USNowRadar] 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

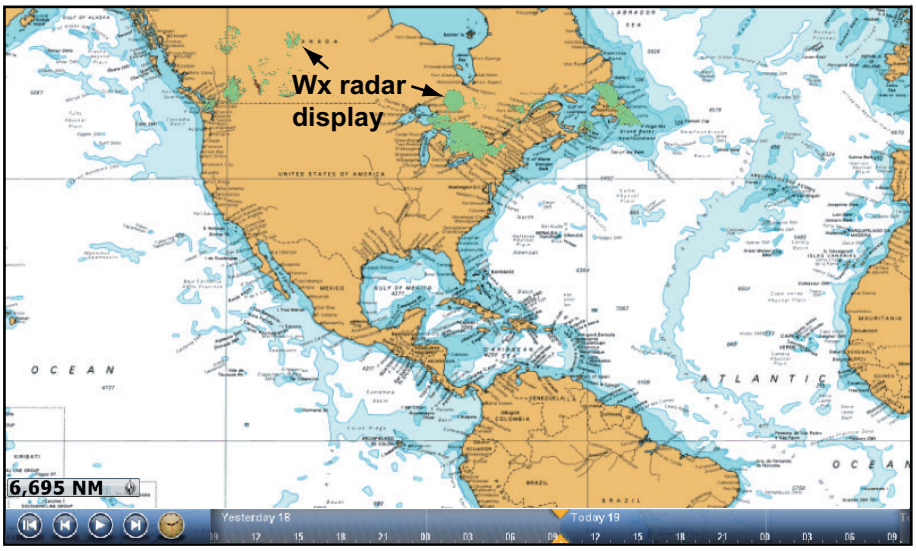
Weather radar color	Level (mm per hour)
Transparent (low precipitation)	0.00 to 0.20 mm/hr
Light green	0.21 to 1.00 mm/hr
Medium green	1.01 to 4.00 mm/hr
Dark green	4.01 to 12.00 mm/hr
Yellow	12.01 to 24.00 mm/hr
Orange	24.01 to 50.00 mm/hr
Light red	50.01 to 100 mm/hr
Dark red	over 100.01 mm/hr

7. Select [Close] to exit the menu.

12.3.2 How to display the SiriusXM data

[Wx Radar] (Weather radar)

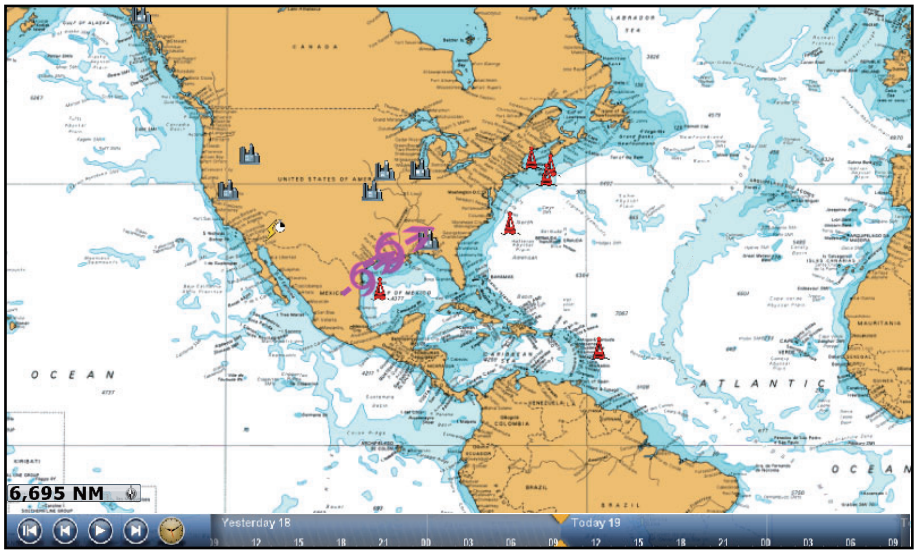
NOWRAD and Canadian weather radar information are put on your chart (see subsection 12.3.1). This display lets you see possible storm fronts to help you identify the clouds from possible sea clutter. To display the weather radar, select [Wx Radar] from the RotoKey menu.



[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 12.4.

1. Select [Adv Wx Data] from the RotoKey menu.
2. Select a menu item to display its data.
3. Repeat steps 1 and 2 to select all menu items desired.

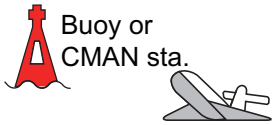
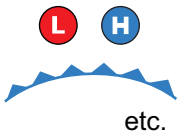


[Anim Radar] (Animation radar)

The animation radar display provides the past weather radar information. To show the animation radar display, select [Anim Radar] from the RotoKey menu. To stop the animation display, select [End Anim] at the top right-hand corner of the screen.

12.4 Weather Icons (SiriusXM Weather)

The table below shows the weather icons that appear on the Sirius weather display. You can show or hide these icons from the RotoKey menu.

Icon	Meaning
	Storm cast
	Lightning
	Surface observation stations
	Wind
	City
	Currents
	Storm tracks
	Surface pressure

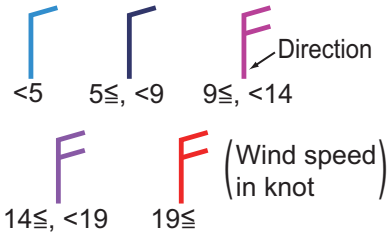
12.5 Weather Data (NavCenter or SiriusXM Weather)

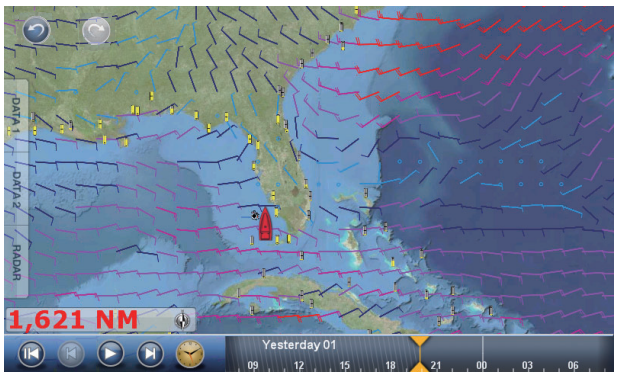
The table below shows the weather data available for displaying according to weather data server (NavCenter or SiriusXM).

Items	NavCenter	SiriusXM	Item	NavCenter	SiriusXM
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

Items	NavCenter	SiriusXM	Item	NavCenter	SiriusXM
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 bottom points in the wind direction.

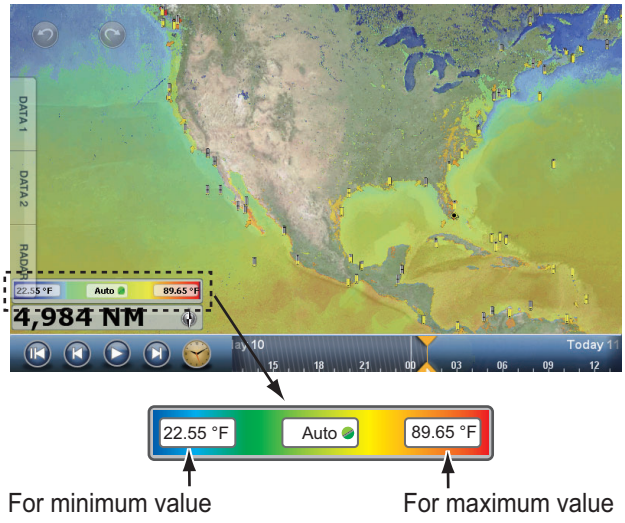




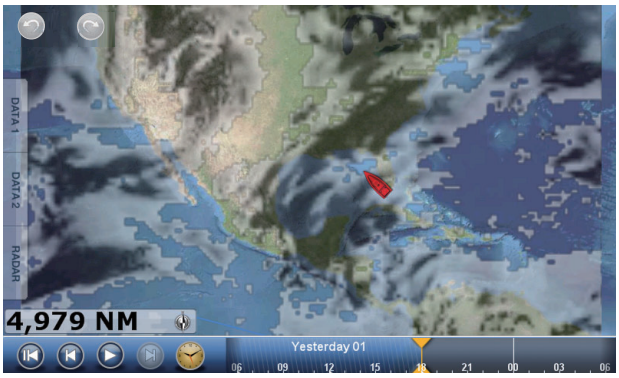
[Waves]: The waves forecast displays wave height with color. 0 foot (minimum) is displayed in light blue, 35 feet (maximum) in red.



[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 [Auto].
Set the minimum or maximum value for which to show SST. See page 3-4 on how to set the value. This is available when [Auto] is off.



[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.



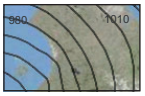
[Rain]: The rain forecast displays rain images. 0.1 mm/hour of rainfall (minimum) is displayed in green, 5 mm/hour (maximum) in dark violet.



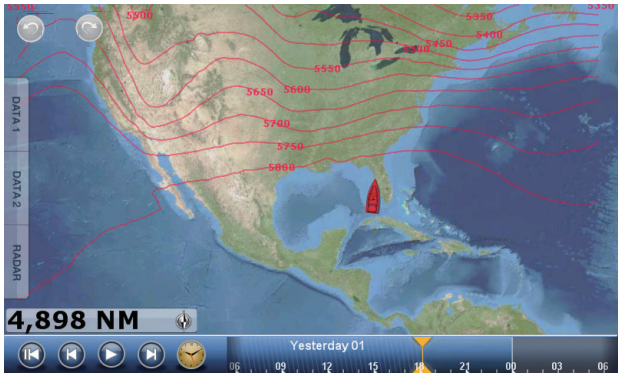
[Pressure]: The pressure forecast displays surface pressure.



Pressure icon	Meaning
	High pressure
	Low pressure
	Warm front
	Cold front
	Occluded front

Pressure icon	Meaning
	Stationary front
	Trough
	Squall line
	Dry line
	Isobars

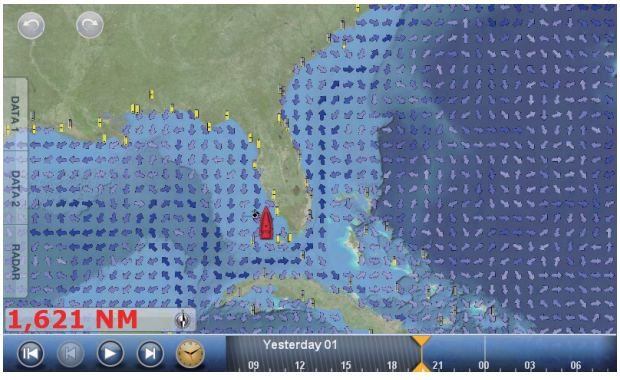
[500mb]: The 500mb forecast displays the contour lines over 500 mb.



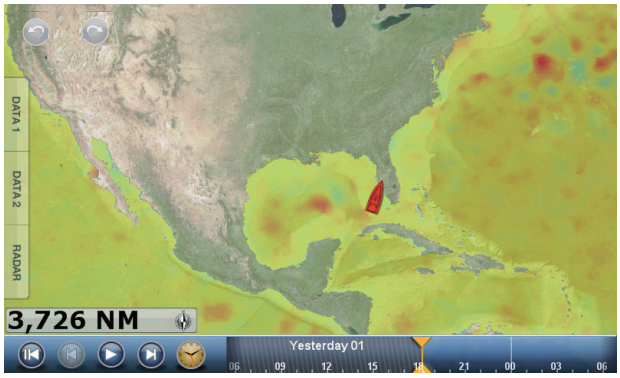
[Air Temp]: The air temp forecast displays the air temperature by color. -45°C (-49°F) (minimum) is displayed in dark violet, 45°C (113°F) (maximum) is displayed in red.



[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.

[Buoys]: You can check the marine observations and the information of buoys.

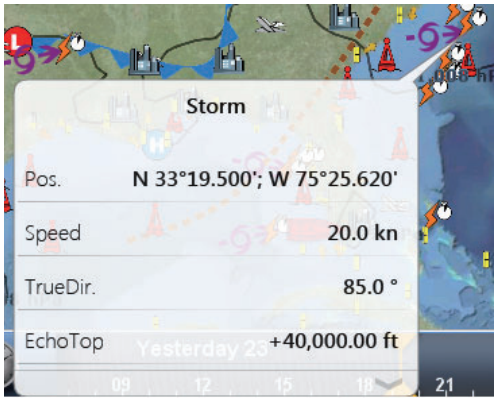
Select a buoy icon ( ) to display the buoy information.



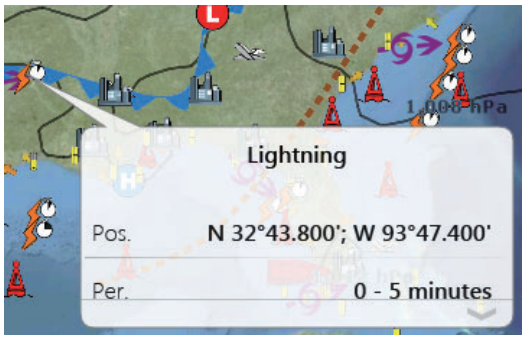
[City]: The city weather forecasts are available where city icons are shown. Select a city icon ( ) to display the city information.



[Storm]: The storm cast icon ( ) shows the direction and speed of a storm when the icon is selected.



[Lightning]: The lightning icons show where lightning has hit, within the last 5, 10 and 15 minutes. The fill color of the icon indicates when the lightning hit occurred. The number of lightning bolt markers indicates the number of times lightning has hit. To find lightning information, select a lightning icon.



Lightning icons	Meaning
	Last 0-5 min. (orange)
	Last 5-10 min. (medium yellow)
	Last 10-15 min. (Light yellow)

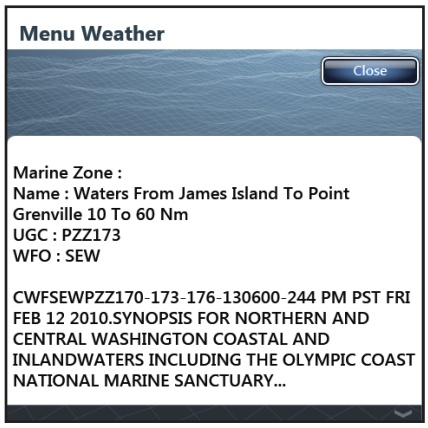
[Storm Tracks]: The storm track icons show major storms in your area. These storms include tropical disturbances, depressions, storms and cyclones, hurricanes, typhoons and super typhoons. These symbols are displayed in three different colors: gray (historical), red (current), and orange (forecast).

Storm track icons	Meaning
	Hurricane (Category 1-5)
	Tropical storm
	Tropical disturbance, Tropical depression

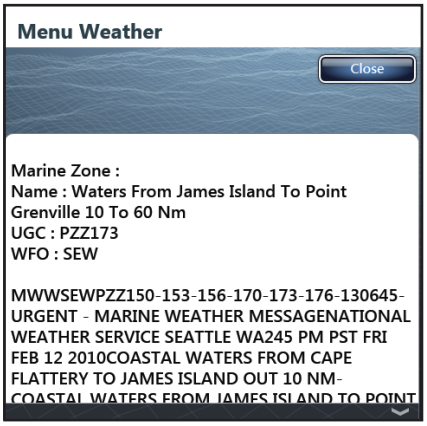
12.6 Weather Reports

Marine zone forecasts, marine warnings, tropical information and Sirius diagnostic are sent to your TZT.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Weather].
3. Select [Zone Forecast], [Marine Warnings], [Tropical Infos] or [Sirius Diagnostic].



Zone forecast



Marine Warnings



Tropical Infos



Sirius Diagnostic

You can also show marine warning for a specific area on the chart. Tap the location you want to view the warnings for, then tap [Marine Warnings] in the pop-up menu.

4. Select [Close] to exit the menu.

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13. AUTOMATIC IDENTIFICATION SYSTEM (AIS)

13.1 AIS Introduction

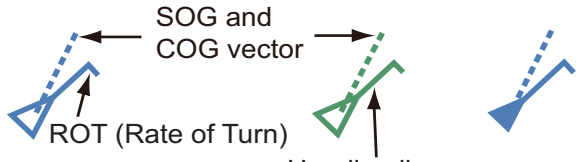
AIS is a system that continuously transmits the identification and position of your ship to other nearby ships. All such ships also receive data from other AIS equipped ships and display their positions and other relevant information. The AIS broadcasts this information over a VHF transceiver. Data include:

- 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

13.2 How to Show or Hide the AIS Symbols

1. On the radar display or chart plotter display, select [Targets] from the RotoKey menu.
2. To show the AIS symbols, select [AIS/DSC]. To hide the AIS symbols, deselect [AIS/DSC].

13.3 AIS Target Symbols

Target type	Symbol	Description
Activated AIS target	 Color Blue: Class A AIS Green: Class B AIS Blue (filled): BFT AIS target (see next page for details)	COG is marked on the symbol with a dashed line.
Dangerous AIS target	Color: Red 	A dangerous target is one whose CPA and TCPA are smaller than the set [CPA Alarm Value] and [TCPA Alarm Value], which are set on the [Targets] menu.

Target type	Symbol	Description
Lost AIS target	 Symbol color Blue: Class A AIS Green: Class B AIS Blue (filled): BFT (Blue Force Tracking) AIS target Cross color Red	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. *: The time depends on the AIS transponder. Check the operator's manual for your AIS transponder for information about lost targets.

Note: This equipment is fitted with the Blue Force Tracking feature. To receive the NMEA0183 VDM sentence from other vessels, the optional NMEA Data Converter IF-NMEA2K2 (with software version 1.07 or later) is required.

Other AIS symbols that may appear are shown in the table below.

Symbol	Color	Meaning
	Green	AtoN
	Green	Base Station
	Green	SAR aircraft
	Green	AIS-SART

13.4 Proximity AIS Target Alarm

When an AIS target is within the distance set, the alarm indication "Proximity AIS Alarm" appears in the status bar and flashes and the audio alarm sounds. (See subsection 2.10.7).

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Targets].
3. To activate the alarm, select the [ON] icon in [Proximity AIS Target Alarm]. To deactivate the alarm, select the [OFF] icon.



4. Select [Proximity AIS Target Alarm Value] to open the software keyboard.

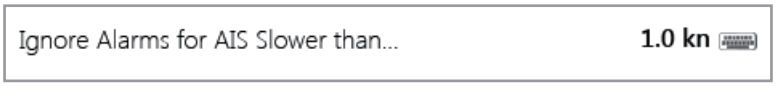


5. Set the alarm value then select [Confirm].
6. Select [Close] to exit the menu.

13.5 How to Ignore the AIS Targets

In the default setting, all AIS targets within 12 NM* from your ship are shown on the display. Slow-moving targets within the AIS proximity alarm range cause frequent violation of the alarm. You can prevent this frequent violation if you ignore targets within the alarm range that are slower than the value you set.

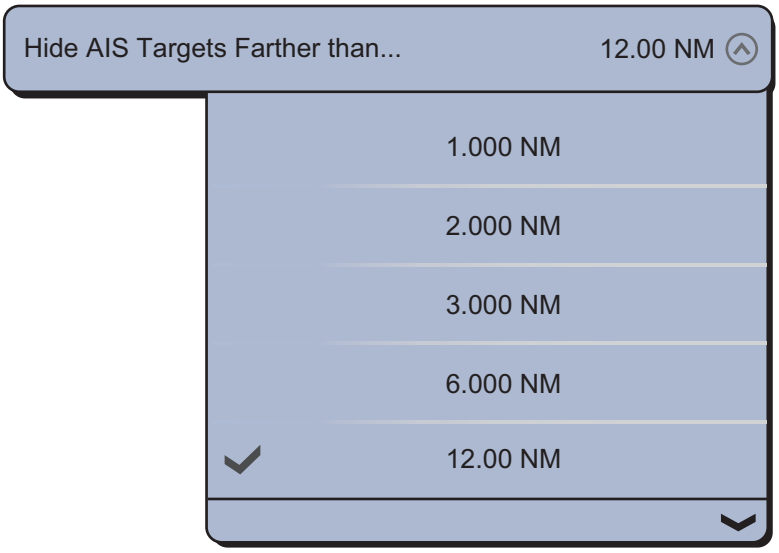
1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Targets] - [Ignore Alarms for AIS Slower than...] menu to open the software keyboard. This menu item prevents frequent violation of the AIS proximity alarm against AIS targets that are slower than the value set here.



3. Set a speed then select [Confirm]. The setting range is 0.0 - 9.9 (knots).
4. Select [Close] to exit the menu.

*: You can change this value. You can hide the AIS symbols that are beyond the distance you set here.

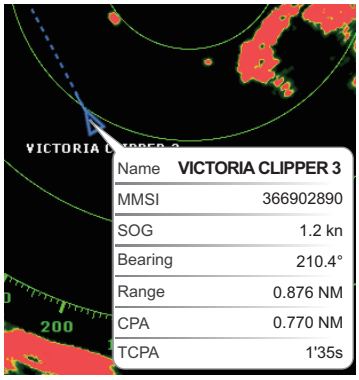
1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Targets] - [Hide AIS Targets Farther than...] menu.



3. Select a distance. Targets at a distance greater than set here are not shown on the screen.
4. Select [Close] to exit the menu.

13.6 How to Display the Target Data

Select an AIS target to display the simple information. To get the detailed information, select an AIS target to display the pop-up menu then select [Info]. The detailed information display can also be shown by selecting the simple information display.



Simple information

Target Info

Nickname	
Name	**VICTORIA 3**
MMSI	**366902890**
Call Sign	**WYX2158**
COG	**263.4°**
SOG	**0.0 kn**
CPA	**0.770 NM**
TCPA	**1'35s**
Range	**0.876 NM**
Bearing	**210.4°**
Destination	**WSF TERMINAL**
Vessel Type	**Passenger ships - All ships of this type**
Vessel Status	**0: Under Way Using Engine**
Heading	**294.0°**
ROT	**+0.0°/m**
Status	**Tracking**
Time	**0'00s**
Vessel Length	**800 ft**
Vessel Width	**120 ft**
Danger	
Position	**N 47°47.692'; W122°29.653'**

Detailed information

13.7 How to Show and Hide the Target IDs

You can show or hide the target ID of AIS targets.

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Targets].
3. Select the [ON] or [OFF] icon in [Display Target IDs].



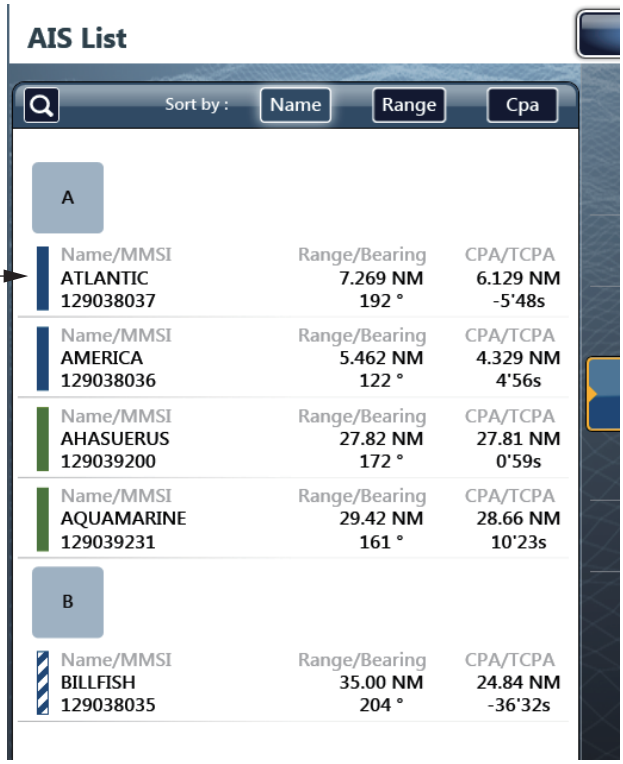
4. Select [Close] to exit the menu.

13.8 AIS List

How to open the AIS list

1. Select [Lists] on the menu icon bar to open the lists menu.
2. Select [AIS List].

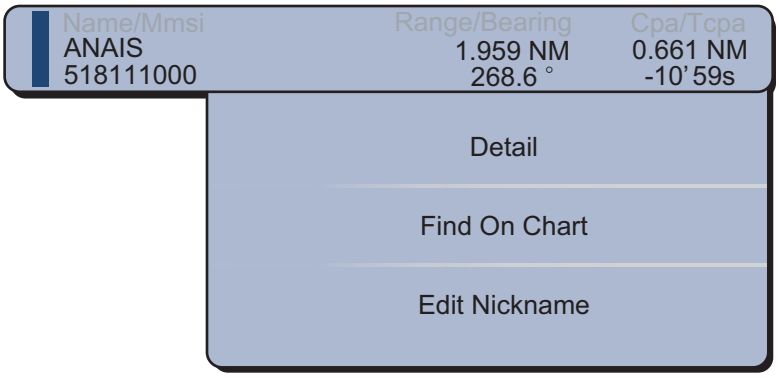
AIS symbol color
Easily identify target type.
Blue: AIS target for Class A
Green: AIS target for Class B
Blue & white stripe: AIS target for BFT



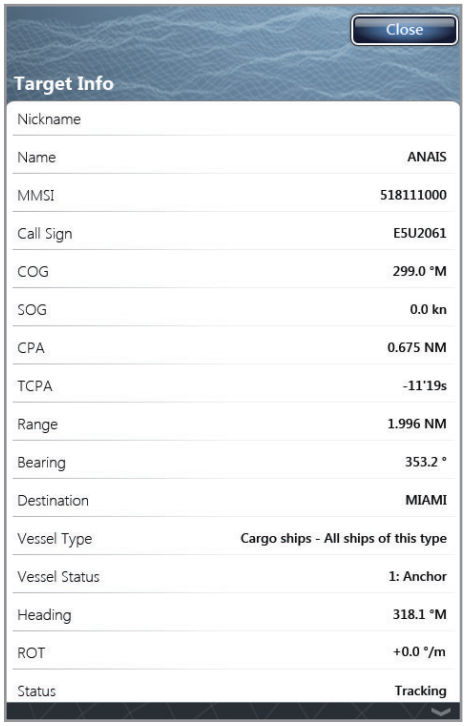
The data for the AIS dangerous targets are displayed in red.

How to display the detailed information for AIS

1. Select the AIS to display the detailed information on the AIS list.



2. Select [Detail].



3. Select [Close] to close the [Target Info] window.
4. Select [Close] to exit the menu.

How to find an AIS target on the chart display

1. Select the AIS target to find on the AIS list.
2. Select [Find On Chart].
   The chart plotter display opens and the selected AIS is zoomed in.

How to edit an AIS nickname

1. Select the AIS target to edit the nickname on the AIS list.
2. Select [Edit Nickname] to display the software keyboard.
3. Enter the nickname. The maximum length of the nickname is 20 alphanumeric characters.
4. Select [Confirm].
5. Select [Close] to exit the menu.

13.9 How to Register an AIS or DSC 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.

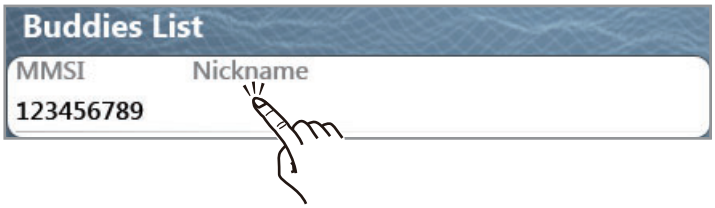
How to add an MMSI no. to the buddies list

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select [Targets].

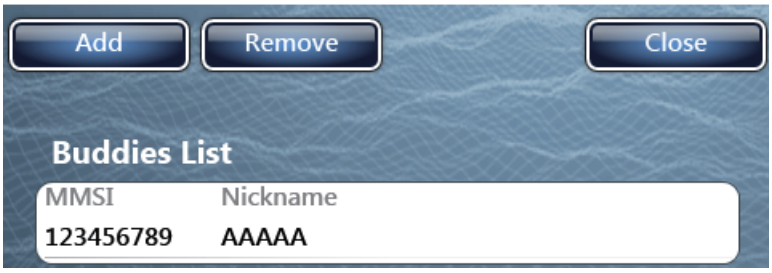
3. Select [Buddies List (AIS & DSC)].



4. Select [Add] to open the numeric software keyboard.
5. Enter the MMSI number then select [Confirm].
6. Select [Nickname] to open the alphabetical software keyboard.



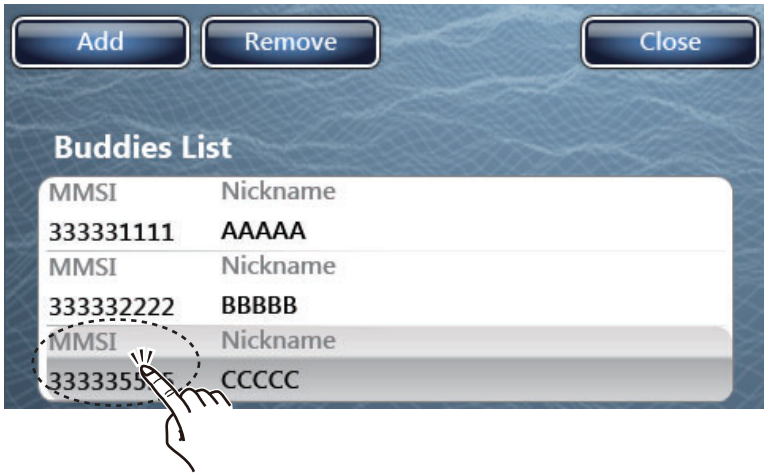
7. Enter the nickname then select [Confirm].



8. Select [Close].
9. Select [Close] to exit the menu.

How to delete an entry from the buddies list

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [Targets] - [Buddies List (AIS & DSC)] menu.
3. Select the [MMSI] field in the AIS or DSC to delete then select [Remove].



4. Select [Close] twice to exit the menu.

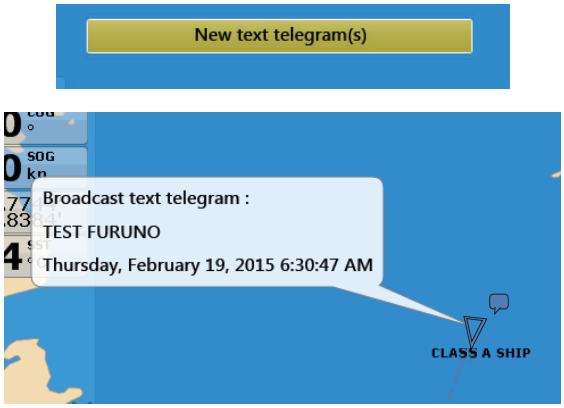
13.10 Receiving AIS Messages

When a binary or safety message (ID 6/8: binary, ID12/14: safety) is received, the status bar shows the type of AIS message received. Additionally, the plotter and radar displays mark the ship that sent the message, with the TX marker. To receive notification of AIS message received, open [Menu]-[Targets], then set [Ais Message Notification] to [ON].

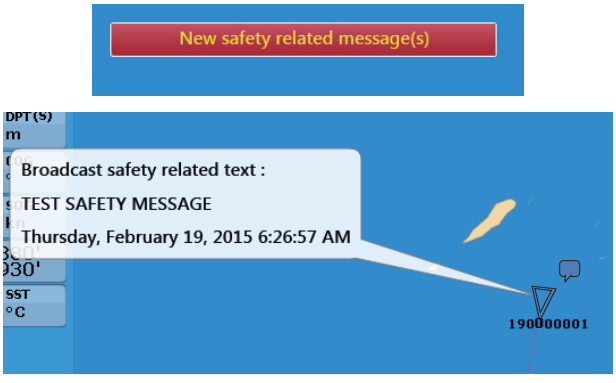
To show the message contents do one of the following:

- Tap the Status bar.
- Tap the on-screen call-out, then select [Last Message].

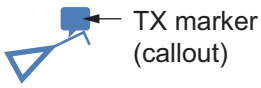
To erase the message, tap the on-screen call-out, then select [Erase Message].



Binary message



Broadcast safety message



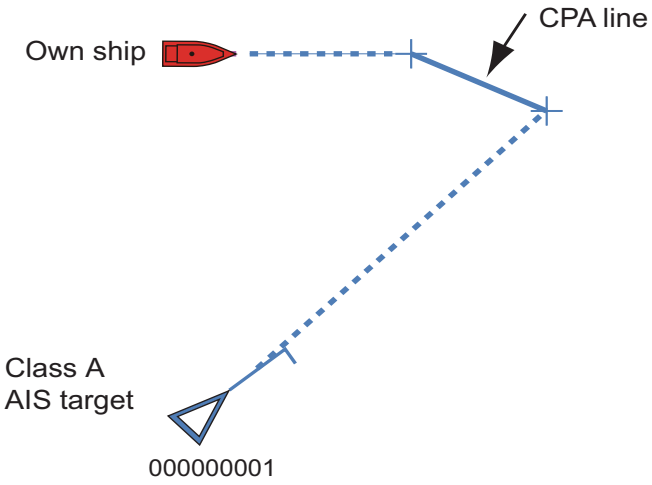
13.11 CPA Graphic Display

The CPA graphic display shows the CPA between own vessel and the selected AIS target with a line, called the “CPA line.” You can use the line to monitor speed and heading changes of another vessel, which makes it useful as an anti-collision aid, especially in congested waters. (Requires own ship and position data.)

To activate or deactivate the CPA graphic display, open the [Targets] menu and turn [CPA Graphic Display] on or off.

To find the CPA of an AIS target on the radar or plotter display, tap the AIS target. The CPA line connects with the position of your vessel and the CPA of the AIS target. The line is the same color as the target symbol. To find the CPA of another AIS target select it, and the CPA line moves to the newly selected target. (Only only line can be displayed at a time between AIS and ARPA targets.) The example below shows the appearance of the CPA line on the radar display.

If the CPA/TCPA alarm is generated while the CPA line is in use, the CPA line and the selected target symbol turn red.



The CPA graphic display is not available in the following conditions:

- The CPA line is turned off. The line can be turned off by selecting the CPA line (or own ship icon), then selecting [Hide CPA line] from the pop-up menu.
- The feature is turned off.
- The TCPA is a minus (-) value.
- The target is a lost target.
- The speed and heading data from the AIS target are lost.
- The CPA and TCPA of the target cannot be calculated (no speed or heading data for own ship).
- No own ship speed or heading.

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14. HOW TO ADJUST SETTINGS

After you understand the basic operation procedures of your equipment, you can set the equipment according to your needs.

- Set the equipment according to your system configuration.
- Change how the equipment operates and displays information.

All the adjustments are done from the menu. To restore the default settings for the selected menu, select [Reset Default Settings] that is provided on each menu.

Some of the items which you can adjust are as follows:

- RotoKey mode
- Data boxes
- Units of measurement
- System settings
- Charts

14.1 RotoKey Mode

The user can select how many menu items to make available with the **RotoKey**™ (touch control for TZTBB) in the chart plotter, weather, radar, sounder, instrument and camera modes. The two quantities are [Base] and [Full].

The table below shows the menu items available for use in the chart plotter, weather, radar, sounder, instrument and camera modes.

Note: The menu items shown on the screen depend on your system configuration, equipment settings or functions in current use.

Menu items available in the chart plotter mode

Control label		Function	Base	Full
Level 1	**Level 2**			
Route	Stop Nav.	Stop following a route.	Yes	Yes
	Restart Nav.	Restart course.	Yes	Yes
	Skip Wpt	Skip a go to point on a route.	Yes	Yes
Orientation	North Up	Set orientation mode to north up.	Yes	Yes
	Head Up	Set orientation mode to head up.	Yes	Yes
Track Rec.	-	Record track of your ship.	Yes	Yes
Event	-	Put an event mark.	Yes	Yes
Lat/Lon	-	Create a point using the software keyboard.	Yes	Yes
3D	-	Switch the display view from 2D to 3D.	Yes	Yes
Chart	Raster	Show raster chart.	Yes	Yes
	S-57	Show S-57 chart.	Yes	Yes
	C-MAP	Show C-MAP chart.	Yes	Yes
	Navionics	Show Navionics chart.	Yes	Yes
	Fishing	Show fishing chart.	Yes	Yes
	Auto	Switch the chart type automatically.	Yes	Yes

Control label		Function	Base	Full
Level 1	**Level 2**			
Overlay	Radar	Show or hide radar overlay.	Yes	Yes
	Sat Photo	Show or hide satellite photo overlay.	Yes	Yes
	Dpth Shade	Show or hide depth shading overlay.	Yes	Yes
	Tide Icons	Show or hide tide icons.	Yes	Yes
	Currents	Show or hide tidal currents.	Yes	Yes
	Accu Fish	Activate or deactivate ACCU-FISH™.	No	Yes
	Points	Show or hide points.	No	Yes
	Routes	Show or hide routes.	No	Yes
	Tracks	Show or hide tracks.	No	Yes
Targets	AIS/DSC	Show or hide AIS and DSC icons.	No	Yes
	ARPA	Show or hide ARPA.	No	Yes
	Cancel All	Cancel tracking on all targets.	No	Yes
	Clear Lost	Clear lost ARPA targets.	No	Yes
Radar	Tx Radar	Switch between transmission and stand-by.	No	Yes
	Transparency	Set the degree of transparency for radar overlay display.	No	Yes
	Auto Gain	Adjust the gain automatically.	No	Yes
	Manual Gain	Adjust the gain manually.	No	Yes
	Auto Sea	Adjust the sea clutter automatically.	No	Yes
	Manual Sea	Adjust the sea clutter manually.	No	Yes
	Auto Rain	Adjust the rain clutter automatically.	No	Yes
	Manual Rain	Adjust the rain clutter manually.	No	Yes
	Echo Trail	Show or hide echo trail.	No	Yes
	Clear Trail	Clear echo trails and restart with new echo trails.	No	Yes
Display (TZT9/TZT14 only)	NavData	Open the data boxes.	No	Yes
	Menu	Open the main menu.	No	Yes
	Lists	Open the lists.	No	Yes
	Tide	Open the tide graph.	No	Yes

Menu items available in the weather mode

Control label		Function	Base	Full
Level 1	**Level 2**			
Wx Radar	-	Show or hide weather radar overlay.	Yes	Yes
Wx Data	Wind	Show or hide wind icon.	Yes	Yes
	Waves	Show or hide wave data.	Yes	Yes
	SST	Show or hide sea surface temperature data.	Yes	Yes
	Cloud	Show or hide cloud data.	Yes	Yes
	Rain	Show or hide rain data.	Yes	Yes
	Pressure	Show or hide surface pressure data.	Yes	Yes
	500mb	Show or hide contour lines over 500 mb.	No	Yes
	Air Temp	Show or hide air temperature data.	No	Yes
	Currents	Show or hide tidal current data by arrows.	No	Yes
	Altimetry	Show or hide sea height anomalies data.	No	Yes
	Plankton	Show or hide plankton data.	No	Yes
Adv Wx Data	Buoys	Show or hide buoy icon.	Yes	Yes
	City	Show or hide city icon.	Yes	Yes
	Storm	Show or hide storm cast icon.	Yes	Yes
	Lightning	Show or hide lighting icon.	Yes	Yes
	Storm Tracks	Show or hide storm track icon.	Yes	Yes
	Marine Zone	Show or hide marine zone. (The coastal waters are divided into zones for forecasts. These zones can be displayed on the screen with lines.)	Yes	Yes
Anim Radar	-	Display the animation for the past weather radar information.	Yes	Yes
Anim Forecast	-	Display the animation for the weather forecast.	Yes	Yes
Chart	Raster	Show raster chart.	Yes	Yes
	S-57	Show S-57 chart.	Yes	Yes
	C-MAP	Show C-MAP chart.	Yes	Yes
	Navionics	Show Navionics chart.	Yes	Yes
	Fishing	Show fishing chart.	Yes	Yes
	Auto	Switch the chart type automatically.	Yes	Yes
Overlay	Sat Photo	Show or hide satellite photo overlay.	Yes	Yes
	Tide Icons	Show or hide tide icons.	Yes	Yes
	Currents	Show or hide tidal currents.	Yes	Yes
	Points	Show or hide points and event marks.	Yes	Yes
Display (TZT9/TZT14 only)	NavData	Open the data boxes.	No	Yes
	Menu	Open the main menu.	No	Yes
	Lists	Open the lists.	No	Yes
	Tide	Open the tide graph.	No	Yes
Get Latest Wx	-	Get the latest weather forecast with internet connection.	Yes	Yes

Menu items available in the radar mode

Control label		Function	Base	Full
Level 1	**Level 2**			
Tx Radar	-	Switch between transmission and stand-by.	Yes	Yes
Radar Adjust	Auto Gain	Adjust the gain automatically.	Yes	Yes
	Manual Gain	Adjust the gain manually.	Yes	Yes
	Auto Sea	Adjust the sea clutter automatically.	Yes	Yes
	Manual Sea	Adjust the sea clutter manually.	Yes	Yes
	Auto Rain	Adjust the rain clutter automatically.	Yes	Yes
	Manual Rain	Adjust the rain clutter manually.	Yes	Yes
Auto Sea Mode	Advanced	Activate or deactivate the auto sea for open waters.	No	Yes
	Coastal	Activate or deactivate the auto sea for coastal waters.	No	Yes
Radar Filters	Int Reject	Activate or deactivate the interference rejector.	No	Yes
	Stretch	Activate or deactivate the echo stretch.	No	Yes
	Average	Activate or deactivate the echo average.	No	Yes
Rings	-	Show or hide the range rings.	Yes	Yes
Orientation	Head Up	Set orientation mode to head up.	No	Yes
	North Up	Set orientation mode to north up.	No	Yes
Hdg Ln Off	-	Hide the heading line and range rings for a few seconds.	No	Yes
Echo Trail	-	Show or hide echo trails.	No	Yes
Clear Trail	-	Clear echo trails and restart with new echo trails.	No	Yes
Target Analyzer	-	Activate or deactivate the target analyzer.	No	Yes
Bird Mode	Off, Calm, Moderate, Rough	Activate or deactivate the bird mode	No	Yes
EBL	Adjust	Set the EBL (setting range: 0.0 to 359.9°).	No	Yes
	Clear	Erase the EBL.	No	Yes
VRM	Adjust	Set the VRM (setting range: 0 yd to 8.000 NM)	No	Yes
	Clear	Erase the VRM.	No	Yes
Guard Zone	Visible	Show guard zone.	Yes	Yes
	Alarm	Activate or deactivate guard zone.	Yes	Yes
	Auto Acquire	Activate or deactivate auto acquisition of ARPA targets.	Yes	Yes
	Resize	Resize guard zone.	Yes	Yes
WatchMan	-	Turn on or off the watchman function.	No	Yes
Targets	AIS/DSC	Show or hide AIS and DSC.	Yes	Yes
	ARPA	Show or hide ARPA.	Yes	Yes
	Cancel All	Cancel tracking on all targets.	Yes	Yes
	Clear Lost	Clear lost ARPA targets.	Yes	Yes
Active Rte	-	Show or hide active route.	No	Yes
CPA Alarm	-	Activate or deactivate CPA alarm.	No	Yes
Display (TZT9/TZT14 only)	NavData	Open the data boxes.	No	Yes
	Menu	Open the main menu.	No	Yes
	Lists	Open the lists.	No	Yes
	Tide	Open the tide graph.	No	Yes

Menu items available in the sounder mode

Control label		Function	Base	Full
Level 1	**Level 2**			
Frequency	HF	Activate HF display.	Yes	Yes
	LF	Activate LF display.	Yes	Yes
Mode	Single Freq.	Activate single frequency display.	Yes	Yes
	Dual Freq.	Activate dual frequency display.	Yes	Yes
	Btm Lock	Activate bottom lock display.	Yes	Yes
	Btm Zoom	Activate bottom zoom display.	Yes	Yes
Adjust	Auto Fishing	Activate automatic fishing mode.	Yes	Yes
	Auto Cruising	Activate automatic cruising mode.	Yes	Yes
	Manual	Activate manual mode.	Yes	Yes
	HF Gain	Adjust the gain for high frequency individually in manual mode.	Yes	Yes
	LF Gain	Adjust the gain for low frequency individually in manual mode.	Yes	Yes
Auto Range	-	Activate or deactivate auto range.	Yes	Yes
A-scope	-	Show or hide A-scope display.	Yes	Yes
Fish Alarm	-	Activate or deactivate fish alarm.	No	Yes
Accu Fish	-	Activate or deactivate ACCU-FISH^{TM}.	Yes	Yes
Bottom Type (BBDS1 and DFF1-UHD)	-	Show or hide bottom discrimination display.	Yes	Yes
Event	-	Put an event mark.	No	Yes
Display (TZT9/TZT14 only)	NavData	Open the data boxes.	No	Yes
	Menu	Open the main menu.	No	Yes
	Lists	Open the lists.	No	Yes
	Tide	Open the tide graph.	No	Yes

Menu items available in the camera mode

Control label		Function	Base	Full
Level 1	**Level 2**			
Analog 1*	-	Display the image from analog 1.	Yes	Yes
Analog 2*	-	Display the image from analog 2.	Yes	Yes
IP 1*	-	Display the image from IP camera 1.	Yes	Yes
IP 2*	-	Display the image from IP camera 2.	Yes	Yes
IP 3*	-	Display the image from IP camera 3.	Yes	Yes
IP 4*	-	Display the image from IP camera 4.	Yes	Yes
Quad	-	Display the four images from axis server.	Yes	Yes
Input 1*	-	Display the image for input 1 from axis server.	Yes	Yes
Input 2*	-	Display the image for input 2 from axis server.	Yes	Yes
Input 3*	-	Display the image for input 3 from axis server.	Yes	Yes
Input 4*	-	Display the image for input 4 from axis server.	Yes	Yes
Quad 2	-	Display the four images from second axis server.	Yes	Yes
Input 1*	-	Display the image for input 1 from second axis server.	Yes	Yes
Input 2*	-	Display the image for input 2 from second axis server.	Yes	Yes

Control label		Function	Base	Full
Level 1	**Level 2**			
Input 3*	-	Display the image for input 3 from second axis server.	Yes	Yes
Input 4*	-	Display the image for input 4 from second axis server.	Yes	Yes
Cycle	-	Cycle the images selected.	Yes	Yes
Cycle Config.	Analog 1*	Activate or deactivate cycle of the image from analog 1.	Yes	Yes
	Analog 2*	Activate or deactivate cycle of the image from analog 2.	Yes	Yes
	IP 1*	Activate or deactivate cycle of the image from IP camera 1.	Yes	Yes
	IP 2*	Activate or deactivate cycle of the image from IP camera 2.	Yes	Yes
	IP 3*	Activate or deactivate cycle of the image from IP camera 3.	Yes	Yes
	IP 4*	Activate or deactivate cycle of the image from IP camera 4.	Yes	Yes
	Quad	Activate or deactivate cycle of the four images from axis server	Yes	Yes
	Input 1*	Activate or deactivate cycle of the image for input 1 from axis server.	Yes	Yes
	Input 2*	Activate or deactivate cycle of the image for input 2 from axis server.	Yes	Yes
	Input 3*	Activate or deactivate cycle of the image for input 3 from axis server.	Yes	Yes
	Input 4*	Activate or deactivate cycle of the image for input 4 from axis server.	Yes	Yes
	Quad 2	Activate or deactivate cycle of the four images from second axis server.	Yes	Yes
	Input 1*	Activate or deactivate cycle of the image for input 1 from second axis server.	Yes	Yes
	Input 2*	Activate or deactivate cycle of the image for input 2 from second axis server.	Yes	Yes
	Input 3*	Activate or deactivate cycle of the image for input 3 from second axis server.	Yes	Yes
	Input 4*	Activate or deactivate cycle of the image for input 4 from second axis server.	Yes	Yes
Zoom In	-	Zoom in the image from FLIR.	Yes	Yes
Zoom Out	-	Zoom out the image from FLIR.	Yes	Yes
FLIR Mode	Thermal	Display the thermal image from FLIR.	Yes	Yes
	Visible	Display the visible image from FLIR.	Yes	Yes
FLIR Scene	Day Running	Set the best viewing when navigating in daytime.	No	Yes
	Night Running	Set the best viewing when navigating in nighttime.	No	Yes
	Night Docking	Set the best viewing when docking at night.	No	Yes
	MOB	Set the best viewing to detect the MOB position.	No	Yes

Control label		Function	Base	Full
Level 1	Level 2			
FLIR Home	-	Put the FLIR camera into the home position. Restore the FLIR camera to the normal magnification.	Yes	Yes
Contrast	-	Adjust the contrast for video image.	No	Yes
Brightness	-	Adjust the brightness for video image.	No	Yes
Display (TZT9/TZT14 only)	NavData	Open the data boxes.	No	Yes
	Menu	Open the main menu.	No	Yes
	Lists	Open the lists.	No	Yes
	Tide	Open the tide graph.	No	Yes

*: These labels are replaced with the nicknames if they are set in [Camera] of the main menu.

Menu items available in the instruments mode

Control label		Function	Base	Full
Level 1	Level 2			
Steering	-	Show steering display.	Yes	Yes
NAVpilot	-	Show NAVpilot display	Yes	Yes
Highway	-	Show highway display.	Yes	Yes
Engine (If one engine only)	-	Show engine display.	Yes	Yes
Engines (If more than one engine)	All	Show all engines display.	Yes	Yes
	Engine 1	Show engine 1 display.	Yes	Yes
	Engine 2	Show engine 2 display.	Yes	Yes
	Engine 3	Show engine 3 display.	Yes	Yes
	Engine 4	Show engine 4 display.	Yes	Yes
Tank Level	-	Show tank level display.	Yes	Yes
Weather	-	Show weather display.	Yes	Yes
Wind	-	Show wind display.	Yes	Yes
Display (TZT9/TZT14 only)	Menu	Open the main menu.	No	Yes
	Lists	Open the lists.	No	Yes
	Tide	Open the tide graph.	No	Yes

How to select the RotoKey mode to use

You can select the RotoKey mode to use from [Base] or [Full].

1. Select [Menu] on the menu icon bar to open the main menu.
2. Select the [General] - [RotoKeys] menu.



3. Select [Base] or [Full], then select [Close] to exit the menu.

TZT9/TZT14: The [Full] set can be always selected by long pushing the **RotoKey**™.

14.2 How to Set the Display Selection Window

The section 1.5 shows how to arrange the display selection window to your liking. The default display selection window provides seven displays in configurations according to the equipment that you have in your network. If the arrangement does not meet your requirements, you can change the configurations as necessary. You can set a maximum of 12 displays to show and split a display up to three ways. For example, you can show the radar and sounder (fish finder) displays in a two-way split screen.

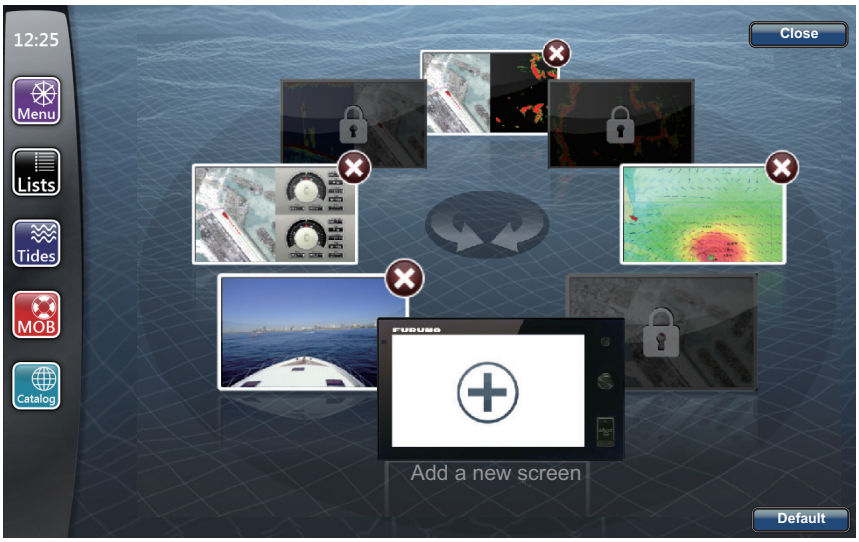
You can select how to split a display by three different methods: full-screen, two-way and three-way. The displays available depend on the display division selected and your system configuration. The table below describes display division and possible display.

Display division	Possible display
Full	Plotter, weather, radar, sounder, instrument, camera, multi-sounder, side scan, cross section, 3D history
Two-way split	Plotter, radar, sounder, camera, multi-sounder, side scan
Three-way split	Plotter, radar, sounder, instrument, camera, multi-sounder, side scan, cross section, 3D history

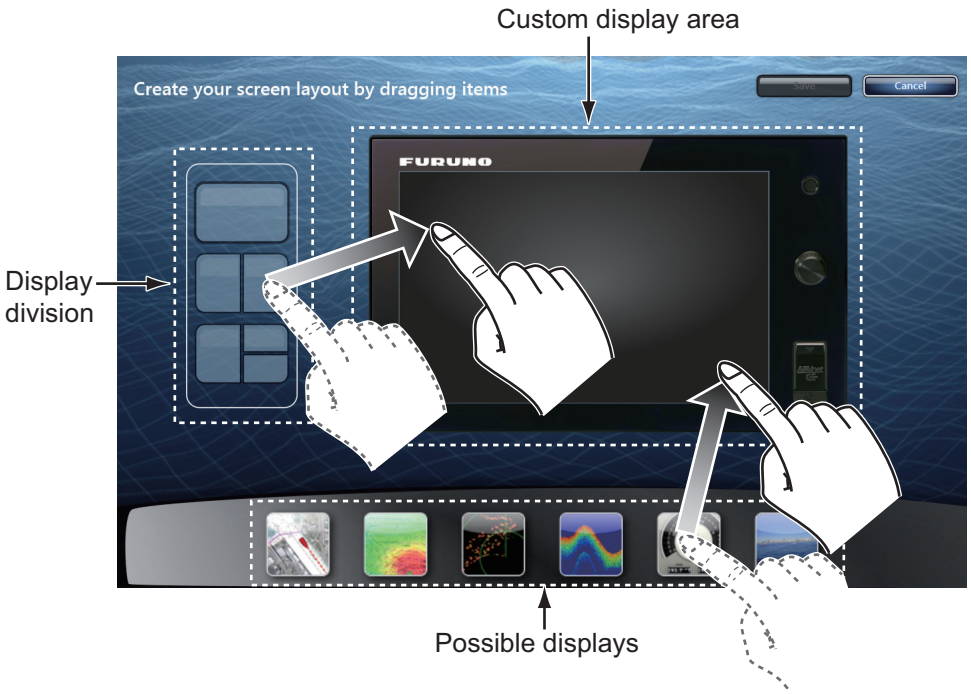
How to add a new screen

Set the display selection window as follows:

1. Press the **Home** key (or tap the **Home** icon) to show the display selection window.
2. Select [Edit] at the top right-hand corner of the screen.



3. Select [+] for [Add a new screen].



4. Drag the desired display division (full-screen, two-way or three-way) to the custom display area.
5. Drag the desired display from the possible displays to the custom display area.
6. Select [Save] to save the setting. Your arrangement of displays appears on the screen and the display selection window is updated according to your arrangement.

How to delete a screen

A maximum of 10 to 12 screens can be used. If you need to add another screen, delete an unnecessary screen to make space.

1. Press the **Home** key (or tap the **Home** icon) to show the display selection window.
2. Select [Edit] at the top right-hand corner of the screen.
3. Select [×] in the screen to delete.



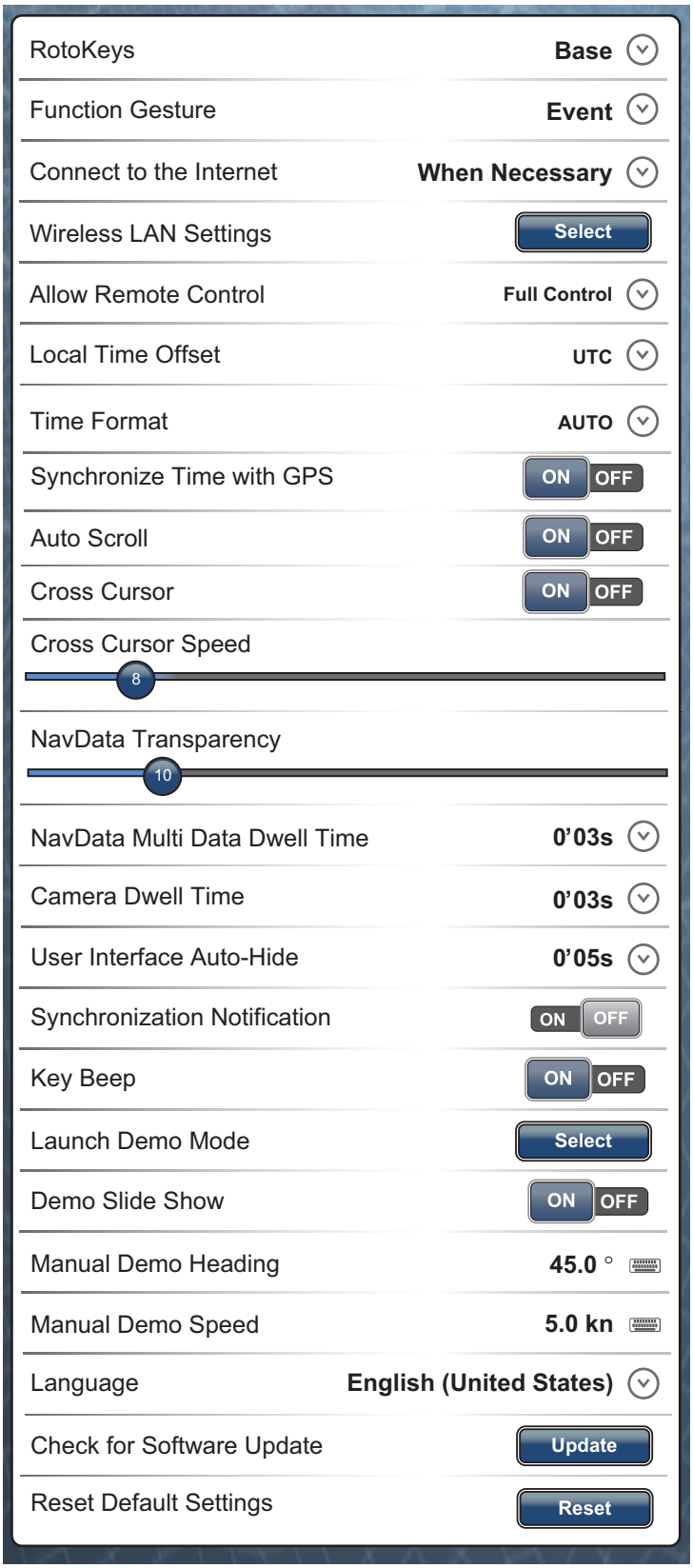
4. Select [Close].

Note: When a sounder or plotter sensor is installed, the default screens are automatically set according to the sensor. The default screens cannot be deleted. The number of screens which you can add, edit or delete decreases according to the number of the default screens. For example, when a sounder, radar and plotter sensors are installed, the two-way split screen for sounder/plotter and the full screens for plotter and radar are set as the default screens. These three screens cannot be edited or deleted. In this case, a maximum of seven screens can be added, edited or deleted.

14.3 General and Units Menus

The [General] menu of the main menu includes the RotoKeys settings, data boxes settings, key beep, etc. The [Units] menu sets units of measurement for range, depth, height, speed, etc.

[General] menu



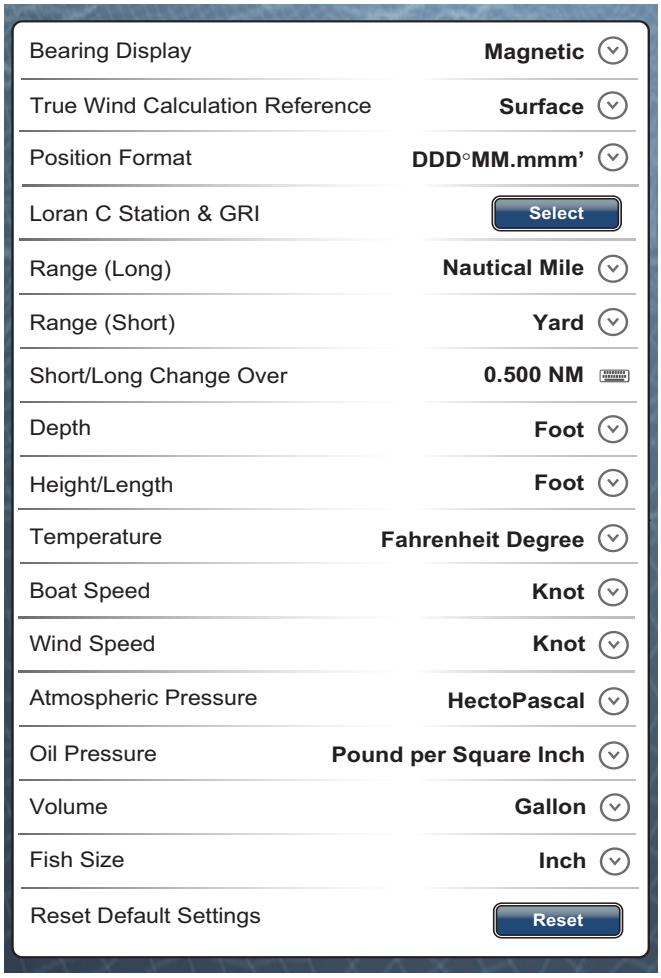
[General] menu description

Menu item	Function	Options
[RotoKeys]	Select the RotoKey menu to show with a short press of the **RotoKey**™ (for TZT9/TZT14) or short tap (for TZTBB). See section 14.1.	[Base], [Full]
[Function Gesture]	Select the function to do by tapping the screen with two fingers (see section 1.15).	[None], [Screen Capture], [Event], [MOB], [Home], [Menu], [Lists], [Tide], [Fusion], [Fusion Ctrl]
[Connect to the Internet]	Select when to connect to the internet. Select [When Necessary] normally.	[Never], [At Startup], [When Necessary]
[Wireless LAN Settings]	Create a local network or connect an existing LAN network (see section 1.22).	-
[Allow Remote Control]	Select the operating range by a wireless terminal.	[Off], [View Only], [Full Control]
[Local Time Offset]	Select the time difference between local time and UTC time.	UTC -12:00 to UTC + 13:00 (at 15-minute intervals)
[Time Format]	Select the time notation.	[AUTO], [12 hours], [24 hours]
[Synchronize Time with GPS]	Activate or deactivate synchronizing time with GPS.	[ON], [OFF]
[Auto Scroll]	When [Auto Scroll] is set to [OFF], the auto scroll function is deactivated.	[ON], [OFF]
[Cross Cursor]	When [Cross Cursor] is set to [ON], the arrow cursor is changed to the cross cursor.	[ON], [OFF]
[Cursor Speed]	Adjust the cross cursor speed.	1 to 20
[NavData Transparency]	Set the degree of transparency of the data box ([DATA 1], [DATA 2] and [RADAR]) (see subsection 1.12.3).	0 to 80%
[NavData Multi Data Dwell Time]	Select the cycling time of data in the data box (see subsection 1.12.2).	[2 s], [3 s], [5 s], [10 s]
[Camera Dwell Time]	Select the cycle period for video images (see subsection 10.3.5).	[2 s], [3 s], [5 s], [10 s]
[User Interface Auto-Hide]	Select the time to wait before closing the RotoKey menu, pop-up menu and tooltip when no operation is found.	[2 s], [3 s], [5 s], [10 s]
[Synchronization Notification]	Turn on or off the notification for data sharing on multiple TZT network.	[ON], [OFF]
[Key Beep]	Activate or deactivate the key beep which sounds when a key (**Home**, **RotoKey**™ or ⏻) is operated (see section 1.1).	[ON], [OFF]
[Launch Demo Mode]*	Open [Demo Files List]. Select the data to play.	-
[Demo Slide Show]*	Activate or deactivate switching the demo displays every minute between chart plotter, weather, radar and sounder.	[ON], [OFF]
[Manual Demo Heading]*	Set the heading in demo displays.	0 to 360°
[Manual Demo Speed]*	Set the ship's speed in demo displays.	0 to 20 kn

Menu item	Function	Options
[Language]	Select the language to use (see section 1.16).	[English (United States)], [English (United Kingdom)], and others
[Check for Software Update]	Update the software version.	-
[Reset Default Settings]	Restore default settings for the [General] menu.	-

*: In the demo displays, you can move the position for the boat icon to the position tapped. Select [Move Boat] from the RotoKey menu. To return to the original position, select the boat icon then deselect [Manual Mode] from the RotoKey menu.

[Units] menu



[Units] menu description

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°], [Loran-C], [MGRS]
[Loran C Station & GRI]	Select the Loran C stations and GRIs to use to get Loran C position.

Menu item	Options
[Range (Long)]	[Nautical Mile], [Kilometer], [Mile]
[Range (Short)]	[Foot], [Meter], [Yard]
[Short/Long Change Over]	Set the distance at which to change between short and long range. Set the long range here.
[Depth]	[Foot], [Meter], [Fathom], [Passi Braza]
[Height/Length]	[Foot], [Meter]
[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]
[Fish Size]	[Centimeter], [Inch]
[Volume]	[Gallon], [Liter]
[Reset Default Settings]	Restore default settings for the [Units] menu.

15. 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.

15.1 Maintenance

Routine maintenance helps keep your equipment in good condition and prevents future problems. Check the items shown in the table below to help keep your equipment in good condition for years to come.

Check item	Check point	Remedy
Cables	Check that all cables are fastened. Check the cables for 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. Those cleaners 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 anti-fog solution, as they can strip the coating from the LCD.
	Waterdrops on the LCD	Wipe the LCD with a dry cloth to remove the water. Waterdrops on the LCD can cause slow touch response.

Check item	Check point	Remedy
Radar antenna	Dirt on the radar antenna can reduce the sensitivity.	Clean the radiator (or radome) with a cloth wetted with freshwater. Do not use commercial cleaners to clean the radiator. Those cleaners can remove paint and markings.

15.2 Life of the Parts

Fuse replacement

The TZT has a fuse that protects the TZT 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 information. A wrong fuse can damage the equipment.

⚠ WARNING

Use the proper fuse.

A wrong fuse can damage the equipment and cause fire.

Name	Type	Code No.	Remarks
Fuse	FGBO-A 125V 4A PBF	000-155-851-10	For TZT9/TZTBB, 24 VDC
Fuse	FGBO 125V 7A PBF	000-155-831-10	For TZT9, 12 VDC
Fuse	FGBO-A 125V 5A PBF	000-155-853-10	For TZT14, 24 VDC
Fuse	FGBO 125V 10A PBF	000-155-826-10	For TZT14/TZTBB, 12 VDC

Lithium battery replacement

The lithium battery on the Main board in this equipment keeps the time data of the internal clock alive when the power is turned off. The life of the battery is approximately three years (in power-off). When the voltage of the battery is low, the message requesting replacement appears at the top of the screen. When this occurs, contact your dealer about replacement of the battery.

⚠ CAUTION

Use the proper lithium battery.

A wrong lithium battery may burst.

Note: Dispose of the battery in accordance with local regulations.

Part	Type	Code No.	Remarks
Lithium battery	CR2032H	-	Use of Japanese make battery is recommended.

Magnetron replacement

When the life of the magnetron is reached, targets do not appear on the radar display. If long-range performance appears to have decreased, contact your dealer about replacement of the magnetron.

Radar Sensor	Magnetron	Code No.	Estimated Life
DRS2D	E3590	000-164-574-11	Approx. 5,000 hours
DRS4D	E3571	000-146-867-11	
DRS4DL	80-0691	001-266-460	
DRS4A	MAF1421B	001-025-710	
DRS6A	MAF1422B	000-158-788-12	
DRS6A X-Class	MAF1422B	000-158-788-12	
DRS12A	MAF1565N	000-174-559-10	
DRS12A X-Class	FNE1201	001-245-890	
DRS25A	MG5436(E2V)	000-140-762-10	
DRS25A X-Class	MG5436	001-205-570	

The total time of power-on ("ON TIME") and transmission ("TX TIME") are displayed on the radar screen during the stand-by mode.

LCD replacement (for TZT9/TZT14)

The life of the LCD is approximately 18,000 hours for TZT14, 25,000 hours for TZT9. 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 replacement

The life of the each fan is shown in the table below. The actual number of hours depends on ambient temperature. When the fan does not rotate sufficiently, an applicable message appears. 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
FAN MOTOR	MFB30G-12A-003 (TZT9/TZT14 only)	000-175-997-10	Approx. 21,000 hours

15.3 Troubleshooting

This section provides simple troubleshooting procedures which 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.

15.3.1 General troubleshooting

Problem	Remedy
You can not turn on the power.	• Check for blown fuse. • Check that the power connector is fastened. • Check for corrosion on the power cable connector. • Check for damaged power cable. • Check battery for correct voltage output.
There is no response when a key is pressed.	Turn off and on the power. If you do not get a response, the key is damaged. Contact your dealer for instructions.
For TZTBB: Picture is not displayed properly.	Turn off and on the power. If you do not get a proper picture, contact your dealer for instructions.
For TZTBB: Nothing appears on the screen after you press the ⏻ key.	• Check if the monitor is powered. • Check if the monitor cable is connected.

15.3.2 Radar troubleshooting

Problem	Remedy
Nothing appears on the screen after you press the RotoKey and select [Tx Radar] from the RotoKey menu to transmit.	• Select [Tx Radar] from the RotoKey menu again. • Check that the antenna cable is fastened. • Check if the radar source is correct.
Marks and characters appear, but echoes do not appear.	Check that the antenna cable is fastened.
Picture is not updated or the picture freezes.	• Check antenna cable. • If the picture freezes, turn the power off and on.
You tuned the receiver, but the sensitivity is weak.	Have a technician check the magnetron.
You changed the range, but the radar picture does not change.	• Try to zoom in or out the radar display. • Turn the power off and on.
Poor discrimination in range.	Adjust the sea control.
Range rings are not displayed.	Select [Rings] from the RotoKey menu to activate the range rings.
You selected [Tx Radar] from the RotoKey menu to transmit. The "TX screen" appears, but the radar goes into stand-by.	This problem indicates that the overload protection has activated. To restore normal operation, turn off all equipment in the TZT network. Wait a few seconds then turn on all the equipment.

15.3.3 Chart plotter troubleshooting

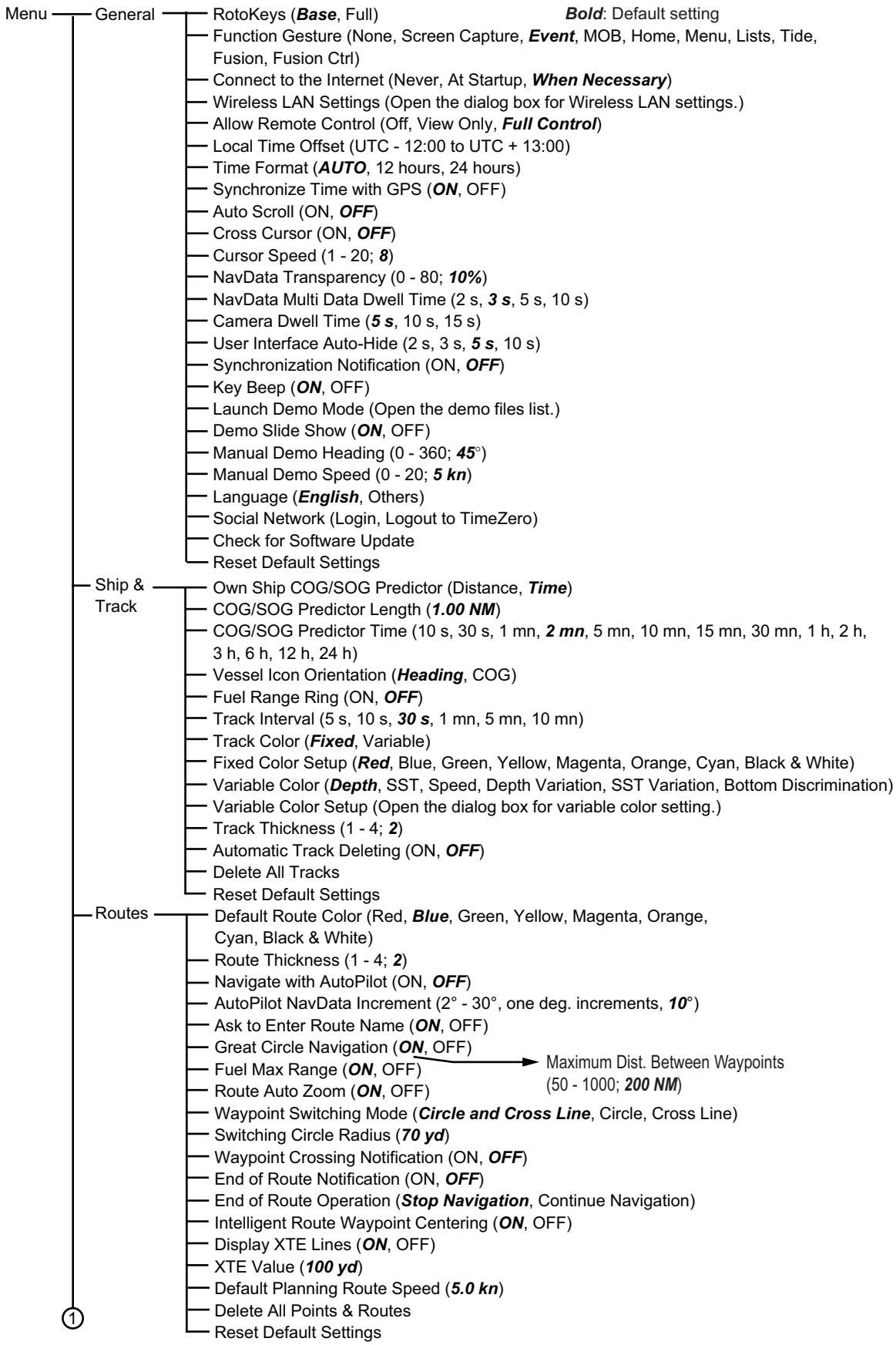
Problem	Remedy
Position is not fixed.	Check that antenna connector is fastened and navigator is correctly connected.
The track of your ship is not plotted.	Check that the track is turned on. Select the [Overlay] - [Tracks] menu from the RotoKey menu.

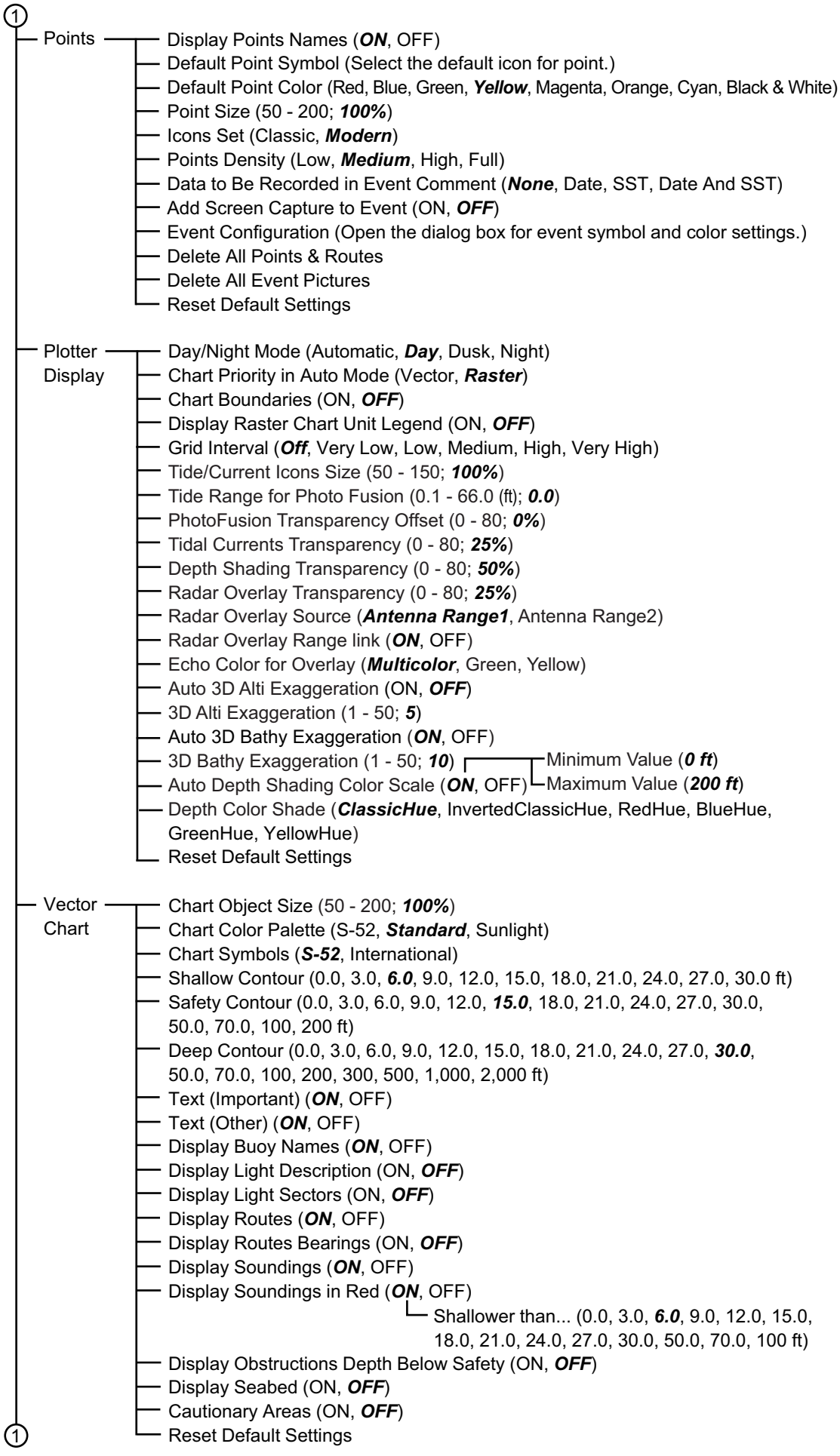
15.3.4 Fish finder troubleshooting

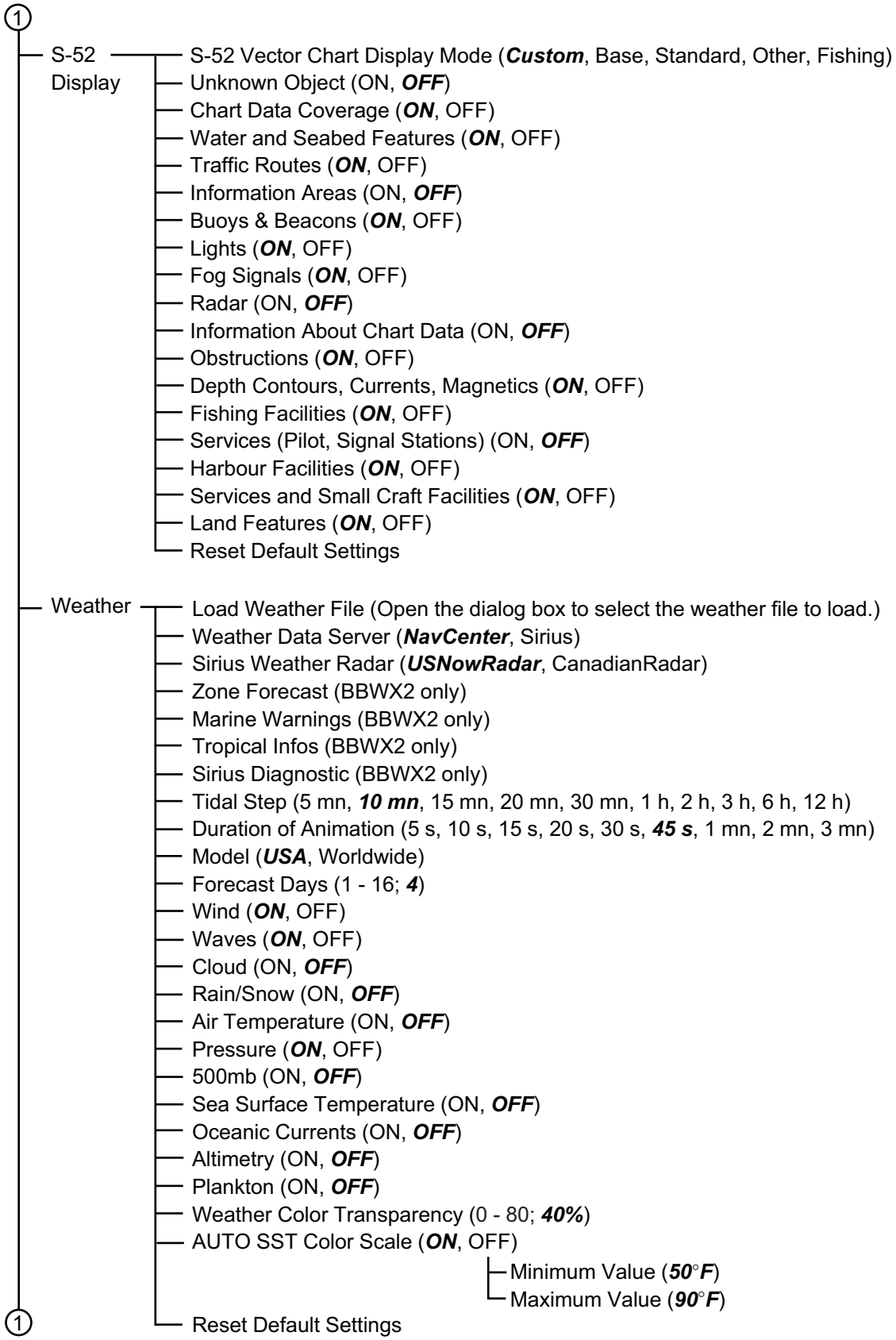
Problem	Remedy
You selected a fish finder display at the display selection window, but no picture appears.	• Check that the signal cable for the fish finder is fastened. • Check that the fish finder source is correct. • Check that the network fish finder is properly connected.
Marks and characters appear, but no picture appears.	Check that the transducer cable is connected.
Picture appears but zero line does not appear.	• The picture is shifted. Check the shift setting. • Check if draft is set to zero or higher.
The picture sensitivity is too low.	• Check the gain setting in manual operation. • The marine life or air bubbles can attach to the transducer face. • Bottom is too soft to return an acceptable echo.
The depth indication does not appear.	• For manual operation, adjust gain and range to display the bottom echo (in reddish-brown). • Adjust bottom level HF/LF.
Noise or interference shows on the display.	• Make sure the transducer cable is not near the engine. • Check the ground. • Check if another fish finder in the vicinity of your boat has the same frequency as your fish finder. • Try to adjust the interference rejection: Select the [Sounder] - [Interference Rejection] menu of the main menu.

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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 & White)
Point Size (50 - 200; 100%)
Icons Set (Classic, Modern)
Points Density (Low, Medium, High, Full)
Data to Be Recorded in Event Comment (None, Date, SST, Date And SST)
Add Screen Capture to Event (ON, OFF)
Event Configuration (Open the dialog box for event symbol and color settings.)
Delete All Points & Routes
Delete All Event Pictures
Reset Default Settings
Plotter Display
Day/Night Mode (Automatic, Day, Dusk, Night)
Chart Priority in Auto Mode (Vector, Raster)
Chart Boundaries (ON, OFF)
Display Raster Chart Unit Legend (ON, OFF)
Grid Interval (Off, Very Low, Low, Medium, High, Very High)
Tide/Current Icons Size (50 - 150; 100%)
Tide Range for Photo Fusion (0.1 - 66.0 (ft); 0.0)
PhotoFusion Transparency Offset (0 - 80; 0%)
Tidal Currents Transparency (0 - 80; 25%)
Depth Shading Transparency (0 - 80; 50%)
Radar Overlay Transparency (0 - 80; 25%)
Radar Overlay Source (Antenna Range1, Antenna Range2)
Radar Overlay Range link (ON, OFF)
Echo Color for Overlay (Multicolor, Green, Yellow)
Auto 3D Alti Exaggeration (ON, OFF)
3D Alti Exaggeration (1 - 50; 5)
Auto 3D Bathy Exaggeration (ON, OFF)
3D Bathy Exaggeration (1 - 50; 10)
Auto Depth Shading Color Scale (ON, OFF)
Minimum Value (0 ft)
Maximum Value (200 ft)
Depth Color Shade (ClassicHue, InvertedClassicHue, RedHue, BlueHue, GreenHue, YellowHue)
Reset Default Settings
Vector Chart
Chart Object Size (50 - 200; 100%)
Chart Color Palette (S-52, Standard, Sunlight)
Chart Symbols (S-52, International)
Shallow Contour (0.0, 3.0, 6.0, 9.0, 12.0, 15.0, 18.0, 21.0, 24.0, 27.0, 30.0 ft)
Safety Contour (0.0, 3.0, 6.0, 9.0, 12.0, 15.0, 18.0, 21.0, 24.0, 27.0, 30.0, 50.0, 70.0, 100, 200 ft)
Deep Contour (0.0, 3.0, 6.0, 9.0, 12.0, 15.0, 18.0, 21.0, 24.0, 27.0, 30.0, 50.0, 70.0, 100, 200, 300, 500, 1,000, 2,000 ft)
Text (Important) (ON, OFF)
Text (Other) (ON, OFF)
Display Buoy Names (ON, OFF)
Display Light Description (ON, OFF)
Display Light Sectors (ON, OFF)
Display Routes (ON, OFF)
Display Routes Bearings (ON, OFF)
Display Soundings (ON, OFF)
Display Soundings in Red (ON, OFF)
Shallower than... (0.0, 3.0, 6.0, 9.0, 12.0, 15.0, 18.0, 21.0, 24.0, 27.0, 30.0, 50.0, 70.0, 100 ft)
Display Obstructions Depth Below Safety (ON, OFF)
Display Seabed (ON, OFF)
Cautionary Areas (ON, OFF)
Reset Default Settings
1

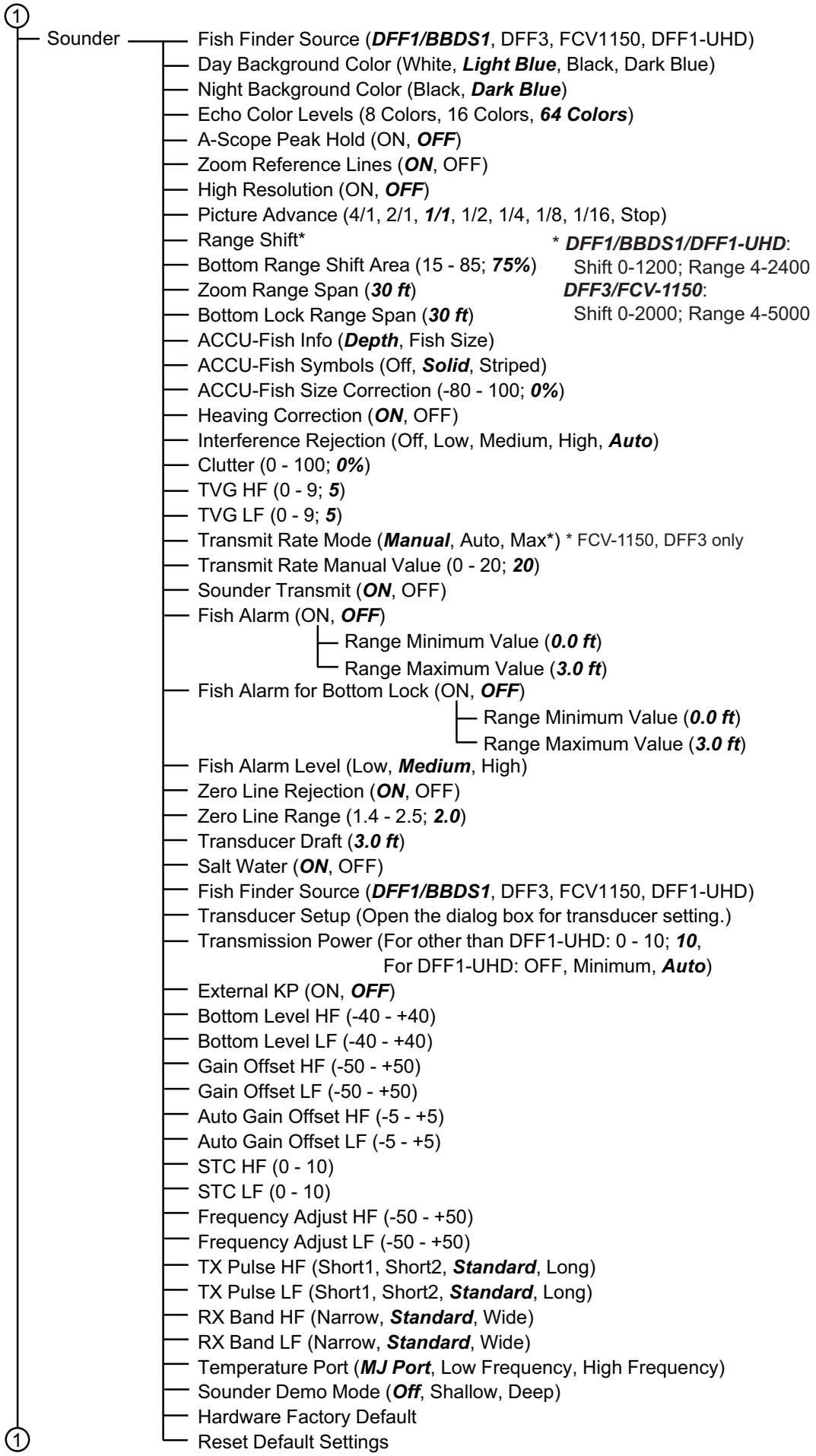

1
S-52 Display
S-52 Vector Chart Display Mode (**Custom**, Base, Standard, Other, Fishing)
Unknown Object (ON, **OFF**)
Chart Data Coverage (**ON**, OFF)
Water and Seabed Features (**ON**, OFF)
Traffic Routes (**ON**, OFF)
Information Areas (ON, **OFF**)
Buoys & Beacons (**ON**, OFF)
Lights (**ON**, OFF)
Fog Signals (**ON**, OFF)
Radar (ON, **OFF**)
Information About Chart Data (ON, **OFF**)
Obstructions (**ON**, OFF)
Depth Contours, Currents, Magnetics (**ON**, OFF)
Fishing Facilities (**ON**, OFF)
Services (Pilot, Signal Stations) (ON, **OFF**)
Harbour Facilities (**ON**, OFF)
Services and Small Craft Facilities (**ON**, OFF)
Land Features (**ON**, OFF)
Reset Default Settings
Weather
Load Weather File (Open the dialog box to select the weather file to load.)
Weather Data Server (**NavCenter**, Sirius)
Sirius Weather Radar (**USNowRadar**, CanadianRadar)
Zone Forecast (BBWX2 only)
Marine Warnings (BBWX2 only)
Tropical Infos (BBWX2 only)
Sirius Diagnostic (BBWX2 only)
Tidal Step (5 mn, **10 mn**, 15 mn, 20 mn, 30 mn, 1 h, 2 h, 3 h, 6 h, 12 h)
Duration of Animation (5 s, 10 s, 15 s, 20 s, 30 s, **45 s**, 1 mn, 2 mn, 3 mn)
Model (**USA**, Worldwide)
Forecast Days (1 - 16; **4**)
Wind (**ON**, OFF)
Waves (**ON**, OFF)
Cloud (ON, **OFF**)
Rain/Snow (ON, **OFF**)
Air Temperature (ON, **OFF**)
Pressure (**ON**, OFF)
500mb (ON, **OFF**)
Sea Surface Temperature (ON, **OFF**)
Oceanic Currents (ON, **OFF**)
Altimetry (ON, **OFF**)
Plankton (ON, **OFF**)
Weather Color Transparency (0 - 80; **40%**)
AUTO SST Color Scale (**ON**, OFF)
Minimum Value (**50°F**)
Maximum Value (**90°F**)
Reset Default Settings
1

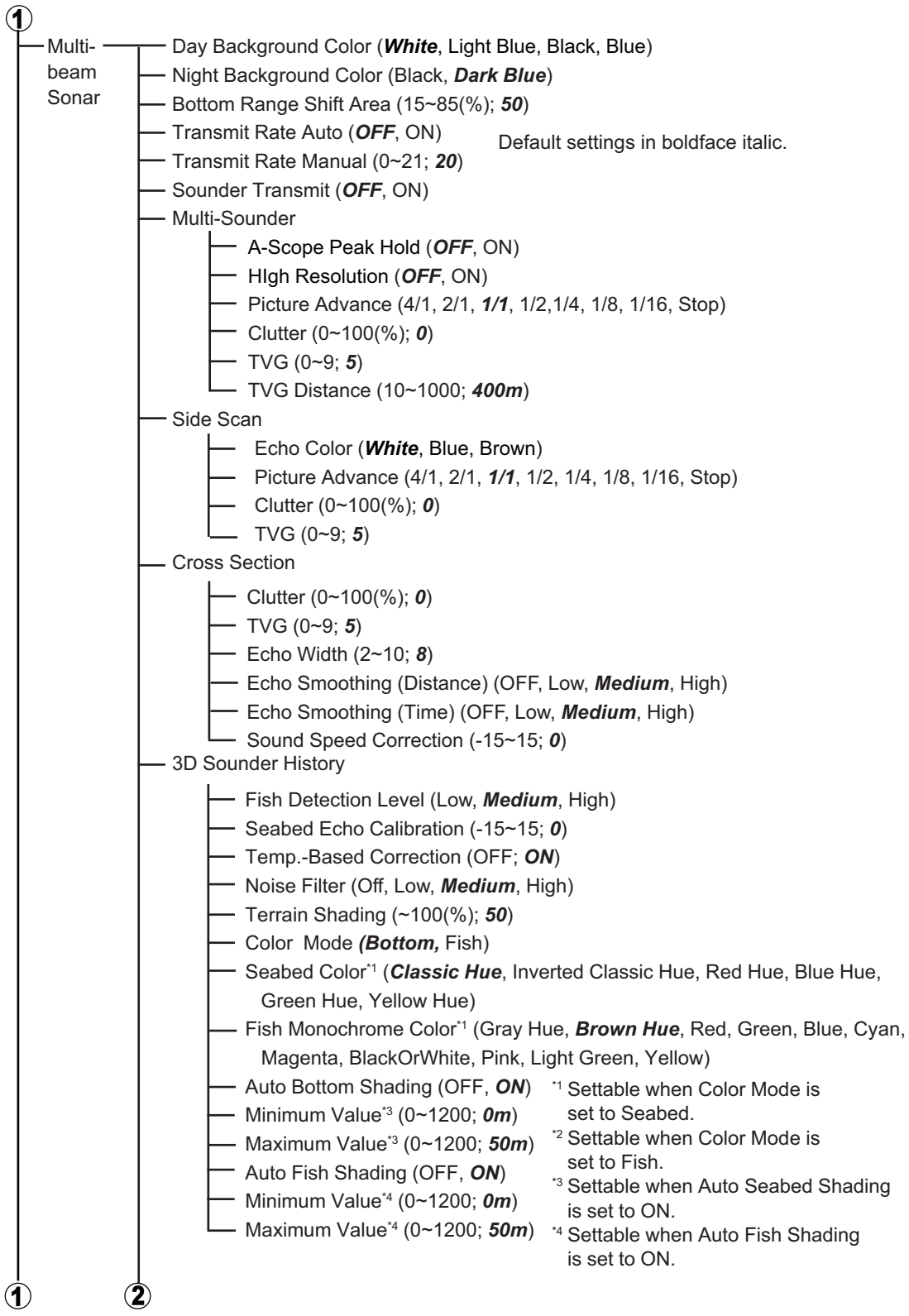
(1)

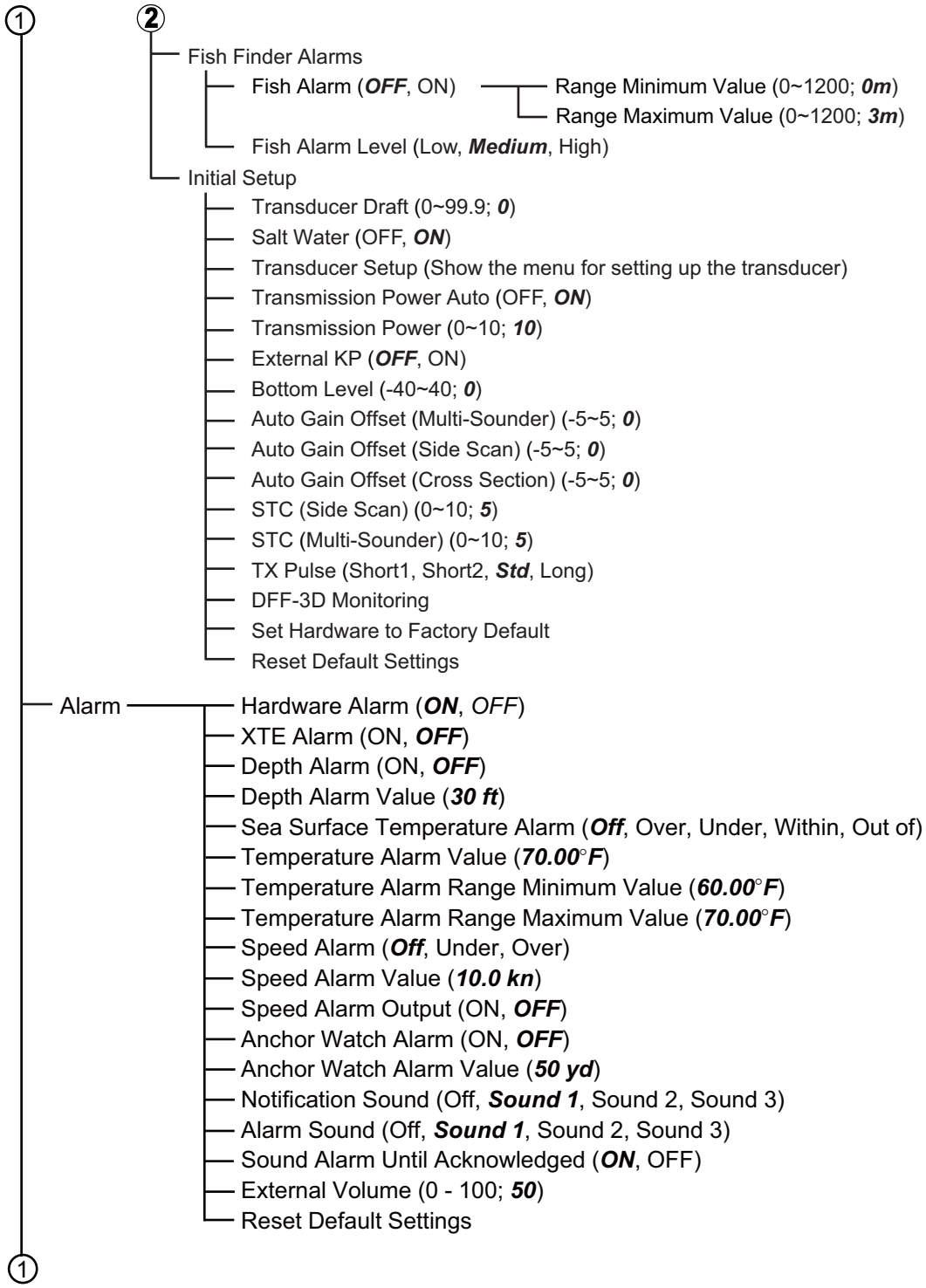
- Radar
  - Radar Source (Select the antenna host name.)
  - Day Background Color (***Black***, Dark Blue, White)
  - Night Background Color (***Black***, Dark Blue)
  - Echo Color (***Multicolor***, Green, Yellow)
  - Sweep Fade (ON, ***OFF***)
  - Rings Interval (***Auto***, 1, 2, 3, 4, 5, 6, 7, 8, 9)
  - Bearing Scale Mode (***Relative***, True)
  - EBL Reference (True, ***Relative***)
  - Own Ship Icon (***ON***, OFF)
  - Watchman (***5 minutes***, 10 minutes, 20 minutes)
  - Trail Color (***Blue***, Yellow, Green)
  - Trail Length (***15 s***, 30 s, 1 mn, 3 mn, 6 mn, 15 mn, 30 mn, Continuous)
  - Trail Shade (Single, ***Multi***)
  - Trail Mode (Relative, ***True***)
  - Antenna Rotation (***Auto***, 24 RPM)
  - Antenna Heading Align (-180 - +180; ***+0.0***°)
  - Main Bang Suppression (0 - 100; ***50***)
  - Enable Sector (2) Blanking (ON, ***OFF***)
  - Start Angle*1 (0 - 359; ***0***)
  - End Angle*1 (0 - 359; ***0***)
  - Antenna Height*6 (For DRS: Under 3 m, ***3 m - 10 m***, Over 10 m)
    (For IMO: 5 m, ***7.5 m***, 10 m, 15 m, 20 m, 25 m, 30 m, 35 m, 40 m, 45 m, 50 m)
  - Antenna Longitudinal Position (***20 ft***)
  - Antenna Lateral Position (-Port) (***0 ft***)
  - Auto Tuning*3 (***ON***, OFF)
  - Tuning Source*3/*6 (***Range1***, Range2)
  - Manual Tuning*2/*3 (-50 - 50; ***-50***)
  - Radar Monitoring (Open the radar monitor window.)
  - Radar Optimization*3/*5
  - ARPA Advanced Settings*6 (Open the dialog box for ARPA setting.)
  - TX Channel*4 (***Auto***, 1, 2, 3)
  - Target Analyzer Mode*4 (***Rain***, Target)
  - Auto acquire by Doppler*4 (ON, ***OFF***)
  - Hardware Factory Default
  - Reset Default Settings
- Targets
  - Display Target IDs (***ON***, OFF)
  - Hide AIS Targets Farther than ... (1 NM, 2 NM, 3 NM, 6 NM, ***12 NM***, 18 NM, 24 NM, 48 NM, 84 NM, 96 NM)
  - Ignore Alarms for AIS Slower than... (***1 kn***)
  - Ais Message Notification (***ON***, OFF)
  - CPA Graphic Display (***ON***, OFF)
  - CPA/TCPA Alarm (ON, ***OFF***)
  - CPA Alarm Value (***0.5 NM***)
  - TCPA Alarm Value (***10 min***)
  - Proximity AIS Target Alarm (ON, ***OFF***)
  - Proximity AIS Target Alarm Value (***100 yd***)
  - Buddies List (AIS & DSC) (Open the buddies list.)
  - Reset Default Settings

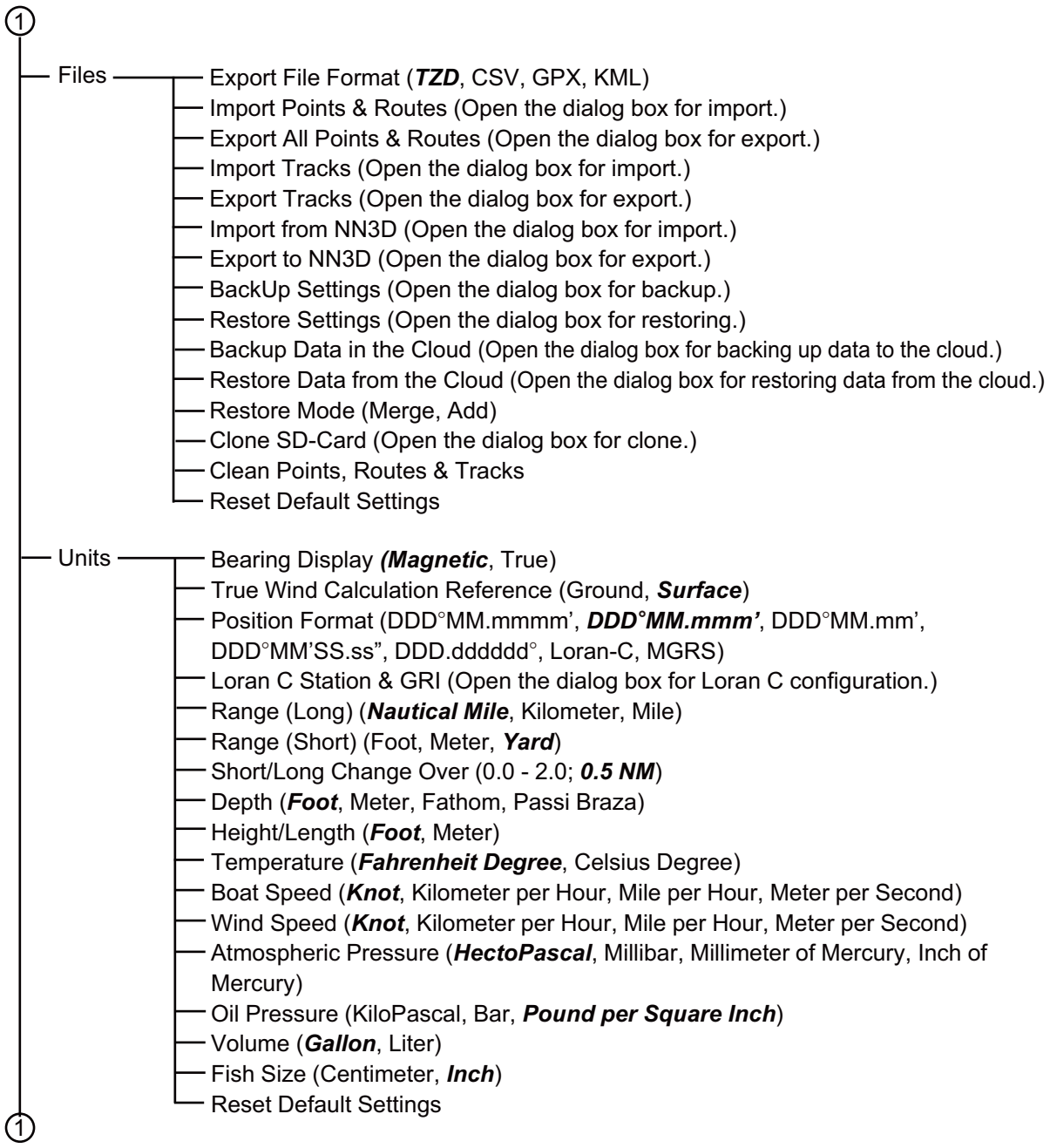
(1)

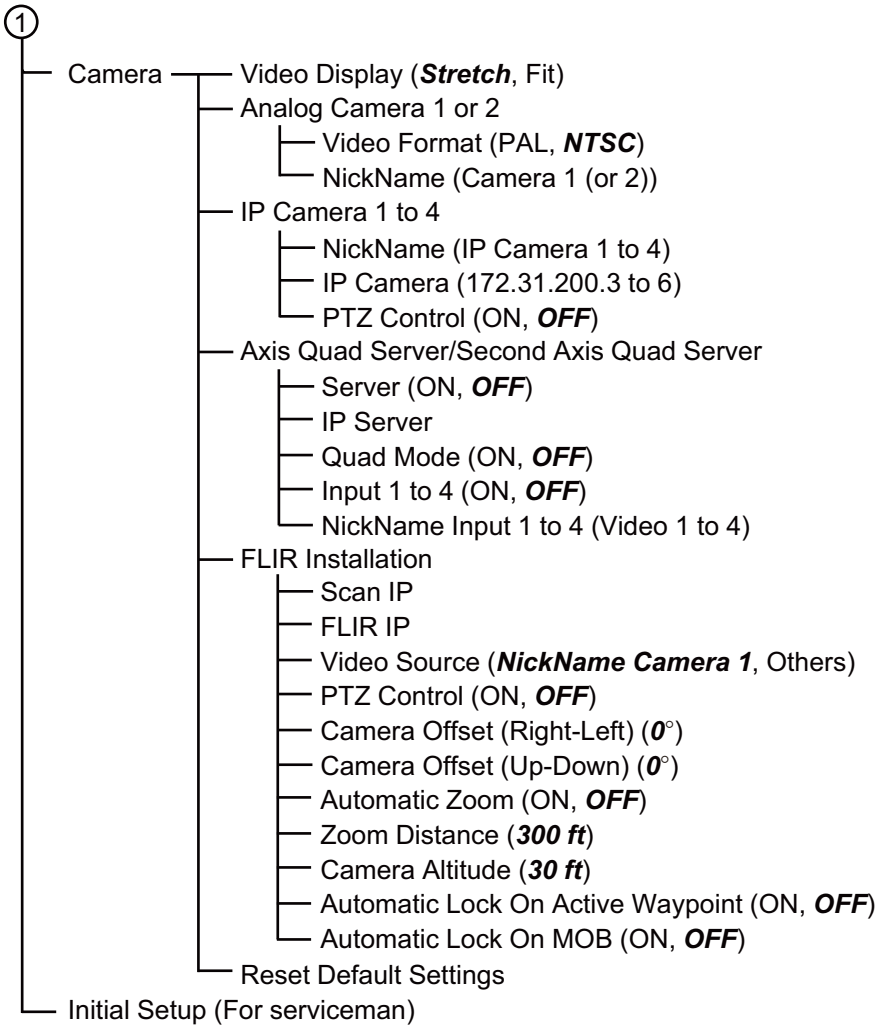
*1: Available when [Enable Sector (2) Blanking] is [ON].
*2: Available when [Auto Tuning] is [OFF].
*3: Not available with radar sensor DRS4D-NXT.
*4: Available with radar sensor DRS4D-NXT.
*5: Available when the radar is set to [Transmit].
*6: Not available with radar sensor DRS4DL.


①
Sounder
Fish Finder Source (DFF1/BBDS1, DFF3, FCV1150, DFF1-UHD)
Day Background Color (White, Light Blue, Black, Dark Blue)
Night Background Color (Black, Dark Blue)
Echo Color Levels (8 Colors, 16 Colors, 64 Colors)
A-Scope Peak Hold (ON, OFF)
Zoom Reference Lines (ON, OFF)
High Resolution (ON, OFF)
Picture Advance (4/1, 2/1, 1/1, 1/2, 1/4, 1/8, 1/16, Stop)
Range Shift*
Bottom Range Shift Area (15 - 85; 75%)
Zoom Range Span (30 ft)
Bottom Lock Range Span (30 ft)
* DFF1/BBDS1/DFF1-UHD: Shift 0-1200; Range 4-2400
DFF3/FCV-1150: Shift 0-2000; Range 4-5000
ACCU-Fish Info (Depth, Fish Size)
ACCU-Fish Symbols (Off, Solid, Striped)
ACCU-Fish Size Correction (-80 - 100; 0%)
Heaving Correction (ON, OFF)
Interference Rejection (Off, Low, Medium, High, Auto)
Clutter (0 - 100; 0%)
TVG HF (0 - 9; 5)
TVG LF (0 - 9; 5)
Transmit Rate Mode (Manual, Auto, Max*) * FCV-1150, DFF3 only
Transmit Rate Manual Value (0 - 20; 20)
Sounder Transmit (ON, OFF)
Fish Alarm (ON, OFF)
Range Minimum Value (0.0 ft)
Range Maximum Value (3.0 ft)
Fish Alarm for Bottom Lock (ON, OFF)
Range Minimum Value (0.0 ft)
Range Maximum Value (3.0 ft)
Fish Alarm Level (Low, Medium, High)
Zero Line Rejection (ON, OFF)
Zero Line Range (1.4 - 2.5; 2.0)
Transducer Draft (3.0 ft)
Salt Water (ON, OFF)
Fish Finder Source (DFF1/BBDS1, DFF3, FCV1150, DFF1-UHD)
Transducer Setup (Open the dialog box for transducer setting.)
Transmission Power (For other than DFF1-UHD: 0 - 10; 10, For DFF1-UHD: OFF, Minimum, Auto)
External KP (ON, OFF)
Bottom Level HF (-40 - +40)
Bottom Level LF (-40 - +40)
Gain Offset HF (-50 - +50)
Gain Offset LF (-50 - +50)
Auto Gain Offset HF (-5 - +5)
Auto Gain Offset LF (-5 - +5)
STC HF (0 - 10)
STC LF (0 - 10)
Frequency Adjust HF (-50 - +50)
Frequency Adjust LF (-50 - +50)
TX Pulse HF (Short1, Short2, Standard, Long)
TX Pulse LF (Short1, Short2, Standard, Long)
RX Band HF (Narrow, Standard, Wide)
RX Band LF (Narrow, Standard, Wide)
Temperature Port (MJ Port, Low Frequency, High Frequency)
Sounder Demo Mode (Off, Shallow, Deep)
Hardware Factory Default
Reset Default Settings
①


①
Multi-beam Sonar
Day Background Color (**White**, Light Blue, Black, Blue)
Night Background Color (Black, **Dark Blue**)
Bottom Range Shift Area (15~85(%); **50**)
Transmit Rate Auto (**OFF**, ON)
Transmit Rate Manual (0~21; **20**)
Sounder Transmit (**OFF**, ON)
Multi-Sounder
A-Scope Peak Hold (**OFF**, ON)
HIgh Resolution (**OFF**, ON)
Picture Advance (4/1, 2/1, **1/1**, 1/2,1/4, 1/8, 1/16, Stop)
Clutter (0~100(%); **0**)
TVG (0~9; **5**)
TVG Distance (10~1000; **400m**)
Side Scan
Echo Color (**White**, Blue, Brown)
Picture Advance (4/1, 2/1, **1/1**, 1/2, 1/4, 1/8, 1/16, Stop)
Clutter (0~100(%); **0**)
TVG (0~9; **5**)
Cross Section
Clutter (0~100(%); **0**)
TVG (0~9; **5**)
Echo Width (2~10; **8**)
Echo Smoothing (Distance) (OFF, Low, **Medium**, High)
Echo Smoothing (Time) (OFF, Low, **Medium**, High)
Sound Speed Correction (-15~15; **0**)
3D Sounder History
Fish Detection Level (Low, **Medium**, High)
Seabed Echo Calibration (-15~15; **0**)
Temp.-Based Correction (OFF; **ON**)
Noise Filter (Off, Low, **Medium**, High)
Terrain Shading (~100(%); **50**)
Color Mode **(Bottom,** Fish)
Seabed Color*1 (**Classic Hue**, Inverted Classic Hue, Red Hue, Blue Hue, Green Hue, Yellow Hue)
Fish Monochrome Color*1 (Gray Hue, **Brown Hue**, Red, Green, Blue, Cyan, Magenta, BlackOrWhite, Pink, Light Green, Yellow)
Auto Bottom Shading (OFF, **ON**)
Minimum Value*3 (0~1200; **0m**)
Maximum Value*3 (0~1200; **50m**)
Auto Fish Shading (OFF, **ON**)
Minimum Value*4 (0~1200; **0m**)
Maximum Value*4 (0~1200; **50m**)
Default settings in boldface italic.
*1 Settable when Color Mode is set to Seabed.
*2 Settable when Color Mode is set to Fish.
*3 Settable when Auto Seabed Shading is set to ON.
*4 Settable when Auto Fish Shading is set to ON.
① ②


①
②
Fish Finder Alarms
Fish Alarm (OFF, ON)
Range Minimum Value (0~1200; 0m)
Range Maximum Value (0~1200; 3m)
Fish Alarm Level (Low, Medium, High)
Initial Setup
Transducer Draft (0~99.9; 0)
Salt Water (OFF, ON)
Transducer Setup (Show the menu for setting up the transducer)
Transmission Power Auto (OFF, ON)
Transmission Power (0~10; 10)
External KP (OFF, ON)
Bottom Level (-40~40; 0)
Auto Gain Offset (Multi-Sounder) (-5~5; 0)
Auto Gain Offset (Side Scan) (-5~5; 0)
Auto Gain Offset (Cross Section) (-5~5; 0)
STC (Side Scan) (0~10; 5)
STC (Multi-Sounder) (0~10; 5)
TX Pulse (Short1, Short2, Std, Long)
DFF-3D Monitoring
Set Hardware to Factory Default
Reset Default Settings
Alarm
Hardware Alarm (ON, OFF)
XTE Alarm (ON, OFF)
Depth Alarm (ON, OFF)
Depth Alarm Value (30 ft)
Sea Surface Temperature Alarm (Off, Over, Under, Within, Out of)
Temperature Alarm Value (70.00°F)
Temperature Alarm Range Minimum Value (60.00°F)
Temperature Alarm Range Maximum Value (70.00°F)
Speed Alarm (Off, Under, Over)
Speed Alarm Value (10.0 kn)
Speed Alarm Output (ON, OFF)
Anchor Watch Alarm (ON, OFF)
Anchor Watch Alarm Value (50 yd)
Notification Sound (Off, Sound 1, Sound 2, Sound 3)
Alarm Sound (Off, Sound 1, Sound 2, Sound 3)
Sound Alarm Until Acknowledged (ON, OFF)
External Volume (0 - 100; 50)
Reset Default Settings
①


1
Files
Export File Format (TZD, CSV, GPX, KML)
Import Points & Routes (Open the dialog box for import.)
Export All Points & Routes (Open the dialog box for export.)
Import Tracks (Open the dialog box for import.)
Export Tracks (Open the dialog box for export.)
Import from NN3D (Open the dialog box for import.)
Export to NN3D (Open the dialog box for export.)
BackUp Settings (Open the dialog box for backup.)
Restore Settings (Open the dialog box for restoring.)
Backup Data in the Cloud (Open the dialog box for backing up data to the cloud.)
Restore Data from the Cloud (Open the dialog box for restoring data from the cloud.)
Restore Mode (Merge, Add)
Clone SD-Card (Open the dialog box for clone.)
Clean Points, Routes & Tracks
Reset Default Settings
Units
Bearing Display (Magnetic, True)
True Wind Calculation Reference (Ground, Surface)
Position Format (DDD°MM.mmmm', DDD°MM.mmm', DDD°MM'SS.ss", DDD.dddddd°, Loran-C, MGRS)
Loran C Station & GRI (Open the dialog box for Loran C configuration.)
Range (Long) (Nautical Mile, Kilometer, Mile)
Range (Short) (Foot, Meter, Yard)
Short/Long Change Over (0.0 - 2.0; 0.5 NM)
Depth (Foot, Meter, Fathom, Passi Braza)
Height/Length (Foot, Meter)
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, Liter)
Fish Size (Centimeter, Inch)
Reset Default Settings
1


1
Camera
Video Display (Stretch, Fit)
Analog Camera 1 or 2
Video Format (PAL, NTSC)
NickName (Camera 1 (or 2))
IP Camera 1 to 4
NickName (IP Camera 1 to 4)
IP Camera (172.31.200.3 to 6)
PTZ Control (ON, OFF)
Axis Quad Server/Second Axis Quad Server
Server (ON, OFF)
IP Server
Quad Mode (ON, OFF)
Input 1 to 4 (ON, OFF)
NickName Input 1 to 4 (Video 1 to 4)
FLIR Installation
Scan IP
FLIR IP
Video Source (NickName Camera 1, Others)
PTZ Control (ON, OFF)
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Camera Offset (Up-Down) (0°)
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Zoom Distance (300 ft)
Camera Altitude (30 ft)
Automatic Lock On Active Waypoint (ON, OFF)
Automatic Lock On MOB (ON, OFF)
Reset Default Settings
Initial Setup (For serviceman)

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'utilization de ce dispositif est autorisée seulement aux conditions suivantes :

(1) il ne doit pas produire de brouillage et

(2) l'utilisateur du dispositif doit étre prêt à accepter tout brouillage radioélectrique reçu, même si ce brouillage est susceptible de compromettre le fomctionnement 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 contrôêolé et respecte les règles d'exposition aux fréquences radioélectriques (RF) CNR-102 de l'IC. Cet équipement doit etre installé et utilise 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
TZT9

1 GENERAL

1.1	Display	9-inch wide color LCD, 196.8 x 118.08 mm
1.2	Resolution	800 x 480 dots (WVGA)
1.3	Indication system	Raster-scan, non-interlace, Horizontal: 31.7kHz, Vertical: 60Hz
1.4	Brightness	900 cd/m^2 typical
1.5	Display colors	262,144 colors (plotter), 64 colors (echo), 16 colors (radar)

2 PLOTTER FUNCTION

2.1	Display mode	Course plot, NAV data
2.2	Projection	Mercator
2.3	Usable area	85° latitude or below
2.4	Memory capacity	Track: 30,000 points, Point: 30,000 points (including MOB) Route: 200 courses w/ 500 waypoints each ARPA: 100 targets, AIS: 100 targets

3 RADAR INDICATION

3.1	Orientation mode	Head-up, North-up (heading data required)
3.2	Echo trail	15/30s, 1/3/6/15/30 min. and continuous

4 OTHER FUNCTIONS

4.1	Sounder mode	Echo sounder data required
4.2	Instrument data display	Weather sensor, Engine monitoring sensor or other instruments required
4.3	Camera monitor	IP camera or NTSC/PAL data required
4.4	Language	Chinese, Danish, Finnish, French, German, Greek, Italian, Japanese, Norwegian, Portuguese, Spanish, Swedish, UK/US
4.5	Alarms	Notification, Anchor watch, Cross track error, CPA/TCPA*, Proximity, Ship's speed under/over*, Sea surface temperature*, Depth*, Fish*, Bottom lock fish*, Hardware *: External data required

5 INTERFACE

5.1	Number of port	
	LAN	1 ports, Ethernet 100Base-TX
	CAN bus	1 port (LEN=1)
	USB	1 ports, USB2.0
	Video output	1 ports, DVI-D, VESA DDC
	Video input	2 ports, NTSC/PAL
	SD card slot	2 slots
	Line out	1 port

5.2	Wireless LAN	IEEE802.11b/g/n
	Transmitting frequency	2.412 to 2.462 GHz
	Output power	12 dBm max.
5.3	NMEA0183 (Ver2.0) sentences (Ethernet)	
	Input/Output	CUR, DPT, GGA, GSA, GSV, HDG, HDT, MDA, MTW, MWV, RSA, ROT, VDM, VHW, VTG, XDR, ZDA
5.4	CAN bus PGN (NMEA2000)	
	Input	059392/904, 060928, 061184, 065280, 126208/720/992/996, 127237/245/250/251/257/488/489/505, 128259/267, 129025/026/029/033/038/039/040/041/538/540, 129793/794/795/797/798/801/802/808/809/810, 130306/310/311/312/313/314/577/578
	Output	059392/904, 060928, 061184, 126208/464/720/992/996, 127250/251/257/258, 128259/267/275, 129025/026/029/033/283/284/285, 130306/310/312/313/314

6 POWER SUPPLY

6.1	Multi function display	12-24 VDC: 3.5-1.8 A
6.2	Rectifier (option)	100-115/220-230 VAC, 1 phase, 50/60Hz

7 ENVIRONMENTAL CONDITION

7.1	Ambient temperature	-15°C to +55°C (wireless LAN: 0°C to +55°C)
7.2	Relative humidity	93% or less at 40°C
7.3	Degree of protection	
	Multi function display	IP56 (w/ connector cover), IP22 (w/ connector boot)
	Remote control unit (option)	IP56 (front panel), IP22 (chassis)
7.4	Vibration	IEC 60945 Ed.4

8 UNIT COLOR

N2.5 (fixed)

SPECIFICATIONS OF MULTI FUNCTION DISPLAY
TZT14

1 GENERAL

1.1	Display	14.1-inch wide color LCD, 303.36 x 189.6 mm
1.2	Resolution	1280 x 800 dots (WXGA)
1.3	Indication system	Raster-scan, non-interlace, Horizontal: 49.4kHz, Vertical: 59.92Hz
1.4	Brightness	900 cd/m^2 typical
1.5	Display colors	262,144 colors (plotter), 64 colors (echo), 16 colors (radar)

2 PLOTTER FUNCTION

2.1	Display mode	Course plot, NAV data
2.2	Projection	Mercator
2.3	Usable area	85° latitude or below
2.4	Memory capacity	Track: 30,000 points, Point: 30,000 points (including MOB) Route: 200 courses w/ 500 waypoints each ARPA: 100 targets, AIS: 100 targets

3 RADAR INDICATION

3.1	Orientation mode	Head-up, North-up (heading data required)
3.2	Echo trail	15/30s, 1/3/6/15/30 min. and continuous

4 OTHER FUNCTIONS

4.1	Sounder mode	Echo sounder data required
4.2	Instrument data display	Weather sensor, Engine monitoring sensor or other instruments required
4.3	Camera monitor	IP camera or NTSC/PAL data required
4.4	Language	Chinese, Danish, Finnish, French, German, Greek, Italian, Japanese, Norwegian, Portuguese, Spanish, Swedish, UK/US
4.5	Alarms	Notification, Anchor watch, Cross track error, CPA/TCPA*, Proximity, Ship's speed under/over*, Sea surface temperature*, Depth*, Fish*, Bottom lock fish*, Hardware *: External data required

5 INTERFACE

5.1	Number of port	
	LAN	3 ports, Ethernet 100Base-TX
	CAN bus	1 port (LEN=1)
	USB	1 ports, USB2.0
	Video output	1 ports, DVI-D, VESA DDC
	Video input	2 ports, NTSC/PAL
	SD card slot	2 slots
	Line out	1 port

5.2	Wireless LAN	IEEE802.11b/g/n
	Transmitting frequency	2.412 to 2.462 GHz
	Output power	12 dBm max.
5.3	NMEA0183 (Ver2.0) sentences (Ethernet)	
	Input/Output	CUR, DPT, GGA, GSA, GSV, HDG, HDT, MDA, MTW, MWV, RSA, ROT, VDM, VHW, VTG, XDR, ZDA
5.4	CAN bus PGN (NMEA2000)	
	Input	059392/904, 060928, 061184, 065280, 126208/720/992/996, 127237/245/250/251/257/488/489/505, 128259/267, 129025/026/029/033/038/039/040/041/538/540, 129793/794/795/797/798/801/802/808/809/810, 130306/310/311/312/313/314/577/578
	Output	059392/904, 060928, 061184, 126208/464/720/992/996, 127250/251/257/258, 128259/267/275, 129025/026/029/033/283/284/285, 130306/310/312/313/314

6 POWER SUPPLY

6.1	Multi function display	12-24 VDC: 5.0-2.5 A
6.2	Rectifier (option)	100-115/220-230 VAC, 1 phase, 50/60Hz

7 ENVIRONMENTAL CONDITION

7.1	Ambient temperature	-15°C to +55°C (wireless LAN: 0°C to +55°C)
7.2	Relative humidity	93% or less at 40°C
7.3	Degree of protection	
	Multi function display	IP56 (w/ connector cover), IP22 (w/ connector boot)
	Remote control unit (option)	IP56 (front panel), IP22 (chassis)
7.4	Vibration	IEC 60945 Ed.4

8 UNIT COLOR

N2.5 (fixed)

SPECIFICATIONS OF MULTI FUNCTION DISPLAY
TZTBB

1 EXTERNAL MONITOR SPECIFICATIONS (REQUIRED)

1.1	Display screen	Color LCD with touch panel control
1.2	Resolution	1920 x 1200 dots max. Horizontal resolution: 1280 or more recommended
1.3	Maximum frequency	165 MHz, DVI single link
1.4	Signal interface	Picture: DVI-D, VESA DDC, Touch panel: USB2.0, Windows®7 multi-touch (The driver installation should not be required)

2 PLOTTER FUNCTION

2.1	Display mode	Course plot, NAV data
2.2	Projection	Mercator
2.3	Usable area	85° latitude or below
2.4	Memory capacity	Track: 30,000 points, Point: 30,000 points (including MOB) Route: 200 courses w/ 500 waypoints each ARPA: 100 targets, AIS: 100 targets
2.5	Picture colors	262,144 colors

3 RADAR INDICATION

3.1	Orientation mode	Head-up, North-up (heading data required)
3.2	Echo trail	15/30s, 1/3/6/15/30 min. and continuous
3.3	Picture colors	16 colors

4 OTHER FUNCTIONS

4.1	Sounder mode	Picture: 64 colors (echo sounder data required)
4.2	Instrument data display	Weather sensor, Engine monitoring sensor or other instruments required
4.3	Camera monitor	IP camera or NTSC/PAL data required
4.4	Language	Chinese, Danish, Finnish, French, German, Greek, Italian, Japanese, Norwegian, Portuguese, Spanish, Swedish, UK/US
4.5	Alarms	Notification, Anchor watch, Cross track error, CPA/TCPA*, Proximity, Ship's speed under/over*, Sea surface temperature*, Depth*, Fish*, Bottom lock fish*, Hardware *: External data required

5 INTERFACE

5.1	Number of port	
	LAN	3 ports, Ethernet 100Base-TX
	CAN bus	1 port (LEN=1)

	USB	6 ports, USB2.0 (includes 1 port for wireless LAN module)
	Video output	2 ports, DVI-D, VESA DDC
	Video input	2 ports, NTSC/PAL
	SD card slot	2 slots (SDXC applicable)
	Line out	1 port
5.2	Wireless LAN	IEEE802.11b/g/n
	Transmitting frequency	2.412 to 2.462 GHz
	Output power	12 dBm max.
5.3	NMEA0183 (Ver2.0) sentences (Ethernet)	
	Input/Output	CUR, DPT, GGA, GSA, GSV, HDG, HDT, MDA, MTW, MWV, RSA, ROT, VDM, VHW, VTG, XDR, ZDA
5.4	CAN bus PGN (NMEA2000)	
	Input	059392/904, 060928, 061184, 065280, 126208/720/992/996, 127237/245/250/251/257/258/488/489/505, 128259/267, 129025/026/029/033/038/039/040/041/538/540, 129793/794/795/797/798/801/802/808/809/810, 130306/310/311/312/313/314/577/578
	Output	059392/904, 060928, 061184, 126208/464/720/992/996, 127250/251/257/258, 128259/267/275, 129025/026/029/033/283/284/285, 130306/310/312/313/314

6 POWER SUPPLY

6.1	Processor unit	12-24 VDC: 3.6-1.8 A (includes switch box)
6.2	Rectifier (option)	100-115/220-230 VAC, 1 phase, 50/60Hz

7 ENVIRONMENTAL CONDITION

7.1	Ambient temperature	-15°C to +55°C (wireless LAN: 0°C to +55°C)
7.2	Relative humidity	93% or less at 40°C
7.3	Degree of protection	
	Processor unit	IP22
	Switch box	IP56 (front panel), IP22 (chassis)
	Remote control unit (option)	IP56 (front panel), IP22 (chassis)
7.4	Vibration	IEC 60945 Ed.4

8 UNIT COLOR

N2.5 (fixed)

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FURUNO Worldwide Warranty for Pleasure Boats (Except North America)

This warranty is valid for products manufactured by Furuno Electric Co. (hereafter FURUNO) and installed on a pleasure boat. Any web based purchases that are imported into other countries by anyone other than a FURUNO certified dealer may not comply with local standards. FURUNO strongly recommends against importing these products from international websites as the imported product may not work correctly and may interfere with other electronic devices. The imported product may also be in breach of the local laws and mandated technical requirements. Products imported into other countries as described previously shall not be eligible for local warranty service.

For products purchased outside of your country please contact the national distributor of Furuno products in the country where purchased.

This warranty is in addition to the customer´s statutory legal rights.

1. Terms and Conditions of Warranty

FURUNO guarantees that each new FURUNO product is the result of quality materials and workmanship. The warranty is valid for a period of 2 years (24 months) from the date of the invoice, or the date of commissioning of the product by the installing certified dealer.

2. FURUNO Standard Warranty

The FURUNO standard warranty covers spare parts and labour costs associated with a warranty claim, provided that the product is returned to a FURUNO national distributor by prepaid carrier.

The FURUNO standard warranty includes:

- Repair at a FURUNO national distributor
- All spare parts for the repair
- Cost for economical shipment to customer

3. FURUNO Onboard Warranty

If the product was installed/commissioned and registered by a certified FURUNO dealer, the customer has the right to the onboard warranty.

The FURUNO onboard warranty includes

- Free shipping of the necessary parts
- Labour: Normal working hours only
- Travel time: Up to a maximum of two (2) hours
- Travel distance: Up to a maximum of one hundred and sixty (160) KM by car for the complete journey

4. Warranty Registration

For the Standard Warranty - presentation of product with serial number (8 digits serial number, 1234-5678) is sufficient. Otherwise, the invoice with serial number, name and stamp of the dealer and date of purchase is shown.

For the Onboard Warranty your FURUNO certified dealer will take care of all registrations.

5. Warranty Claims

For the Standard Warranty - simply send the defective product together with the invoice to a FURUNO national distributor.
For the Onboard Warranty – contact a FURUNO national distributor or a certified dealer. Give the product´s serial number and describe the problem as accurately as possible.

Warranty repairs carried out by companies/persons other than a FURUNO national distributor or a certified dealer is not covered by this warranty.

6. Warranty Limitations

When a claim is made, FURUNO has a right to choose whether to repair the product or replace it.

The FURUNO warranty is only valid if the product was correctly installed and used. Therefore, it is necessary for the customer to comply with the instructions in the handbook. Problems which result from not complying with the instruction manual are not covered by the warranty.

FURUNO is not liable for any damage caused to the vessel by using a FURUNO product.

The following are excluded from this warranty:

a. Second-hand product

b. Underwater unit such as transducer and hull unit

c. Routine maintenance, alignment and calibration services.

d. Replacement of consumable parts such as fuses, lamps, recording papers, drive belts, cables, protective covers and batteries.

e. Magnetron and MIC with more than 1000 transmitting hours or older than 12 months, whichever comes first.

f. Costs associated with the replacement of a transducer (e.g. Crane, docking or diver etc.).

g. Sea trial, test and evaluation or other demonstrations.

h. Products repaired or altered by anyone other than the FURUNO national distributor or an authorized dealer.

i. Products on which the serial number is altered, defaced or removed.

j. Problems resulting from an accident, negligence, misuse, improper installation, vandalism or water penetration.

k. Damage resulting from a force majeure or other natural catastrophe or calamity.

l. Damage from shipping or transit.

m. Software updates, except when deemed necessary and warrantable by FURUNO.

n. Overtime, extra labour outside of normal hours such as weekend/holiday, and travel costs above the 160 KM allowance

o. Operator familiarization and orientation.

FURUNO Electric Company, March 1, 2011

FURUNO Warranty for North America

FURUNO U.S.A., Limited Warranty provides a twenty-four (24) months LABOR and twenty-four (24) months PARTS warranty on products from the date of installation or purchase by the original owner. Products or components that are represented as being waterproof are guaranteed to be waterproof only for, and within the limits, of the warranty period stated above. The warranty start date may not exceed eighteen (18) months from the original date of purchase by dealer from Furuno USA and applies to new equipment installed and operated in accordance with Furuno USA's published instructions.

Magnetrons and Microwave devices will be warranted for a period of 12 months from date of original equipment installation.

Furuno U.S.A., Inc. warrants each new product to be of sound material and workmanship and through its authorized dealer will exchange any parts proven to be defective in material or workmanship under normal use at no charge for a period of 24 months from the date of installation or purchase.

Furuno U.S.A., Inc., through an authorized Furuno dealer will provide labor at no cost to replace defective parts, exclusive of routine maintenance or normal adjustments, for a period of 24 months from installation date provided the work is done by Furuno U.S.A., Inc. or an AUTHORIZED Furuno dealer during normal shop hours and within a radius of 50 miles of the shop location.

A suitable proof of purchase showing date of purchase, or installation certification must be available to Furuno U.S.A., Inc., or its authorized dealer at the time of request for warranty service.

This warranty is valid for installation of products manufactured by Furuno Electric Co. (hereafter FURUNO). Any purchases from brick and mortar or web-based resellers that are imported into other countries by anyone other than a FURUNO certified dealer, agent or subsidiary may not comply with local standards. FURUNO strongly recommends against importing these products from international websites or other resellers, as the imported product may not work correctly and may interfere with other electronic devices. The imported product may also be in breach of the local laws and mandated technical requirements. Products imported into other countries, as described previously, shall not be eligible for local warranty service.

For products purchased outside of your country please contact the national distributor of Furuno products in the country where purchased.

WARRANTY REGISTRATION AND INFORMATION

To register your product for warranty, as well as see the complete warranty guidelines and limitations, please visit www.furunousa.com and click on "Support". In order to expedite repairs, warranty service on Furuno equipment is provided through its authorized dealer network. If this is not possible or practical, please contact Furuno U.S.A., Inc. to arrange warranty service.

FURUNO U.S.A., INC.
Attention: Service Coordinator
4400 N.W. Pacific Rim Boulevard
Camas, WA 98607-9408
Telephone: (360) 834-9300
FAX: (360) 834-9400

Furuno U.S.A., Inc. is proud to supply you with the highest quality in Marine Electronics. We know you had several choices when making your selection of equipment, and from everyone at Furuno we thank you. Furuno takes great pride in customer service.

Declaration of Conformity
[TZT9/TZT14/TZTBB]

Bulgarian (BG)	С настоящото Furuno Electric Co., Ltd. декларира, че гореспоменат тип радиосъоръжение е в съответствие с Директива 2014/53/ЕС. Цялостният текст на ЕС декларацията за съответствие може да се намери на следния интернет адрес:
Spanish (ES)	Por la presente, Furuno Electric Co., Ltd. declara que el tipo de equipo radioeléctrico arriba mencionado es conforme con la Directiva 2014/53/UE. El texto completo de la declaración UE de conformidad está disponible en la dirección Internet siguiente:
Czech (CS)	Tímto Furuno Electric Co., Ltd. prohlašuje, že výše zmíněné typ rádiového zařízení je v souladu se směrnicí 2014/53/EU. Úplné znění EU prohlášení o shodě je k dispozici na této internetové adrese:
Danish (DA)	Hermed erklærer Furuno Electric Co., Ltd., at ovennævnte radioudstyr er i overensstemmelse med direktiv 2014/53/EU. EU-overensstemmelseserklæringens fulde tekst kan findes på følgende internetadresse:
German (DE)	Hiermit erklärt die Furuno Electric Co., Ltd., dass der oben genannte Funkanlagentyp der Richtlinie 2014/53/EU entspricht. Der vollständige Text der EU-Konformitätserklärung ist unter der folgenden Internetadresse verfügbar:
Estonian (ET)	Käesolevaga deklareerib Furuno Electric Co., Ltd., et ülalmainitud raadioseadme tüüp vastab direktiivi 2014/53/EL nõuetele. ELi vastavusdeklaratsiooni täielik tekst on kättesaadav järgmisel internetiaadressil:
Greek (EL)	Με την παρούσα η Furuno Electric Co., Ltd., δηλώνει ότι ο προαναφερθέντας ραδιοεξοπλισμός πληροί την οδηγία 2014/53/ΕΕ. Το πλήρες κείμενο της δήλωσης συμμόρφωσης ΕΕ διατίθεται στην ακόλουθη ιστοσελίδα στο διαδίκτυο:
English (EN)	Hereby, Furuno Electric Co., Ltd. declares that the above-mentioned radio equipment type is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address:
French (FR)	Le soussigné, Furuno Electric Co., Ltd., déclare que l'équipement radioélectrique du type mentionné ci-dessusest conforme à la directive 2014/53/UE. Le texte complet de la déclaration UE de conformité est disponible à l'adresse internet suivante:
Croatian (HR)	Furuno Electric Co., Ltd. ovime izjavljuje da je gore rečeno radijska oprema tipa u skladu s Direktivom 2014/53/EU. Cjeloviti tekst EU izjave o sukladnosti dostupan je na sljedećoj internetskoj adresi:
Italian (IT)	Il fabbricante, Furuno Electric Co., Ltd., dichiara che il tipo di apparecchiatura radio menzionato sopra è conforme alla direttiva 2014/53/UE. Il testo completo della dichiarazione di conformità UE è disponibile al seguente indirizzo Internet:
Latvian (LV)	Ar šo Furuno Electric Co., Ltd. deklarē, ka augstāk minēts radioiekārta atbilst Direktīvai 2014/53/ES. Pilns ES atbilstības deklarācijas teksts ir pieejams šādā interneta vietnē:

Lithuanian (LT)	Aš, Furuno Electric Co., Ltd., patvirtinu, kad pirmiau minėta radijo įrenginių tipas atitinka Direktyvą 2014/53/ES. Visas ES atitikties deklaracijos tekstas prieinamas šiuo interneto adresu:
Hungarian (HU)	Furuno Electric Co., Ltd. igazolja, hogy fent említett típusú rádióberendezés megfelel a 2014/53/EU irányelvnek. Az EU-megfelelőségi nyilatkozat teljes szövege elérhető a következő internetes címen:
Maltese (MT)	B'dan, Furuno Electric Co., Ltd., niddikjara li msemmija hawn fuq-tip ta' tagħmir tar-radju huwa konformi mad-Direttiva 2014/53/UE. It-test kollu tad-dikjarazzjoni ta' konformità tal-UE huwa disponibbli f'dan l-indirizz tal-Internet li ġej:
Dutch (NL)	Hierbij verklaar ik, Furuno Electric Co., Ltd., dat het hierboven genoemde type radioapparatuur conform is met Richtlijn 2014/53/EU. De volledige tekst van de EU-conformiteitsverklaring kan worden geraadpleegd op het volgende internetadres:
Polish (PL)	Furuno Electric Co., Ltd. niniejszym oświadcza, że wyżej wymieniony typ urządzenia radiowego jest zgodny z dyrektywą 2014/53/UE. Pełny tekst deklaracji zgodności UE jest dostępny pod następującym adresem internetowym:
Portuguese (PT)	O(a) abaixo assinado(a) Furuno Electric Co., Ltd. declara que o mencionado acima tipo de equipamento de rádio está em conformidade com a Diretiva 2014/53/UE. O texto integral da declaração de conformidade está disponível no seguinte endereço de Internet:
Romanian (RO)	Prin prezenta, Furuno Electric Co., Ltd. declară că menționat mai sus tipul de echipamente radio este în conformitate cu Directiva 2014/53/UE. Textul integral al declarației UE de conformitate este disponibil la următoarea adresă internet:
Slovak (SK)	Furuno Electric Co., Ltd. týmto vyhlasuje, že vyššie spomínané rádiové zariadenie typu je v súlade so smernicou 2014/53/EÚ. Úplné EÚ vyhlásenie o zhode je k dispozícii na tejto internetovej adrese:
Slovenian (SL)	Furuno Electric Co., Ltd. potrjuje, da je zgoraj omenjeno tip radijske opreme skladen z Direktivo 2014/53/EU. Celotno besedilo izjave EU o skladnosti je na voljo na naslednjem spletnem naslovu:
Finnish (FI)	Furuno Electric Co., Ltd. vakuuttaa, että yllä mainittu radiolaitetyyppi on direktiivin 2014/53/EU mukainen. EU-vaatimustenmukaisuusvakuutuksen täysimittainen teksti on saatavilla seuraavassa internetosoitteessa:
Swedish (SV)	Härmed försäkrar Furuno Electric Co., Ltd. att ovan nämnda typ av radioutrustning överensstämmer med direktiv 2014/53/EU. Den fullständiga texten till EU-försäkran om överensstämmelse finns på följande webbadress:

Online Resource

http://www.furuno.com/en/support/red_doc