OPERATOR'S MANUAL

FURUNO

NAVnet

TZtouch2

MULTI FUNCTION DISPLAY

Model **TZTL12F/TZTL15F/TZT2BB**

ECF
(Elemental Chlorine Free)
The paper used in this manual
is elemental chlorine free.

FURUNO ELECTRIC CO., LTD.

9-52 Ashihara-cho,
Nishinomiya, 662-8580, JAPAN

FURUNO Authorized Distributor/Dealer

Printed in Japan

A : MAY. 2015
H1 : NOV. 13, 2020

(GREG) TZTL12F/TZTL15F/TZT2BB

00019006917

TimeZero Designed by MAXSEA
MTC Multi Touch Control
RezBoost
BDS Bottom Discrimination Sounds
ACCU-FISH
UHD Ultra High Definition
TruEcho CHIRP

Enhanced Sunlight Viewable
Bonded LCD
Polarized Friendly
GPS Internal Antenna
FISH FINDER Internal
Ethernet Plug&Play
CAN bus
NMEA2000 Certified
VIDEO
AUTO
Target Tracking
AIS

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.
- The microSDXC logo is a trademark of the SD Card Association.
- The SD, SDHC and SDXC logos are trademarks of SD-3 LCC.
- Apple, App Store, iPhone, iPod, iPad are registered trademarks of Apple Inc, registered in the USA and other countries.
- Android, Google and Google Play are registered trademarks of Google, Inc.
- FLIR and ClearCruise are registered trademarks of FLIR Systems, Inc.
- Fusion-Link and PartyBus are registered trademarks of FUSION Entertainment Ltd.
- The following concern acts as our importer in Europe, as defined in DECISION No 768/2008/EC.
  - Name: FURUNO EUROPE B.V.
  - Address: Ridderhaven 19B, 2984 BT Ridderkerk, The Netherlands
- All brand and product names are trademarks, registered trademarks or service marks of their respective holders.

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

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

In the European Union
The crossed-out trash can symbol indicates that all types of batteries must not be discarded in standard trash, or at a trash site. Take the used batteries to a battery collection site according to your national legislation and the Batteries Directive 2006/66/EU.
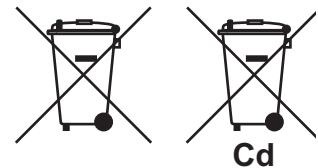
In the USA
The Mobius loop symbol (three chasing arrows) indicates that Ni-Cd and lead-acid rechargeable batteries must be recycled. Take the used batteries to a battery collection site according to local laws.
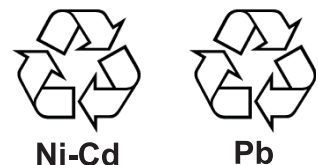
In the other countries
There are no international standards for the battery recycle symbol. The number of symbols can increase when the other countries make their own recycle symbols in the future.

⚠ SAFETY INSTRUCTIONS

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 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	Antenna Model	Distance to 100 W/m^2 point	Distance to 10 W/m^2 point
DRS2D	N/A	0.4 m	DRS6A X-Class w/XN12A	N/A	2.2 m
DRS4A	N/A	1.2 m	DRS6A X-Class w/XN13A	N/A	1.9 m
DRS4D	0.1 m	1.4 m	DRS12A w/XN12A	0.2 m	2.4 m
DRS4D-NXT	N/A	0.7 m			
DRS4DL	N/A	1.1 m	DRS12A w/XN13A	0.2 m	1.9 m
DRS4DL+	N/A	0.9 m			
DRS6A	N/A	1.2 m	DRS12A X-Class w/XN12A	0.3 m	3.1 m
DRS6A-NXT w/XN12A	N/A	0.6 m			
DRS6A-NXT w/XN13A	N/A	0.4 m	DRS12A X-Class w/XN13A	0.2 m	2.9 m
DRS12A-NXT w/XN12A	0.2 m	1.9 m	DRS25A w/XN12A	0.5 m	5.3 m
DRS12A-NXT w/XN13A	0.15 m	1.8 m	DRS25A w/XN13A	0.4 m	4.4 m
DRS25A-NXT w/XN12A	0.3 m	2.8 m	DRS25A X-Class w/XN12A	0.8 m	7.7 m
DRS25A-NXT w/XN13A	0.2 m	2.65 m	DRS25A X-Class w/XN13A	0.7 m	6.8 m
DRS6A X-Class w/XN10A	0.1 m	3 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 of the display unit is made of glass. Handle it with care.
Injury can result if the glass breaks.

Do not open the equipment.
Only qualified persons can work inside the equipment.

⚠ WARNING

Keep units other than the radar antenna away from 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.

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 result 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 based on the depth indication alone.

Grounding can occur.

⚠ CAUTION

The fish finder picture is not refreshed when the picture advance setting is "OFF".

Do not use high-pressure cleaners to clean this equipment.

This equipment has the waterproof rating outlined in the specifications, at the back of this manual. However, the use of high-pressure cleaning equipment can cause water ingress, resulting in damage to, or failure of, the equipment.

⚠ WARNING

🚫 **The ARPA function is a valuable aid to navigation. However, the navigator must check all aids available to avoid collision.**

- The ARPA automatically tracks an automatically or manually acquired radar target and calculates its course and speed, indicating them with a vector. Since the data generated by the ARPA depends on the selected radar targets, the radar must be optimally tuned for use with the ARPA, to ensure required targets will not be lost or unnecessary targets, like sea returns and noise, will not be acquired and tracked.

- A target is not always a landmass, reef, ship, but can also be returns from the sea surface and from clutter. As the level of clutter changes with the environment, the operator must correctly adjust the sea and rain clutter controls and the gain control so that the target echoes do not disappear from the radar screen.

Safety Labels

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

⚠ WARNING ⚠
To avoid electrical shock, do not remove cover. No user-serviceable parts inside.
⚠ 警告 ⚠
感電の恐れあり。サービスマン以外の方はカバーを開けないで下さい。内部には高電圧部分が数多くあり、万一さわると危険です。

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

⚠ CAUTION

The plotting accuracy and response of this ARPA 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 approx. 15-30 seconds for the higher relative speed; approx. 30-60 seconds for the lower relative speed. The following factors can affect accuracy:
- Echo intensity
- Radar transmission pulse length
- Radar bearing error
- Gyrocompass error
- Course change (own ship and targets)

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.

TABLE OF CONTENTS

FOREWORD

A Word to the Owner

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

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

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

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

Thank you for considering and purchasing FURUNO.

Features

The NavNet TZtouch2, equipped with a touch screen with multi touch capacity, is a networked navigation system that gives you functions such as radar, plotter, fish finder and AIS. Information is transferred between NavNet TZtouch2 units through Ethernet or NMEA 2000. The plug-and-play format allows expansion and you can connect a maximum of six NavNet TZtouch2 units (for configurations with a TZT2BB on the same network as the TZTL12F/15F, the maximum number of TZTL12F/15F units is four.). Also, you can control the NavNet TZtouch2 units and display their data on an iOS or Android™ device.

Main features

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

Application*	Capability	iOS	Android™
NavNet Remote (NavNet software version 4.01 or higher)	Monitor or operate NavNet TZtouch2	iPad only	Other than 7 inch
		Other than iPad	Less than 7 inch
NavNet Viewer	Display nav data, sounder picture.	Yes	Yes
NavNet Controller	Remote control of NavNet TZtouch2.	Yes	Yes

  * Check compatibility with your OS version in the store before downloading. Applications are available from the App Store (iOS) or Google Play™ (Android) at no cost.

- Instrument display provides comprehensive navigation data with connection of appropriate sensors.
- Built in wireless LAN to update program and download weather data via the internet. (NavNet TZtouch2 units sold in China do not have wireless LAN capability.)

- Points (waypoints) and routes are transferred and shared between NavNet TZtouch2 units via Ethernet.
- Large memory stores 30,000 track points, 30,000 points, and 200 routes (500 points per route), 200 boundaries, 1000 photos and 1000 catches.
- Able to write and read data (points, routes, tracks, etc.).
- Built in GPS receiver and antenna (TZTL12F/TZTL15F).
- Built in fish finder.
- AIS function (requires connection of AIS transponder) receives AIS data from AIS equipped vessels, shore stations and navigational aids and displays relevant data.
- ACCU-FISH™ provides at-a-glance estimation of length and depth of individual fish.
- Bottom discrimination display helps identify probable bottom composition with graphics and colors.
- RezBoost™ raises echo resolution to see fish echoes clearly. (Requires RezBoost™ capable transducer. Not available when the transducer is installed with the inside hull installation method.)
- Dual-range radar display for watch on short and long distances at the same time.
- DSC (Digital Selective Calling) message information feature provides the MMSI no. and position of vessels that have transmitted a DSC message to you. (Requires DSC capable radiotelephone.)
- Control audio of FUSION-Link™ equipment.
- HDMI output (type A receptacle).
- Monitoring of the inside/outside of your ship via analog camera (FLIR™ or AXIS™).
- Monitoring around the vessel with pan-tilt-zoom capable (PTZ) cameras (FLIR™ or AXIS™).
- Control of all software applications from an external monitor, connected via the HDMI IN and USB for HDMI OUT ports (TZT2BB only).
- View separate screens on connected dual monitors (TZT2BB only.)

Software used in this product

This equipment uses the following open source software.

- Ubiquitous QuickBoot Copyright© 2015 Ubiquitous Corp. All rights reserved.

- This product includes software to be licensed under the GNU General Public License (GPL) version 2.0, GNU Lesser General Public Software License (LGPL) version 2.0, Apache, BSD and others. The program(s) is/are free software(s), and you can copy it and/or redistribute it and/or modify it under the terms of the GPL version 2.0 or LGPL version 2.0 as published by the Free Software Foundation. Please access to the following URL if you need source codes: https://www.furuno.co.jp/contact/cnt_oss01.html.

Program no.

1950152-07.** (** 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 lines. Optional equipment is denoted with dashed lines.

TZTL12F/15F System Configuration

DRS4D-NXT

Select one of radome or open array sensor.

DRS6A X-Class/DRS12A X-Class/DRS25A X-Class/
DRS6A-NXT/DRS12A-NXT/DRS25A-NXT

Radome Radar Sensors

DRS2D/DRS4D

Open Array Radar Sensors

DRS4DL, DRS4DL+

DRS4A/DRS6A/DRS12A/DRS25A

POWER SUPPLY UNIT*
PSU-017

For PSU-017

POWER SUPPLY UNIT*
PSU-012/PSU-013

12-24 VDC

12-24 VDC

12-24 VDC

12-24 VDC

24 VDC

FAR-2xx7/2xx8 series
FAR-15x3/15x8 series

BBDS1, DFF series

FA-30/50

AIS Transponder

FA-40/FA-70

SC-30

SCX-20

GP-33/GP-330B

FI-50/70

NAVpilot Series

IF-NMEA2K1/2

IF-NMEAFI

FI-5002

HUB -101*4

FAX-30

BBWX weather receiver

IP Camera

FUSION-Link Equipment

Multi Beam Sonar
(DFF-3D)

Multi Function Display*2
TZTL12F
or
TZTL15F

Wide Monitor

Remote Controller
MCU-002 or MCU-004
or
SD Card Unit SDU-001

CCD Camera

CCD Camera

Remote Controller
MCU-005

PoE HUB*3

Transducer

12/24 VDC

Event SW
External Buzzer
Operator Fitness
Power input for NMEA2000
NMEA0183 out

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

————— : Standard supply

-------- : Optional or local supply

*1 Radar and required power supply unit.
    DRS2D/4D/6A/12A: PSU-012; DRS25A/: PSU-013; DRS2D/4D: PSU-017
     See the radar sensor Installation Manual (IME-35670) for details.
*2 A maximum of 6 NavNet TZtouch2 units can be connected via Ethernet hub. With connection of a
    TZT2BB unit, the maximum number of units is 4. These units are internally fittted with a GPS
    antenna/receiver and fish finder as standard.
*3 Use an after-market PoE hub. The NETGEAR GS108PE is confirmed as compatible. Compatibility tests are
     limited to general use as part of this configuration and in no way indicates overall capability.
     Further, FURUNO cannot guarantee the functionality of any after-market hub.
*4 FURUNO networks allow for a maximum of three Ethernet Hub HUB-101s.
    Exceeding this can result in undesirable results.

TZT2BB System Configuration

DRS4D-NXT

Select one of radome or open array sensor.

DRS6A X-Class/DRS12A X-Class/DRS25A X-Class/
DRS6A-NXT/DRS12A-NXT/DRS25A-NXT

Radome Radar Sensors

DRS2D, DRS4D

DRS4DL, DRS4DL+

Open Array Radar Sensors

DRS4A/DRS6A/DRS12A/DRS25A

POWER SUPPLY UNIT*1 PSU-017

12-24 VDC

12-24 VDC

12-24 VDC

12-24 VDC

POWER SUPPLY UNIT*1 PSU-012/PSU-013

24 VDC

FAR-2xx7/2xx8 series
FAR-15x3/15x8 series
(BBDS1, DFF series)

FA-30/50

FAX-30

BBWX weather receiver

IP Camera

FUSION-Link Equipment

Multi Beam Sonar (DFF-3D)

HUB -101*5

AIS Transponder

FA-40/FA-70

SC-30

SCX-20

GP-33/GP-330B

FI-50/70

NAVpilot Series

IF-NMEA2K1/2

FI-5002

HDMI Input

Remote Controller MCU-002 or MCU-004

CCD Camera

CCD Camera

Remote Controller MCU-005

PoE HUB*4

Transducer

Processor Unit*2 MPU-004

Display Unit (Touch Monitor*3)
HD19T21-MMD-MA1-FHGP,
HD19T22-MMD-MA1-FHGP,
HD24T21-MMD-MA1-FHGP
or
HD24T22-MMD-MA1-FHGP

Sub Display Unit (Same models as above)

Event SW
External Buzzer
NMEA0183 out
Power SW

12/24 VDC

Switch Box PSD-003

Environmental category

Radar antenna: Exposed to the weather
All other units: Protected from the weather

————— : Standard supply

-------- : Optional or local supply

*1 Radar and required power supply unit.
  DRS2D/4D/6A/12A: PSU-012; DRS25A/: PSU-013; DRS2D/4D: PSU-017
*2 Max. 6 NavNet TZtouch2 units connected via Ethernet hub.
  For configurations with TZT2BB included, a maximum of 4 NavNet TZtouch2 units
  can be connected.
*3 Hatteland Display monitor.
*4 Use an after-market PoE hub. The NETGEAR GS108PE is confirmed as compatible. Compatibility tests are
  limited to general use as part of this configuration and in no way indicates overall capability.
  Further, FURUNO cannot guarantee the functionality of any after-market hub.
*5 FURUNO networks allow for a maximum of three Ethernet Hub HUB-101s.
  Exceeding this can result in undesirable results.

  Note: Do not connect/disconnect the HDMI cable between the MPU-004 and touch monitor while the power is
        turned on.

This page is intentionally left blank.

1. SYSTEM INTRODUCTION

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

Standards used in this manual

- Key names are shown in boldface type. For example, **ENT** key (on the MCU-002, MCU-004 or MCU-005).

- Menu items, on-screen indications, and pop-up menus and pop-up windows names are shown in brackets. For example, the [Settings] menu.

- Messages shown on the screen (including the Status bar) are enclosed in quotations. For example, "No Network Connected".

- The [Settings] menu is comprised of several sub menus. When you are asked to select one of its sub menus, "[Settings]" is followed by a hyphen and the sub menu name. For example, "Tap [Settings] - [General]".

- The colors mentioned in this manual are the default colors. Your colors may be different.

- Most of the screenshots in this manual are taken from the TZTL12F. Layouts may be slightly different on the TZTL15F/TZT2BB.

1.1 Controls

The TZTL12F and TZTL15F are operated by a power switch on the front panel and a microSD card slot, which is used for chart data, is on the rear panel. The power switch is also used to adjust brilliance.

The TZT2BB uses the Switch Box (PSD-003) for power and SD cards.

You can operate the TZTL12F/15F and TZT2BB by touch controls, on the screen.

TZTL15F

TZTL12F

TZTL multi function display units (shown in optional hanger)

Switch Box PSD-003 (for TZT2BB)

No.	Item	Function
1	⏻ (Power switch)	• Turns the power on. • Adjust the brilliance and hue of the display. • Adjust the brilliance of the power lamp and the power key back-light (TZT2BB only) • Turns the power off (device or network). • Locks, unlocks the touch screen.
2	Card slot	• TZTL12F/15F: This slot is exclusively for use with chart cards. • PSD-003: Charts cards must be inserted in the left slot.

About the soft cover
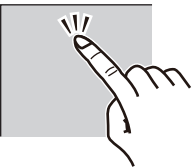
The soft cover (supplied with TZTL12F/TZTL15F) protects the LCD when the display unit is not in use. To remove the cover, grasp the cover at the locations circled in the right figure and pull forward.
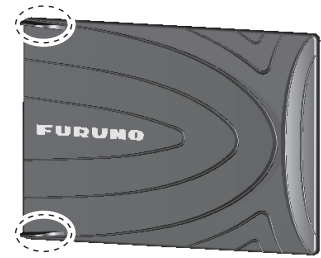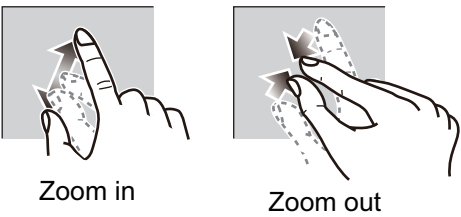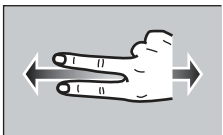
Touchscreen operations

The tables which follow outline the touchscreen operations.

Operation with a finger

Operation with a finger		Function
Tap		Short tap • Select a menu item. • Select an object or position to display the corresponding pop-up menu. Long tap • Edit display icon (on home screen).
Drag		• Pan the charts. • Scroll the menu.

Operation with two fingers

Operation with two fingers		Function
Pinch	Zoom in Zoom out	• Zoom in or out the display range in the 2D/3D modes or weather display. • Select radar range on the radar display.
Drag		Change 3D viewing point.
Tap		Do the function assigned to [Function Gesture], which is in the ([Settings] - [General] menu. See section 1.16.

Notes on touch control operations

• Waterdrops on the screen can cause mis-operation and slow touch response. Wipe the screen with a dry cloth to remove the water.

• This equipment uses a capacitive touch screen. Tap the screen with your fingertips directly. Do not use sharp objects (needle, pen, nail) or a stylus pen. Be careful not to scratch the screen.

• The touchscreen cannot be operated while wearing gloves.

• Do not put objects (adhesive-backed paper, etc.) on the screen. Mis-operation can result.

• Keep the equipment away from a radio antenna, fluorescent light, solenoid valve and electronic devices to prevent unintended operation by noise.

• The front panel is made of glass. If the front panel is damaged, do not try to repair it yourself. Unauthorized repair will void the warranty. Contact your dealer about repair or replacement.

• The touch screen can be locked to prevent operation of the equipment. See the procedure below.

• **For TZT2BB configurations**, see the manual for your touch monitor.

How to lock the touch screen

The touch screen can be locked to prevent unintentional operation.

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

Lock/unlock touchscreen
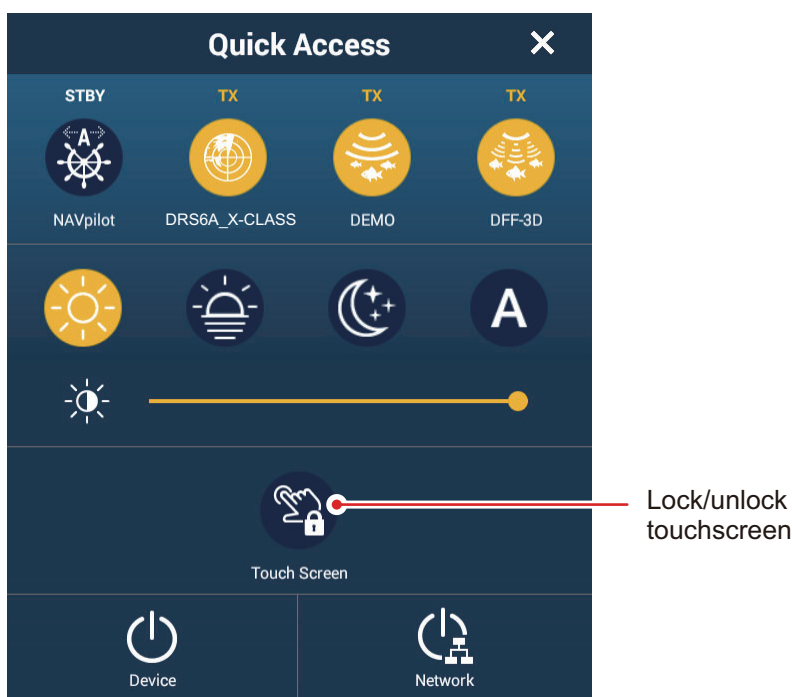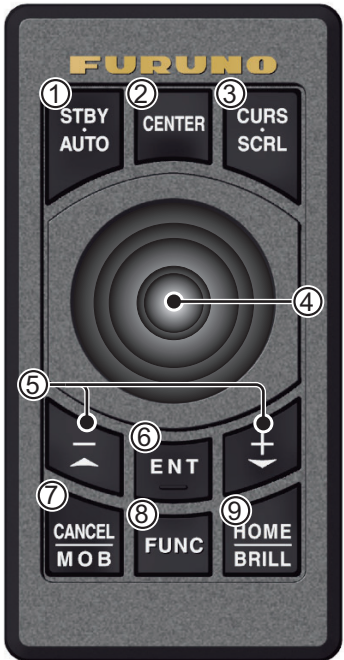
1.2 Remote Control Units (option)

The Remote Control Units MCU-002/MCU-004/MCU-005 let you operate the system without touching the screen. When the power is applied and a Remote Control Unit is connected, an orange cursor (selection cursor) marks current selection in menus.

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

1.2.1 Remote Control MCU-002

	No.	Key	Function
	1	**STBY•AUTO** key	Switches the steering mode of the FURUNO NAVpilot series Autopilot between the STBY and AUTO modes.
	2	**CENTER** key	• Returns own ship to the center of the screen (Plotter/Weather/Radar display). • Cancels the echo history (Fish finder display).
	3	**CURS•CRL** key	Switches the joystick gesture between the cursor mode and scroll mode.
	4	Joystick	Short push: Works same as tap gesture. • Opens the pop-up menu. • Activates the item selected by the cursor. 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 slide-out/main/pop-up menu. • Zooms in (+) and out (-).
	6	**ENT** key	• Activates a selected item. • Swipe function: Opens the slide-out menu, [Layers] menu, data area, quick page
	7	**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).
	8	**FUNC** key	Does the function set at [Function Gesture].
	9	**HOME/BRILL** key	Short push: • Opens the home screen. Long push: • Opens the [Power & Brilliance] window.
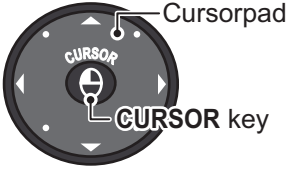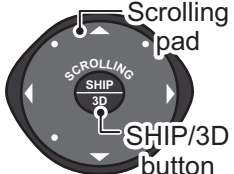
1.2.2 Remote Control Unit MCU-004

No.	Key	Function
1	**STBY•AUTO** key	Switches the steering mode of the FURUNO NAVpilot series Autopilot between the STBY and AUTO modes.
2	**HOME/BRILL** key	• Short press: Opens the home screen. • Long press: Opens the Brilliance/Power window.
3	**CONTROL** key	Short press: Switches the active screen on the current display unit. Long press: Switches control between active display units on 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 (-). • Raises (+) and lowers (-) the brilliance on the Brilliance/Power window. • Controls the slider bar.
8	Joystick	Short press: Works same as tap gesture. • Opens the pop-up menu. • Activates the item selected by the cursor. 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	Press the **EDGE** key and operate the Joystick to activate the Edge Swipe function. • **EDGE** key and upward swipe: [Layers] menu • **EDGE** key and downward swipe: Quick page • **EDGE** key and leftward swipe: slide-out menu • **EDGE** key and rightward swipe: Data area
10	**CANCEL/ MOB** key	Short press: • Closes the menu or dialog box. • Stops the aural alarm. • Ends the tool mode (End Route, End Move, etc.). Long press: • Enters the MOB mark (at the own ship's position).

FURUNO

① STBY AUTO
② HOME BRILL
③ ↔
④ FUNC
⑤ CURS SCRL
⑥ CENTER
⑦
⑧
⑨
⑩ CANCEL MOB

Edge key operations:

- Layers menu
  Push

- Quick page
  Push

- Slide-out menu
  Push

- Data area
  Push

1.2.3 Control Unit MCU-005

No.	Key Name	Description
1	Power lamp	When the power is on, the lamp is lit.
2	**EVENT** key	Inscribes an event mark at your current position.
3	**GAIN/TX** key	Short press: • Adjusts the radar gain/AC SEA/AC RAIN or adjust the Fish Finder/Multi-beam Sounder gain. Long press: • Toggles between Standby and Transmit for the radar.
4	**MENU** key	Open/close the menu.
5	**HOME/BRILL** key	Short press: • Opens the home screen. Long press: • Opens the Brilliance/Power window.
6	**CANCEL/MOB** key	Short press: • Closes menus/windows. • Stops the aural alarm. • Ends the tool mode (End Route, End Move, etc.). Long press: • Enters the MOB mark (at the own ship's position).
7	**CTRL** key	Switches control between multiple displays when more than one display is on the same network.
8	**EDGE** key	Press the **EDGE** key, then tap the cursor pad in the desired direction. - Layers menu — Press → Tap - Slide-out menu — Press → Tap - Quick page — Press → Tap - Data area — Press → Tap **Note:** You can also use the scrolling pad to open the above menus.
9	**FUNCTION GESTURE** key	Activates the function set at [Function Gesture] in the [General] menu.

No.	Key Name	Description
10	**CURSOR** key and cursor pad 	<u>**CURSOR** key short press:</u> • Opens pop up menus. • Activates/confirms the item selected by the cursor. <u>**CURSOR** key long press:</u> • Edit display icon (on home screen). <u>Cursorpad operation:</u> • Moves the selection cursor. Selected items are highlighted. **Note: CURSOR** key "short press" and "long press" operations are the same as "tap" and "long tap" operations respectively.
11	**STBY/AUTO** key	Switches the steering mode of the connected FURUNO NAVpilot series between the STBY and AUTO modes.
12	**POINTS/ROUTE** key	<u>Short press:</u> • Sets the cursor location as a point. <u>Long press:</u> • Starts a route from the cursor location.
13	**Rotary** knob	<u>Short press:</u> • Opens pop up menus. • Activates/confirms the item selected by the cursor. <u>Long press:</u> • Edit display icon (on home screen). <u>Rotate:</u> • Moves the selection cursor. Selected items are highlighted. • Zooms in/out. **Note: Rotary** knob "short press" and "long press" operations are the same as "tap" and "long tap" operations respectively.
14	**RANGE OUT/IN** key	• Moves the selection cursor. Selected items are highlighted. • Zoom in/out. • Changes the range for the radar/fish finder.
15	**SHIP/3D** key and scrolling pad 	<u>**SHIP/3D** key short press:</u> • Returns own ship to center of screen (Plotter/Weather/Radar display). • Cancels the echo history (Fish finder display). <u>**SHIP/3D** key long press:</u> • Switches between 2D and 3D display. <u>Scrolling pad:</u> • Moves the selection cursor. Selected items are highlighted. • Zooms in/out.

1.2.4 Remote Control Unit group settings

If multiple NavNet TZtouch2 units are installed in the network, you can the select the display to show on a unit, using the MCU-004 or MCU-005. 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. From the Home page, select [Settings]→[Initial Setup].
2. Tap the item [Remote Controller Configuration] twice.
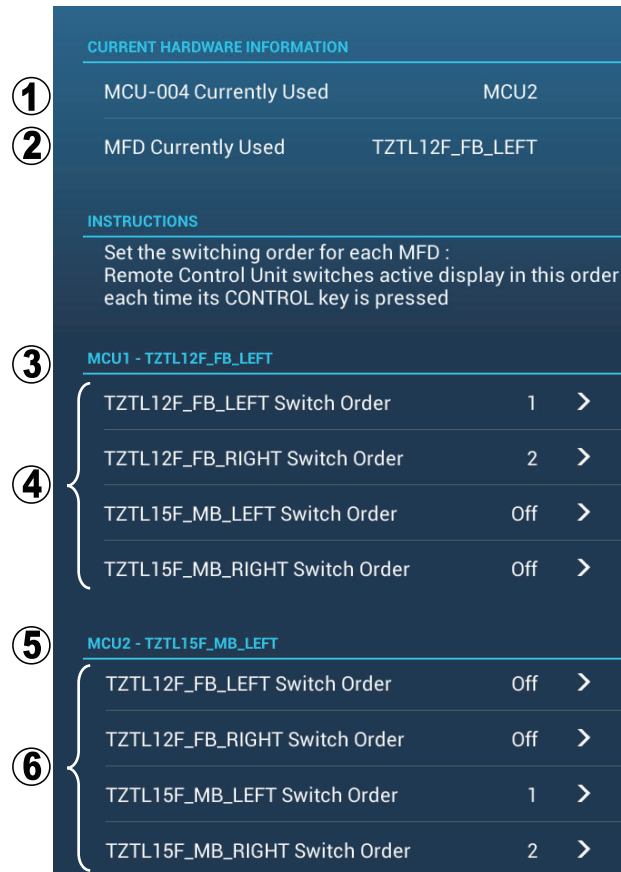
Example remote configuration - MCU-004

No.	Description
1	The nickname automatically assigned to the MCU-004/MCU-005.
2	The nickname assigned to the NavNet TZtouch2 unit currently being operated.
3	Setting for the unit connected to TZTL12F_FB_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 TZTL12F_MB_LEFT*, controlled by MCU2.
6	Set the cycling order of units controlled by MCU2. To skip a unit, select it to [Off].

*: For configurations with an MCU-005 connected, the nickname for the MCU-005 appears.

Based on the menu settings shown on the previous page, the installed configuration should look similar to the following image.

FLYBRIDGE
(A) and (B) can
be controlled
from MCU1.

MCU1

(A) TZTL12F_FB_LEFT

(B) TZTL12F_FB_RIGHT

FLYBRIDGE
(C) and (D) can
be controlled
from MCU2.

MCU2

(C) TZTL15F_MB_LEFT

(D) TZTL15F_MB_RIGHT

HUB
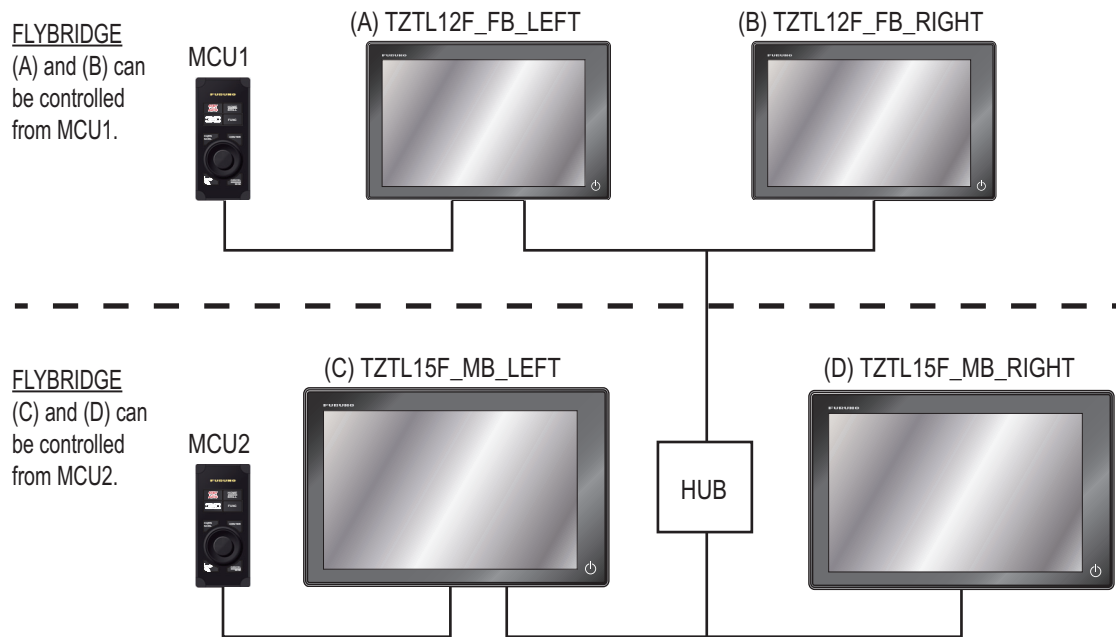
3. Select the displays to cycle.

1	✓
2	
3	
4	
5	
6	
7	
8	
9	
10	
Off	
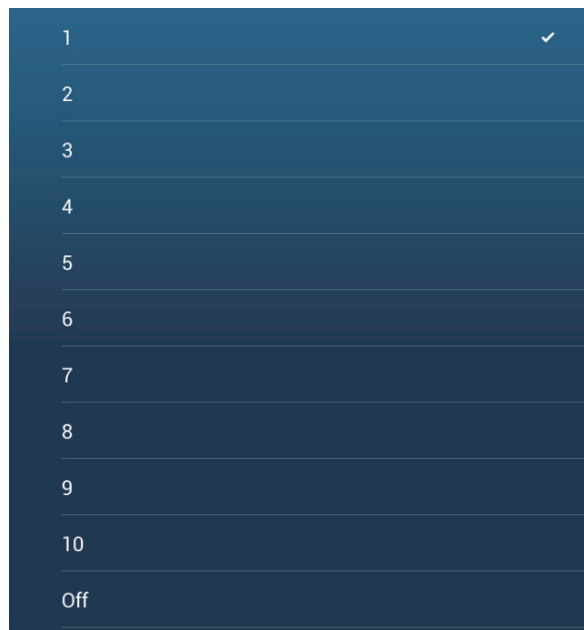
4. Set the order. To skip a display, select it to [Off].

5. Tap "<" on the title bar to return to the [REMOTE CONTROLLER CONFIGURATION] menu.

6. Tap the [Confirm] button on the title bar to save settings and close the menu.

1.3   How to Turn the Power On or Off

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

TZTL12F/TZTL15F   TZT2BB

When you turn on the power, he equipment beeps twice and the splash screen appears. After the startup process is completed, the welcome screen replaces the splash screen.

[**Demo Mode**]: Tap [Start] to start the Demo mode. To stop the Demo mode, go to the Home screen, tap [Settings]→[General], then [Stop Demo].

[**Let's Navigate**]: Start normal operation. (The equipment starts up with the last-used display.)

[**Tutorial**]: Tap [Start Tour] to start the tutorial. You can stop the tutorial at any time by tapping the screen. A confirmation message appears; tap [OK] to stop the tutorial.

[**Show at startup**]: Check to get the welcome screen each time the equipment is powered. Remove the checkmark to hide the welcome screen at power-up. You can also show or hide the welcome screen from the menu.*

After clearing the welcome screen, the [NAVIGATION WARNING] screen appears*. Read the warning, then click [OK].

*: For vessels with more than one TZtouch2 on the same network, when this message is confirmed on any unit, it is also confirmed on the other networked TZtouch2 units.

The color of the lamp in the power switch changes according to equipment state.
Green: Equipment is powered.
Orange: Equipment is not powered but power is flowing to the equipment.

How to turn the power off

Tap the power switch to show the [Power & Brilliance] window.

Closes the
window.

Tap either of
these two.

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

Note 1: If you cannot turn off the power as shown above, or the screen has frozen, push and hold the power switch until the screen goes blank, wait two seconds, then release the switch.

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

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

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

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

Hue options

TZTL12F/15F: Adjust the display brilliance.
TZT2BB: Adjust the power lamp and power key backlight brilliance.
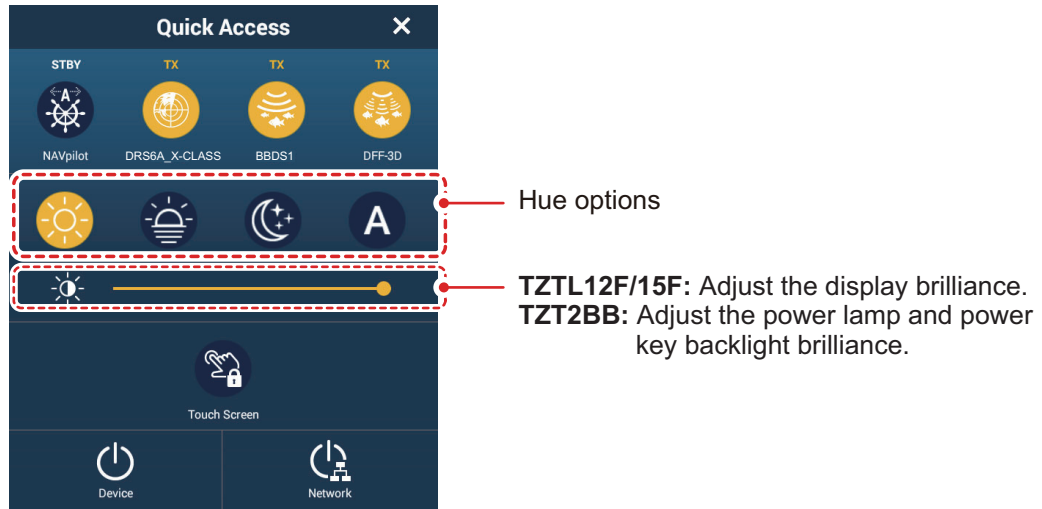
TZTL12F/15F: Tap the power switch, tap the slider bar, or drag the slider icon (circle) to adjust the brilliance of both the display and the power indicator.

TZT2BB: Tap the power switch, tap the slider bar, or drag the slider icon (circle) to adjust the brilliance of both the power lamp and the power key backlight.

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

How to synchronize brilliance of units in the network

Turn on [Brilliance Synchronization] in the [Settings] - [General] menu to synchronize the brilliance among units in the network.

1.5   Home Screen

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

The figure below shows an example display with all sensors and corresponding devices connected.

Home icon

Tap

Home   Center Vessel

Time, date

12:01:32 PM ----- Time

Wednesday, January 1, 2014 ---- Date

Sensor icons

Heading   Sounder   Fusion

GPS   Radar   Sirius   WiFi

12:23:53 PM   Wednesday, January 1, 2014   TZTL15F

MOB

Settings

Tide

Charts

Lists

eGuide

Home screen

Functions

MOB

Settings

Tide

Lists

Catalog

eGuide

Display icons

Plotter	Radar	Sounder	Camera
Weather	Instrument	Multi Sounder	Side Scan
Cross Section	3D History	YAMAHA Engine Manager	

The **Sensor icons** show the sensors connected in the system and their status, in the following colors. **White**: Sensor normal**; Red**: Sensor error; **Gray**: Sensor inactive (stopped).

The **Functions** section provides the features mentioned below. If the item is hidden, drag up or down from [Settings]. ([MOB] is fixed.)
[MOB]: Enters a MOB mark (to mark man overboard location on the plotter and radar displays). See section 1.18.
[Settings]: Menus (general, plotter, radar, sounder, etc.) for customization of the system. See section 1.15.
[Tide]: Opens the tide graph.
[Lists]: Accesses the lists (points, routes, AIS, DSC, ARPA, Alarms).
[Catalog]: Opens the list of charts installed in your system.
[Fax30]*: Opens the FAX-30 operation screen.
[Fusion]*: Opens the FUSION operation screen.
[SiriusAudio]*: Opens the SiriusAudio control panel.
[eGuide]: Opens the abbreviated operator's manual. You can get the latest version of the operator's manual by accessing the quick response code provided in the introduction section of the guide.
* Requires appropriate equipment connection. Not shown otherwise.

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

1.6   How to Set a Nickname for Your Unit

If your vessel has more than one NavNet TZtouch2/3 unit connected to the same network, differentiating between the units can become difficult. You can use the nickname feature to help tell each one apart. The nickname appears on the Home screen, in the top status bar, between the time/date and sensor icons. By default, the unit model is set as the nickname; for example "TZTL12F".

To change the nickname, tap the [Home] icon to show the home screen then tap the nickname indication.
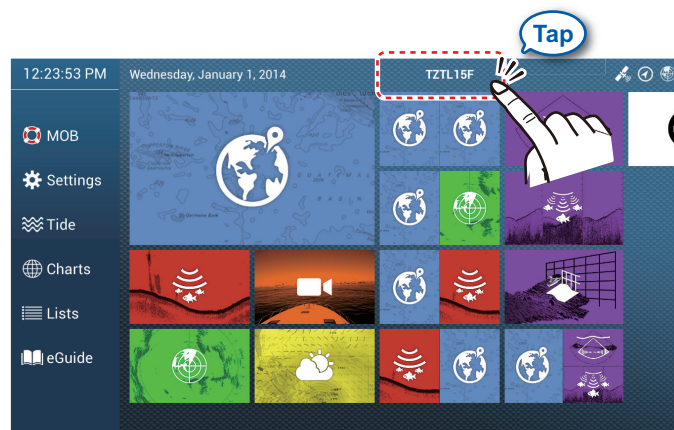
Note: You can also change the nickname from the [Sensor List] in the [DATA ACQUISITION] section of the [Initial Setup] menu (See "DATA ACQUISITION section" on page 15-7).

1.7 How to Select a Display

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

1.7.1 How to select a display from the home screen

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

Display icons

1.7.2 How to select a display from the quick page

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

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

Quick pages
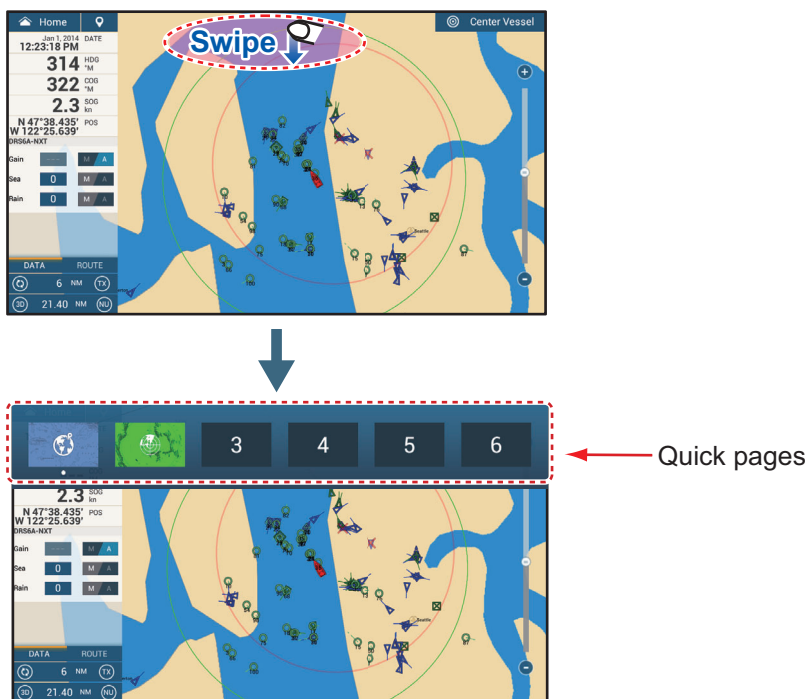
1.8 How to Edit the Display Icons

The default home screen arrangement provides seven displays (icons) in configurations according to the equipment that you have in your network. If the arrangement does not meet your requirements, you can change the display icons to suit your needs. You can have a maximum of 16 display icons, in full screen, 2-way or 3-way split screens. For example, you can show the radar and sounder (fish finder) displays in a two-way split screen.

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

Display division	Available displays
Full screen	Plotter, weather, radar, sounder, instrument, camera, multi sounder, side scan, cross section, 3D history, Yamaha Engine Manager
Two-way split	Plotter, radar, sounder, multi sounder, side scan
Three-way split, four-way split*	Plotter, radar, sounder, instrument, camera, multi sounder, side scan, cross section, 3D history, Yamaha Engine Manager

*: The four-way split option is available only for TZT2BB.

Note: For vessels with more than one TZtouch2 on the same network, changes made to displays are shared and applied to the other TZtouch2 units.

1.8.1 How to add a new display icon

1. Tap the [Home] icon to show the home screen.

2. Tap the + icon, shown right. (If the icon is not shown, this means that all available display icons (16) have been used. Erase an unnecessary icon to make room. See subsection 1.8.2.)

3. Follow the instructions below to create a display icon.

*: Drag the display page to the center of the location where you want to place it.
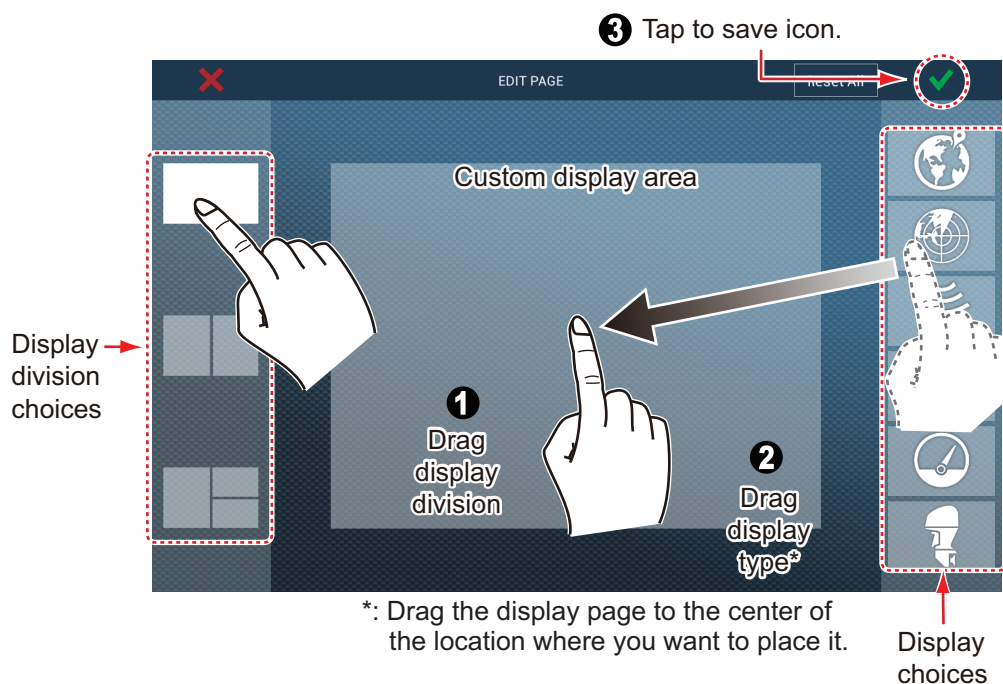
Your arrangement is then opened on the screen and the home screen is updated according to your arrangement.

1.8.2 How to edit a display icon

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

Note: For vessels with more than one TZtouch2 on the same network, changes made to displays are shared and applied to the other TZtouch2 units.
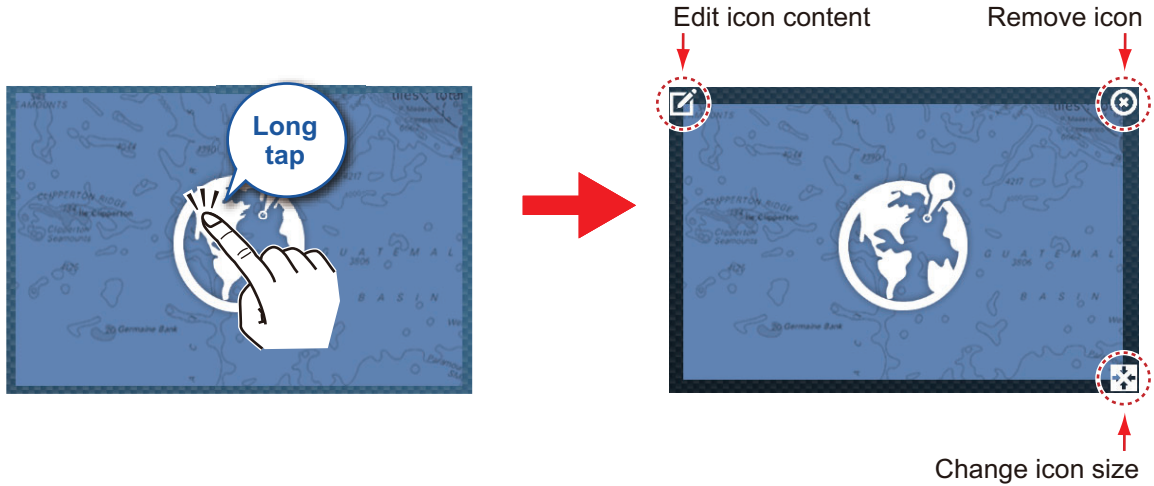
Edit icon content: Tap the icon at the upper left corner. See the illustration in subsection 1.8.1 for how to set the icon.
Remove icon: Tap the icon at the upper right corner to remove the icon from the home screen (and quick page if the icon size is selected to "large".
Change icon size: Tap the icon at the lower right corner to switch the size between large and small. (Icons set for large size appear on the quick page.)

1.9 Hidden Functions

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

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

Quick page

Data area

Swipe
Swipe
Tap
Swipe
Swipe

Slide-out menu

Layers menu*

Pop-up menu
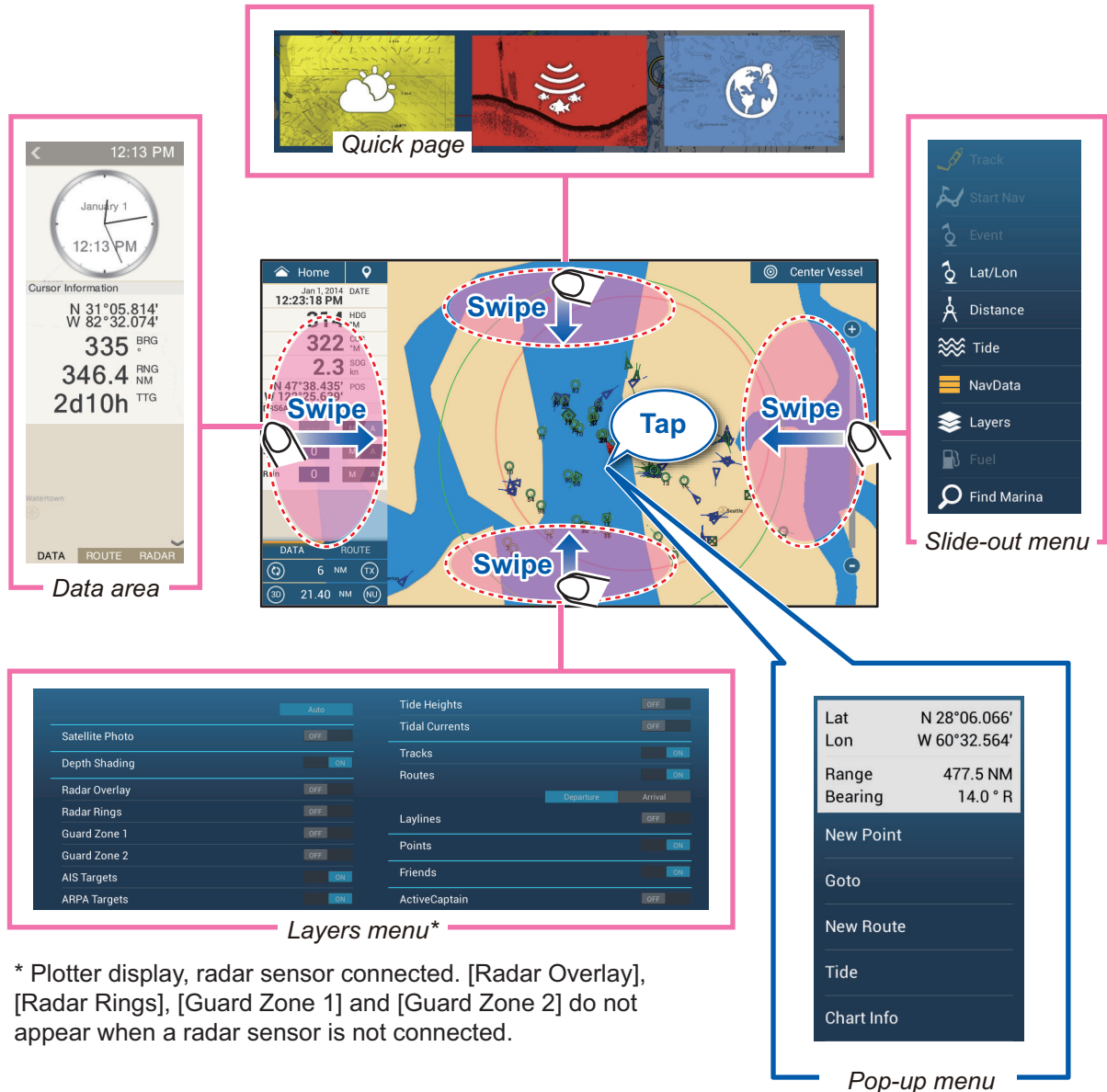
* Plotter display, radar sensor connected. [Radar Overlay], [Radar Rings], [Guard Zone 1] and [Guard Zone 2] do not appear when a radar sensor is not connected.

Function description

The **quick page** selects displays. The display icons set to large size appear on the quick page. (See subsection 1.7.2.)

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

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

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

Radar Rings	ON
Guard Zone 1	OFF
Guard Zone 2	OFF
AIS Targets	ON
ARPA Targets	ON

Routes	ON
Points	OFF
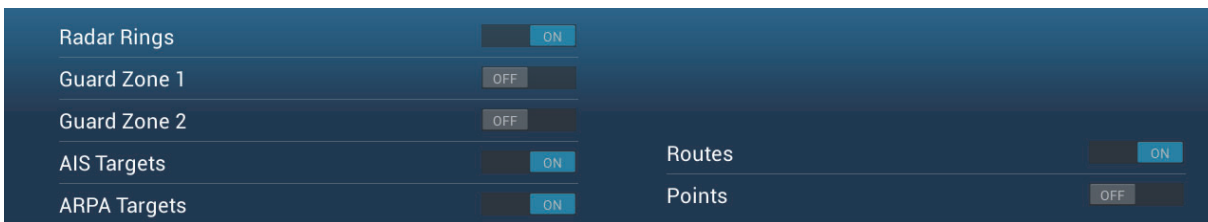
Layers menu for radar display

Wx Data	ON
Adv Wx Data	ON
	Auto
Satellite Photo	OFF
AIS Targets	OFF
ARPA Targets	OFF

Tide Heights	ON
Tidal Currents	ON
Tracks	ON
Routes	ON
	Departure / Arrival
Points	ON
Friends	ON
ActiveCaptain	ON
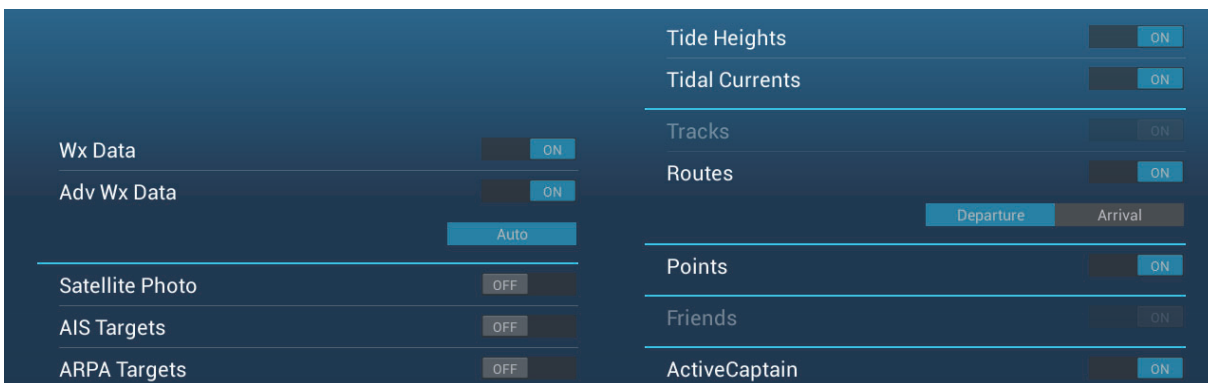
Layers menu for weather display

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

Hidden function availability and screen division

Full screen displays and hidden function availability

	Display						
	Camera	Instrument	Plotter	Radar	Sounder	Weather	YAMAHA
[Layers] menu	Yes	No	Yes	Yes	Yes	Yes	No
Pop-up menu	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data area	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quick page	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Slide-out menu	Yes	Yes	Yes	Yes	Yes	Yes	Yes
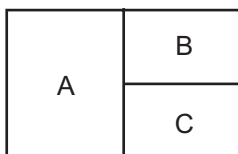
A: Data area, [Layers] menu, pop-up menu, quick page
B: [Layers] menu, pop-up menu, quick page, slide-out menu
C: Pop-up menu, slide-out menu

Three-way split-screen and hidden function availability

1.10 Data Area

The data area at the left side of the screen shows various navigation data, in movable and editable data boxes. You can select the data to display, select format (analog or digital) for data and change the order of the data. Data availability depends on your system configuration.
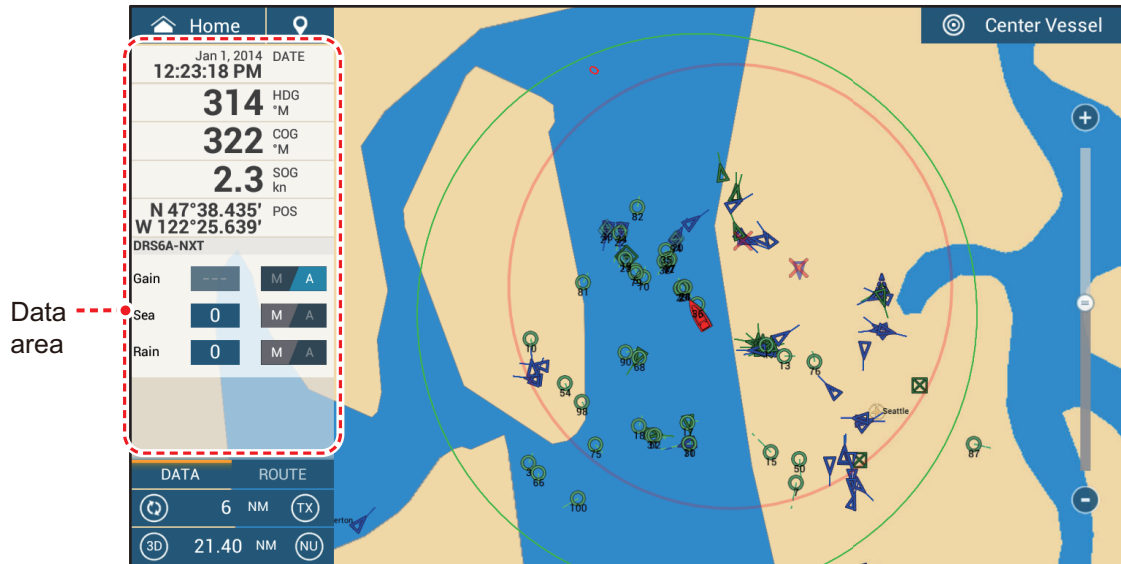
Note 1: The data display is also available in the two- and three-way split screens, on the left screen.

Note 2: For vessels with more than one TZtouch2 on the same network, changes made to data area are shared and applied to the other TZtouch2 units.

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

1.10.1 How to change the order of the data

Drag and drop the data boxes to change their order.

1.10.2   How to change the contents of a data box

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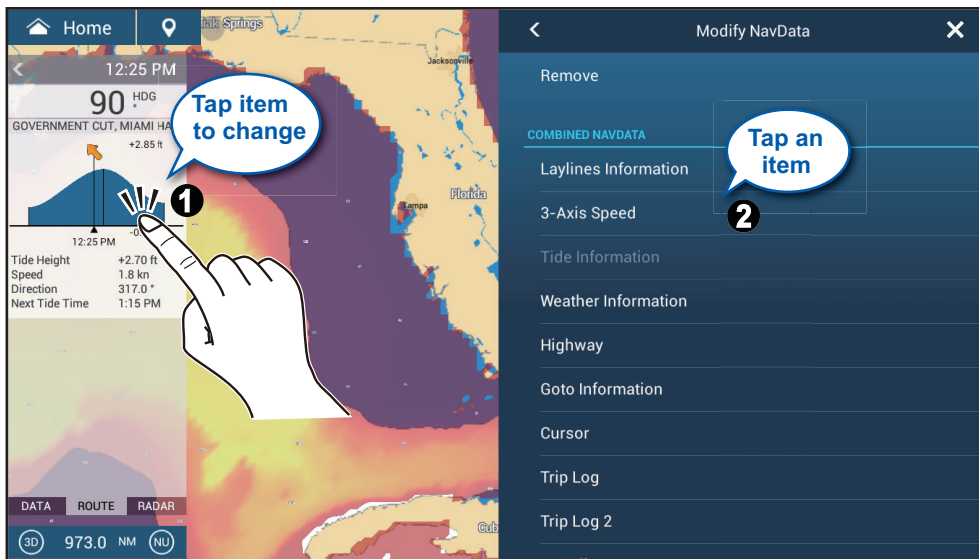
1.10.3   How to add data to a data area

1.   Tap an unoccupied area in the data area to display the [Add NavData] pop-up menu.
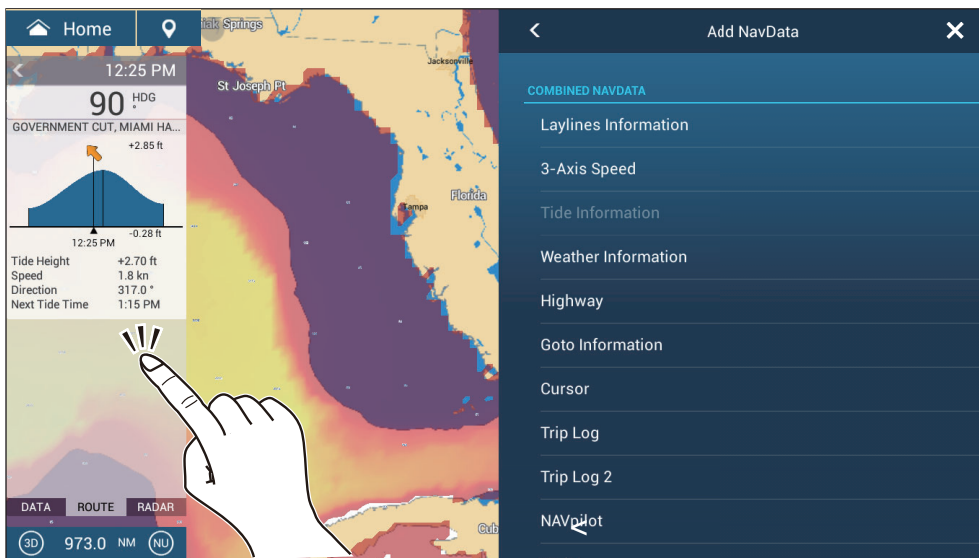
2. On the pop-up menu, tap the data to add. For example, tap [Cursor].The added data appears at the bottom of the data area.
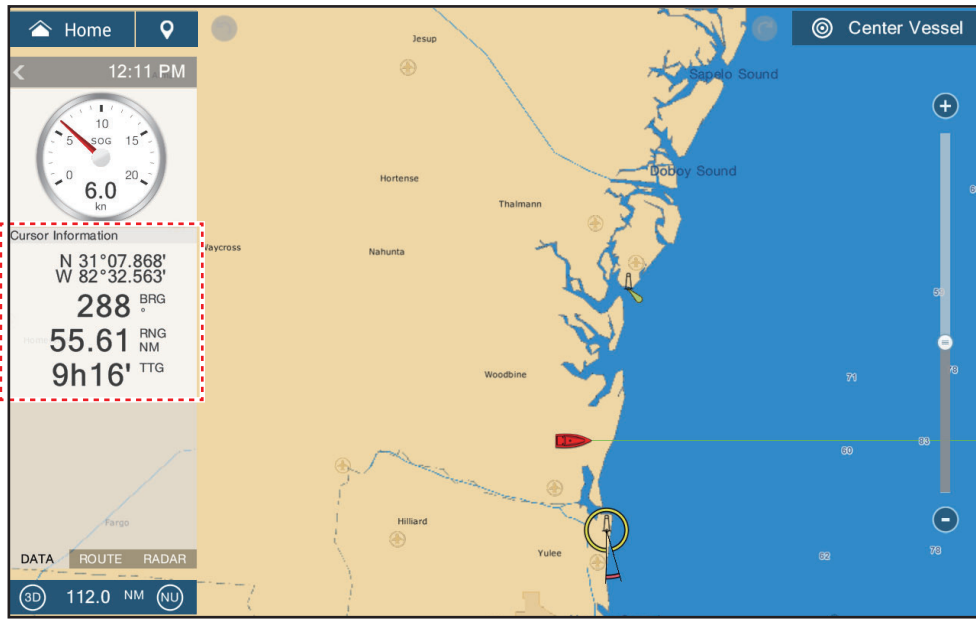
1.10.4 How to delete a data box

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

1.10.5 How to change the display method for data in the data box

Tap the data box for which to switch the indication, and the [Modify NavData] menu appears. Tap [Change Type], then tap the desired display method.
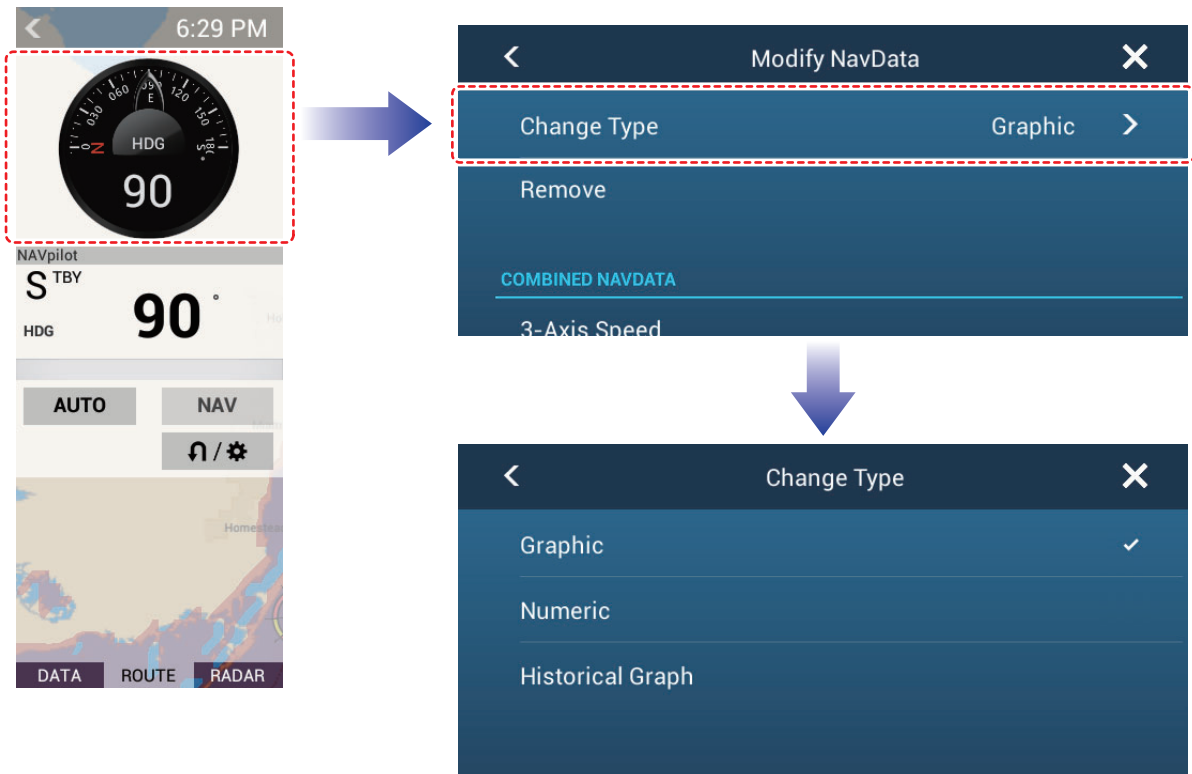
1.10.6 How to adjust the transparency of the data area

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

Note: Alpha blending technology is used for transparency effects.

1.10.7 How to use the data box as a display for the SC-33

When a SC-33 Satellite Compass™ is connected to the same network, you can use a box in the data area as a dedicated SC-33 display.

Note: This function requires PGN 130578 Vessel Speed Components to be output from the SC-33.

Referring to section 1.10.2 and section 1.10.3, select the 3-Axis Speed display.

The uppermost speed indication is the speed at the CCRP. The CCRP is set and installation.

The middle speed indication is the speed at mid-ship.

The lowermost speed indication is the speed at the stern

3-Axis speeds show the speed at the CCRP, mid-ship and stern. The CCRP, set at installation, is either the bow, transducer location, or center of the vessel.

Wind direction (purple arrow)

Tidal current direction (brown arrow)

Directional indicators
The directional indicators show which direction the boat is travelling.

↕ : Indicates speed in the fore/aft direction.

↔ : Indicates transverse (port/starboard) speed.

Note 1: To correctly display directional indications and speed indications, the following are required:

• Heading: when a valid heading is not input, wind and tidal current indications are not shown. Further, speed is indicated as blank "----" and the compass directions (N,S,E,W) are not shown.

• Connection to a rate gyro or gyrocompass: when there is no signal received from the rate gyro or gyrocompass, the aft speed is indicated as blank "----".

1.11 MicroSD Cards/SD Cards

This equipment uses two types of microSD cards/SD cards, chart cards and data cards. The chart cards contain charts and the data cards store plotter-related data such as tracks, routes, points and generic data such as menu settings. (The microSD card drive on the TZTL12F/TZTL15F display is for chart cards only. Use the SD card unit for data cards and chart cards.) Set and remove the card as shown below. Secure Digital Extended Capacity (SDXC) cards can also be used.

Note: SD cards are available for use with the TZT2BB only.

How to insert a microSD card/SD card

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

For TZTL12F/TZTL15F

① Unfasten two screws.　② Push card into slot and close cover.

Chart card drive (multi function display)

① Open cover.　② Push card into a slot and close cover.

SD card unit (SDU-001)

For TZT2BB

Protective cover

For chart cards　② Remove the protective cover　③ Install the chart card in the left slot.

Note: After installing the chart card, be sure to replace the protective cover.

① Peel the card slot cover from the top end to show the card slots.

For tracks, routes, points and settings data cards　② Install the data card in the right slot.

Note: The TZT2BB does not recognize cards that are locked. Before inserting a card, check the tab on the side of the card to be sure that the card is unlocked.

How to format a microSD card/SD card

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

How to remove a microSD card/SD card

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

About the microSD cards/SD cards

• Handle the cards carefully. Improper use can damage the card and destroy its contents.

• Make sure the slot lid (cover) is closed at all times.

• Remove a card with only your fingers. Do not use metal instruments (like tweezers) to remove the card.

• Do not remove a card during the reading of or writing to the card.

• Make sure the lock, located on the side of the card, is not enabled. If the card is locked, data cannot be read/written.

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

Compatible microSD cards/SD cards

The tables below list the cards that have been verified for use with this equipment.

Note 1: The cards were verified using basic functions. All functions were not verified. FURUNO does not guarantee card operations.
Note 2: Cards other than those listed below have not been verified.
Note 3: Use a class 6 or higher card for storing chart data.

MicroSD cards

Maker	Model	Capacity (GB)	Class
KINGMAX	KM-MCSDHC10X32GUHS1P	32	10
	KM-MCSDXC6X64G	64	6
Kingston	SDC4/8GB	8	4
	SDCA10/16GB	16	10
	SDC4/16GB	16	4
	SDCA10/32GB	32	10
	SDC4/32GB	32	4
	SDCA10/64GB	64	10
Panasonic	RP-SMKC08FR0	8	2
SANDISK	SDSDQ-008G-J35U	8	4
	SDSDQ-016G-J35U	16	4
	SDSDQUAN-032G-G4A	32	10
	SDSDQ-032G-J35U	32	4
	SDSDQUAN-128G-G4A	128	10
Silicon Power	SP008GBSTH004V10SP	8	4
	SP016GBSTH004V10SP	16	4
	SP032GBSTHBU1V20SP	32	10
	SP032GBSTH004V10SP	32	4
Silicon Power	SP064GBSTXBU1V20SP	64	10
	SP128GBSTXBU1V20SP	128	10

Maker	Model	Capacity (GB)	Class
Transcend	TS8GUSDU1	8	10
	TS8GUSDHC4	8	4
	TS16GUSDU1	16	10
	TS16GUSDHC4	16	4
	TS32GUSDU1	32	10
	TS32GUSDHC4	32	4
	TS64GUSDU1	64	10
	TS128GUSDU1	128	10

SD cards

Maker	Model	Capacity (GB)	Class
KINGMAX	KM-MCSDHC10X32GUHS1P	32	10
	KM-MCSDHC10X16GUHS1P	16	10
Kingston	SDA10/128GB	128	10
	SDCX10/64GB	64	10
	SDC10/32GB	32	10
	SDC4/32GB	32	4
	SDC10/16GB	16	10
	SDC4/16GB	16	4
	SDC4/8GB	8	4
SANDISK	SDSDXPA-128G-G46	128	10
	SDSDXPA-064G-JU3	64	10
	SDSDXPA-032G-JU3	32	10
	SDSDB-032G-J35U	32	4
	SDSDXPA-016G-EPK2	16	10
	SDSDB-016G-J35U	16	4
	SDSDB-008G-J01	8	4
Silicon Power	SP128GBSDXAU1V10	128	10
	SP064GBSDXAU1V10	64	10
	SP032GBSDHAU1V10	32	10
	SP032GBSDH004V10	32	4
	SP016GBSDHAU1V10	16	10
	SP016GBSDH004V10	16	4
	SP008GBSDH004V10	8	4
Transcend	TS128GSDU3	128	10
	TS64GSDU3	64	10
	TS32GSDU3X	32	10
	TS32GSDHC4	32	4
	TS16GSDHC10U1	16	10
	TS16GSDHC4	16	4
	TS8GSDHC10U1	8	10
	TS8GSDHC4	8	4

1.12 Plotter Introduction

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

The plotter receives position data fed from the built in GPS receiver (TZTL12F/TZ-TL15F only), or from the connected EPFS device (TZT2BB). Your position is marked on the screen with the boat icon.

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

The plotter also:

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

Home icon   Undo icon   Status bar   Redo icon

Return own ship to screen center

Slider bar

Inactive route (expanded)

Point

Track

Inactive route (sleeping)*

Data area

Orientation mode switch

Chart range

2D/3D switch

* Arrival or departure position, selectable on [Layers] menu.
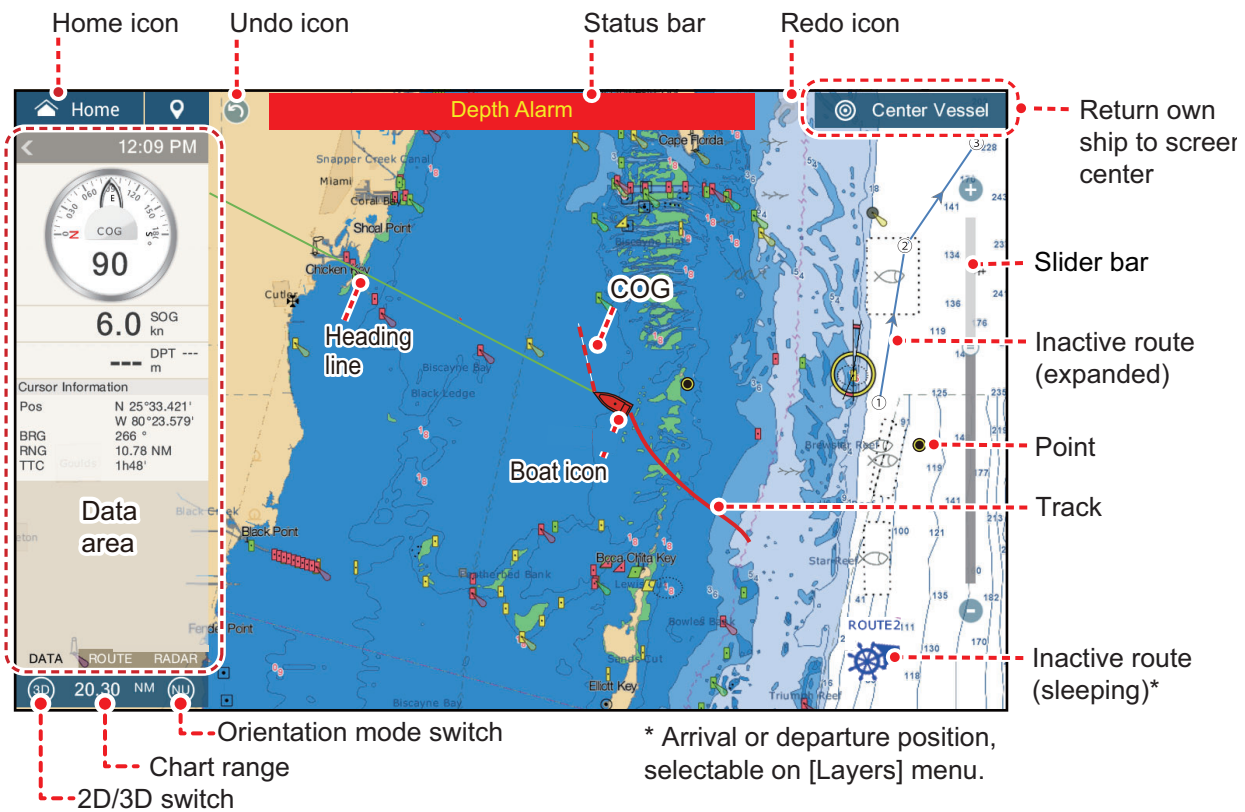
The **status bar**, common to all modes, alerts you to equipment status. The color of both the bar and the status message change according to message category.
• Red bar, yellow characters: warning (alarm violation, equipment error, etc.)
• Yellow bar, black characters: caution (system message, etc.)
When an alert condition occurs, the equipment beeps (if enabled), the name of the alert appears in the bar, and the bar flashes. You can stop the flashing and silence the beep by tapping the bar. The alert indication remains in the status bar until the cause for the alert is removed.

The **redo icon** has the following functions with points and routes.

- Undo icon: Reverse the last change done.
- Redo icon: Restore the undo action.

1.13   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.

A guard zone tells you when the radar targets are in the area you indicate.
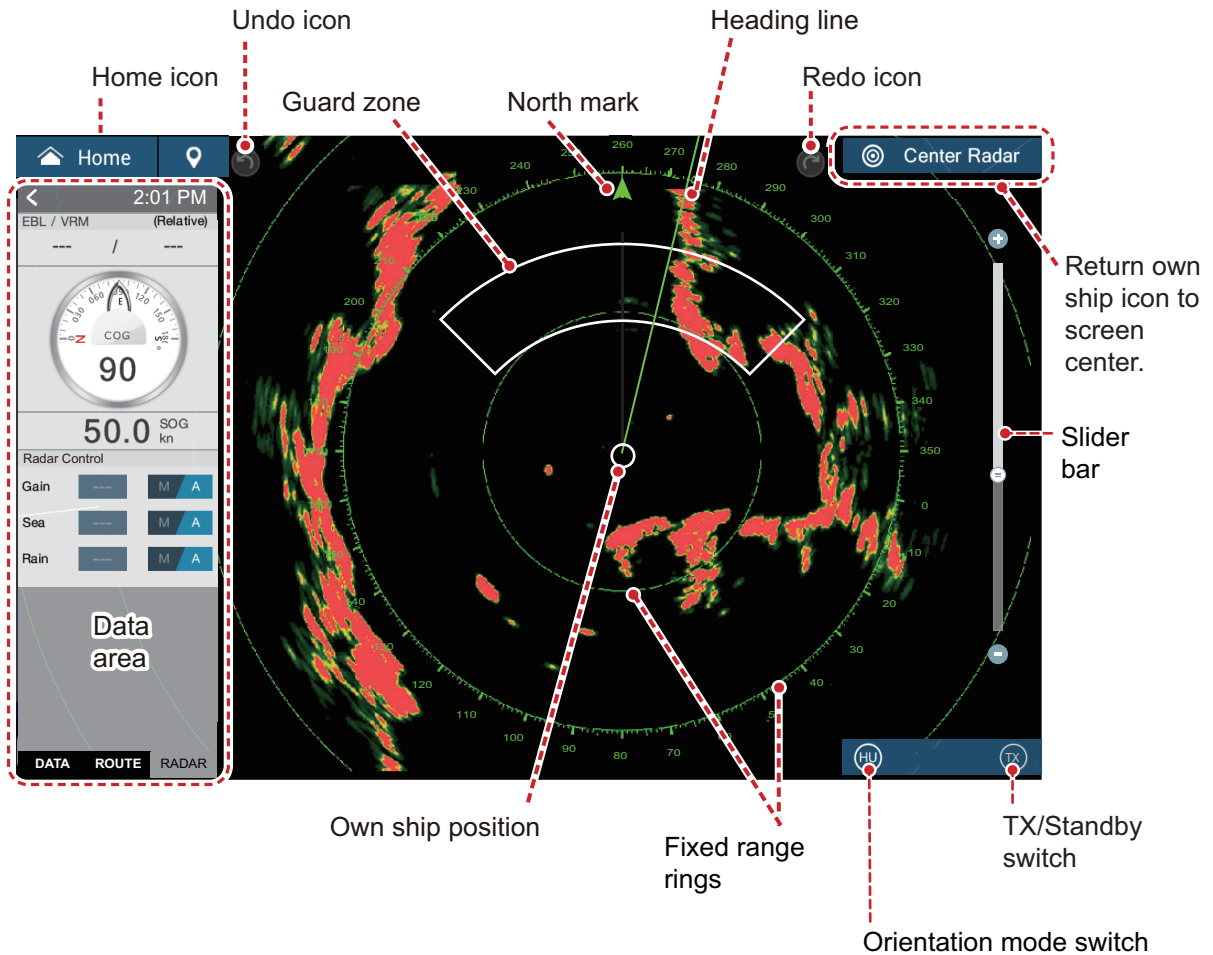
1.14 Sounder (Fish Finder) Introduction

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

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

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

The range, gain, clutter and TVG can be adjusted automatically according to your purpose (cruising or fishing) to let you do other tasks.
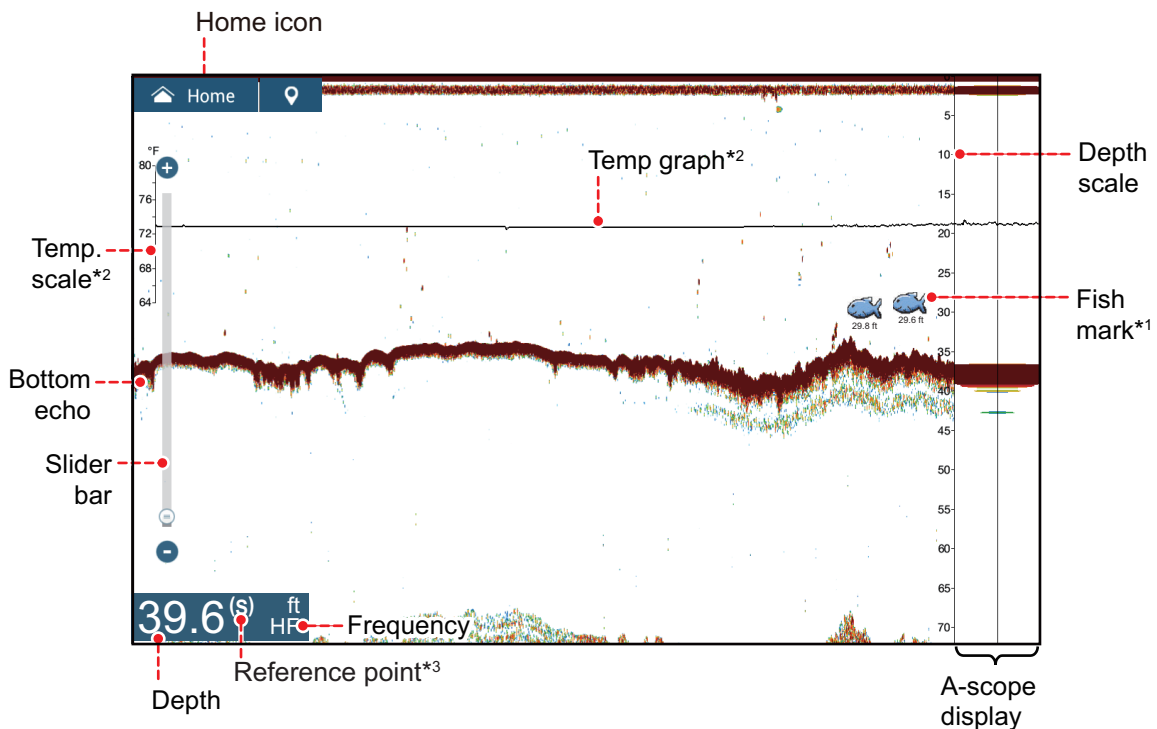
*¹ Requires appropriate transducer.
*² Requires water temperature sensor.
*³ Displayed as "(S)" for "Surface" or "(K)" for "Keel". Reference point is set from the [Initial Setup] - [BOAT INFORMATION] - [Depth Display] menu.

1.15   Settings Menu

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

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

Back button

Menu name

Close button

Title bar

Sub menus

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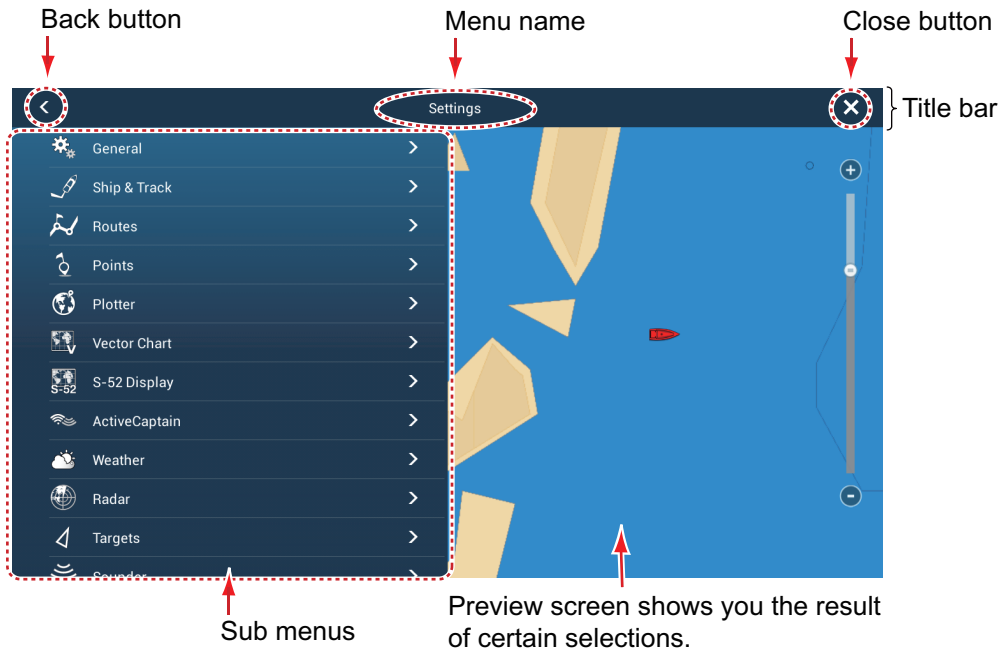
3.   Tap a sub menu. For example, tap the [General] sub menu.
4.   Do one of the following according to the menu item:
   - **ON/OFF flipswitch**: Tap the flipswitch to switch between [ON] and [OFF].

Flipswitch

Show Range Sliders   ON

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

Cross Cursor Speed   1

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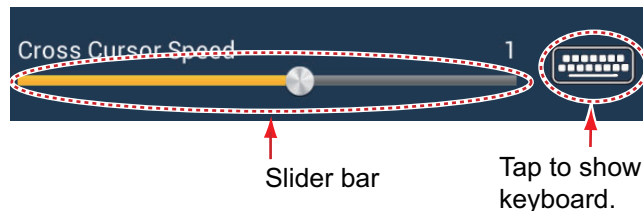
- **Alphabet, numerical data entry**: A menu item that requires entry of alphabet and/or numerical data has a keyboard icon (▦). Tap the keyboard icon to show the keyboard. (The keyboard displayed depends on the item selected. Some items provide only the numeric keyboard.) Enter data, then tap [✓] to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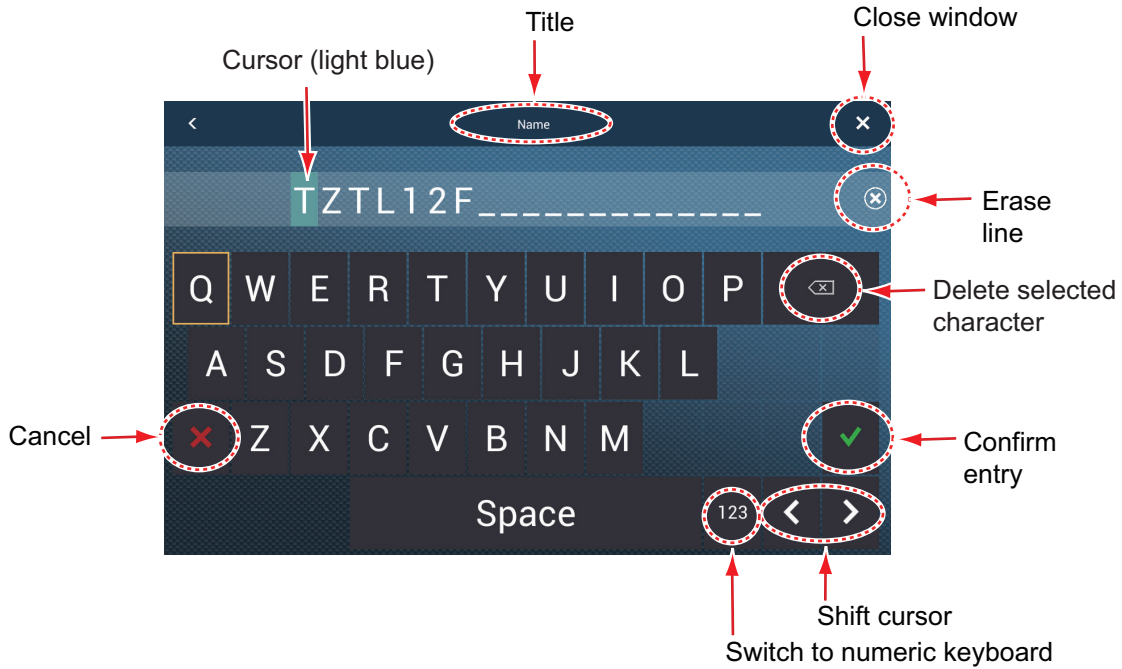
Alphabet keyboard

Numeric keyboard

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

Tap menu item.   Current selection

COG Vector Color   ●   ›

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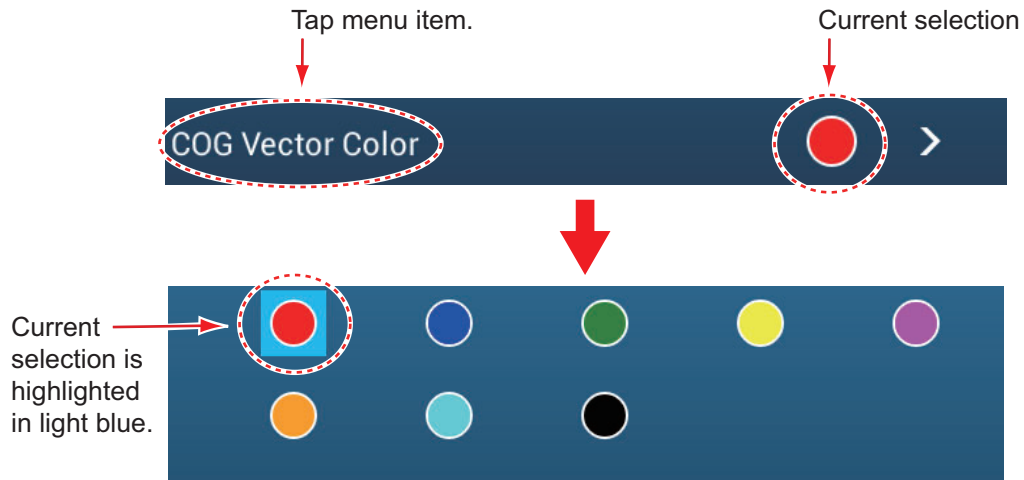
- **Option selection**: A menu item that requires selection of an option shows the current selection on the menu. Tap the option desired. The current selection has a checkmark.

Tap menu item.   Current selection

Track Interval   0'05s ›

0'05s   ✓   Current selection has a checkmark.

0'10s

0'30s

1'00s

5'00s

10'00s
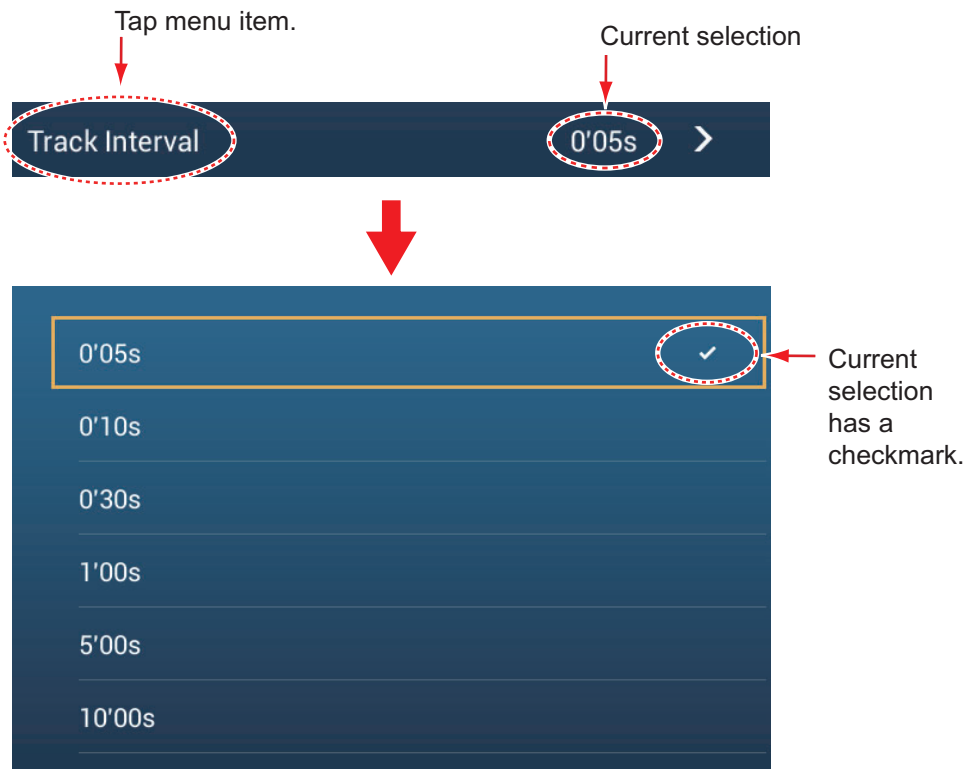
5.   Tap the close button to finish.

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

1.16 Function Gesture

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

1. Open the home screen, then select [Settings] - [General].

2. Tap [Two Finger Tap Function], or [Two Finger Long Tap Function] as required. [Two Finger Tap Function] sets the function for a single, short tap, [Two Finger Long Tap Function] sets the function for "tap-and-hold" long taps.

None	
Screen Capture	✓
Event	
Home	
Settings	
Lists	
Tide	
Fusion	
Fusion Bar	
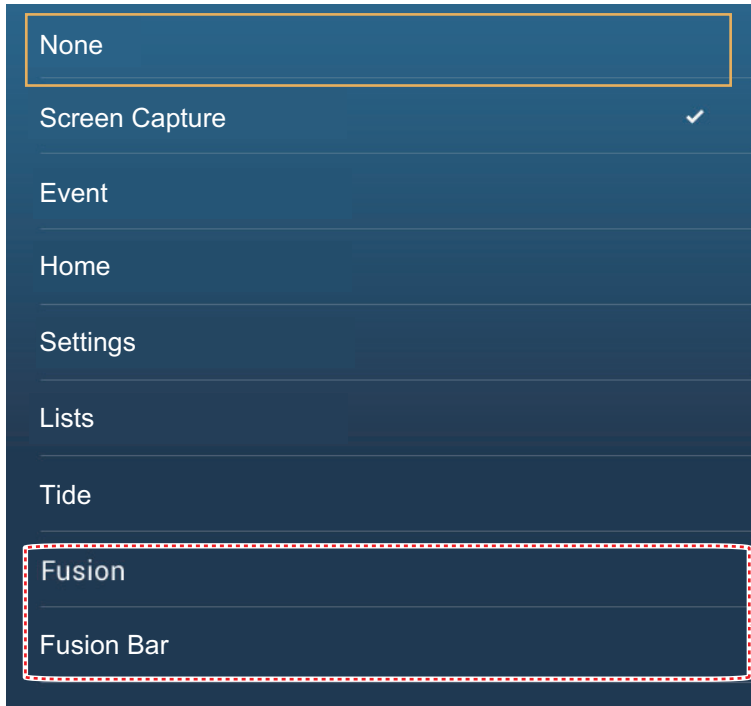
Appears with connection of FUSION-Link™ equipment.

3. Tap a function among the following:
   [None]: Nothing happens.
   [Screen Capture]: Capture the screen and save it to a microSD card (or USB memory). The message shown below appears. Tap [OK] to save the screen capture. The information following "TZT2SCREENSHOT" is the year, month, day, hour, minute and second the screenshot was captured.
   [Event]: Record an event. Select a mark from the pop-up menu, and the mark is put at the position at the time the screen was tapped (see subsection 4.2.2). The position, etc. is saved to the points list.
   [Home]: Open the home screen (see section 1.7).
   [Settings]: Open the [Settings] menu (see section 1.15).
   [Lists]: Open the lists menu (see section 1.15 and section 4.7).
   [Tide]: Open the tide graph (see section 1.15 and subsection 3.2.4).
   [Fusion]: Open the Fusion screen (see section 11.1).
   [Fusion Bar]: Show the Fusion operation bar (see section 11.2).

   Creating Events

   Event mark

   New

   Cancel

4. Tap the close button to finish.

1. SYSTEM INTRODUCTION
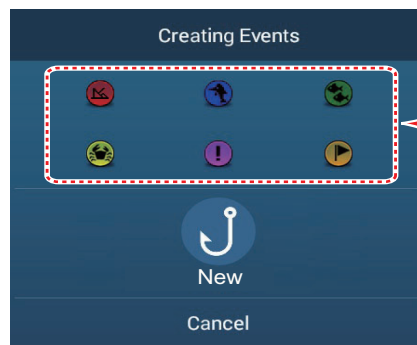
1.17 Language

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

1. Open the home screen, then tap [Settings] - [General].
2. Tap [Language].
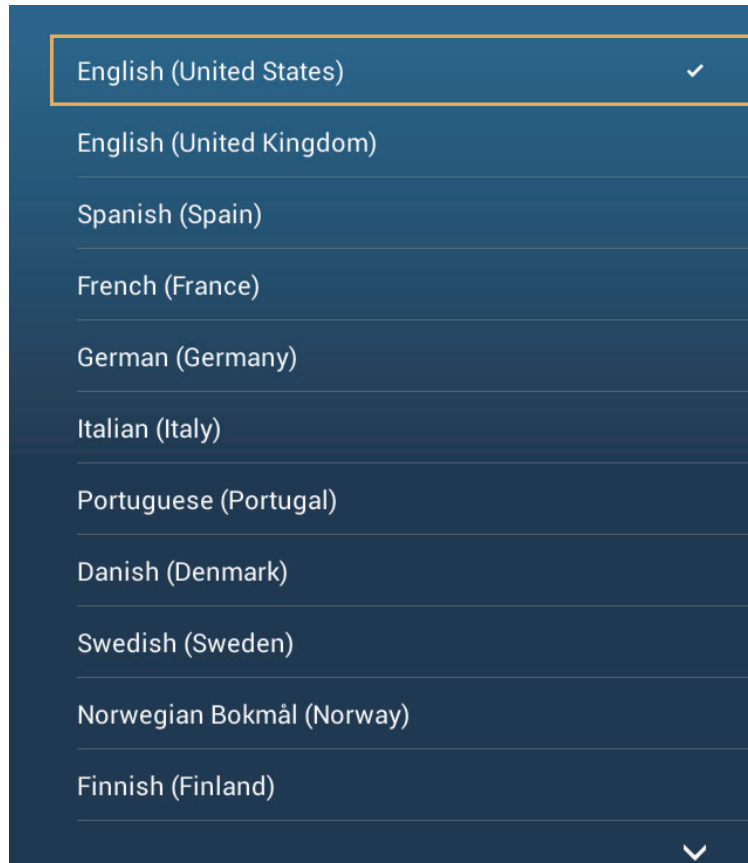
3. Tap the language to use. The message "APPLICATION HAS TO RESTART NOW! DO YOU WANT TO RESTART APPLICATION?" appears.
4. Tap [OK].
   The system takes approximately five minutes to optimize the system for the new language setting.

For TZTL12F or TZTL15F users, when the process is completed, the power switch will change color to orange. Press the power switch to start the system.

For TZT2BB users, if you have a monitor connected to the HDMI OUT1 port, the monitor become blank when the optimization process completes. Press the power switch to restart the system. If you have a monitor connected to the HDMI OUT2 port, the system automatically restarts when the optimization process completes.

1.18   Man Overboard (MOB)

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

How to mark the MOB position

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

• The message "MOB" flashes in the status bar, with yellow characters on a red background. The aural alarm sounds if it is enabled. Tap the status bar to stop the flashing indication and silence the aural alarm.

• The MOB mark is highlighted.

• A yellow line connects between the MOB mark and current location. This line shows the straightest course between own ship and the MOB mark.

• If a FM-4800 VHF Radiotelephone is connected to the same network, the MOB information is also sent to the FM-4800 and can be sent as a DSC message.
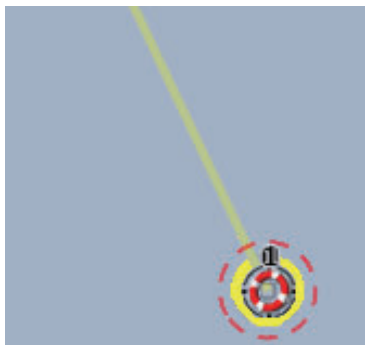
MOB mark on the plotter display   MOB mark on the radar display

MOB information

Tap a MOB mark to display he following MOB data: latitude, longitude, DTA (distance to the MOB), ETA (Estimated Time of Arrival at the MOB), depth*.

* Depth data requires a depth sensor.

How to delete a MOB mark

Tap a MOB mark to display the pop-up menu, then tap [Delete]. However, if the MOB position is set as destination, the MOB point (highlight) remains on the screen and the destination is not canceled. To erase a MOB mark set as a destination, you must first stop navigation to the MOB. Tap the MOB mark, select [Stop Nav] (to cancel the destination), tap the mark again, then tap [Delete].

1.19 Wireless LAN Settings

Note: This procedure is not available from a monitor connected to the HDMI OUT2 port (TZT2BB only).

You can connect to the internet with the wireless LAN signal to download weather information (see chapter 13) and to connect to an iOS or Android™ device. To download weather information, connect the existing LAN network. To connect to an iOS or Android™ device, create a local wireless network.

About the wireless LAN

- The wireless LAN function is available only in the countries which have acquired radio wave certification. Turn this function off in countries which do not have radio wave certification. Ocean-going vessels that have radio wave certification can use the wireless LAN function in any country that has acquired radio wave certification. Vessels with radio wave certification that enter a country that does not have radio wave certification may use the wireless LAN function only onboard the vessel. Available countries (as of 04/2018): USA, Canada, New Zealand, Australia, Japan, and all countries of the EU.

- The communication rate and effective range for the wireless LAN can be affected by electromagnetic waves, interfering objects, or access point location.

- We strongly recommend using the wireless LAN with encrypted connection. Otherwise unauthorized access by a third party can occur, which can cause loss of data or system crash.

- We recommend changing the initial password when using a local wireless network.

1.19.1 How to connect the existing LAN

1. Open the home screen, then tap [Settings]→[General]→[Connect to the Internet].
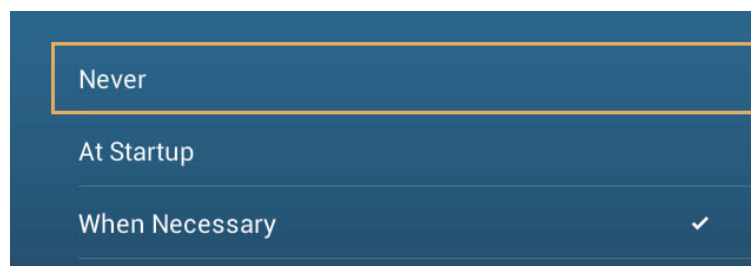
2. Tap [When Necessary]. Tap "<" to go back one layer.
3. Tap [Wireless LAN Settings]→[Wireless Mode].
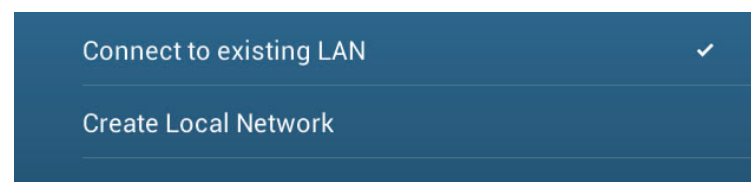
4. Tap [Connect to existing LAN]. Tap "<" to go back one layer.

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

6. Tap the network to use.
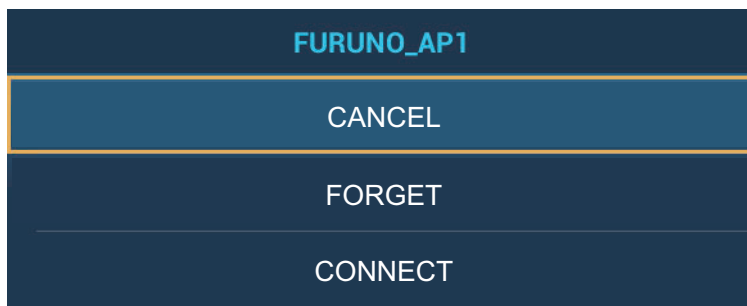
7. Tap [Connect] to show the network key input window.
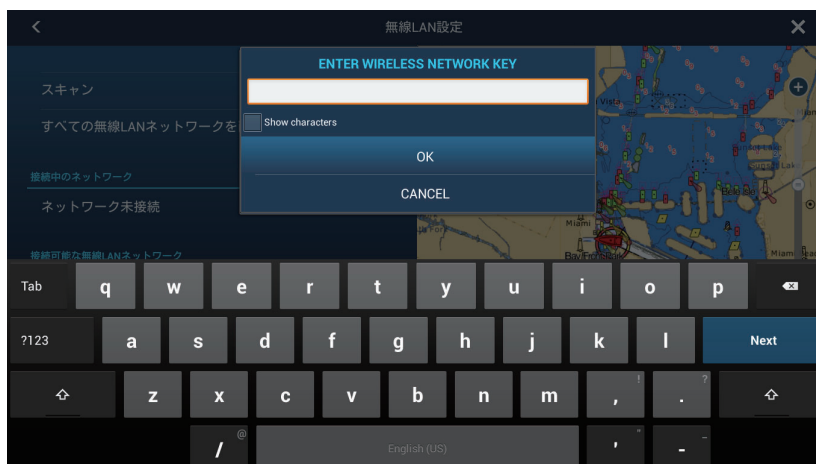
8. Enter the network key, then tap [OK].
   When the connection is successful, the network details appear below [CURRENT CONNECTED NETWORK].
   Note: If the network key is incorrect, an error message appears. Enter the correct key and tap [OK] again.

9. Tap X on the title bar to close the menu.

1.19.2 How to create a local wireless network

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

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

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

1. Open the home screen, then tap [Settings]→[General]→[Wireless LAN Settings]→[Wireless Mode].
2. Tap [Create Local Network], then tap "<" to go back one layer.

LOCAL NETWORK SETTINGS	
Name	TZTL15F
Password	XXXXXXXX
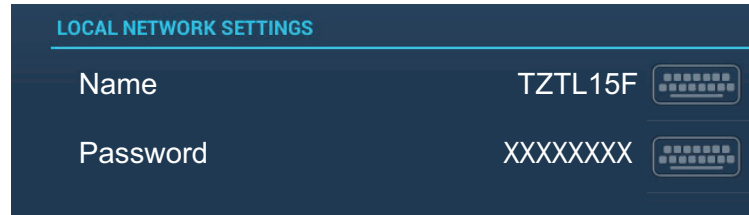
3. Tap [Name].
4. Enter the name of the network, then tap [✓].
5. Tap [Password].
6. Enter the password, then tap [✓]. (If the password is wrong, an error message appears. Tap the [OK] button then reenter the password.)
7. Turn on [Local Network] in [Wireless LAN Settings] to connect to the network.
8. Tap X on the title bar to close the menu.
9. Connect to NavNet TZtouch2 at your tablet or smartphone.

1.20 How to Create and 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 NavNet TZtouch2 to the internet. See section 1.19.

2. Open the [Settings]-[General] menu, then select [Login] in the [SOCIAL NET-WORK] section.
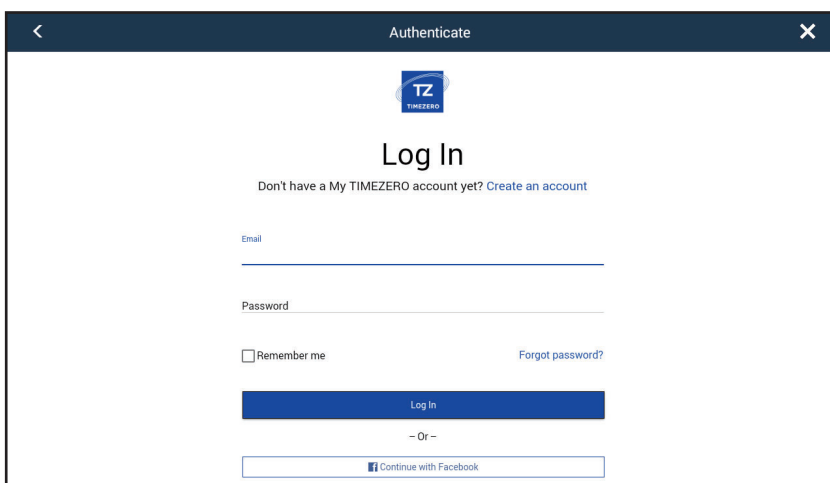
Note: You can also login with your Facebook account.

3. Tap [Create an account].
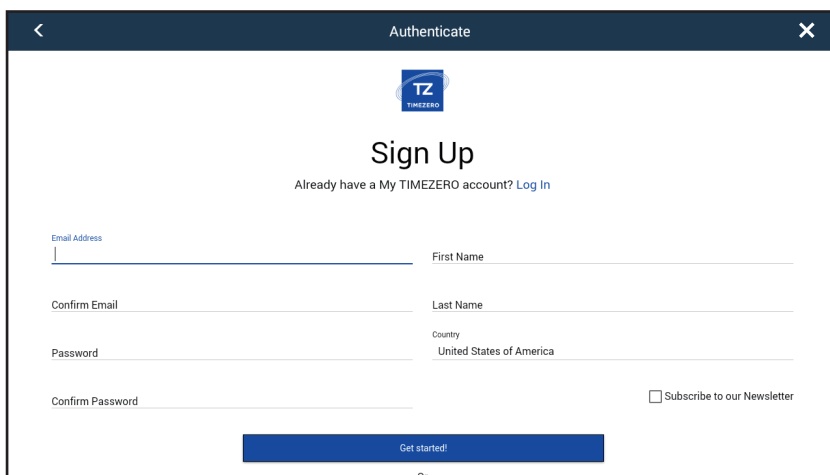
4. Fill in all fields. Check the checkbox if you want to subscribe to the Newsletter.

1. SYSTEM INTRODUCTION

5. Click [Get started!] to finish.

> **Registration successful, check your emails.**
>
> Thank you, *Your name*, an email has been sent to you at *Your e-mail address*. Please follow the link provided in this email, in order to activate your account.
>
> Go to Log In page
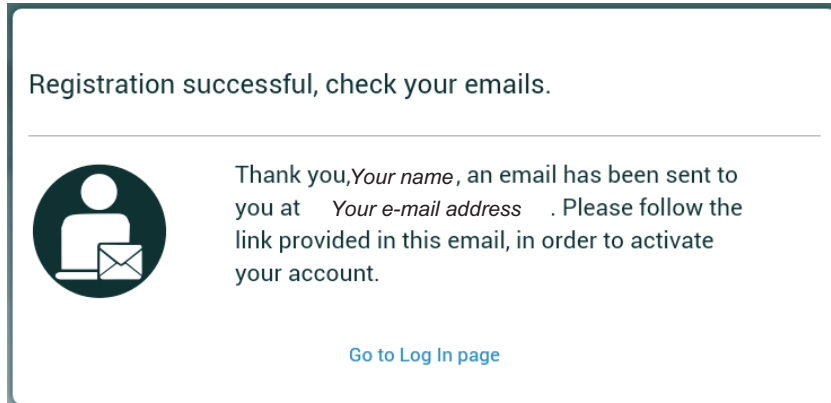
6. From a PC or mobile device, follow the link provided in the e-mail to log into your account. Leave the NavNet TZtouch2 as is.

7. Tap [Go to Log in page] on this equipment.

> **Authenticate**
>
> **TZ** TIMEZERO
>
> **Log In**
>
> Don't have a My TIMEZERO account yet? Create an account
>
> Email
>
> Password
>
> ☐ Remember me   Forgot password?
>
> Log In
>
> – Or –
>
> 🅕 Continue with Facebook
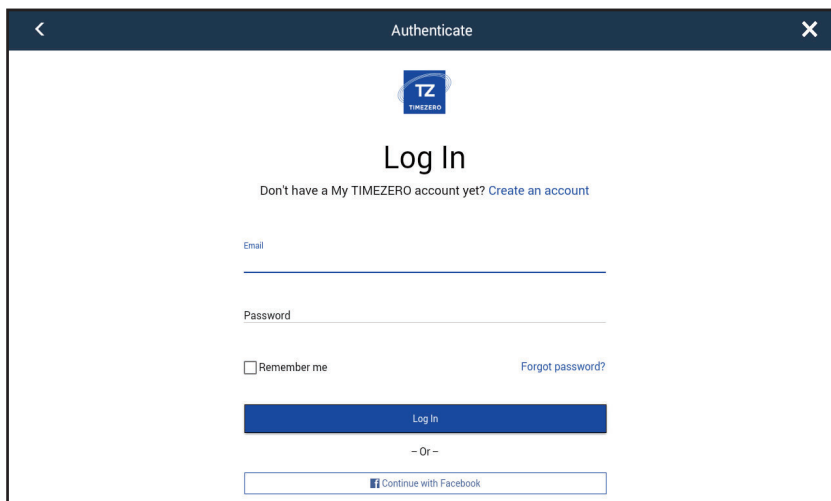
8. Enter the e-mail address used to register the account, and your password.

9. 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.

1.21 Dual Monitor Configurations

The TZT2BB supports dual monitor display, provided that the monitors are connected to the HDM1 OUT and HDMI2 OUT ports on the MPU-004. Monitors connected in this manner can be operated individually of each other.

1.22 PIN Code Lock

The PIN code lock feature allows you to require a four-digit password to be entered upon startup, keeping your data safe against theft.

Follow the procedure below to set the password.

Note 1: Make a note of your password and store it in a safe place. If the password is forgotten you cannot retrieve your user data (points, routes, tracks, boundaries, catches, photos, settings).

Note 2: Set a password for each MFD (Multi Function Display) in the network.

1. Open the [Settings]→[General] menu.

2. Turn on [Password Lock].
   You will use this password to unlock the MFD. Make a note of the password and store it in a safe place. If you forget the password, all MFDs must be restored to factory default to unlock the unit.

3. Tap [OK] to show the password input screen.
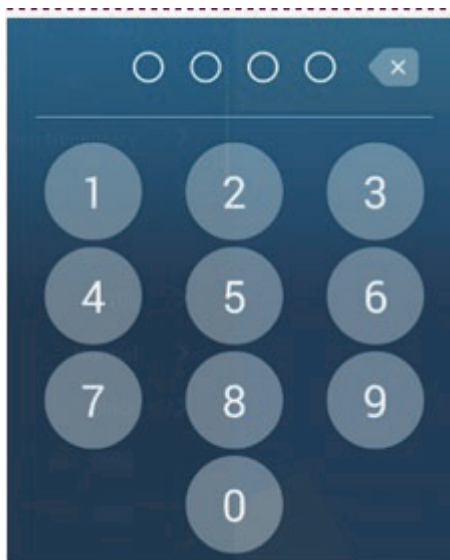
4. Enter your password with four digits. You are asked to confirm the password.

5. Re-enter your password. The message "Password protected" appears.

6. Tap [OK] to finish.

To release password protection, turn off [Password Lock] in the above procedure.The message "The password will removed and all units in the network will no longer be protected. Are you sure you want to proceed?" Tap [OK].

2. PLOTTER

This chapter shows you how to do the following:

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

2.1 Chart Type

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

There are two types of charts available with this equipment.

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

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

How to select a chart type

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

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

2.2   Display Range

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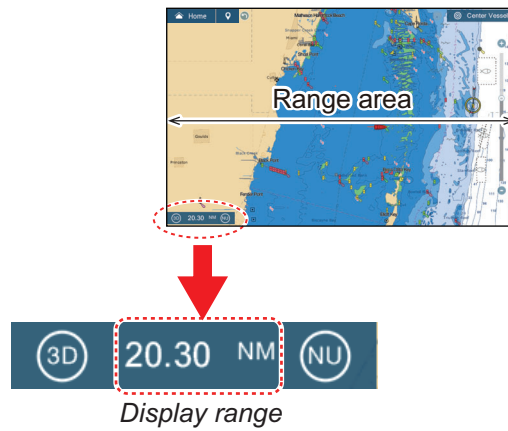
Display range

How to zoom in or out the display range

Method 1: Pinch the plotter display.

Zoom in

Zoom out
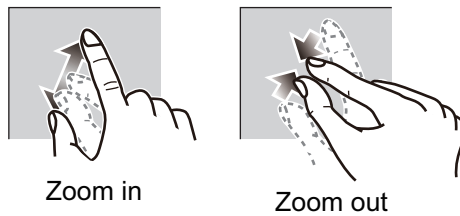
Method 2: Operate the slider to bar to adjust the display range, using one of the methods shown below.
1) Drag the slider.
2) Tap the bar.
3) Tap the "+" or "-" icon on the slider.

(The slider bar is shown in the default setting. The slider bar can be shown or hidden with [Show Scale Slider] in the [Settings] - [Plotter] menu.)

Zoom in

Drag the slider
(or tap bar or +, - icons)

Slider bar

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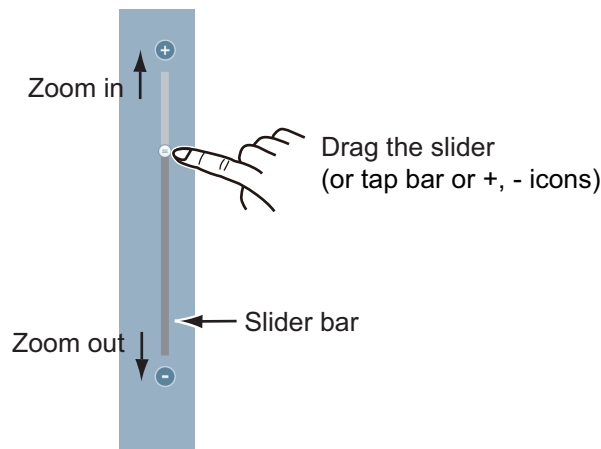
Note: You can zoom in or out the display range on the preview screen.

2.3   Orientation Mode

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

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

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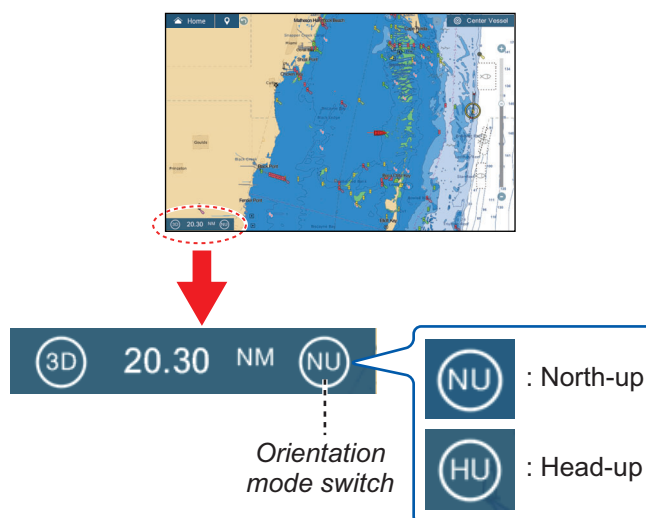
2.4   How to Move the Chart

Move the chart in the following conditions.

• Your ship is not in the current area

• Take a look at another area

• Enter a point at another location

Do the following to move the chart:

• Change the display range (section 2.2).

• Tap [Center Vessel] at the top right-hand corner of the screen to return your ship to the center of the screen.

• Switch to the 3D display by tapping the 3D icon at the bottom left corner.

2.5   The Boat Icon

2.5.1   Description

The boat icon (red) marks current position and moves according to your vessel's movement.
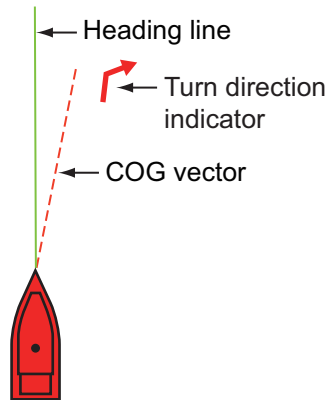
- The **heading line** is a straight line that runs from your position and shows the current heading.
- The **COG vector** is a vector line that runs from the boat icon and points in the direction in which your ship is now moving.
- The **turn direction indicator** points in the direction your vessel is turning, starboard or port. in the figure above, the starboard turn indicator is shown.

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

Tap the boat icon to show the pop-up menu. [COG] controls the COG vector; [HDG] the heading line. Note that the turn direction indicator is also turned on or off with [COG].
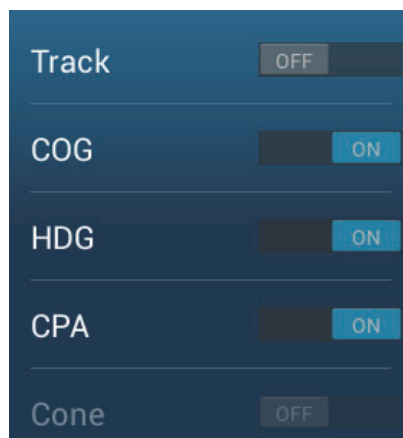
Note 1: The color of the COG vector (including the ROT indicator) can be changed. Go to the home screen, then select [Settings] - [Ship & Track] - [COG Vector Color].

Note 2: The thickness of the heading line can be changed. Go to the home screen, then select [Settings] - [Ship & Track] - [Heading Line Thickness]. Set the thickness with the software keyboard or slider bar. [1] is thinnest; [5] is thickest.

2.5.3   COG vector length

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

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

2. Tap [COG Vector].

Time	✓
Distance	

3. Tap [Distance] or [Time]. For [Distance], do steps 1) and 2) below. For [Time], go to step 4.

    1) Tap [COG Vector Length] to display the software keyboard.

    2) Set the length for the COG vector, then tap [✓]. Go to step 5.

4. Tap [COG Vector Time], then tap the time for the COG vector.

0'10s	
0'30s	
1'00s	
2'00s	✓
5'00s	
10'00s	
15'00s	
30'00s	
1h00'	
2h00'	
3h00'	
⌄	

5. Tap the close button to finish.

2.5.4   Boat icon orientation

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

1. Open the home screen, then tap [Settings] - [Ship & Track].
2. Tap [Vessel Icon Orientation].
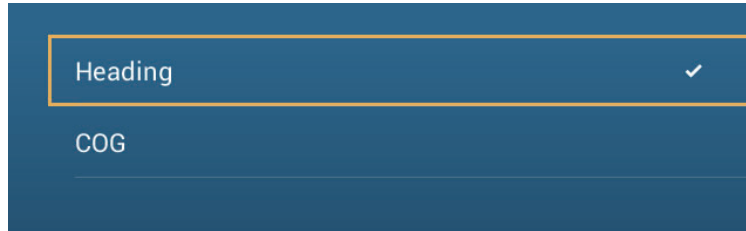
3. Tap [Heading] or [COG].
4. Tap the close button to finish.

2.6   How to Information About a Chart Object, Chart

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

2.6.1   Chart object information

Simple information

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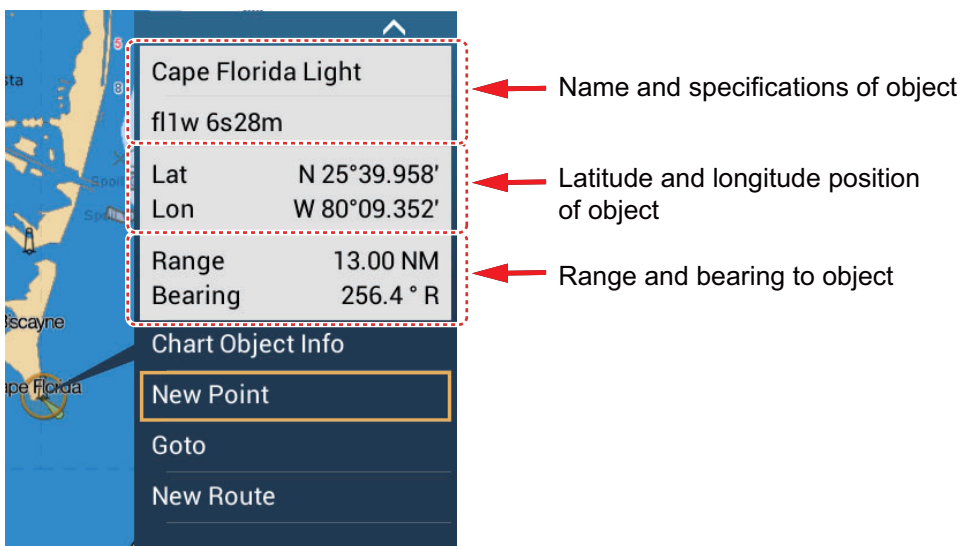
Detailed information

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

LANDMARK

Category	tower
Conspicuous	visually conspicuous
Source date	Saturday, October 5, 2002

POINT INFO

Lat	N 25°43.981'
Lon	W 80°09.634'
Bearing	163 °
Range	21.34 NM

2.6.2 Chart information

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

CHART INFO

Chart type	Vector charts
Chart manufacturer	N.O.A.A.
File name	SDUS00VS57MAP10.DBV
Chart name	US5FL22M
Chart Number	US5FL22M
Edition #	26
Revision Date	4/4/2011
Revision #	3
Chart Scale	10,000

POINT INFO

Lat	N 25°44.384'

2.7 How to Find the Range and Bearing Between Two Locations

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

1. Open the slide-out menu.

2. Tap [Distance].
   A dashed line runs between the start location and the 2nd location. The range, bearing, SOG, and TTG to the 2nd location is shown at the top of the screen.
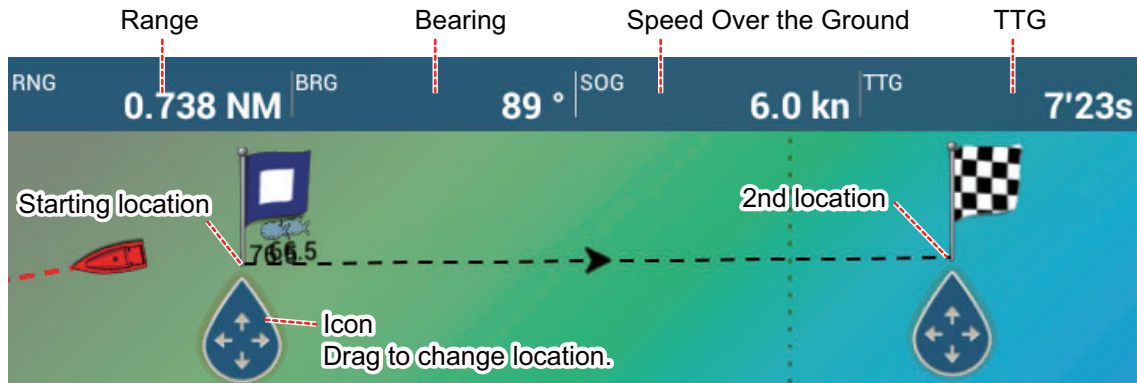
3. To change the location of either point, drag and drop.

4. To quit the distance measurement, tap [Cancel Ruler] at the top right-hand corner of the screen.

2.8   Multiple Plotter Displays

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

The following features can be adjusted individually.

- AIS
- ARPA
- Display range
- Chart orientation
- Chart type
- Scroll the chart
- Overlays (radar, sat photo, depth shading, tide icon, tidal current, ACCU-FISH^{TM} (see section 7.12), points, routes, tracks)
- 2D and 3D: Independent orientation (2D, 3D) and view point (3D) are possible.

Plotter display 2
Display range: 80.03 NM
Orientation: Head-up
Perspective: 2D
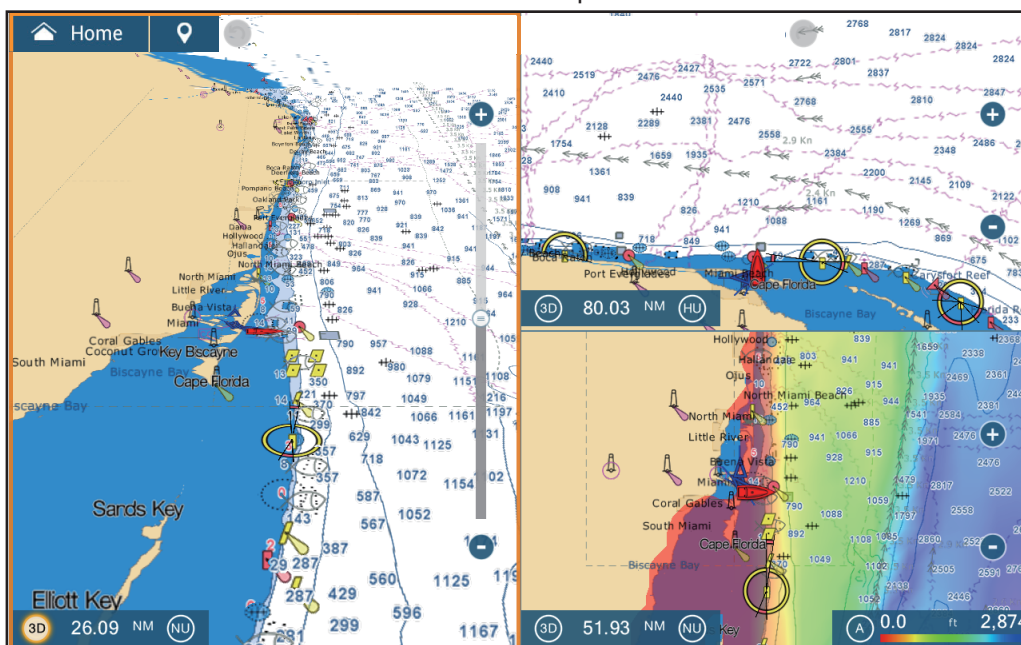
Plotter display 1
Display range: 26.09 NM
Orientation: North-up
Perspective: 3D

Plotter display 3
Display range: 51.93 NM
Orientation: North-up
Perspective: 2D
Overlay: Depth shading

2.9 Cartographic Text and Objects on Vector Charts

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

2.9.1 Control visibility of text and object information in vector charts

The [Settings] - [Vector Chart] menu controls the visibility of text and object information, for example, buoy names and light description.
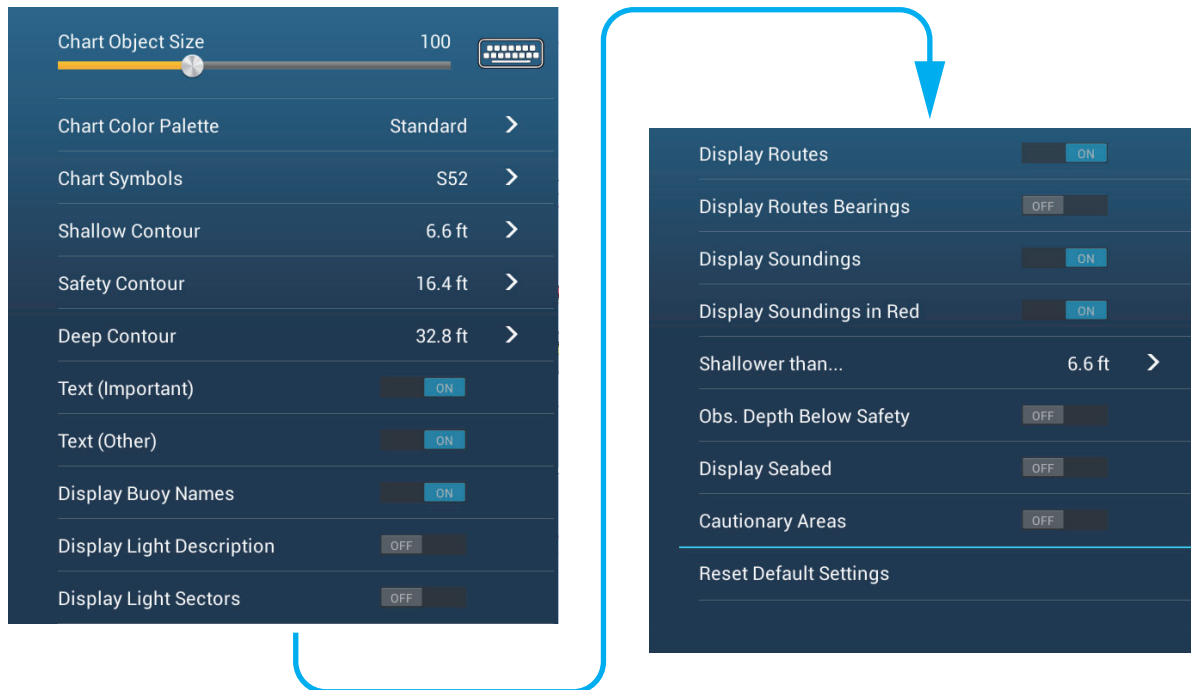
[Chart Object Size]: Drag the slider to set the chart object size (setting value: 50 to 200%).

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

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

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

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

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

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

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

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

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

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

[Display Routes]: Show or hide routes.

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

[Display Soundings]: Show or hide depth soundings.

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

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

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

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

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

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

2.9.2   Control visibility of cartographic objects in S-52 charts

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

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

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

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

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

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

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

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

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

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

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

[Radar]: Show or hide the radar buoy.

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

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

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

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

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

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

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

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

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

2.10 Alarms

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

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

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

Status bar

Alarm indication (ex. anchor watch alarm)

Anchor Alarm

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

How to open the [Alarm] menu

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

Hardware Alarm	ON
Cross Track Error Alarm	OFF
Depth Alarm	OFF
Depth Alarm Value	10.0 m
Sea Surface Temperature Alarm	Off >
Temperature Alarm Value	21.11 °C
Temp. Alarm Range Min Value	15.56 °C
Temp. Alarm Range Max Value	21.11 °C
Temp. Shear Alarm Value	0.56 °C
Speed Alarm	Off >
Speed Alarm Value	10.0 kn
Anchor Watch Alarm	OFF
Anchor Watch Alarm Value	46 m
Wind Speed Alarm	Off >
Wind Speed Alarm Value	30.0 kn

Own Ship Alarm Zone	ON
Own Ship Alarm Zone Warning	305 m
Low Fuel Alarm	OFF
Low Fuel Alarm Level	20 %
Notification Sound	ON
Notify when NAVpilot is engaged	ON
Alarm Sound	ON
Sound Alarm Until Acknowledged	ON
Save Log File	>
Reset Default Settings	

2.10.1 XTE alarm

The XTE alarm tells you when your ship goes off course by more than the limit set (XTE alarm boundaries).
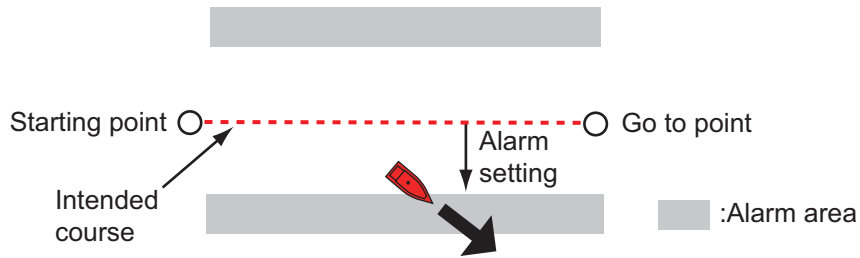
1. Turn on [XTE Alarm] in the [Alarm] menu.
2. Tap [XTE Alarm Value] to display the software keyboard.
3. Set the value, then tap [✓].
4. Tap the close button to finish.

2.10.2 Depth alarm

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

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

2.10.3 SST alarm

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

1. Tap [Sea Surface Temperature Alarm] on the [Alarm] menu.
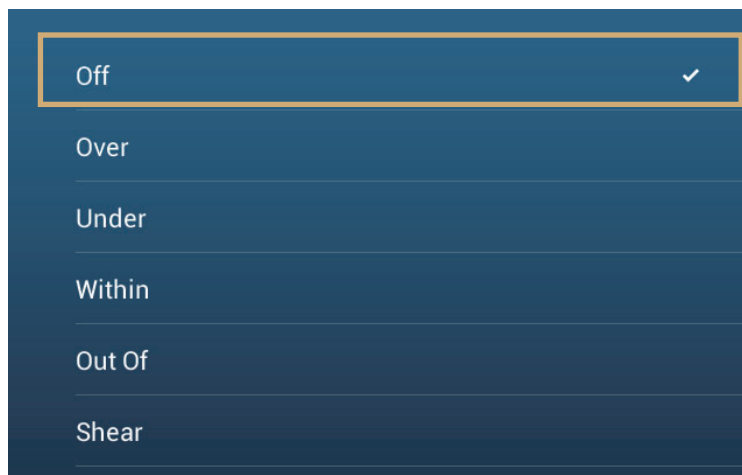
2. Tap [Over], [Under], [Within], [Out of] or [Shear]. Follow the appropriate procedure below.

[Over] or [Under]

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

1) Tap [Temperature Alarm Value] to display the software keyboard.

2) Set the value, then tap [✓]. Go to step 3.

[Within] or [Out of]

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

1) Tap [Temp. Alarm Range Min Value] to display the software keyboard.

2) Set the minimum value, then tap [✓].

3) Tap [Temp. Alarm Range Max Value] to display the software keyboard.

4) Set the minimum value, then tap [✓]. Go to step 3.

[Shear]

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

1) Tap [Temp. Shear Alarm Value] to display the software keyboard.

2) Set the value, then tap [✓]. Go to step 3.

3. Tap the close button to finish.

2.10.4 Speed alarm

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

1. Tap [Speed Alarm] on the [Alarm] menu.
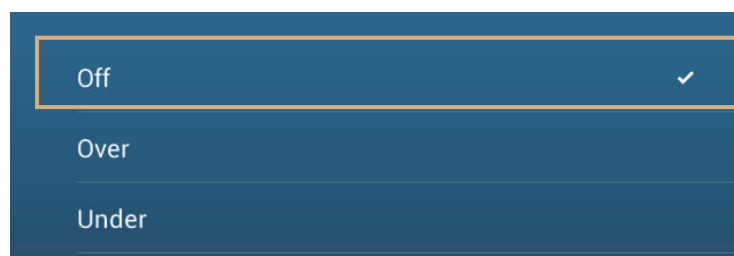
2. Tap [Over] or [Under].

3. Tap [Speed Alarm Value] to display the software keyboard.

4. Set the value for [Over] or [Under] then tap [✓].

5. Tap the close button to finish.

2.10.5   Anchor watch alarm

The anchor watch alarm tells you that your ship has moved a distance greater than the set value when the ship must not be moving.
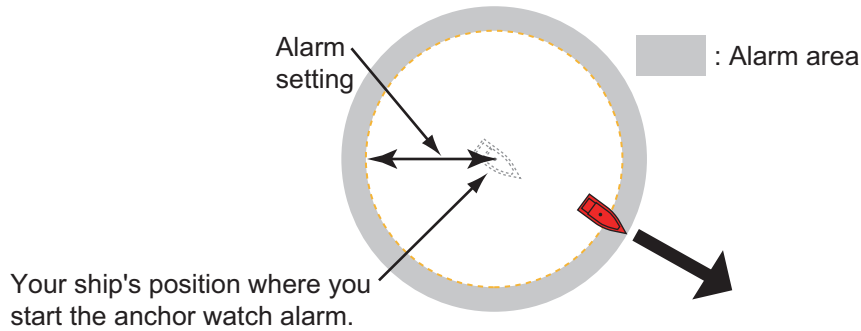
1. Turn on [Anchor Watch Alarm] in the [Alarm] menu.
2. Tap [Anchor Watch Alarm Value] to display the software keyboard.
3. Set the value, then tap [✓].
4. Tap the close button to finish.

2.10.6   Low fuel alarm

The low fuel alarm informs to a low fuel situation.

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

The low fuel alarm can be deactivated by selecting [OFF] at step 1 in the above procedure.

2.10.7   Other Alarm menu items

The followings are the alarm menu items not previously mentioned.

[Hardware Alarm]: The [OFF] setting disables hardware-related alarms.

[Notification Sound]: Activate or deactivate the notification sound (for "Waypoint Crossing" (see section 5.10), "End of Route" (section 4.13) or fish finder alarms (section 7.11)).

[Notification when NAVpilot is engaged]: Activate or deactivate the notification when the autopilot is engaged to or disengaged from this system.

[Alarm Sound]: Disable or enable the buzzer.

[Sound Alarm Until Acknowledged]: Turn this item on to sound the aural alarm until an alarm is acknowledged (see subsection 2.10.8).

[Save Log File]: Save alert list to microSD card.

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

2.10.8 Alarms list

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

Message   Date, time alarm generated

ACTIVE

Speed Alarm   1/1/2014   12:10:48 PM

Anchor Alarm   1/1/2014   12:10:18 PM

HISTORIC

Depth Alarm   1/1/2014   12:04:32 PM

Color on Status bar

2.11 Track

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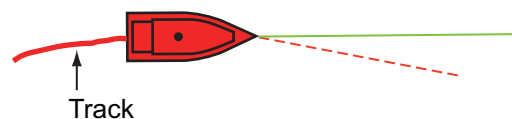
Track

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

Track is saved when the power is turned off. Unnecessary track can be deleted. Track can also be used to create a route.

2.11.1 How to start, stop recording the track

Start recording

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

Stop recording

Method 1: Tap the track, then tap [Stop Track].
Method 2: Open the slide-out menu or tap the boat icon, then turn [Track] off.

2.11.2 How to show or hide the track display

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

2.11.3 Track recording interval

Tracks are recorded at specified time or distance intervals to the internal memory of this unit.

A shorter interval gives a smoother, clearly reconstructed track, however the overall distance/time that can be recorded is shorter.

When the positioning data source is set to SC-30, or the internal GPS antenna (TZ-TL12F/15F only) is used, the following occurs:

• tracks are plotted at very short intervals for five minutes immediately behind your vessel, regardless of the recording interval selected, to give you a more accurate and smooth track.

Uses your set interval setting

5 minutes
Uses very short interval
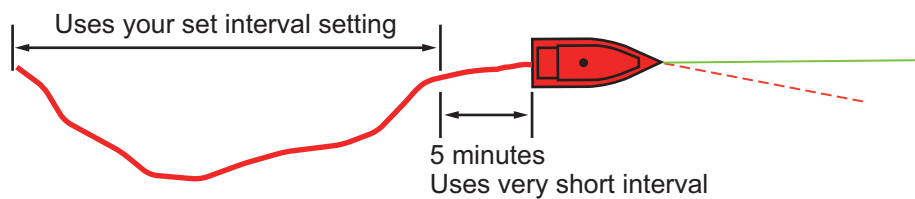
• track plotting reverts to the selected interval after the five minutes pass, or if recording is stopped within the first five minutes.

For time-based intervals

1. Open the home screen, then tap [Settings] - [Ship & Track].
2. Tap [Track Interval]→[Time], then tap "<" to go back one layer.
3. Tap [Time Interval].

0'05s	✓
0'10s	
0'30s	
1'00s	
5'00s	
10'00s	
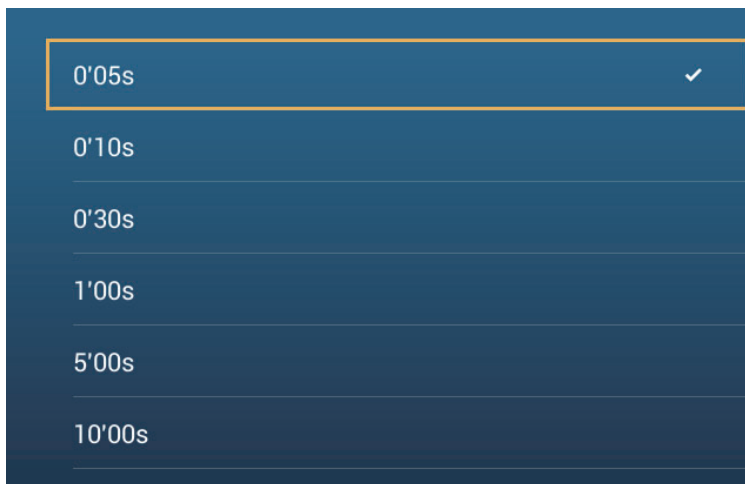
4. Tap a time interval.
5. Tap the close button to finish.

For distance-based intervals

1. Open the home screen, then tap [Settings] - [Ship & Track].
2. Tap [Track Interval]→[Distance], then tap "<" to go back one layer.
3. Tap [Distance Interval]. The software keyboard appears.
4. Input the desired interval, then tap [✓].
5. Tap the close button to finish.

2.11.4 Track color

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

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

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

From the home screen

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

2. Tap [Track Color].

3. Tap [Fixed] or [Variable]. Tap "<" to go back one layer. For [Fixed], go to the next step. For [Variable], go to step 5.

4. Tap [Fixed Color Setup] then tap a color. Go to step 10.
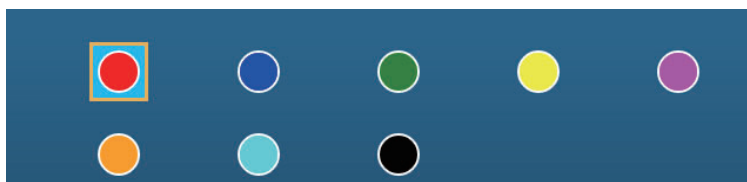
5. Tap [Variable Color] then tap an option.
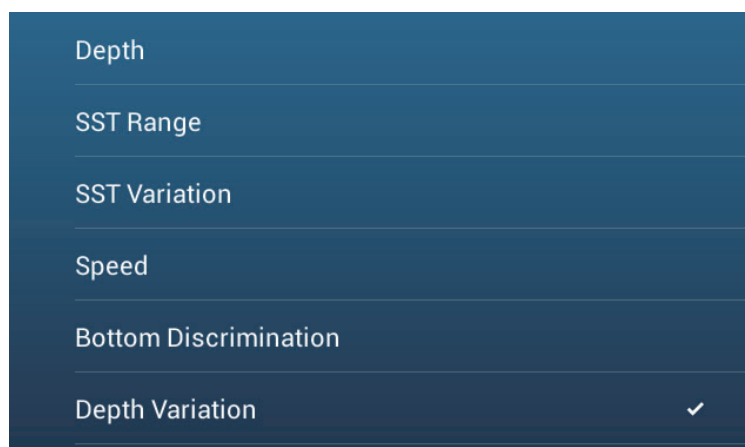
[Depth]: Change the color of the track with depth.
[SST Range]: Change the color of the track with change in sea surface temperature.
[SST Variation]: Change the color of the track according to variation in sea surface temperature. The following is an example.

Temperature range (°F)	Color
16.60 to 16.80	Red
16.81 to 17.00	Yellow
17.01 to 17.20	Green
17.21 to 17.40	Light-blue
17.41 to 17.60	Purple
17.61 to 17.80	Orange
17.81 to 18.00	Blue

18.01 to 18.20	Red
18.21 to 18.40	Yellow
18.41 to 18.60	Green

[Speed]: Change the color of the track with speed.
[Bottom Discrimination]: Change the color of the track with bottom sediment.
[Depth Variation]: Change the color of the track with depth variation. The depth at the start of track recording becomes the reference depth.

6. Tap [Variable Color Setup].

Color icon   Threshold amount

For [Depth]   For [SST Range]   For [SST Variation]

For [Speed]   For [Bottom Discrimination]   For [Depth Variation]

7. For [Bottom Discrimination], tap [Mud], [Sand], [Rock] or [Gravel]. For others, tap a color (seven choices).

8. Tap a color for each menu item.
[Depth]: Set the color for each depth range. For example, when the red icon is selected in [Color 1], the track is red for depths from 5 to 10 ft.
[SST Range]: Set the color for each range of sea surface temperature. For example, when the blue icon is selected in [Color 1] (temperature range: 10 to 15°F), the track is blue for temperatures from 10 to 15°F.
[SST Variation]: Set the color for each temperature variation. Tap [Step 0.2°F], then set each color. Do the same for [Step 2.0°F].
[Speed]: Set the color for each speed range. For example, when the blue icon is selected in [Color 1], the track is blue for speed from 0 to 5 kn.
[Bottom Discrimination]: Set the color for each bottom sediment. For example, when the blue icon is selected in [Mud], the track where mud is found is blue.
For [Depth], [SST Range], [SST Variation] and [Speed], you can change the threshold amount for each color. Tap a threshold amount to display the software

keyboard. Set the value, then tap [✓].
[Depth Variation]: Set the color for each depth variation. Tap [Step 2.0 ft], then set each color. Do the same for [Step 20.0 ft], and [Step 200.0 ft].

9. Tap X on the title bar to close the menu.

On the screen

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

2.11.5   Track thickness

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

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

2.11.6   How to create a route with past track

You can use past track to create a route. The route is saved to the routes list.

1. Tap the past track to use to create a route to show the pop-up menu.

Delete Track

Del From Here

Del Up to Here

Color
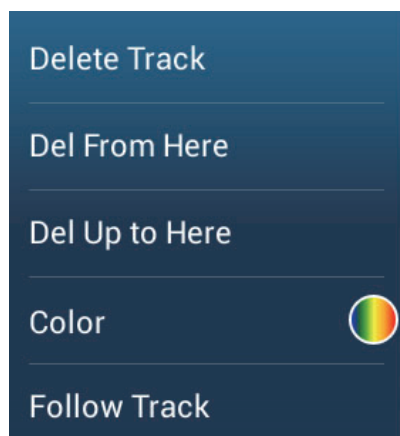
Follow Track

2. Tap [Follow Track].
    A route is created with past track. Points are automatically entered and arrows (see "1" in the illustration on the next page) point in the direction of travel.
3. Enter route name, then tap [✓].

2.11.7 How to create a route with track currently being recorded (track back)

You can create a route with track that is currently being recorded. This method can be useful for retracing track; for example, when you need to retrieve crab pots or the like. The route is saved to the routes list.

1. Tap the current track or own ship mark to show the pop-up menu.

2. Tap [Track Back].

3. Enter route name, then tap [✓].

A route is then created as shown below.

- Points are created along the route. Arrows on the route point in the direction of travel.

- A thick red dashed line runs between the starting point ("1" in the figure below) and go to point ("2" in the figure below). A solid yellow line shows the shortest distance between current position and go to point.

- Route points are highlighted in yellow.

- Arrival range and cross track error lines are shown.
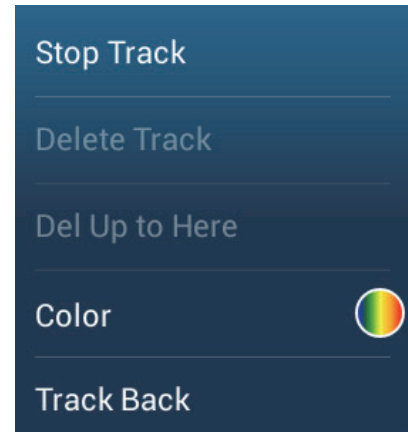
Pop-up menu when track is selected
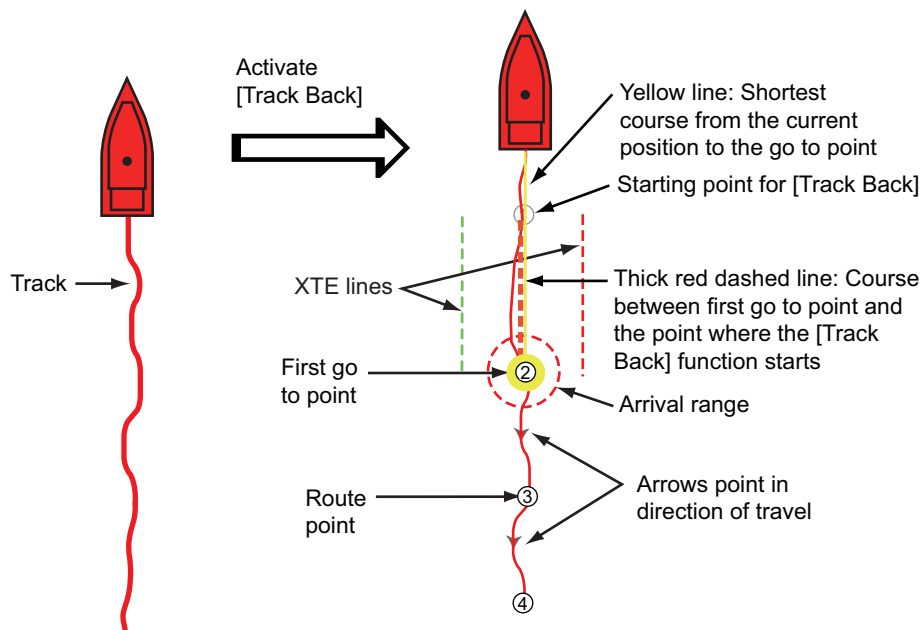
When you are following a track back route, the functions described below are available, from the pop-up menu. Tap the yellow line to display the pop-up menu. For details about each function, see chapter 5.

- [Stop Nav.]: Stop following the route.

- [Restart Nav.]: Restart following the route.

- [Insert]: Insert a waypoint.

- [Extend]: Extend a route from the last point on the route.

- [Name]: Enter a name for the route.

- [Rte Detail]: Open the [Route Detail] list.

2.11.8 How to delete tracks

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

How to delete a specific part of a track

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

How to delete all tracks

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

Automatic deleting of tracks

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

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

2.11.9 How to find the number of track points used

On the home screen, tap [Settings] - [General]. Find [Track points] in the [DATA US-AGE] section. In the example below. 15,377 track points out of 30,000 have been used.

DATA USAGE	
Points	16 / 30000
Routes	3 / 200
Track Points	15377 / 30000
Boundaries	99/100

2.12 Plotter Menu

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

Grid Interval	Off ❯
Show Scale Slider	ON
Tide/Current Icons Size	100

TRANSPARENCIES

NavData Transparency	10
PhotoFusion Transparency	15
Tide Range for PhotoFusion	0.0 ft
Tidal Currents Transparency	25

RADAR OVERLAY

Radar Transparency	20
Range Link	OFF
Echo Color	Multicolor ❯

DEPTH SHADING VALUES

Depth Shading Transparency	50
Auto Depth Shading Color Scale	ON
Minimum Value	0.0 ft
Maximum Value	200 ft
Depth Color Shade	Classic Hue ❯

3D DISPLAY

Auto Alti 3D Exaggeration	ON
3D Alti Exaggeration	3

Reset Default Settings

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

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

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

[Transparencies]

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

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

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

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

[Radar Overlay]

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

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

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

Depth Shading Values

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

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

Menu item	Reference
[3D Display] • [Auto 3D Alti Exaggeration] • [3D Alti Exaggeration]	See subsection 3.1.2.
[Depth Shading Values] • [Auto Depth Shading Color Scale] • [Minimum Value] • [Maximum Value] • [Depth Color Shade]	See subsection 3.2.1.

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

2.13 NAVpilot Series Auto Pilot

This section shows you to how to enable use of the NAVpilot with your system. For how to use the NAVpilot to steer to a point, see subsection 4.13.4.

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

• Control operation of the NAVpilot from this equipment.

• Select the NAVpilot steering mode (Auto or Nav).

• Set up the NAVpilot-300 (see subsection 2.13.4).

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

2.13.1 How to enable use of the NAVpilot

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

If [Alarm Sound when NAVpilot is Engaged] is turned on in the [Alarm] menu, a beep sounds to tell you that the NAVpilot is engaged or disengaged. Note that the beep sounds regardless of the [Alarm Sound] setting.

Note: The following PGN sentences should be turned on (in the [Initial Setup] menu) the to enable use of the autopilot with this system.

• 129283: Cross Track Error
• 129284: Navigation Data
• 129285: Navigation - Route/WP Information

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

1. Tap [DATA] or [ROUTE] on the data area to select where to show the NAVpilot control box.

2. Tap a data box or an unoccupied area to select where to show the NAVpilot control box. A pop-up menu appears.

3. Tap [NAVpilot] to show the NAVpilot control box in the area selected.

Note: The example figure below shows the NAVpilot-300 series. The turn/menu button is not shown on the NAVpilot-700 series, however all other indications are the same.

AUTO mode   Stand-by mode   NAV mode

Course adjustment buttons.
(Port=Red, STBD=Green)
Tap the single arrow for fine adjustments;
Tap the double arrow for coards adjustments.

AUTO/NAV
mode buttons.

Turn/Menu button.
Appears in all modes for
NAVpilot-300 series only.
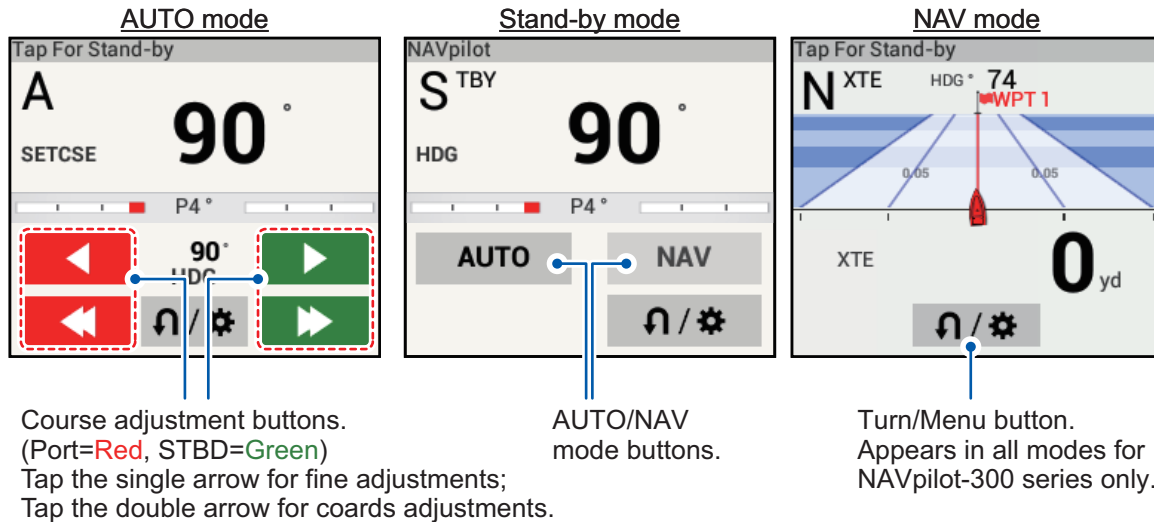
2.13.3 How to make an automated turn with the NAVpilot

1. Tap the [Turn/menu button] to show the NAVpilot menu.

2. Tap the desired turn type. For details regarding the turn types, see the NAVpilot operator's manual.

2.13.4 How to change the NAVpilot settings

1. Tap the [Turn/menu button] to show the NAVpilot menu.

2. Tap [NAVpilot Settings] to show the NAVpilot settings menu.

3. Change the settings as required. For details, see the NAVpilot operator's manual.

Note: You can also access the NAVpilot settings from [Home]→[Settings]→[Initial Setup], then tap the indication for your NAVpilot in the [NETWORK SENSOR SETUP] section.

2.14   My Friends (Social Network)

The My Friends feature marks (with a symbol), on the Plotter and Weather displays, the locations of the vessels registered to the My Friends function (see 2.15.1). A vessel must be equipped with NavNet TZ Touch 2 version 3.01 or higher, be logged into its My TimeZero™ accounts and have My Friends activated. Only friends within the WLAN range are shown.

2.14.1   How to setup My Friends

1.   Open the [Settings]-[General] menu.

2.   Login to your My TimeZero™ account at the [SOCIAL NETWORK] section.

3.   At the [Nickname] field in the [MY FRIENDS] section, the name used to register your My TimeZero™ account is shown. If desired you can change the name. Tap the keyboard, then enter a name.

4.   Tap [Manage My Friends] in the [MY FRIENDS] section.
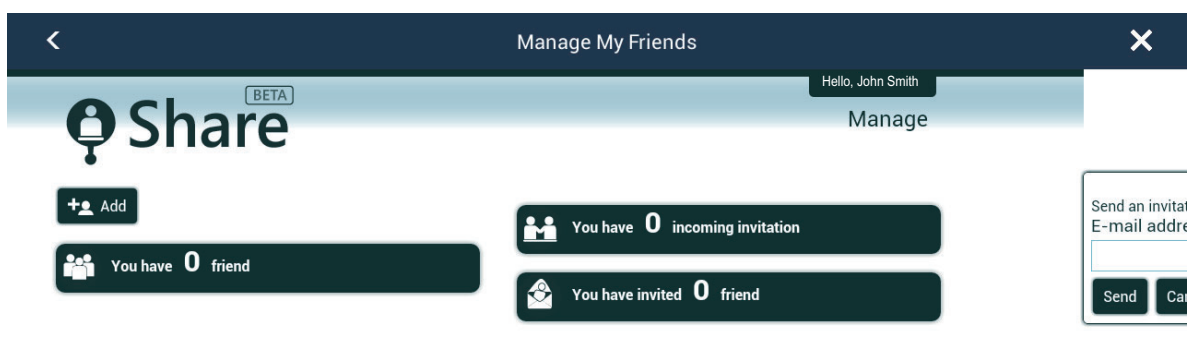
5.   Tap [+ Add].

6.   Enter friend's e-mail address then tap [Send].

7.   When the friend approves your invitation, The "You have xx friend" will reflect the addition.

2.14.2   How to show or hide the My Friends display

On the Plotter display or Weather display, open the [Layers] menu, then turn [My Friends] on or off as required.

When the My Friends display is active, the vessels that you have registered (see subsection 2.14.1) are marked with a symbol, as shown in the figure below. Tap the symbol to show detailed information about the vessel.

My Friends symbol

	Furuno
Lat	N 34°26.400'
Lon	E 135°07.104'
COG	179.7°
SOG	20.0 kn

Vessel's data (Name, geographical position, COG, SOG)
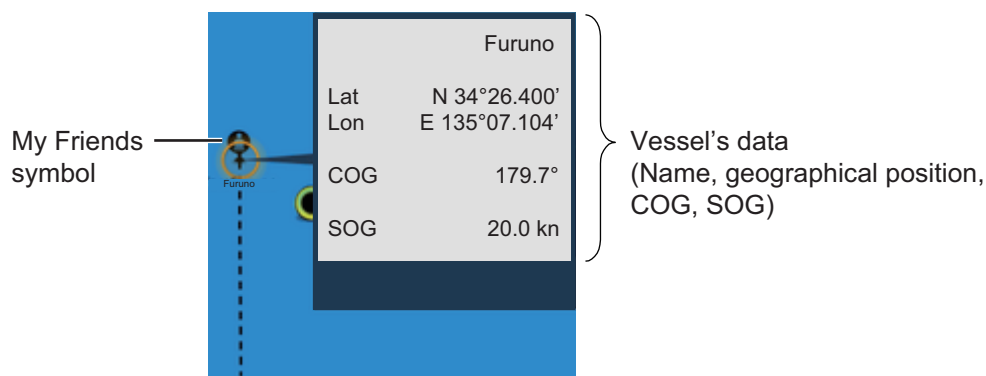
This page is intentionally left blank.

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.

Point
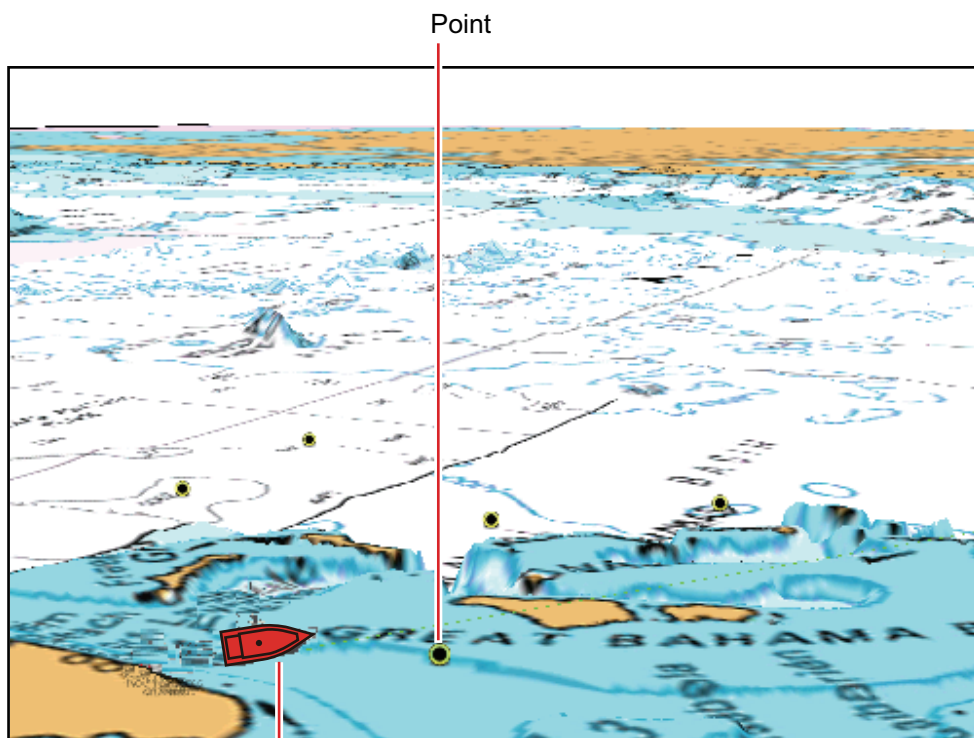
Boat icon (your ship)

3D display

3.1.1 How to activate the 3D display

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

Drag upward.
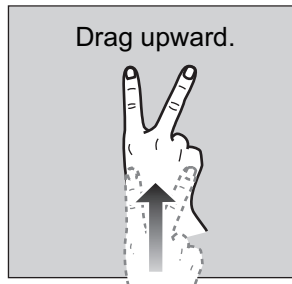
2. Tap the orientation mode switch to select an orientation mode.

3. Orientate the 3D display by dragging leftward or rightward with two fingers.
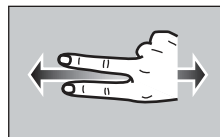
The 2D/3D display switch, orientation mode switch

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

2D display: 3D	3D 20.30 NM NU
3D display: 3D	

2D/3D display switch   Orientation mode switch

NU	: North-up
HU	: Head-up
←	: North
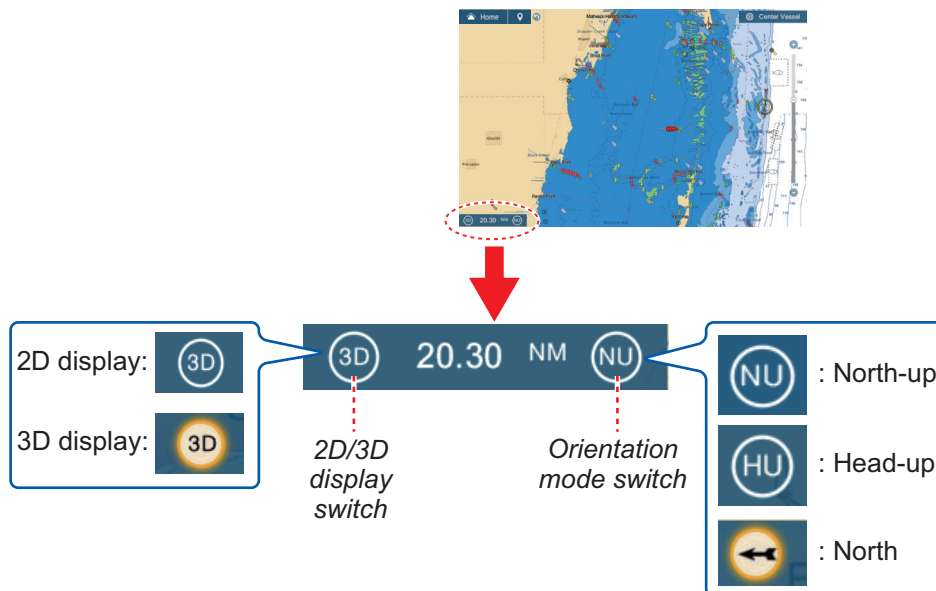
3.1.2   How to make the 3D view clearer

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

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

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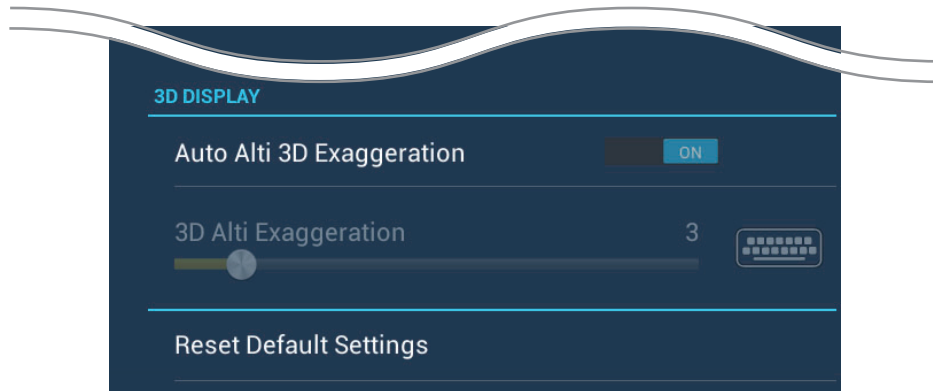
3.   Automatic method:
Turn on [Auto Alti 3D Exaggeration].
Manual method:
Turn off [Auto Alti 3D Exaggeration]. Use the slider or software keyboard at [3D Alti Exaggeration] to set the exaggeration level.
High gives the highest level of exaggeration. The example below compares the same picture in low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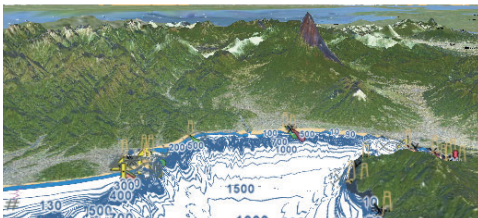
Low exaggeration
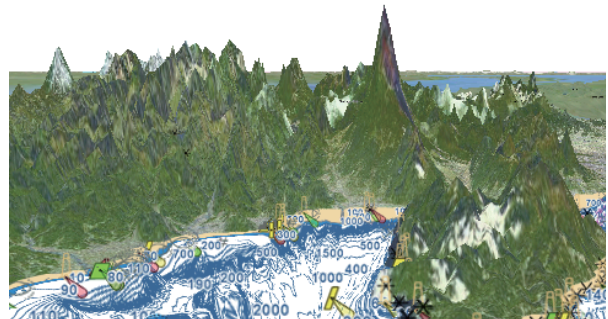
High exaggeration

4.   Tap the close button to finish.

3.2 Overlays

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

3.2.1 Depth shading overlay

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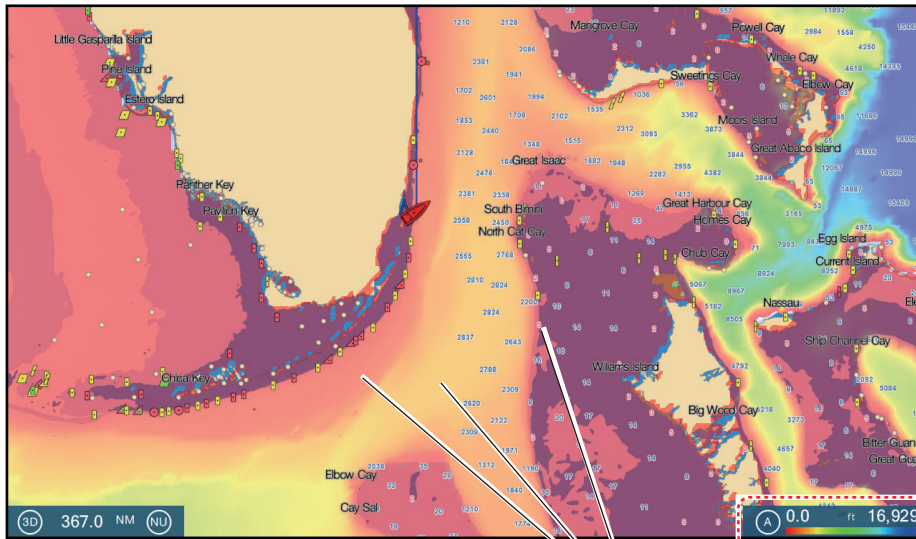
Depth shading

Minimum value   Maximum value

Manual mode

Auto mode

You can turn the automatic depth shading color scale adjustment on or off (auto, manual) by tapping the "A".
Automatic mode:
Depth shading is set according to the depth shading values set in the menu (Settings→Plotter).
Manual mode:
1) Tap the minimum value (maximum value) at left side (right side) of scale.
2) Drag the slider bar at right side of screen to set value.
3) Tap [End] to complete.

3. 3D DISPLAY, OVERLAYS

Depth shading settings

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

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

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

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

[Depth Color Shade]: Select how to display the depth colors among [Classic Hue], [Inverted Classic Hue], [Red Hue], [Blue Hue], [Green Hue] and [Yellow Hue].
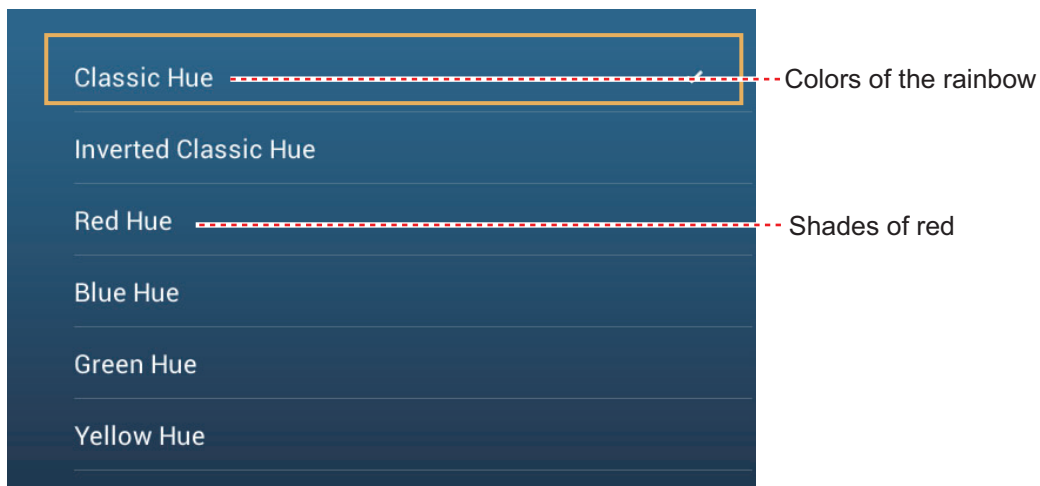
[Depth Shading Transparency]: Adjust the degree of transparency of the depth shading overlay.

3.2.2   Satellite photo overlay

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

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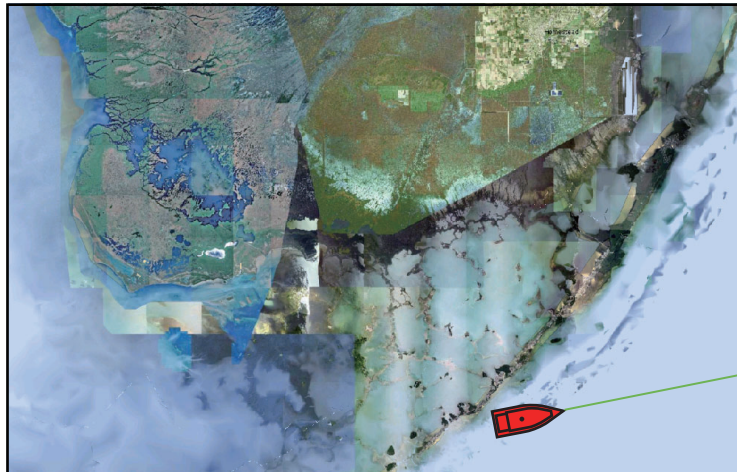
How to set satellite photo transparency on water

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

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

3.2.3   Radar overlay

The radar overlay display puts the radar picture on the top of the navigation chart. To display the radar overlay, open the [Layers] menu, then turn on [Radar Overlay].
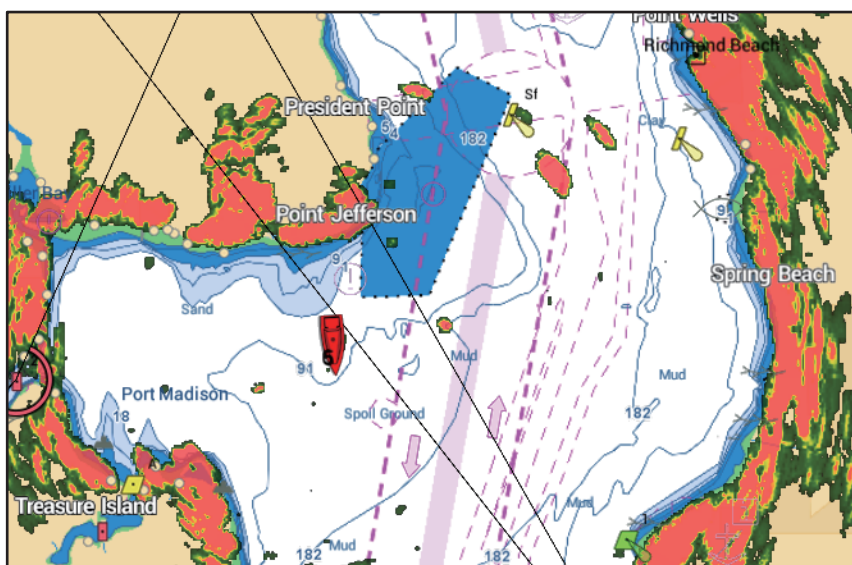
How to switch between stand-by and TX; match overlay and radar ranges

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

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

Tap to sync radar and overlay ranges.
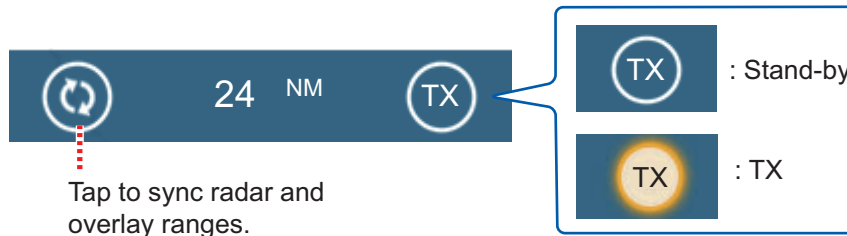
How to set the level of the radar echo transparency

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

How to adjust radar gain, sea, rain

The gain and sea and rain clutters can be adjusted from the navigation data display. See sections 6.3 - 6.5.

How to select the echo color

Open the home screen, then tap Settings - [Plotter] - [Echo Color]. Tap [Multicolor], [Green] or [Yellow].
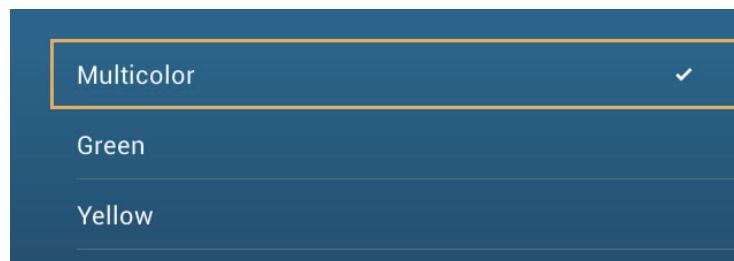
How to acquire a target for ARPA

A target can be acquired for ARPA. See subsection 6.27.2.

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.

3.2.4   Tide info overlay

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

How to display the tide info overlay

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

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

Tide icon
(yellow
and/or
gray)
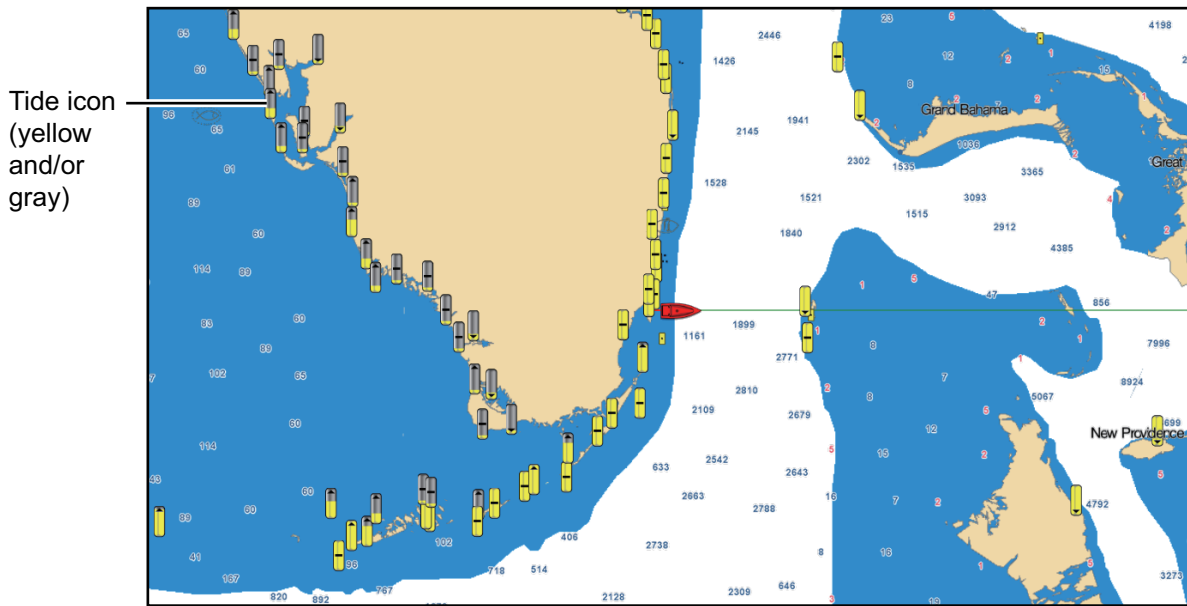
 : Up arrow indicates the tide is going high.   : Down arrow indicates the tide is going low.

 : No arrow indicates no change in tide.

How to change the size of the tide icon

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

How to show the tide information

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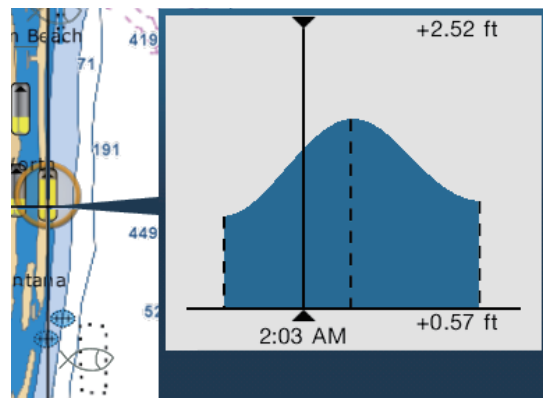
How to display the tide graph

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

Clock icon   Time scale   Tide height at the selected time
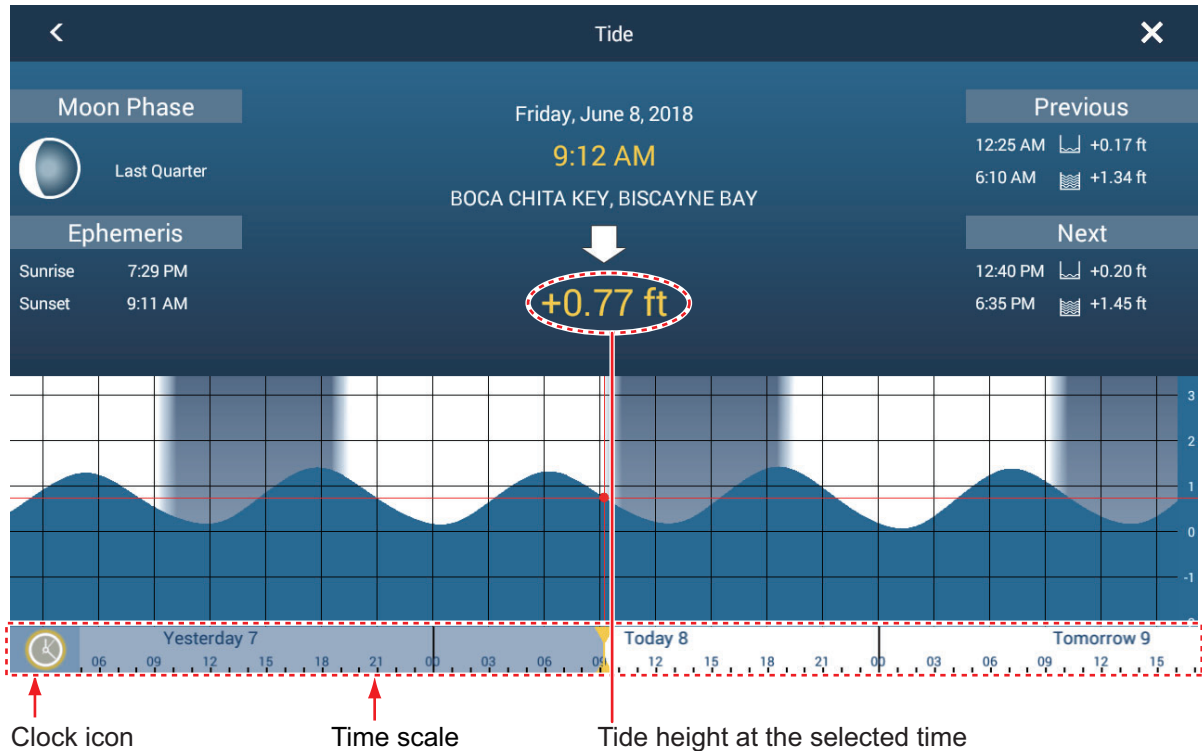
How to read the tide graph

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

Clock icon for the current time   Clock icon other than the current time

- To exit the screen, tap the close button.

3.2.5 Tidal current overlay

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

How to display the tidal current overlay

Open the [Layers] menu, then turn [Tidal Currents] on. Arrows of more than one color and size appear on the screen and are pointing in different directions.
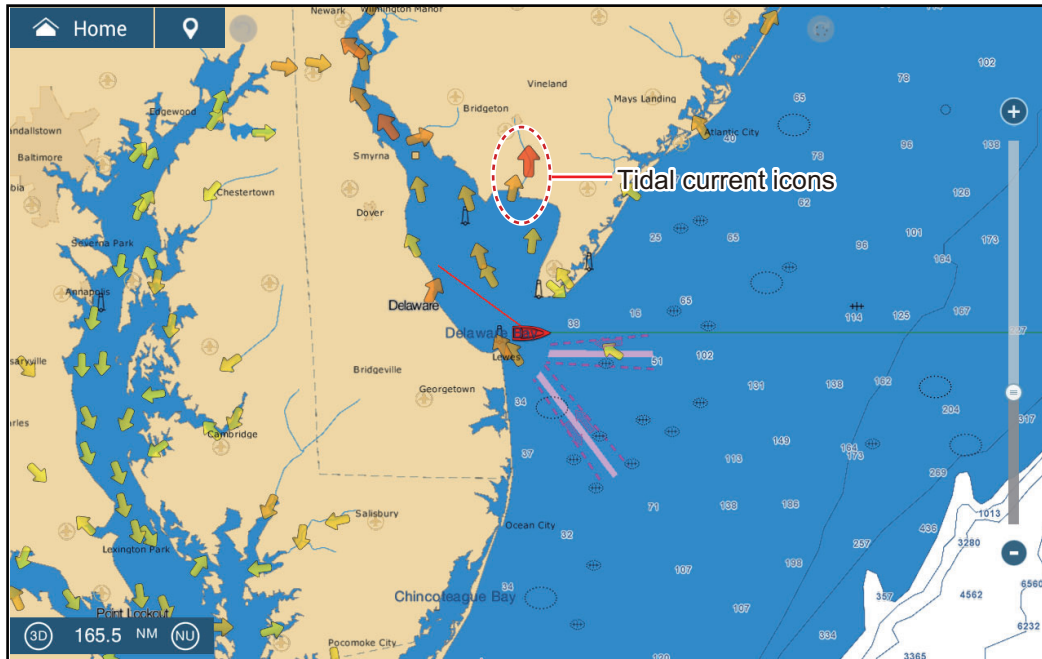
The arrows point in the direction of tidal current movement. The size and color of the arrows indicates the tidal current speed - yellow, slow; orange, medium; red, fast).

How to change the tidal current icon size

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

How to show the tidal current information

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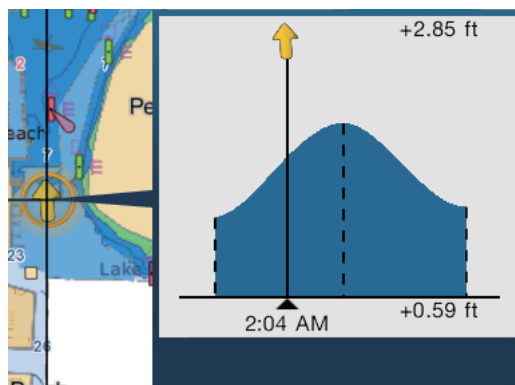
How to display the tidal current graph

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

Clock icon   Time scale   Tidal current speed at the selected time
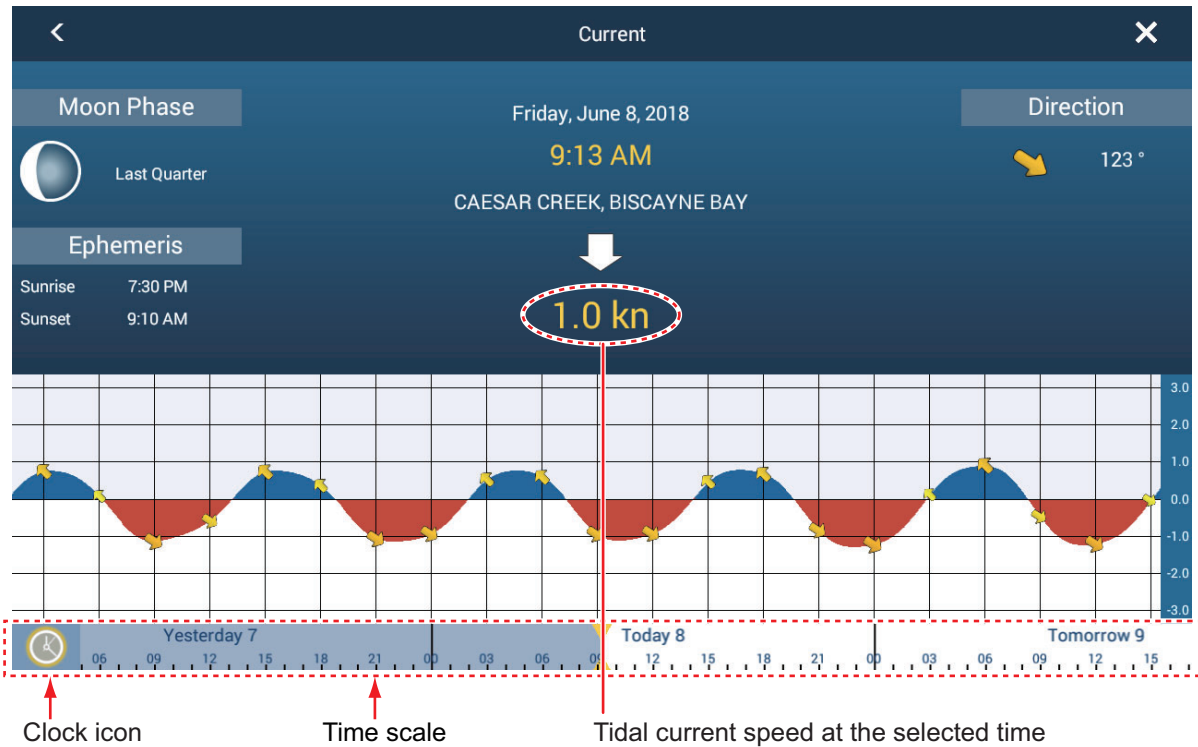
How to read the tidal current graph

- Vertical axis: Speed, Horizontal axis: Time

- The information is mostly accurate under moderate weather conditions. However, storms and weather fronts can influence forecasted tidal current directions and speeds.

- Drag the time scale at the bottom of the screen sideways then read the tidal current speed at the selected time (drag to the left to display the future information, right for the past information).

- To set the time scale to the current time, tap the clock icon at the bottom left-hand corner of the screen to show the clock mark in yellow-white.

Clock icon for the current time   Clock icon other than the current time

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

This page is intentionally left blank.

4. POINTS, BOUNDARIES

4.1 About Points, Event Marks

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

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

When you enter a point it 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 for chart plotter, radar and weather displays (black circle in yellow circle)

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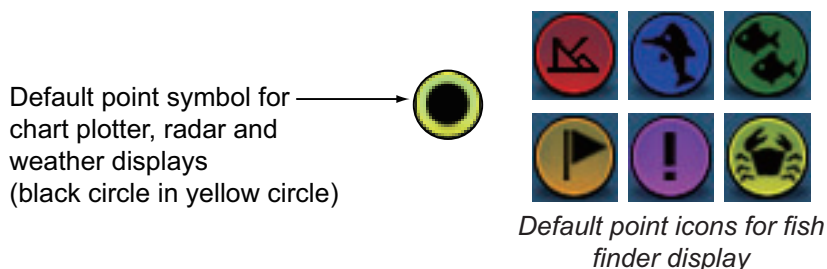
An event mark is used to mark current position on the plotter, radar, sounder and weather displays. When you enter an event mark, it is entered on all of the above-mentioned displays, with the event mark icon selected. The default event marks are shown in the right figure. You can change them with the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

Event mark default icons

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

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

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

4.2 How to Enter a Point, Event Mark

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

Method 1: Directly on-screen

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

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

Lat	N 50°53.481'
Lon	W 1°24.010'
Range	3,917 NM
Bearing	337.4 ° R

| New Point |
| Goto |
| New Route |
| Tide |
| Chart Info |
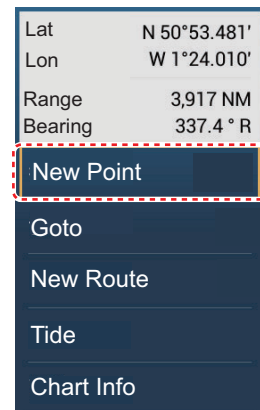
Method 2: Manual input (excluding Fish Finder display)

Open the slide-out menu, then tap [Lat/Lon]. The position shown is latitude/longitude of the center of the displayed area. Edit the position as required. Tap [✓] to register the point and close the keyboard.

Cursor (light blue)

Create Point

N 34°31.585'
E 135°09.130'

Latitude and Longitude for displayed screen's center.

1	2	3
4	5	6
7	8	9

N

S

Switch coordinate: N↔S, E↔W

Units   ✕   0   ✓   ‹ ›

Position display format
Select position display format from pull-down menu.

Move cursor
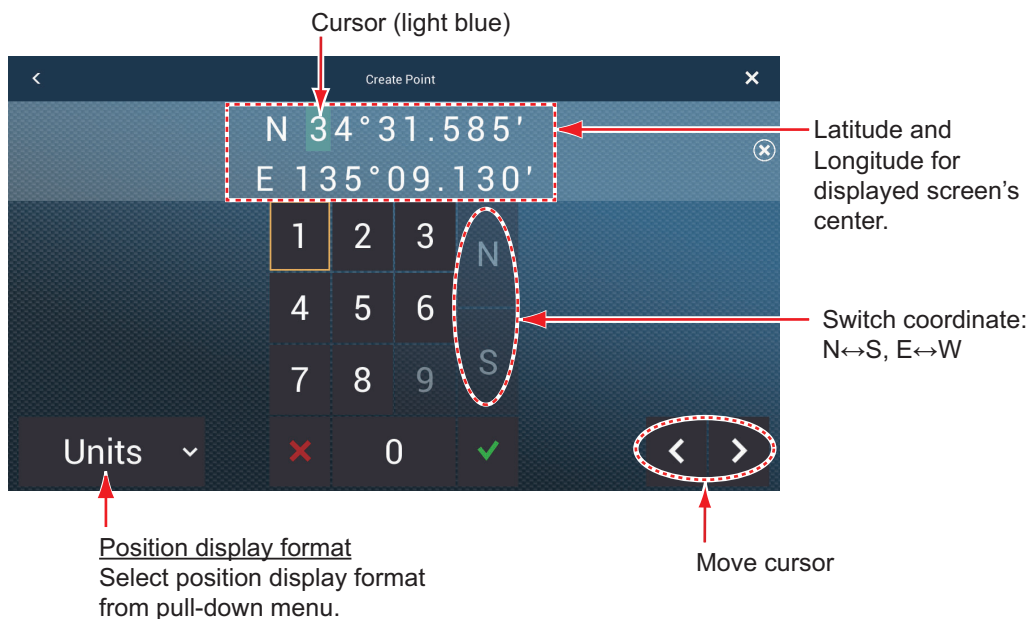
Method 3: Register point on the Points list

External equipment (fish finder, etc.) can output points to this equipment. TLL data (NMEA 0183 format) from the external equipment is output to this equipment via an NMEA data converter (IF-NMEA2K2, option). The latitude and longitude position of the point is marked with the event icon.

1. On the home screen, tap [Lists]→[Points] to show the Points list.
2. Tap the [Add Point] button at top of the screen. The [Point Edition] screen shows the latitude and longitude of the point to be registered and its location (on the preview screen).

3. Edit the point referring to section 4.7.4.

4. Tap X on the title bar to close the menu.

Method 4: Input from external equipment

External equipment (fish finder, etc.) can output points to this equipment. TLL data (NMEA 0183 format) from the external equipment is output to this equipment via an NMEA data converter (IF-NMEA2K2, option). The latitude and longitude position of the point is marked with the event icon.

4.2.2 How to enter an event mark

Method 1: EVENT key (MCU-005 only)

Press the **EVENT** key. The event mark is automatically named as "WPXXX" (XXX=3 digit number, sequential). You can turn off automatic naming (only the icon is shown) of a point. See section 4.11.

Method 2: Creating Events window

At the top left corner, tap the event icon to show the [Creating Events] window. Tap desired event mark.
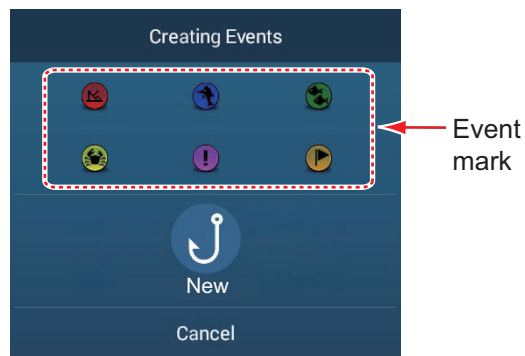
Method 3: Two-finger tap

An event mark can be entered by tapping the screen with two fingers. To enable this function, open [Settings]→[General]. Set [Two Finger Tap Function] (or [Two Finger Long Tap Function] for [Event Mark] (see section 1.16). Then, tap (long tap if the function is set up for long tap) the screen with two fingers to show the [Creating Events] window. Tap the desired mark.

4.3   How to Display Point, Event Mark Information

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

Lat	N 41°47.477'
Lon	W 56°03.600'
Range	284.2 NM
Bearing	55.8 °
Goto	
Move	
New Route	
Name	
Comment	
Symbol	⌄
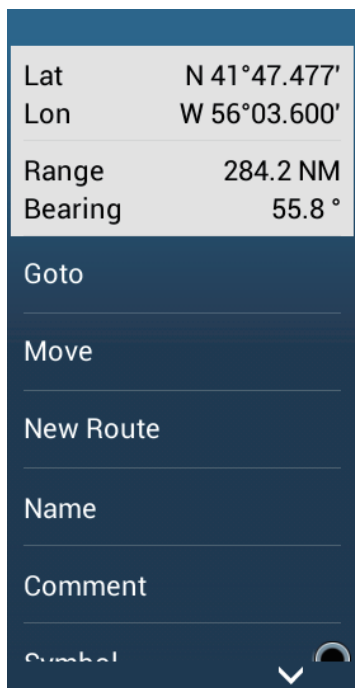
*Point, event mark information
(Plotter and radar displays)*

Range	102 yd
Depth	161 ft
New Point	
Goto	
Frequency	>
Mode	>
Adjust	>
Auto Range	OFF
A-Scope	OFF
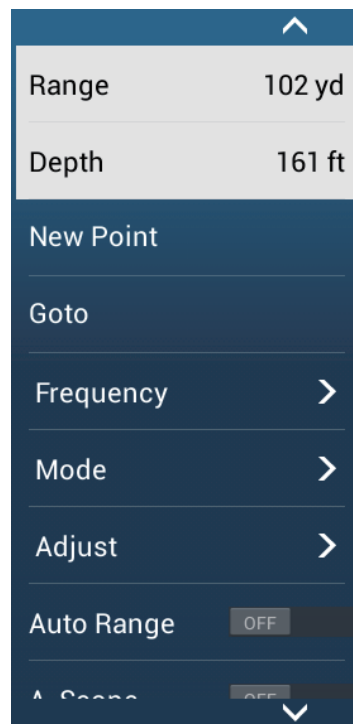
*Event mark information
(Sounder display)*

4.4 Event Mark Comment

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

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

2. Tap [Data to Be Recorded in Event Comment].

3. Tap an option.
   [None]: No comment
   [Date]: Date
   [SST]: Sea surface temperature
   [Date And SST]: Date and sea surface temperature

4. Tap the close button to finish.

4.5 Default Point, Event Mark Settings

4.5.1 Default point settings

The equipment saves a point in the shape, color and size assigned on the [Points] menu. If the default point settings are not to your liking, change them as shown in the procedure below.
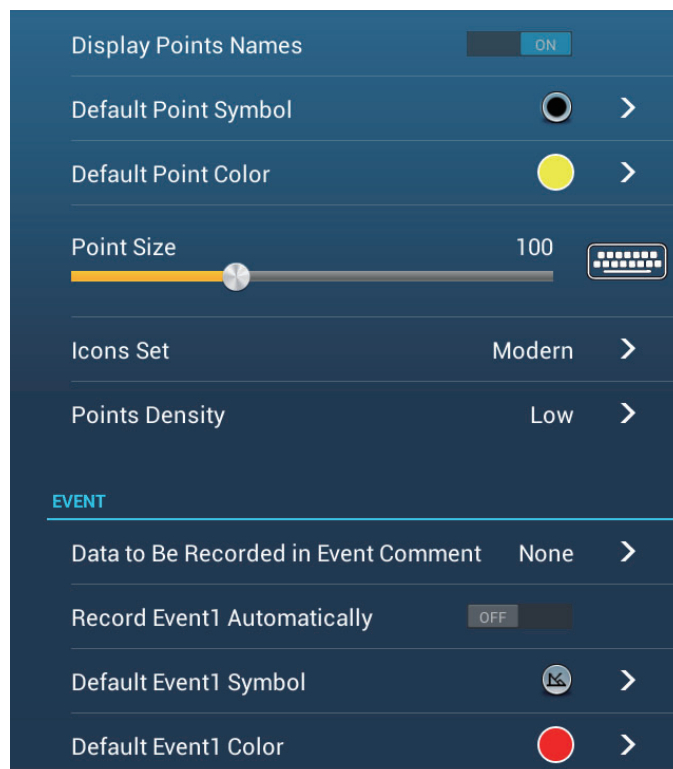
1. Open the home screen, then tap [Settings] - [Points].

2. Tap [Default Point Symbol], [Default Point Color], or [Icons Set].
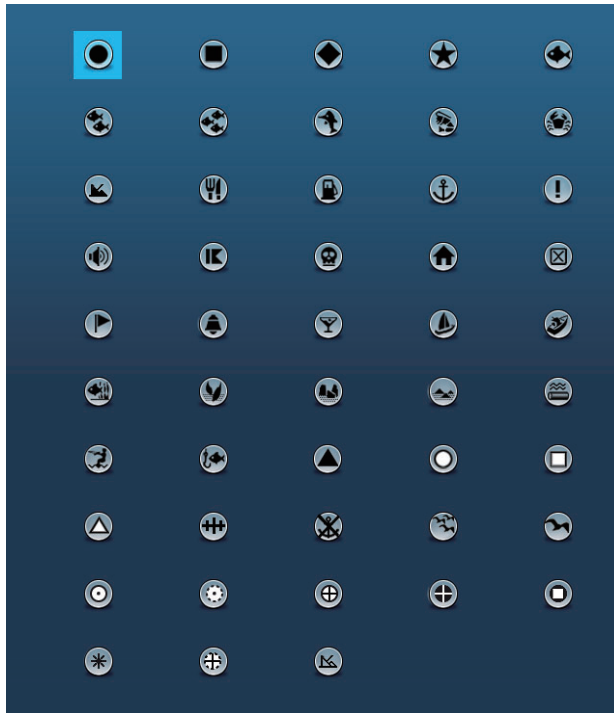
[Default Point Symbol]
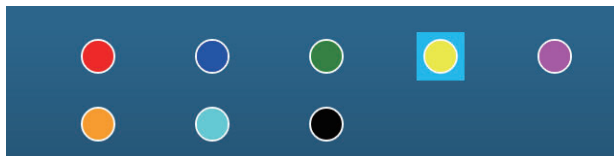
[Default Point Color]
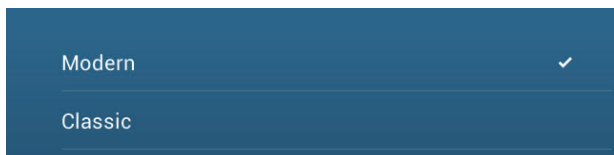
[Icons Set]

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

4. Tap the close button to finish.

4.5.2   Default event mark settings

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

2.   Tap [Default Event1 Symbol], [Default Event1 Color], or [Icons Set].
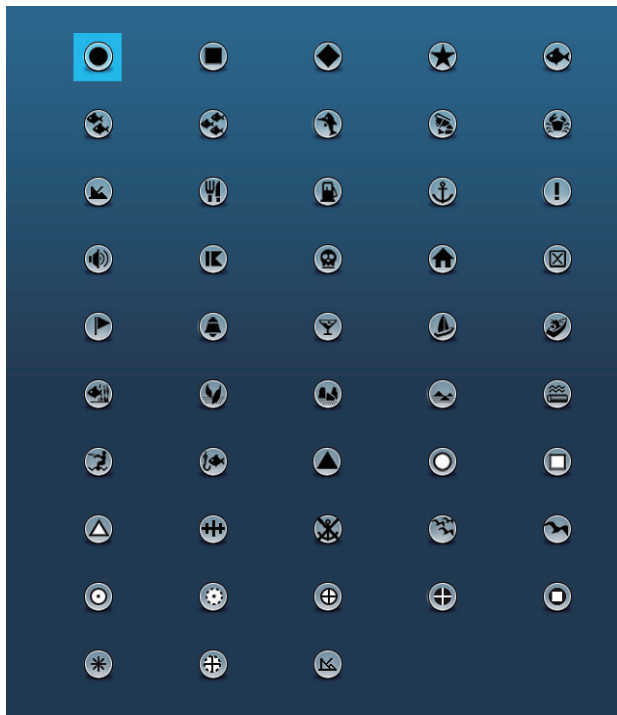
[Default Event1 Symbol]
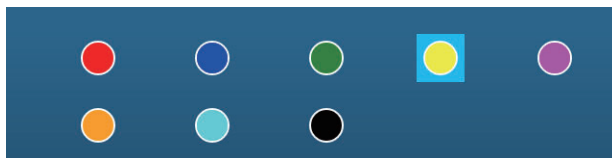
[Default Event1 Color]

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

4.   Tap the close button to finish.

Note: If you do not require event marks 2 - 6, turn on [Record Event1 Automatically] in the [Points] menu. In this case, the pop-up menu does not appear when you register an event mark. See section 4.2.2.

4.6   How to Find Number of Points Used

Open the home screen, then tap [Settings] - [General]. Find [Points] in the [DATA USAGE] section. In the example below, 16 of 30,000 points have been used.

DATA USAGE	
Points	16 / 30000
Routes	3 / 200
Track Points	15377 / 30000
Boundaries	99/100

4.7 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.

4.7.1 How to show the points list

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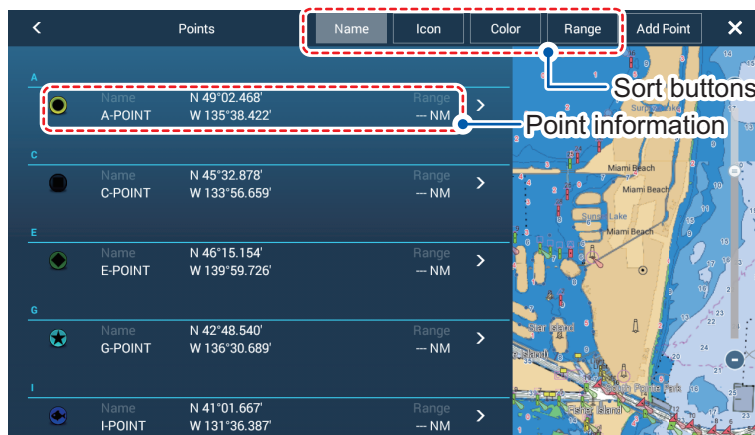
4.7.2 How to sort the points list

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

1. Open the home screen, then tap [Lists].
2. Tap [Points] to open the points list.
3. Tap the appropriate sort button, at the top of the list.

4.7.3 How to search the points list

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

1. Open the home screen, then tap [Lists].
2. Tap [Points] to open the points list.
3. Tap the appropriate sort button, at the top of the list. This will be the main method for the search.
4. Tap the name, icon or color as appropriate, from the above-left of a point in the list (see the figure below for reference). For the purpose of this example, the list in the following figure is sorted by name.

The search options appear.
For searches by name, an alphabet appears. If a point starts with a particular letter, the letter is highlighted, as shown in the example below.
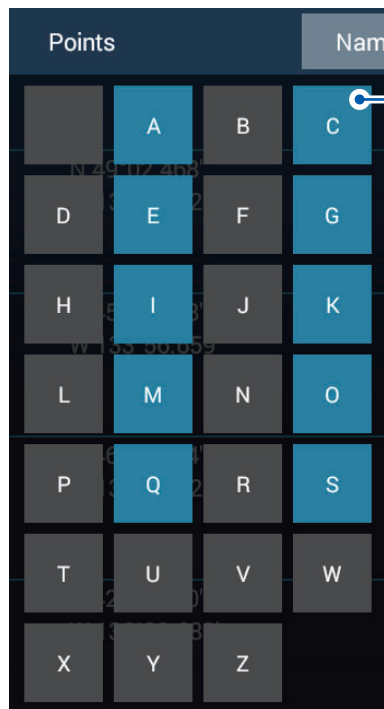
Points which start with a particular letter have the first letter highlighted in the search options. In this example, the points list has points which start with the letter highlighted in blue. Grayed out letters indicate that no saved point names begin with that letter.

For searches by icon or color, the available search options appear.

5. Tap the letter, icon or color you want to search for. The list moves to show the search results.

4.7.4   How to view and edit point details

You can view and edit the name, location, comment, color and icon of points.

1. Open the home screen, then tap [Lists].
2. Tap [Points] to open the points list.
3. Tap the point you want to view or edit. The point details appear on the left-hand section of the screen, and the point is also centered on the plotter display in the right-hand section of the screen. For this example, "K-POINT" is selected.
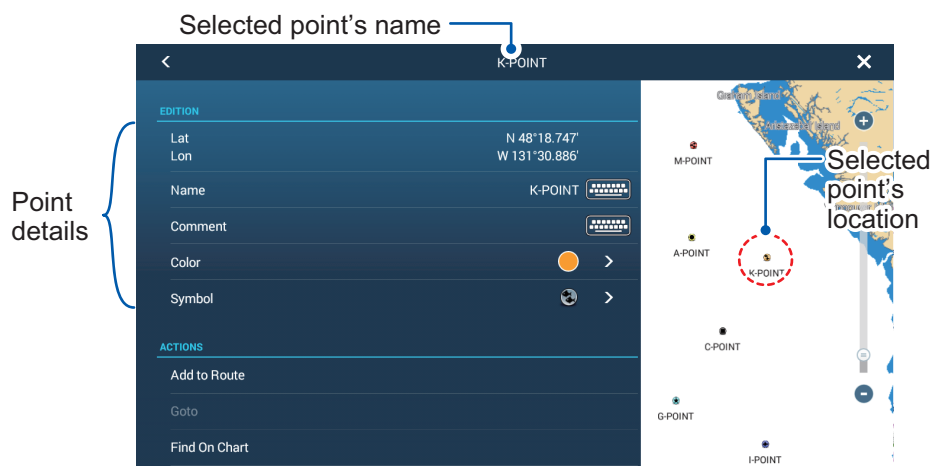
4. Tap the detail(s) you want to edit, then edit as required.
5. Tap the [×] at the top-right of the details screen to close the screen.

4.7.5   How to edit a point on the screen

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

Lat	N 39°07.370'
Lon	W 61°11.489'
Range	1,114 NM
Bearing	63.6 °

Goto

Point editing tools →

Name

Comment

Symbol   ⬤

Color   🟡

Edit Pos

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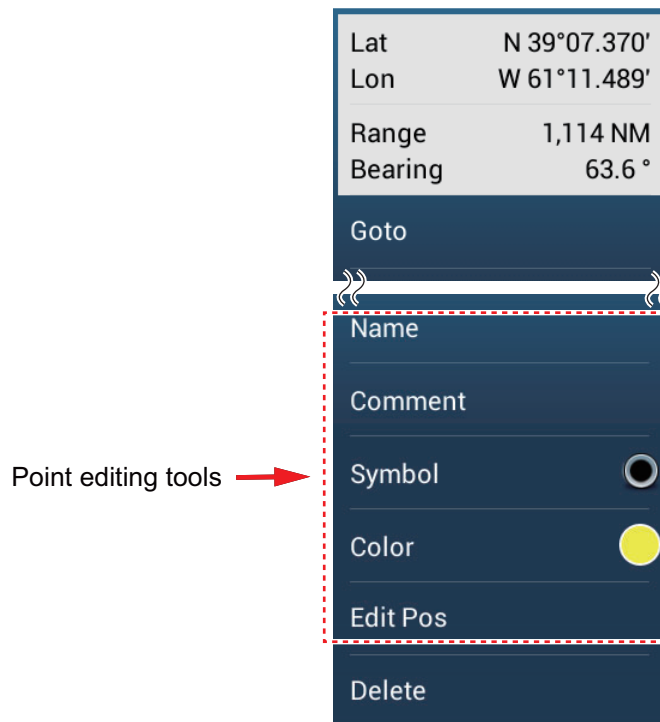
2. To change the name of the point, tap [Name] to display the software keyboard. Change the name as follows:

    1) Tap the character to edit.

Confirm entry.

Clear all characters.

Delete character selected.

Cursor

Name

Q W E R T Y U I O P ⌫

A S D F G H J K L

✕ Z X C V B N M ✓

Space   123 ‹ ›

Name

1 2 3 +

4 5 6

7 8 9 −

✕ 0 ✓   ABC ‹ ›

Close keyboard without saving.

Switch to the numeric software keyboard.

Shift cursor.

Switch to the alphabet software keyboard.
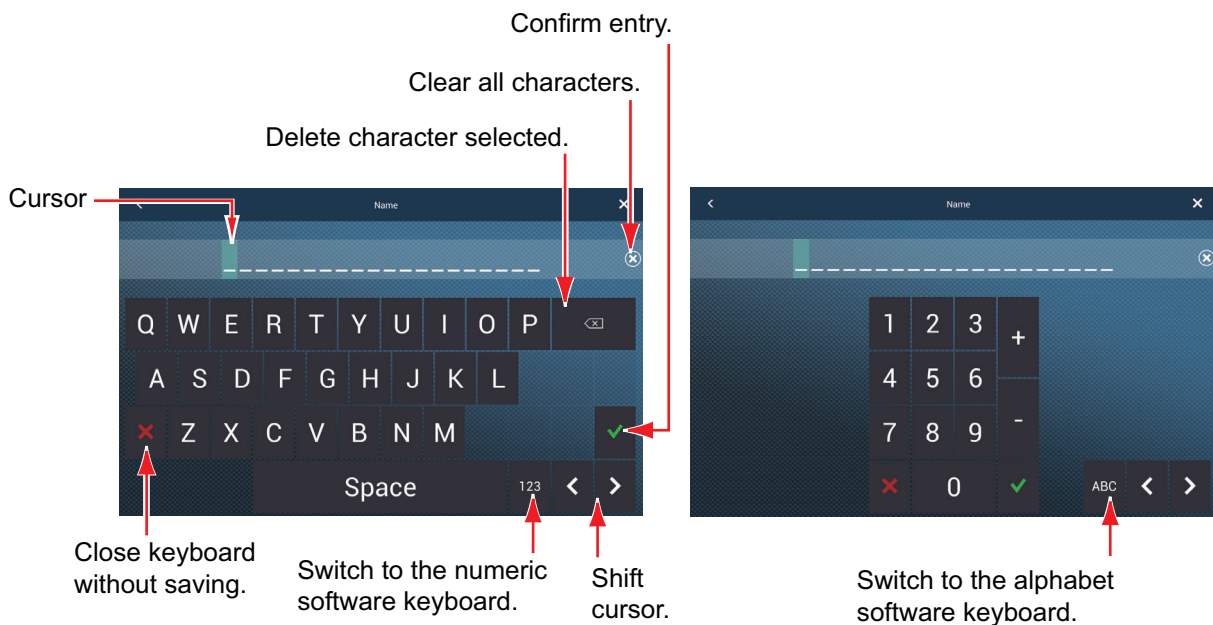
2) Tap an alphanumeric character on the software keyboard.

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

4) Tap [✓] to confirm.

3. To change the position, tap [Edit Pos] to display the software keyboard. Set the position referring to the instructions in step 2.

Switch latitude and longitude coordinates.
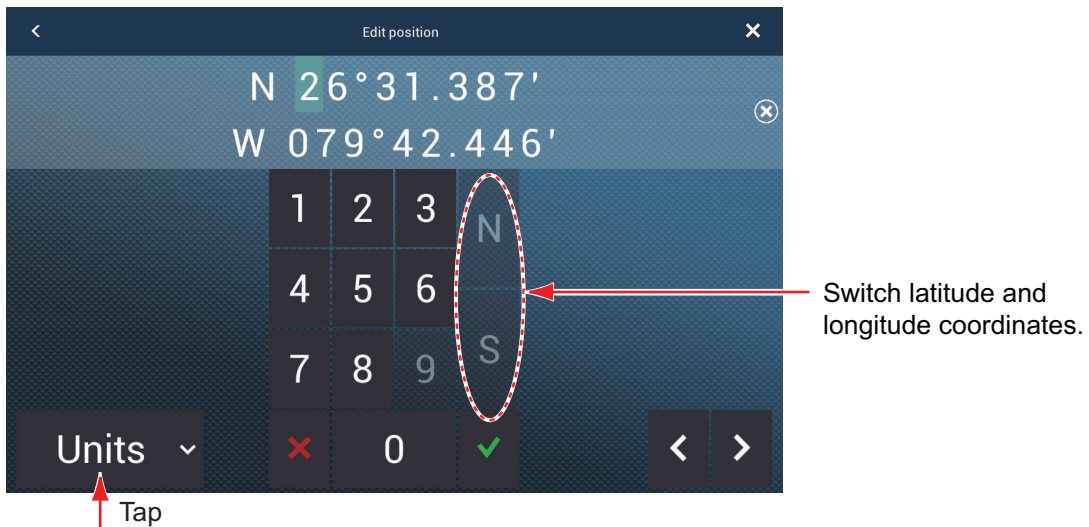
Tap
Position display format
Select position display format from pull-down menu.

4. Tap [Color] to change the color of the point symbol.

5. Tap [Symbol] to change the point symbol.

6. Tap [Comment] to enter a comment, with the software keyboard.

7. Tap [✓] to confirm.

4.8 How to Move a Point

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

4.8.1 How to move a point on the screen

1. Tap the point to move, then select [Move] from the pop-up menu. The icon shown right is put on the point.

2. Drag and drop the point to its new location.

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

Note 1: If [Move Tool on Long Push] is set to ON (in the [Settings]-[General] menu, a point can be moved by long-pushing on the point for three seconds.

Note 2: A point can be moved to the position you specify. Tap the point and [Edit Pos], then enter the position from the keyboard.

4. POINTS, BOUNDARIES

4.8.2 How to move a point from the points list

1. Open the home screen, then tap [Lists]

2. Tap [Points] to open the points list.

3. Tap the point to move to show the editing window.
   You can also edit the position of a point from the screen. Tap the point then tap [Edit Pos] on the pop-up menu.

4. Tap [Lat Lon] to display the numeric keyboard.

5. Enter the position then tap [✓] to confirm.

6. Tap the close button to finish.

4.9 How to Delete a Point

You can delete points by two methods, on the screen and from the points list.

Note: The point currently set as a go to point cannot be deleted.

4.9.1 How to delete a point on the screen

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

4.9.2 How to delete a point from the points list

1. Open the home screen, then tap [Lists].

2. Tap [Points] to open the points list.

3. Tap the point to delete then tap [Delete]. The point disappears from both the screen and the points list.

4. Tap the close button to finish.

4.9.3 How to delete all points

You can delete points and routes collectively except for points included in the active route.

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

2. Tap [Delete All Points & Routes].

3. You are asked if you are sure to delete all points and routes. Tap [OK].

4. Tap the close button to finish.

4-12

4.10 How to Move a Point to the Screen Center

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

1. Open the home screen, then tap [Lists].

2. Tap [Points] to open the points list.

3. Tap [Name], [Icon], [Color] or [Range] at the top of the list to sort the list.

4. Tap the point to find then tap [Find On Chart].

The menu closes and the selected point is put at the center of the screen on the plotter display.

Note: If a split screen is in use doing this procedure, the split screen is replaced with the full screen chart plotter display, then the point is put at the center of the full screen display.

4.11 How to Show or Hide All Points or Points Names

Points

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

Points names

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

4.12 How to Set Point Density

The screen can become cluttered if all points are shown. To prevent this, set point density as shown below to limit the number of points to show.

1. On the home screen, tap [Settings]→[Points]→[Points Density] to show the following options menu.

Low	
Medium	✓
Full	
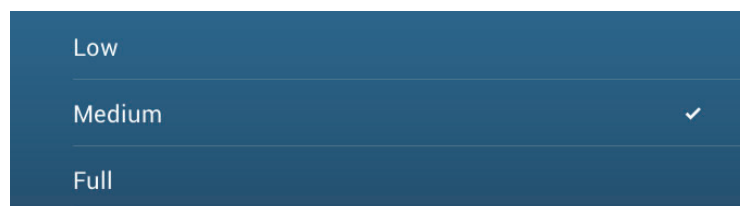
2. Tap desired point density. [Low] is the lowest point density, and [Full] displays all points.

3. Tap X on the title bar to close the menu.

4.13 How to Go to a Point

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

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

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

- Restart the cross-track error (XTE) indication.
- Stop and restart Goto. (Tap the boat icon to display the pop-up menu. Tap [Stop Nav] and [Restart Nav] respectively.)
- Set how the autopilot behaves when you reach your destination (requires connection to a NAVpilot series autopilot).

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.

4.13.1 How to go to an on-screen point

1. Tap the desired point to show the pop-up menu.
2. Tap [Goto].
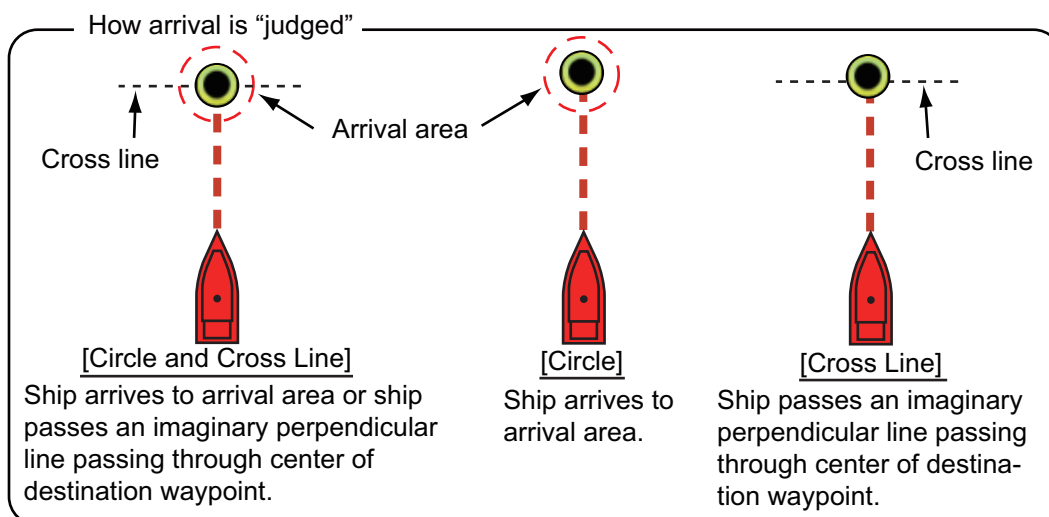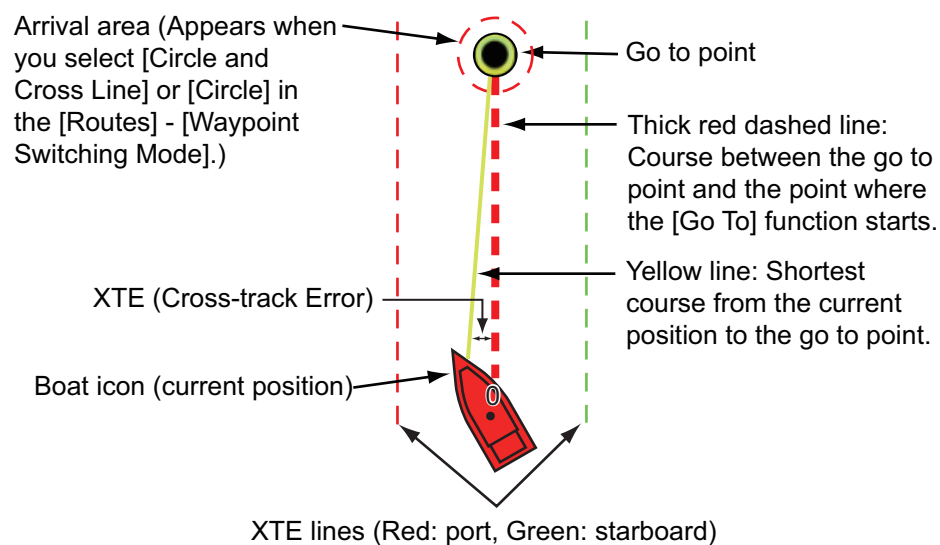
Arrival area (Appears when you select [Circle and Cross Line] or [Circle] in the [Routes] - [Waypoint Switching Mode].)

Go to point

Thick red dashed line: Course between the go to point and the point where the [Go To] function starts.

Yellow line: Shortest course from the current position to the go to point.

XTE (Cross-track Error)

Boat icon (current position)

XTE lines (Red: port, Green: starboard)

How arrival is "judged"

Cross line

Arrival area

Cross line

[Circle and Cross Line]
Ship arrives to arrival area or ship passes an imaginary perpendicular line passing through center of destination waypoint.

[Circle]
Ship arrives to arrival area.

[Cross Line]
Ship passes an imaginary perpendicular line passing through center of destination waypoint.

The following occurs:

• The go to point is highlighted.

• A thick red dashed line and a yellow line appear. The thick red dashed line is the course to follow to get to the point. The yellow line is the shortest course from the current position to the go to point.

• The arrival area marker appears if activated on the menu (see subsection 5.11.5).

• The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines with [Display XTE Lines] in the [Settings] - [Routes] menu.

• The route is saved to the routes list.

Note: If you want to be notified when you reach the go to point (the end of a route), turn on [End of Route Notification] in the [Routes] menu (see subsection 5.11.9). The message "End of Route" appears when you reach the end of a route. For the arrival timing, see subsection 5.11.5.

4.13.2 How to go to a position selected on screen

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

1. Tap the position to set as the go to point to show the pop-up menu.

2. Tap [Goto].

The following occurs:

• The go to point is highlighted.

• A thick red dashed line and a yellow line appear. The thick red dashed line is the course to follow to get to the point. The yellow line is the shortest course from the current position to the go to point.

• The arrival area marker appears if activated on the menu (see subsection 5.11.5).

• The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines with [Display XTE Lines] in the [Settings] - [Routes] menu.

Note: If you want to be notified when you reach the go to point (the end of a route), turn on [End of Route Notification] in the [Routes] menu (see subsection 5.11.9). Then the message "End of Route" appears when you reach the end of a route. For the arrival timing, see subsection 5.11.5.

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

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

The following occurs:

- The go to point is highlighted.
- A thick red dashed line and a yellow line appear. The thick red dashed line is the course to follow to get to the point. The yellow line is the shortest course from the current position to the go to point.
- The arrival area marker appears if activated on the menu (see subsection 5.11.5).
- The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines with [Display XTE Lines] in the [Settings] - [Routes] menu.

Note: If you want to be notified when you reach the go to point (the end of a route), turn on [End of Route Notification] in the [Routes] menu (see subsection 5.11.9). Then the message "End of Route" appears when you reach the end of a route. For the arrival timing, see subsection 5.11.5.

4.13.4 How to use the NAVpilot to steer to a point

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

Note: The example figure below shows the NAVpilot-300 series. The turn/menu button is not shown on the NAVpilot-700 series, however all other indications are the same.

Course adjustment buttons. (Port=Red, STBD=Green) Tap the single arrow for fine adjustments; Tap the double arrow for coards adjustments.

AUTO/NAV mode buttons.

Turn/Menu button. Appears in all modes for NAVpilot-300 series only.
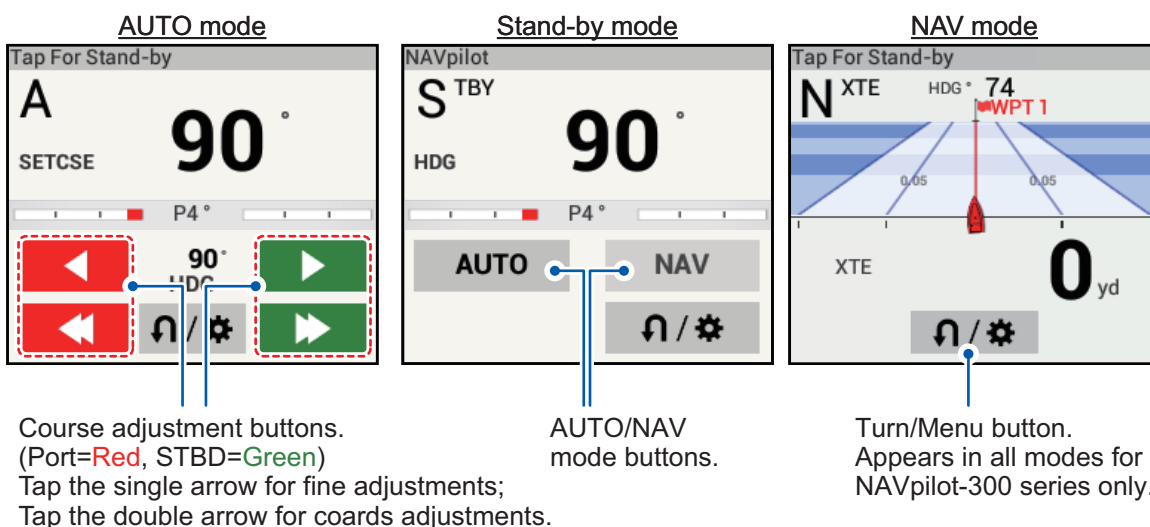
Use the course adjustment buttons to set the course to steer. Tap the double arrow for coarse adjustment, and single arrow for adjustment in 1° steps.

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

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

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

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

3. Tap the close button to finish.

Description of Route Detail window

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

[ID]: Point no. ([Start] or [Goto])
[BTW]: Bearing to goto point
[SPEED]: Speed to goto point
[DISTANCE]: Distance from starting point
[TOTAL]: Total distance from start to goto point
[TTG]: Time to go to the goto point, using speed shown in [SPEED] column.
[TOTAL]: The time from start to the goto point.

4.14 How to Restart or Cancel Navigation to a Point

4.14.1 How to restart navigation to a point

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

When you steer to keep away from an obstruction or the ship drifts, you go off course as shown in Line 1 in the figure. If you do not need to return to the original course, you can go to the point from the current position as shown in Line 2 in the figure.
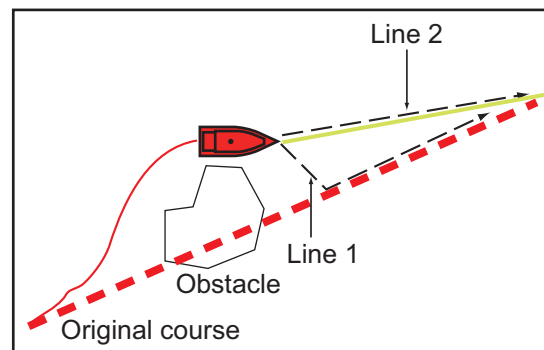
1. Tap the red dashed line or the yellow line of the route to display the pop-up menu.
2. Tap [Restart]. The route start position for the route moves to the current position.

4.14.2 How to cancel navigation to a point

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

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

4.15   Boundaries

Boundaries can be marked anywhere on the chart plotter screen, and can be used to denote net position, avoidance areas, etc. Boundaries can be shown or hidden and edited. Additionally, an audiovisual alarm can be set to alert when your vessel approaches a boundary.

Boundaries created with TIMEZERO Marine Software can be imported.

4.15.1   How to create a boundary

A boundary is available in three forms: area, circle, line. A boundary can be stored in the unit as a screenshot and shared on a "cloud" (internet connection required) and the local network.

Method 1: How to create a boundary on the screen

1. Tap the location where you want to place a boundary.

2. Tap [New Boundary] on the pop-up window.

3. Tap [Area], [Circle] or [Line] as appropriate. An icon corresponding to the boundary type selected appears at the location selected at step 1.

4. Do one of the following depending on the boundary type selected.
    Area boundary
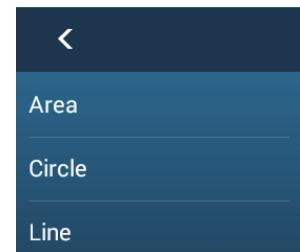
    1) Tap the location for the next point of the area. A yellow line runs between the 1st location and the 2nd.

    2) Tap the location for the next point of the area.
        Repeat this step to complete the area. You can drag an icon to change the position of a point.
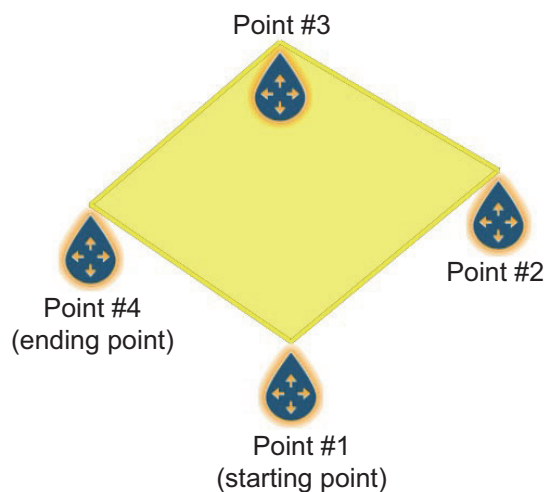
    3) After selecting the ending point, tap [End Boundary] at the top-right corner.

Circle boundary

1) Tap the location for the circle area. A yellow circle appears with circle resizing icons. Drag the icons to change the location and radius of the circle.

Resize icon →
Drag to resize the
radius of circle.

Reposition icon
Drag to reposition
the circle.
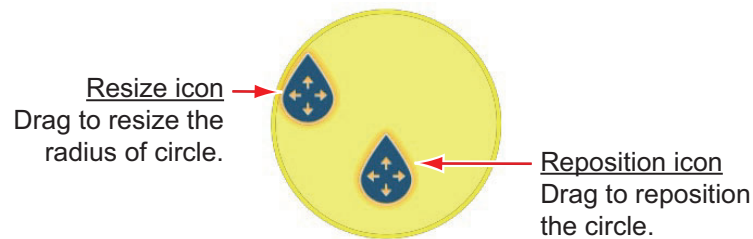
2) After arranging the circle, tap [End Boundary] at the top-right corner.

Line boundary

1) Tap the location for the next point of the area. A yellow line runs between the 1st location and the 2nd.

2) Tap the location for the next point of the area.
Repeat this step to complete the area. You can drag an icon to change the position of a point.

Point #1
(starting point)

Point #2

Point #3

Point #4

Point #5
(ending point)
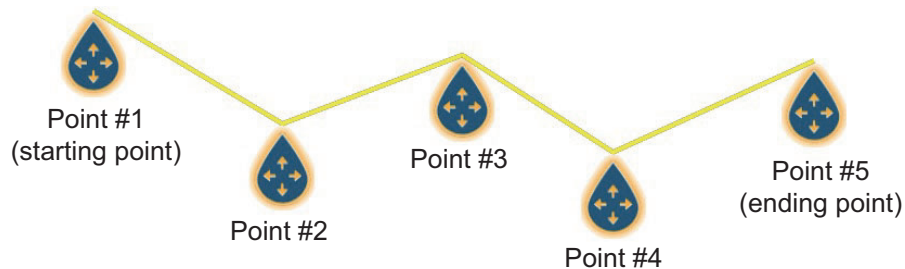
3) After selecting the ending point, tap [End Boundary] at the top-right corner.

The boundary line is placed at the center of the screen.

Method 2: How to create a boundary from the Boundaries list

1. On the Home screen, tap [Lists]→[Boundaries] to show the [Boundaries] list.

2. At the top of the screen, tap [Add Area] or [Add Line] depending on the type of boundary you want to make.

3. Use the software keyboard to enter the latitude and longitude position of the starting point, then tap [✓].
The point entered at center of the preview screen.

4. Tap[Add Point].

5. Enter the latitude and longitude position of the next point, then tap [✓].
Repeat this step to complete the boundary.

6. Tap [<] on the title bar to go back one layer in the menu.

7. Refer to section 4.15.5 to edit the boundary.

8. Tap the close button on the title bar to finish.

4.15.2   How to show or hide all boundaries

On the Layers menu, turn [Boundaries] [ON] or [OFF].

4.15.3 How to set default boundary attributes

You can set the color, line type and transparency of boundaries on the [Points & Boundaries] menu.

1. On the Home screen, tap [Settings]→[Points & Boundaries]. Scroll to find the [BOUNDARIES] section.
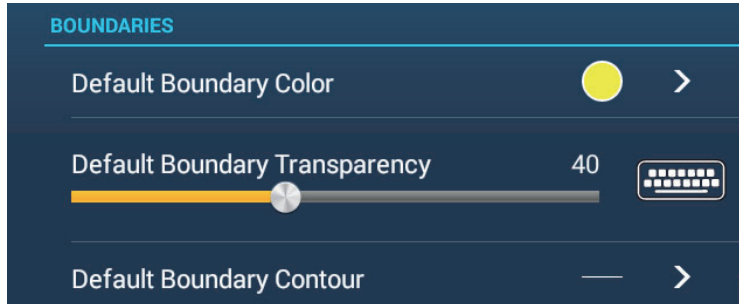
2. Tap [Default Boundary Color].
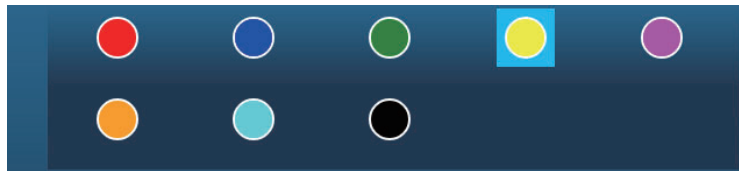
3. Tap the color desired, then tap [<] on the title bar to go back one layer in the menu.

4. To change boundary transparency, adjust the slider bar at [Default Boundary Transparency].

5. Tap [Default Boundary Contour].
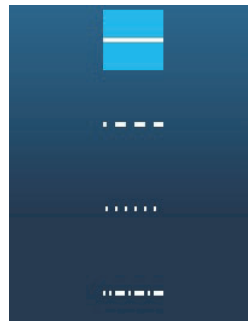
6. Tap the line type desired.

7. Tap the close button at the top of the screen to finish.

4.15.4 Boundaries list

Boundaries are stored on the [Boundaries] list. From the list you can find information about boundaries and edit boundaries. The following data is stored for each boundary created.

- Boundary name
- Boundary comment
- Boundary color
- Boundary line type
- Boundary transparency
- Alarm status
- Distance from own ship
- Boundary latitude and longitude position (circle only)
- Boundary radius (circle only)

How to display the Boundaries list

1. On the home screen, tap [Lists]→[Boundaries] to show the [Boundaries] list.
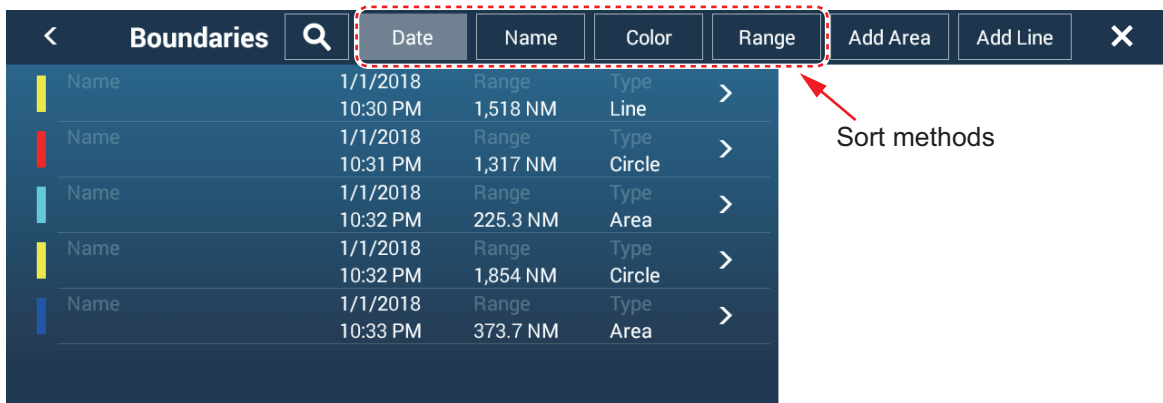
Sort methods

2. To sort the list, do as shown below.

List sorting methods

[**Date**]: Sort by date
[**Name**]: Sort by name
[**Color**]: Sort by color
[**Range**]: Sort by range from own ship

How to search boundaries

Boundaries can be searched by entering name, alphabet and color.

Search by name

1) Tape the magnifying glass at the top of the screen.

2) Enter the name (2-3 characters) of the boundary to search for, then tap [✓]. Boundaries matching the name entered appear in the list.

Search by alphabet

1) Tap [Name] at the top of the list.

2) Tap the alphabet to search.

The alphabet search screen appears, showing, in blue, the alphabets available for search.

3) Tap the alphabet to search.
   The list is sorted with the alphabet selected at the top of the screen.

Search by color

1) Tap [Color] at the top of the list.

2) Tap the color to search.

The color search screen appears, showing the colors available for search. The alphabets under which boundaries are stored are shown in blue.

3) Tap the color to search.
The list is sorted with the color selected at the top of the screen.

3. To find information about a boundary or edit a boundary, tap the boundary entry in the list.
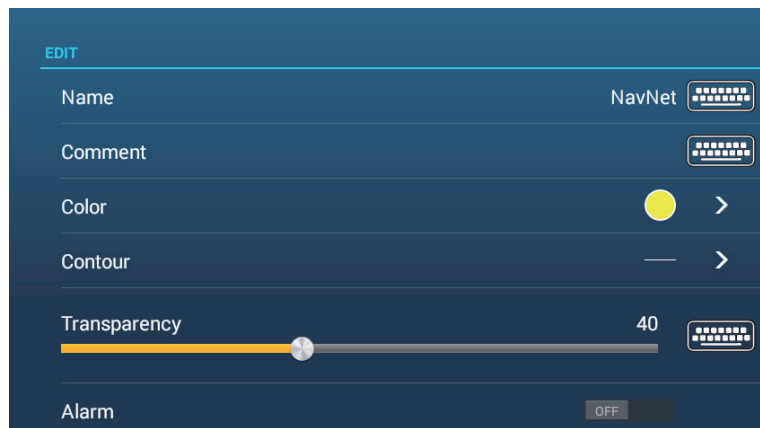
Edit screen for Area, Line boundary
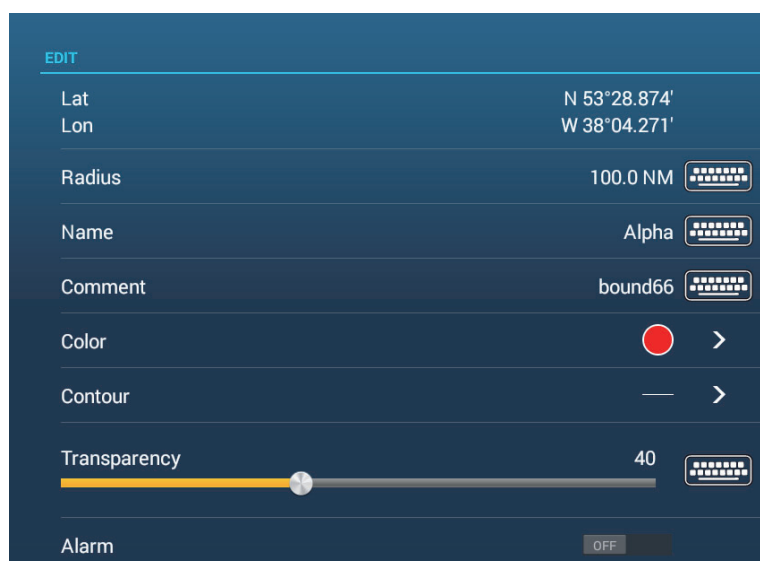
Edit screen for Circle boundary

4. Tap respective item (Latitude, Longitude circle only), Radius (circle only), Name, Comment, Color, Contour, Transparency to change its data.

5. Tap the close button on the title bar to finish.

4.15.5 How to edit an on-screen boundary

On-screen boundaries can be edited as shown in this section.

Note: The entire area boundary must be present on the display in order to display it. Zoom to fit the boundary within the screen.

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

| Edit |
| Edit Points |
| Alarm   OFF |
| Delete |
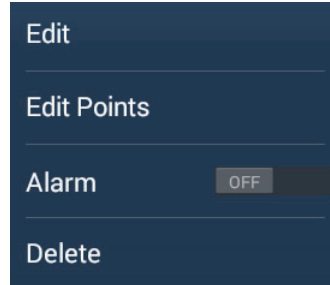
2. Tap [Edit] to show the Edit screen.
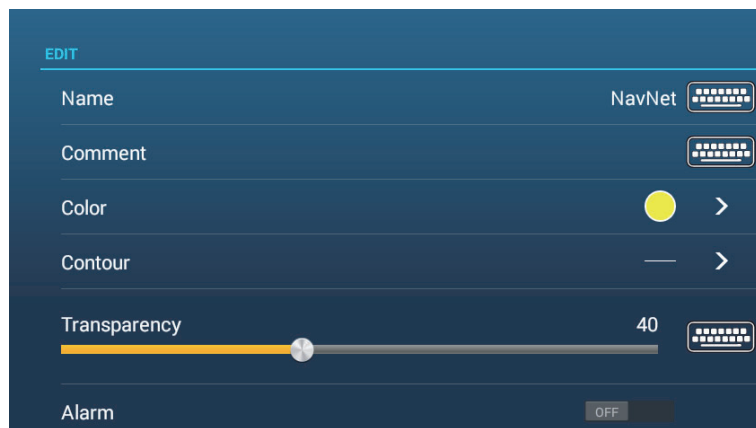
Edit screen for Area, Line boundary

Edit screen for Circle boundary

Go to step 3 to edit a circle, or go to step 7 to edit a line or area.

3. To change circle position, tap [Lat Lon].
4. Use the software keyboard to enter new position, then tap [✓].
5. To change circle radius, tap [Radius].

4-25

6. Use the software keyboard to enter new radius, then tap [✓].

7. To change the name, tap [Name].

8. Enter new name, then tap [✓].

9. To change the comment, tap [Comment].

10. Enter new comment, then tap [✓].

11. To change the color, tap [Color].

12. Tap color desired, tap [✓], then tap [<] on the title bar to go back one layer in the menu.

13. To change line type, tap [Contour].

14. Tap line type desired, tap [✓], then tap [<] on the title bar to go back one layer in the menu.

15. To change boundary transparency, tap [Transparency].

16. Adjust the slider bar at [Transparency], or enter desired value with the software keyboard at [Transparency].

17. Tap the close button on the title bar to finish.

4.15.6 How to add a point to a boundary

You can add points to a line or area type boundary.

1. Tap the boundary to which you want to add a point(s).

2. Tap [Edit Points] on the pop-up menu.
    Icons appear on the boundary.

3. Tap the position where to add a point, and an icon appears at that position. If necessary, drag the icon to reposition the new point.

4. Tap [End Boundary] at the top-right corner to finish.

4.15.7 How to move a point on a boundary

You can move a point on a boundary by two methods, on-screen and on the [Boundaries] list.

How to move an on-screen point

1. Tap the boundary to which you want to add a point(s).

2. Tap [Edit Points] on the pop-up menu.
    Icons appear on the boundary.

3. **For area or line type boundary**: Drag the icon to new location.
    For circle boundary: Drag the "resize" or "relocate" icon to new location.

4. Tap [End Boundary] at the top-right corner to finish.

How to move a point from the Edit screen

1. Tap the boundary to which you want to add a point(s).

2. Tap [Edit] on the pop-up menu to show the Edit menu.

3. Tap [Edit Points] to show the [Boundary Detail] screen.

4. Tap the point whose position you want to change to show the [Position] screen.

5. Tap [Lat Lon] to show the software keyboard.

6.   Use the software keyboard to enter new position, then tap [✓].

7.   Tap the close button on the title bar to finish.

4.15.8   How to delete a point from a line or area boundary

You can delete a point from a line or area boundary.

1.   Tap the line or area boundary to process.

2.   Tap [Edit Points] on the pop-up menu.
     Icons appear on the boundary.

3.   Tap the icon belonging to the point to delete, then tap the [Delete] indication.

4.   Tap [End Boundary] at the top-right corner to finish.

4.15.9   How to set an alarm for a boundary

How can get an audiovisual alarm when your vessel approaches a boundary within the specified distance.

1.   Open the [Alarm] menu, then find and set [Own Ship Alarm Zone] to [ON].

2.   Tap [Own Ship Alarm Zone Warning] to show the software keyboard.

3.   Enter the distance for the alarm, then tap [✓]. When your vessel is within this distance to the boundary, the audiovisual alarm is released.

4.   Tap the close button on the title bar.

5.   On the chart plotter tap the boundary for which you want to get the alarm, and a pop-up menu appears.

6.   Turn [Alarm] to [ON]. Note that the alarm for a boundary can be turned on/off from the Edit screen.
     When your vessel is within the distance set at step 3, a black dashed black line runs between the boat icon and the boundary as shown in the figure below.
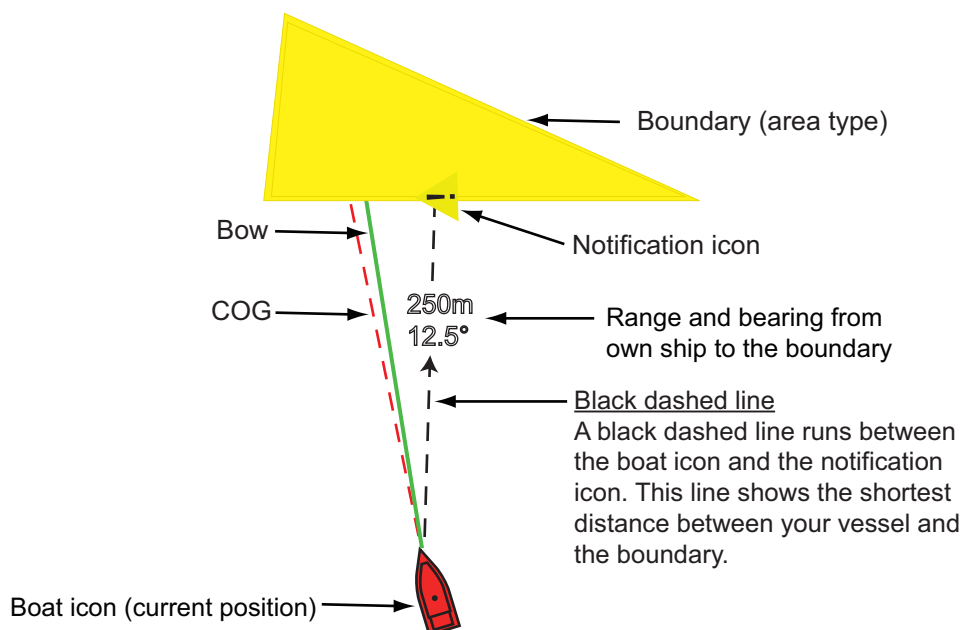
• The status bar at the top of the screen shows the message "Near Alarm Zone: Area" (or Circle, or Line), and the audio alarm sounds. The audio alarm can be silenced by tapping the status bar.
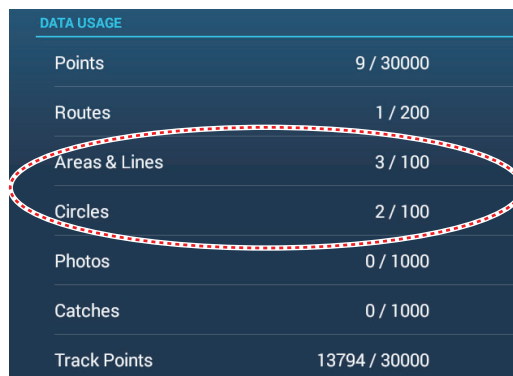
- The boundary is highlighted.
- A dashed black line runs between the boat icon and the notification icon. This line shows the shortest distance between own ship and the boundary.
- The range and bearing to the boundary are overlaid on the black line.
- If the Data box has the item [Boundary Alarm Zone], the distance to the boundary appears in the Data box, like the example shown below.

4.15.10 How to find the number of boundary points used

Go to the Home screen, then tap [Settings]→[General]. Find [Areas & Lines] and [Circles] in the [DATA USAGE] section. In the example below, three areas/lines and two circles have been used.

4.15.11 How to display a boundary at the screen center

Do the following to move a boundary to the screen center.

1. Go to the Home screen, then tap [Lists]→[Boundaries] to show the [Boundaries] list.
2. Tap the boundary that you want to place at the screen center.
3. Tap [Find on Chart].

The chart plotter display appears, with the selected boundary at the screen center.

4.15.12 How to delete boundaries

How to delete an on-screen boundary

Tap a boundary line to show the pop-up menu. Tap [Delete] to delete the line from the screen.

How to delete a boundary on the Boundaries list

1. Go to the Home screen, then tap [Lists]→[Boundaries].
2. Tap the boundary to delete.
3. Tap [Delete].

4. Tap the close button on the title bar to close the menu.

How to delete all boundaries

1. Go to the Home screen, then tap [Settings]→[Points & Boundaries]→

2. Tap [Delete All User Objects]. The message "THIS ACTION WIL DELETE PER-MANENTLY ALL USER OBJECTS. ARE YOU SURE TO CONTINUE?" appears.

3. Tap [OK].

4. Tap the close button on the title bar to close the menu.

This page is intentionally left blank.

5. ROUTES

5.1 What is a Route?

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

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

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

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

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

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

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

5.2 How to Create a Route

5.2.1 How to create a new route from the plotter screen

1. Tap a location on the screen for the 1st point in the route to display the pop-up menu.

2. Tap [New Route]. The flag mark appears on the selected position and the route information box appears (at the top of the screen).
   Note: The route information box is hidden behind the status bar when an alarm message appears in the status bar.

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

4. Tap the next route point in the route.
   Repeat this step to enter all route points. Each route point is numbered.
   The route information box shows the point's range and bearing, the distance to arrival and the time-to-go to the last waypoint.

Route information
- RNG: Range between last two points   - BRG: Bearing between last two points
- DTA: Distance to Arrival   - TTA: Time To Arrival
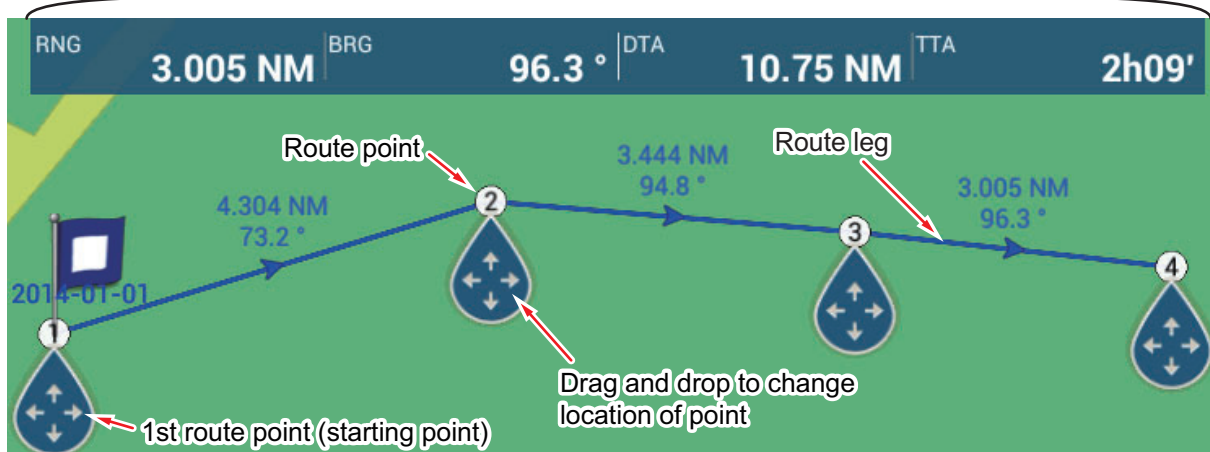
5. At the last route point, tap [End Route] at the top right-hand corner of the screen to complete the route.

6. The window for entering route name appears. Enter route name, then tap [✓] to confirm. The route information box shows, to the last waypoint, the range, time-to-go, estimated time of arrival and SOG.

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

Inactive route   Sleeping route
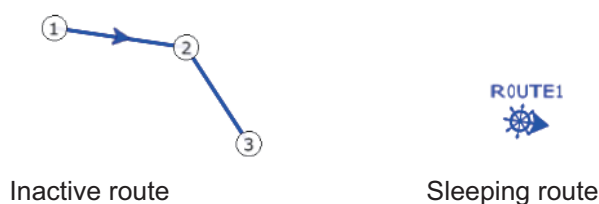
Note 2: The points used to create a route by the above method are not saved to the [Points] list.

5.2.2 How to create a new route with points

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

1. Tap a point to display the pop-up menu.
2. Tap [New Route]. The flag mark as below appears on the point. The flag mark appears on the selected position and the route information box appears (at the top of the screen).

   Note: The route information box is hidden behind the status bar when an alarm message appears in the status bar.

3. Tap the next route point in the route. A light-blue line with arrow runs between the previous point and the next route point. The arrow points in the direction of route flow.
4. Tap the next route point in the route.
   Repeat this step to enter all route points. Each route point is numbered.

Route information
- RNG: Range between last two points   - BRG: Bearing between last two points
- DTA: Distance to Arrival   - TTA: Time To Arrival
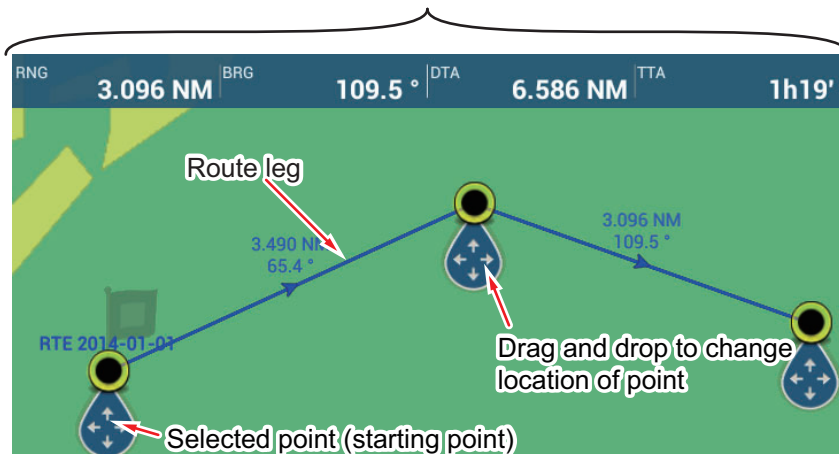
5. At the last route point, tap [End Route] at the top right-hand corner of the screen to complete the route.
6. The window for entering route name appears. Enter route name then tap [✓] to confirm. The route information box shows, to the last waypoint, the range, time-to-go, estimated time of arrival and SOG.

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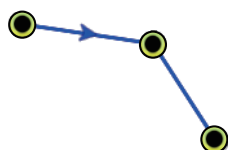
Inactive route   Sleeping route

5.2.3 How to create a route from the points list

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

5.3 How to Edit a Route

5.3.1 How to insert a route point on a route

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

1. Tap a position on a route leg where to insert a route point.
2. Tap [Insert] on the pop-up menu. The compass symbol marks the position selected. The route point is numbered according to its position in the route, and the succeeding route points are renumbered.
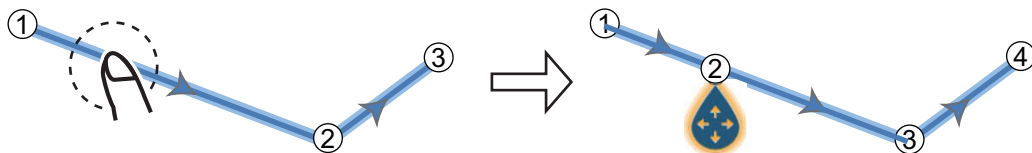
3. Tap [End Move] at the top right-hand corner of the screen.

5.3.2 How to move a route point on a route

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

1. Tap a route point on a route to display the pop-up menu.
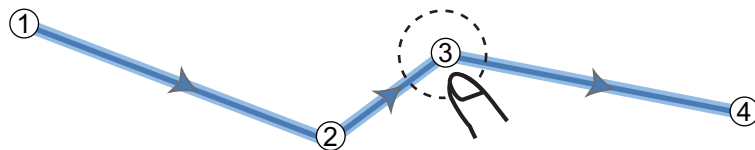
2. Tap [Move]. The selected route point is highlighted.
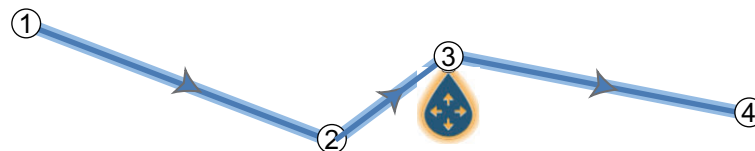
3. Move the route point to the new position by dragging the route point or tapping the new position.
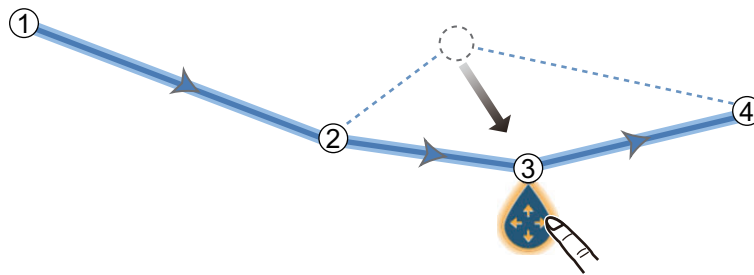
4. Tap [End Move] at the top right-hand corner of the screen.

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

You can delete a point on a route.

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

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

5.3.4 How to remove a point from a route

You can remove a point from a route.

1. Tap the point to remove to show the pop-up menu.
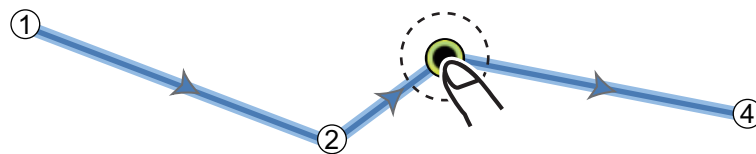
2. Tap [Remove]. The selected point is removed from the route, and the succeeding route points are renumbered.
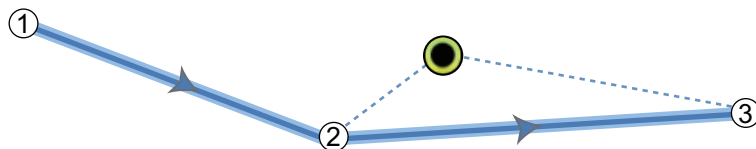
5.3.5 How to extend a route

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

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

5.4 Routes List

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

- Name of route
- Length of route
- Names of starting route point and last route point (Enter them with the software keyboard.)
- Color of route
- Comment for route
- Each number of each route point
- Bearing to steer
- Planning route speed (see section 5.15)
- Distance between legs and total distance
- TTG between legs and total TTG

To open the routes list:

1. Open the home screen, then tap [Lists].

2. Tap [Routes] to open the routes list. You can sort the list with the route sort buttons on the title bar.

Route sort buttons

	Routes	Name	Color	Length	✕

R				
ROUTE1		Length	12.36 NM	>
From		To		
ROUTE2		Length	13.36 NM	>
From		To		

3. Tap the route to view.

EDITION

Name	1234 ⌨
Length	5.304 NM
From	⌨
To	⌨
Color	⬤ >
Comment	⌨

ACTIONS

Detail

Goto

Reverse Route

⌄
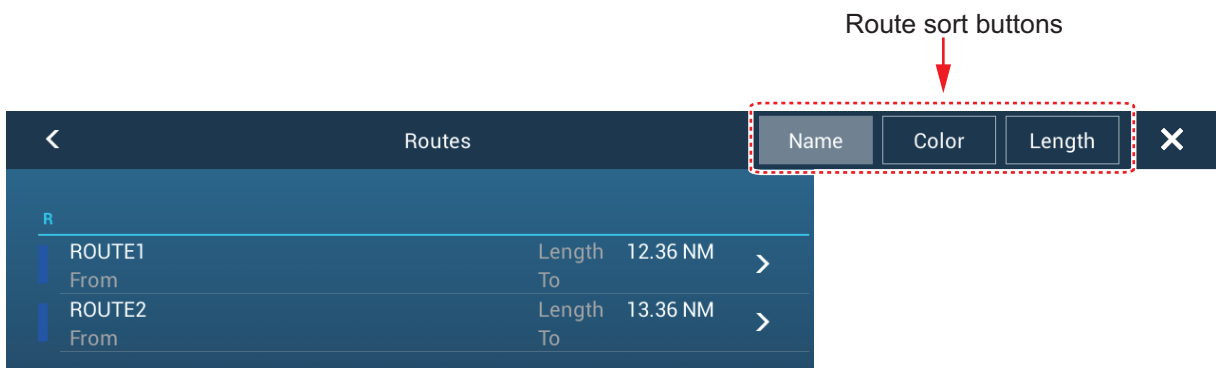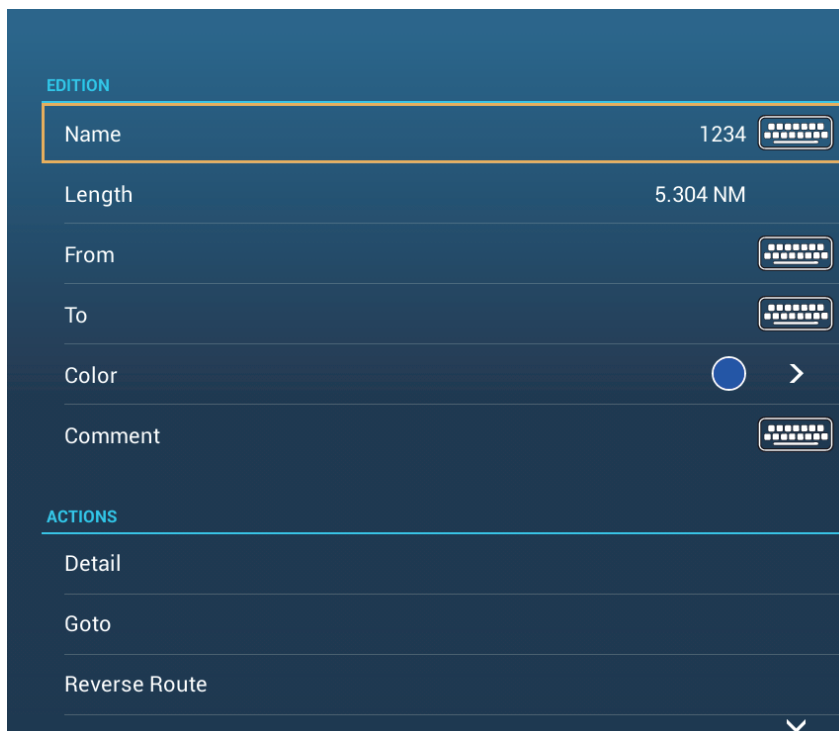
4. From the [EDITION] section, you can edit the name, from point, to point, color and comment for the route.

5. To find details about the route, tap [Detail].

Route speed
adjustment button

Departure date
adjustment button

	ID	BTW	SPEED	DISTANCE	TOTAL	TTG	TOTAL	
	1	0.0 °	5.0 kn	0 yd	0 yd	- - -	0'00s	>
	ID	BTW	SPEED	DISTANCE	TOTAL	TTG	TOTAL	
	2	92.6 °	5.0 kn	1.657 NM	0 yd	- - -	0'00s	>
	ID	BTW	SPEED	DISTANCE	TOTAL	TTG	TOTAL	
	3	69.1 °	5.0 kn	2.029 NM	0 yd	- - -	0'00s	>
	ID	BTW	SPEED	DISTANCE	TOTAL	TTG	TOTAL	
	4	121.9 °	5.0 kn	1.618 NM	0 yd	- - -	0'00s	>
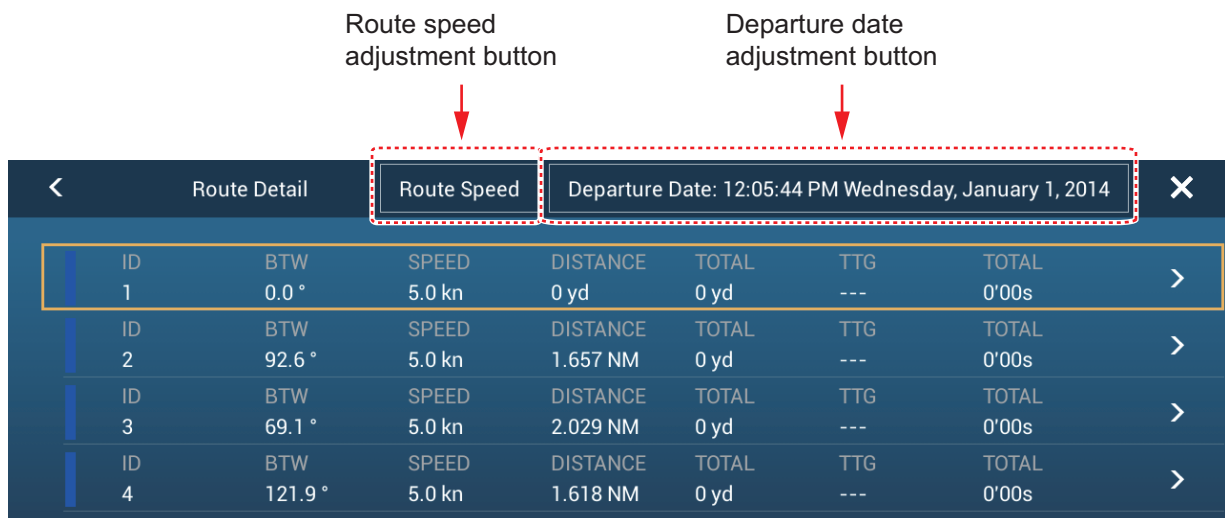
[Route Speed] button: Change the route speed to use to follow the route.
[Departure Date] button: Change the date of departure.

The **vertical bar** at the left side of the screen is colored according to the status of the waypoints.
Blue: Inactive
Gray: Starting point
Yellow: Point you are currently heading toward.
Red: Subsequent waypoint
The column labels are as follows:
[ID]: Waypoint number
[BTW]: Bearing to waypoint.
[SPEED]: The speed set with [Default Planning Speed] in the [Routes] menu.
[DISTANCE]: Distance between adjacent waypoints.
[TOTAL]: Cumulative distance.
[TTG][*]: Time to go between adjacent waypoints.
[TOTAL][*]: Cumulative time in route.
* Shown only when navigating a route.

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

Start Nav
Find On Chart
Delete
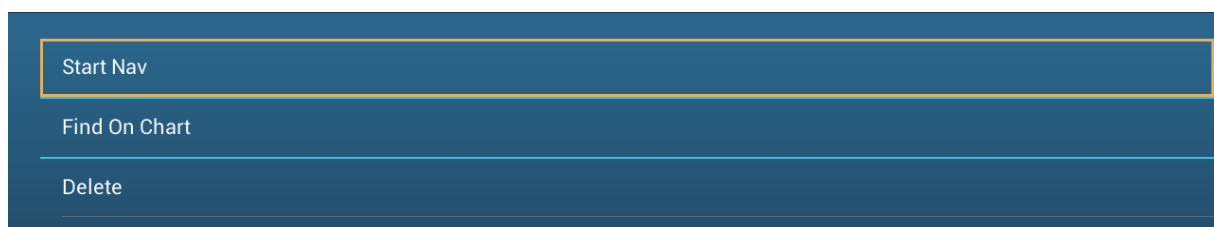
[Start Nav]: Starts navigation of the route from the point selected.
[Find on Chart]: Shows the location of the route on plotter display. The list closes and the route is put at the center of the plotter display.
[Delete]: Deletes the point selected. The [Edit] screen closes and the [Routes Detail] screen reappears. The points on the route are renumbered.

5.5   How to Find Number of Routes Created

Open the home screen, then tap [Settings] - [General]. Find [Routes] in the [DATA US-AGE] section. In the example below, 3 routes out of 200 have been created.

DATA USAGE	
Points	16 / 30000
Routes	3 / 200
Track Points	15377 / 30000
Boundaries	99/100

5.6   How to Find a Route on the Chart

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

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

5.7   How to Delete a Route

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

5.7.1   How to delete a route on the screen

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

5.7.2   How to delete a route from the routes list

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

5.7.3   How to delete all routes

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

5.8 How to Show or Hide All Routes

All routes (including the route information box) can be shown or hidden. Open the [Layers] menu, the turn [Routes] on or off as required.

Note 1: An active route cannot be hidden from the screen unless route following is stopped.

Note 2: Inactive routes can be placed at either the arrival or departure location. Open the Layers menu, then activate [Departure] or [Arrival] (below the [Routes] flipswitch).

5.9 How to Set Route Density

If you display all your routes, the screen can become cluttered with routes. To prevent this, set route density as shown below to limit the number of routes to show.

1. On the home screen, tap [Settings]→[Points]→[Routes Density] to show the following options menu.

Low	
Medium	✓
Full	
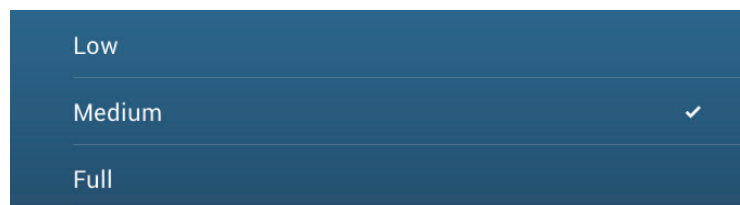
2. Tap desired route density. [Low] is the lowest route density, and [Full] displays all routes. Tap X on the title bar to close the menu.

5.10 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.

5.10.1 How to follow an on-screen route

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

Arrow points in direction to follow route

Route leg (red line)

Boat icon
(current position)

XTE line
Green: starboard
Red: port

Course to 1st route point
(thick red dashed line)

Arrival area (appears when you select [Circle and Cross Line] or [Circle] in the [Routes] - [Waypoint Switching Mode].)

The following occurs:

- The line for the selected route turns red.

- The go to point (1st route point) is highlighted.

- A thick red dashed line and a yellow line run between the current position and the 1st route point of the selected route. The thick red dashed line is the course to follow to get to the 1st route point. The yellow line is the shortest course from the current position to the go to point.

- The go to point is numbered "1". The starting point is indicated in the pop-up menu item [Details] as [Start].

- The arrival area marker appears if activated on the menu (see subsection 5.11.5).

- The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines and set their width with [Display XTE Lines] and [XTE Value] respectively in [Routes] menu.

Note: If you want to be notified when you reach a go to point, turn on [Waypoint Crossing Notification] on [Routes] of the menu (see subsection 5.11.8). Then the message "Waypoint Crossing" appears when you reach a go to point. For the arrival timing, see subsection 5.11.5.

5.10.2 How to follow a route selected from the routes list

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

The following occurs:

- The line for the selected route turns red.
- The go to point (1st route point) is highlighted.
- A thick red dashed line and a yellow line run between the current position and the 1st route point of the selected route. The thick red dashed line is the course to follow to get to the 1st route point. The yellow line is the shortest course from the current position to the go to point.
- The go to point is numbered "1". The starting point is indicated in the pop-up menu item[Details] as [Start].
- The arrival area marker appears if activated on the menu (see subsection 5.11.5).
- The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines and set their width with [Display XTE Lines] and [XTE Value] respectively in [Routes] menu.

Note: If you want to be notified when you reach a goto point, turn on [Waypoint Crossing Notification] in the [Routes] menu (see subsection 5.11.8). Then the message "Waypoint Crossing" appears when you reach a goto point. For the arrival timing, see subsection 5.11.5.

5.10.3 How to start navigation from a route point

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

In the above example, the following occurs:

- The route point "3" is selected to start navigation from, and is highlighted.
- The starting point is indicated in the pop-up menu item[Details] as [Start].
- The line from "3" to the route point "5" for the selected route turns red and the legs for "0" and "1" turn gray.
- A thick red dashed line and a yellow line run between the current position "2" and the "3" route point. The thick red dashed line is the course to follow to get to the route point "3". The yellow line is the shortest course from the current position to the route point "3".
- The arrival area marker appears if activated on the menu (see subsection 5.11.5).
- The XTE lines, red for port side, green for starboard side, appear. You can show or hide these lines with [Display XTE Lines] in the [Routes] menu.

Note: If you want to be notified when you reach a goto point, turn on [Waypoint Crossing Notification] in the [Routes] menu (see subsection 5.11.8). Then the message "Waypoint Crossing" appears when you reach a goto point. For the arrival timing, see subsection 5.11.5.

5.10.4 How to show the detailed information about a route

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

5.11 Operations When You Follow a Route

5.11.1 How to restart navigation

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

When you steer to keep away from an obstruction or the ship drifts, you go off course as shown in Line 1 in the figure. If you do not need to return to the original course, you can go to the route point from the current position as shown in Line 2 in the figure.
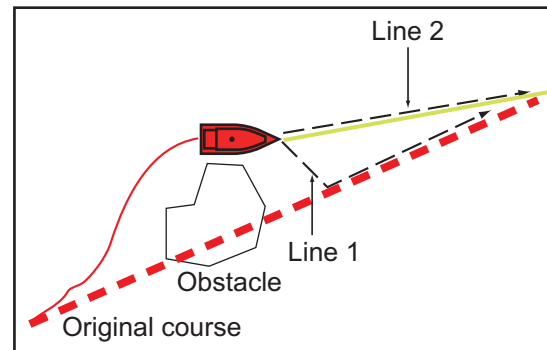
Tap a route leg, the red dashed line or the yellow line of the route to display the pop-up menu. Tap [Restart]. The route start position for the route moves to the current position.

5.11.2 How to follow a route in the reverse direction

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

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

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

5.11.3 How to stop following a route

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

5.11.4 How to skip a point on a route

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

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

5.11.5 Waypoint switching mode

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

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

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

Cross line   Arrival area   Cross line

The value for the circle radius is set in [Switching Circle Radius].

[Circle and Cross Line]   [Circle]   [Cross Line]
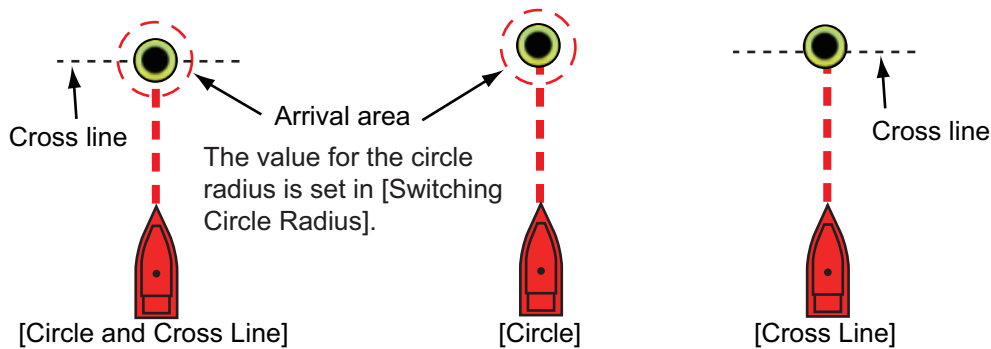
1. Open the home screen, then tap [Settings] - [Routes].

2. Tap [WPT Switch Mode].
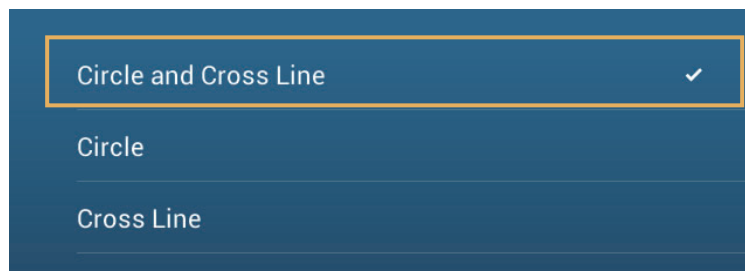
3. Tap [Circle and Cross Line], [Circle] or [Cross Line]. For [Circle and Cross Line] or [Circle], do 1) and 2) below. For [Cross Line], go to step 4.

   1) Tap [Switching Circle Radius] to display the software keyboard.

   2) Set the arrival area (circle radius) then tap [✓] confirm.

4. Tap the close button to finish.

5.11.6 Route auto zoom

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

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

2. Turn [Route Auto Zoom] on or off.

3. Tap the close button to finish.

5.11.7   XTE lines

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

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

2.   Turn [Display XTE Lines] on or off. For [ON], go to the next step. For [OFF], tap the close button to finish.

3.   Tap [XTE Value] to display the software keyboard

4.   Set the distance of the XTE lines from your ship then tap [✓]. The XTE alarm sounds (if active) when your ship veers off course by the amount set here.

5.   Tap the close button to finish.

XTE lines
(Red: port,
Green: starboard)
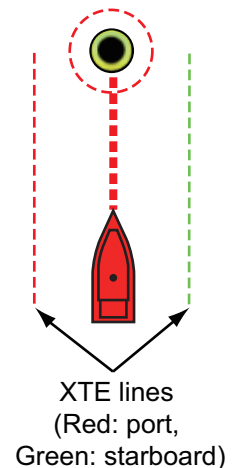
5.11.8   Waypoint arrival notification

The waypoint arrival notification feature releases audio and visual notifications when your ship reaches a go to point. For the arrival timing, see subsection 5.11.5. The notification message "Waypoint Crossing" appears. Activate or deactivate this feature as follows.

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

2.   Turn [Waypoint Crossing Notification] on or off.

3.   Tap the close button to finish.

5.11.9   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 5.11.5. The notification message "End of Route" appears. Activate or deactivate this feature as follows.

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

2.   Turn [End of Route Notification] on or off.

3.   Tap the close button to finish.

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

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

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

2.   Tap [End of Route Operation].

3.   Tap [Stop Navigation], or [Continue Navigation], as required.

4.   Tap the close button to finish.

5.11.11 Steering a route with the NAVpilot

The NAVpilot can be used to steer a route, from the NAVpilot control box in the data area. The figure belows shows the NAVpilot control box. See subsection 4.13.4 for details.

AUTO mode	Stand-by mode	NAV mode

Course adjustment buttons.
(Port=Red, STBD=Green)
Tap the single arrow for fine adjustments;
Tap the double arrow for coards adjustments.

AUTO/NAV
mode buttons.

Turn/Menu button.
Appears in all modes for
NAVpilot-300 series only.
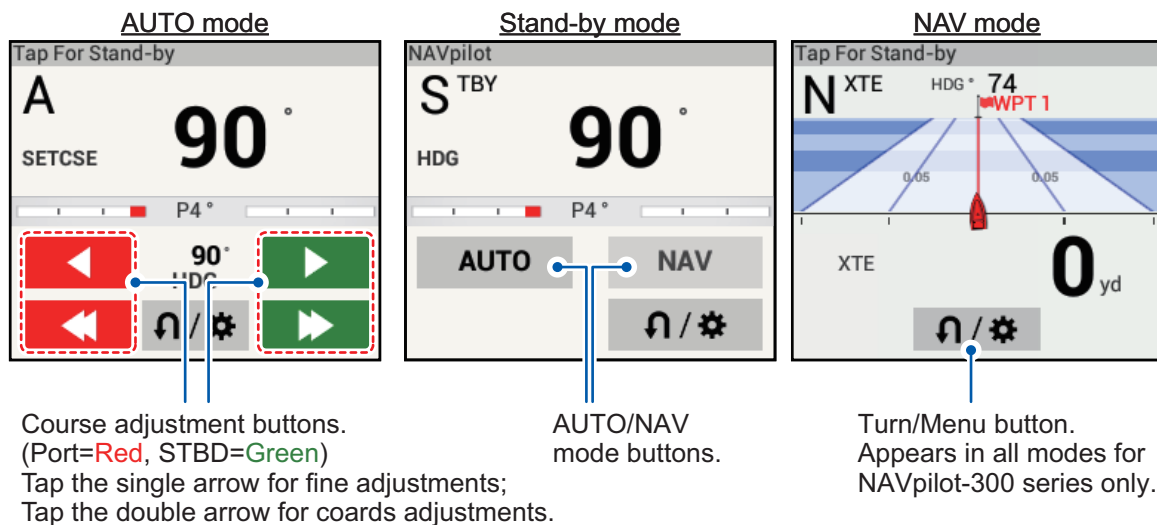
5.12 Fuel Level Indicators

This equipment provides indicators that show both the approximate location where you may run out of fuel and the distance you can travel with the remaining fuel. This function requires the NMEA 2000 sentence PGN127489 (Engine Fuel Rate).

Fuel max range indicator (on route)

The fuel pump icon marks on the current route how far you can travel on the remaining fuel. To show this marker, tap [Settings]→[Routes]→[Fuel Max Range]→[ON].

Fuel range indicator (ring about own position)

The fuel range indicator draws a circle about own ship, the radius of the circle equivalent to the distance you can travel with the remaining fuel. To show this indicator, [Settings]→[Ship & Track]→[Fuel Range Ring]→[ON].

5.13   SAR Operations

The SAR (Search And Rescue) feature facilitates search and rescue, and MOB (Man Over Board) operations. This feature requires several installation menu changes and requires a qualified technician to make the necessary menu changes. To active this feature, contact your local dealer.

1. On the plotter display, tap the location where you want to start SAR operations. the pop-up menu appears.

2. Tap [New SAR Pattern]. The SAR pattern menu appears with the selected location set as the start point. To change the start point, go to step 3. To keep the current start point, skip to step 5.

3. Tap [Commence Search Point] to show the software keyboard.

4. Input the coordinates for the starting location, then tap [✓].

5. Tap [SAR Track Spacing Setup]. The software keyboard appears.

6. Set the distance between the SAR tracks, then tap [✓].

7. Tap [Starboard] or [Port] to select the direction in which to start the SAR pattern.

8. Tap the type of pattern you want to use. The following figures show examples for each of the patterns.
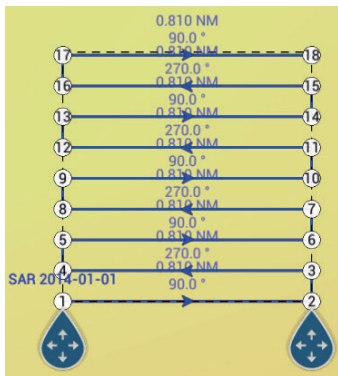
Parallel/Creeping Line   Sector Search   Expanding Square
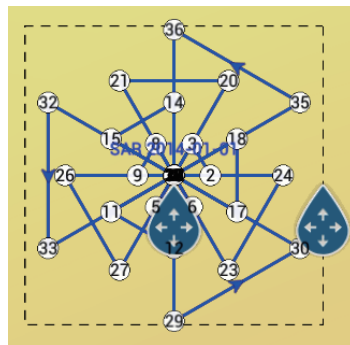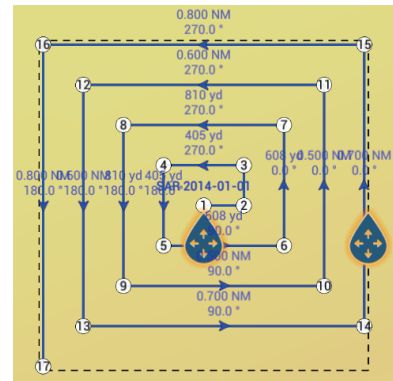
9. Adjust the following items as required.

    • Drag the SAR area on the screen to change the search location.

    • Drag the outer edges of the SAR area to change the search area size

    • Tap a location on the screen to change the heading in that direction.

10. Tap [End SAR] to finalize the SAR area. The confirmation message "DO YOU WANT TO START NAVIGATION?" appears.

11. Tap [OK] to start SAR operations, or [Cancel] to cancel the search. If you select [Cancel], the selected SAR pattern is still saved and remains on the screen.
    To delete the SAR pattern, tap [Home]→[Lists]→[Routes] to show the Routes list, tap the SAR pattern, then tap [Delete] in the route options.

5.14 Laylines

A layline is the best course for route, calculated using wind speed and direction, heading, own ship speed and tidal currents.

Note 1: Appropriate sensors for these data are required to use the layline feature.
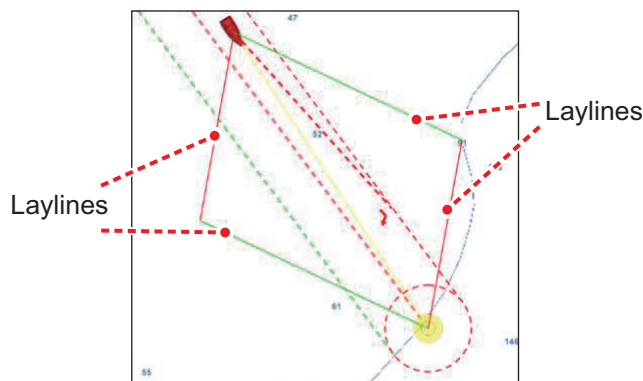
5.14.1 How to enable/disable the layline feature

1. Open the home screen, then tap [Settings]→[Routes]. The routes menu appears.
2. At [Laylines], tap the toggle box to show [ON] (enable) or [OFF] (disable) as required.
3. At [Tidal Offset for Laylines], tap the toggle box to show [ON] (offset the laylines based on tidal data) or [OFF] (no offset is applied) as required.
4. Tap the close button to close the menu.
5. Open the [Layers] menu, then tap the toggle box at [Laylines] to show [ON]or [OFF] as required. Note that this menu item is not visible in the [Layers] menu if [OFF] is selected at step 2.

Note: You can also enable/disable the layline feature from the pop-up menu, provided that [Laylines] is set to [ON] in the [Routes] menu.

5.14.2 How to show layline data in the data area

1. Open the data area, then tap [DATA] (at the bottom of the data area).
2. Tap the location in the data area where you want to show the layline data. The [Add NavData] menu appears.
3. Tap [Layline Information]. Data for port-side and starboard-side appears in the data area.

5.14.3 How to change the polar wind file

Your NavNet TZTouch2 comes with a pre-installed polar wind file. This file contains data for sailboats, helping to improve sailing performance, by applying the data to the laylines. Polar files can be downloaded from the MyTimeZero™ cloud service and imported to the NavNet TZTouch2.

1. From a your PC (internet connection required), access the following site (without quotation marks) "https://furuno.mytimezero.com/#/tzt2/polars".

2. Login to your MyTimeZero™ account.

3. Download the required polar file and save the file to a USB flash memory.
    Note: SD cards and microSD cards cannot be used.

4. Connect the USB flash memory to the TZTouch2 USB cable.

5. On the TZTouch2, open the home screen, then tap [Settings]→[Files]. The Files menu appears.

6. Tap [Import Wind Polar]. The list of available polar wind files appears.

7. Tap the file you want to import, then tap [OK].

8. Check that the select file's name appears in the menu, directly below [Import Wind Polar].

9. Tap the close button to finish.

5.15 Routes Menu

This section provides descriptions for the items in the [Routes] menu not previously mentioned.
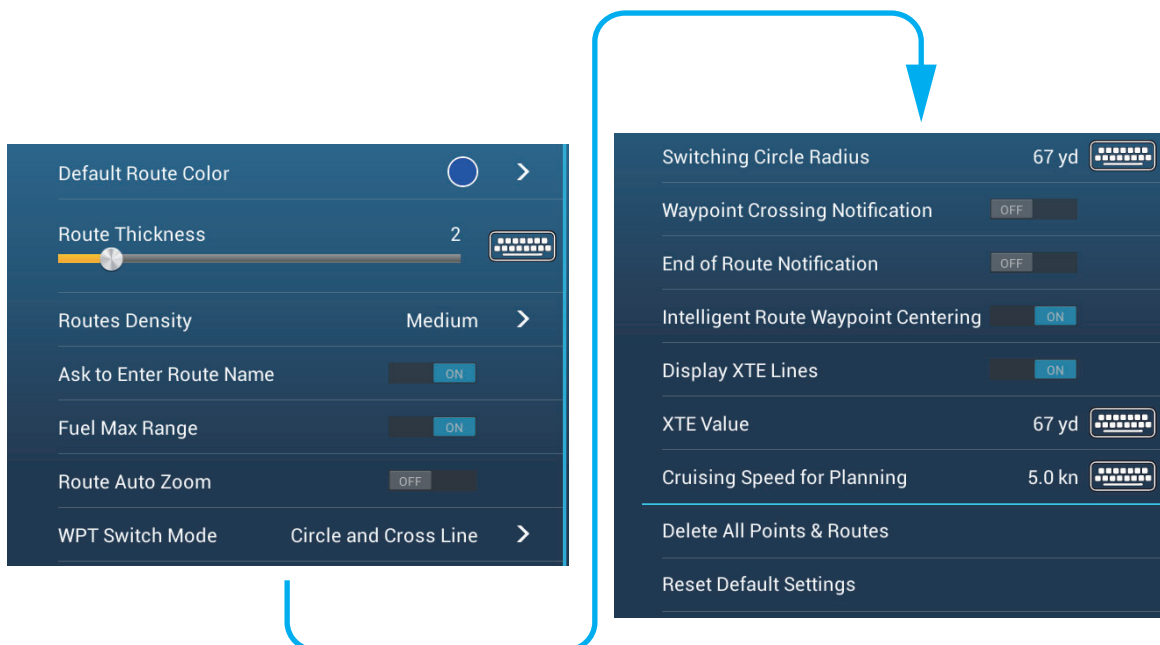
[Default Route Color]: Select the color of the routes. The options are red, blue, green, yellow, magenta, orange, cyan, or black & white.

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

[Navigate with Autopilot]: A message asks if you want to navigate with the autopilot, after setting a destination. Requires NAVpilot. Not shown otherwise.

[Autopilot Step]: Controls the amount of course change set with the preset adjustment buttons in the NAVpilot display. Requires NAVpilot. Not shown otherwise.

Preset adjustment buttons
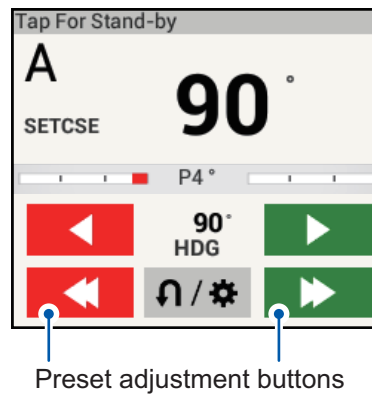
Note: The turn/menu button (Ω/✿) appears only when a NAVpilot-300 is connected and used as the autopilot.

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

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

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

[Cruising Speed for Planning]: Set the default cruising speed for routes (see section 5.4).

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

This page is intentionally left blank.

6. RADAR

This chapter provides the information necessary for radar operation, which requires a radar sensor.

Note: To change the radar source, go to the Home screen, tap [Settings] - [Radar] - [Radar Source], then tap desired radar source.

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

Tap the [TX] icon at the bottom right corner of the screen to put the radar in transmit or stand-by state. The icon is filled in white when the radar is in transmit state. (Transmit, stand-by can also be controlled from the pop-up menu with [TX/STBY].)
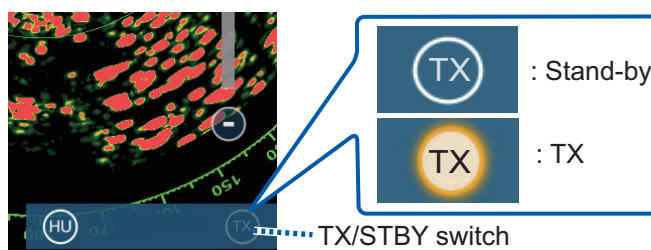
If you do not require the radar for some time, set the radar in stand-by to save the magnetron from unnecessary use.

TX channel selection (w/DRS-NXT series radar sensor)

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

By design the radar receiver is tuned automatically after the radar is set to transmit. For vessels with magnetron radars or DRS X-Class series radars, if you require fine tuning, do the following to tune manually:

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

2. The default tuning method is automatic. Turn off [Auto Tuning] to enable manual tuning.

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

4. Tap the close button to finish.

6.3 How to Adjust the Gain

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

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

Method 1: pop-up menu

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

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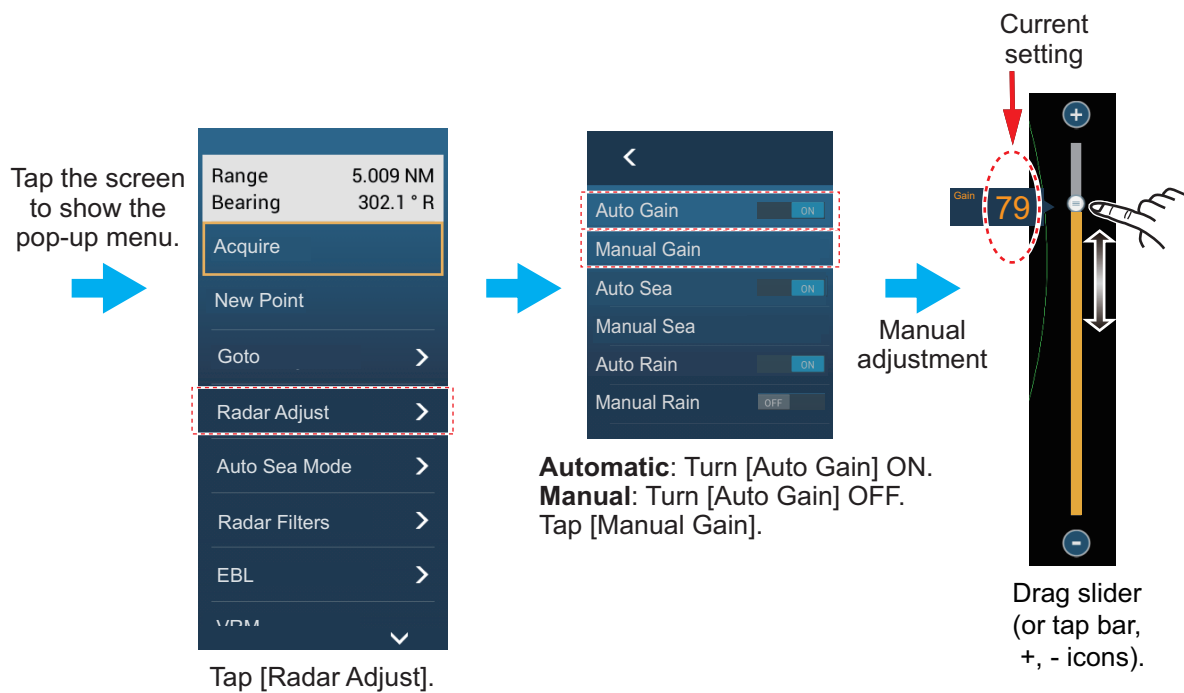
How to adjust the gain

Method 2: Radar Control data box in data area

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

Note: The name (model) of your radar appears at the top of the control box.

Tap "A" to alternate between auto and manual.

All items set for manual adjustment

Manual adjustment

Current setting

Drag slider (or tap bar or +, - icons).
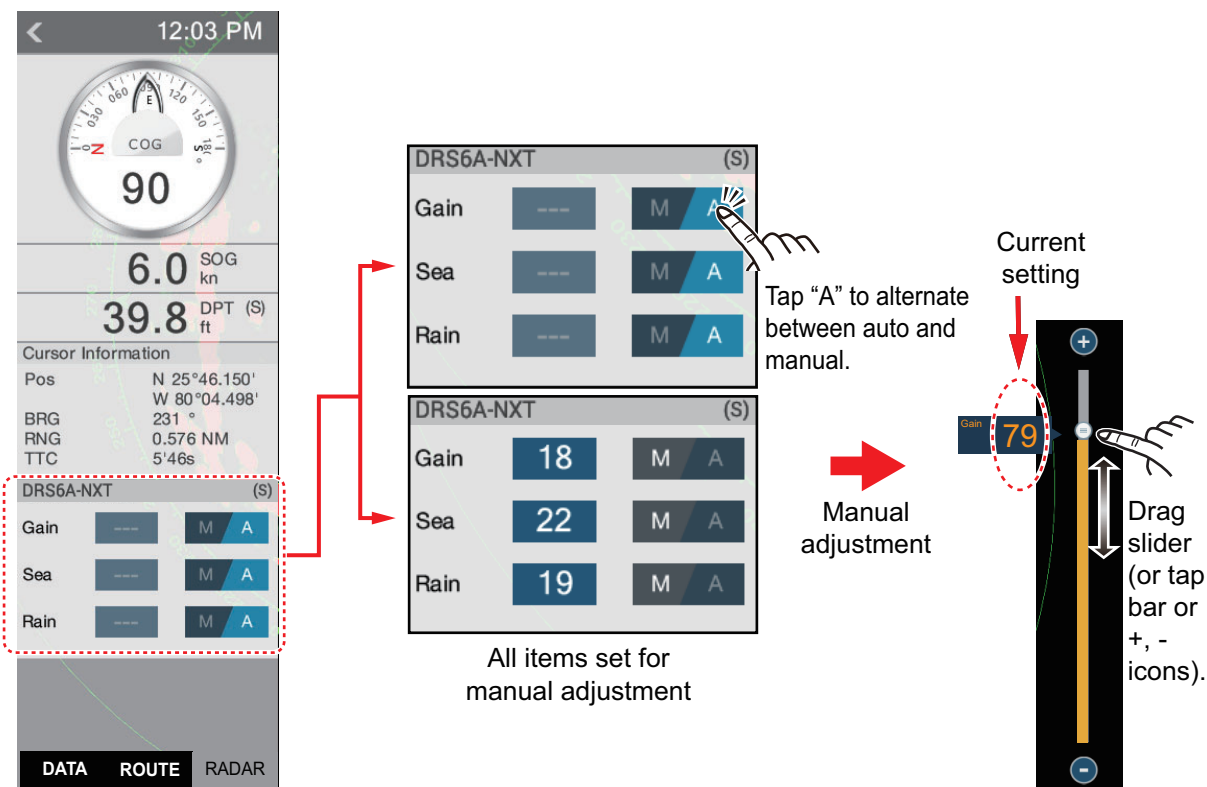
6.4 How to Reduce the Sea Clutter

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 right-hand figure.
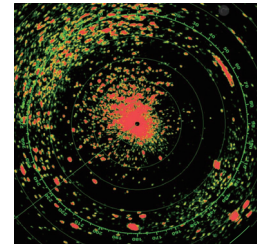
Sea clutter at screen center

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

For automatic sea clutter suppression, there are two methods: [Advanced] and [Coastal]. [Advanced] provides good overall clutter reduction, however some surface reflections may appear on-screen. [Coastal] provides strong clutter reduction based on echo strength, however some objects, such as small land masses, may also be removed.
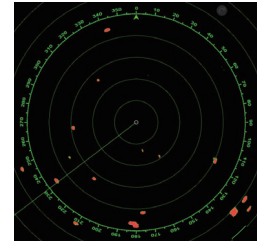
Sea control adjusted; sea clutter suppressed

[Advanced] should be used under normal circumstances and [Coastal] should be used when reflections and clutter are not sufficiently removed under [Advanced].

To select an automatic sea clutter suppression method, open the pop-up menu, tap [Auto Sea Mode] then turn on [Advanced] or [Coastal] as required.
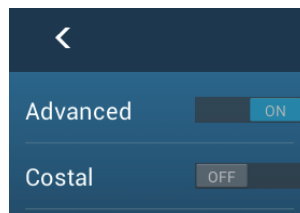
6.5 How to Reduce the Rain Clutter

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

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

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

6.6   Range Scale

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

How to zoom in or out the range scale

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

Zoom in   Zoom out
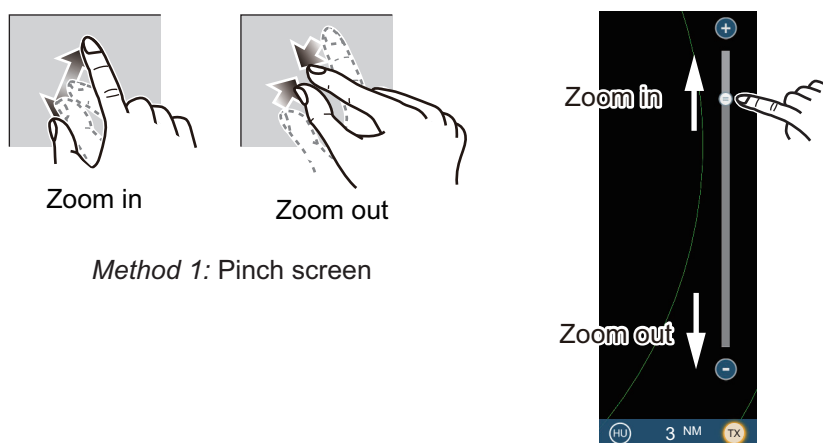
Method 1: Pinch screen

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

6.7   Orientation Mode

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

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

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

Head-up: HU

North-up: NU

Orienatation mode switch
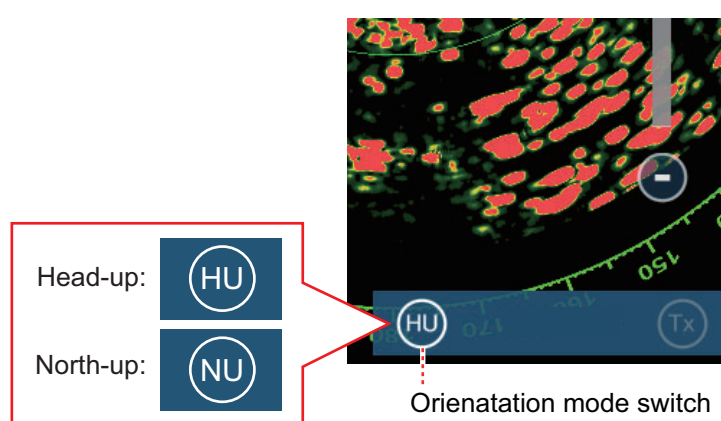
Head-up

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.
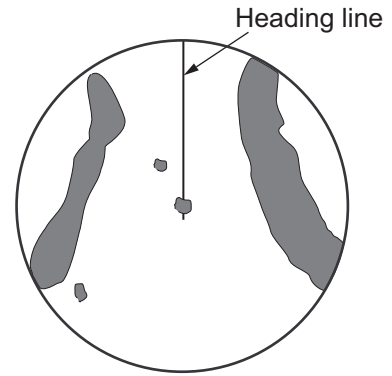
Heading line

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.

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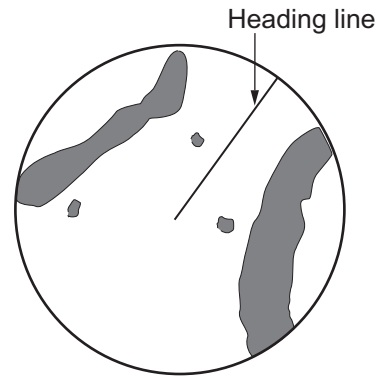
6.8 How to Measure the Range and Bearing from Your Ship to a Target

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

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

6.8.1 How to display the range rings

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

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

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

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

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

Automatic	✓
1 Ring	
2 Rings	
3 Rings	
4 Rings	
5 Rings	
6 Rings	
7 Rings	
8 Rings	
9 Rings	
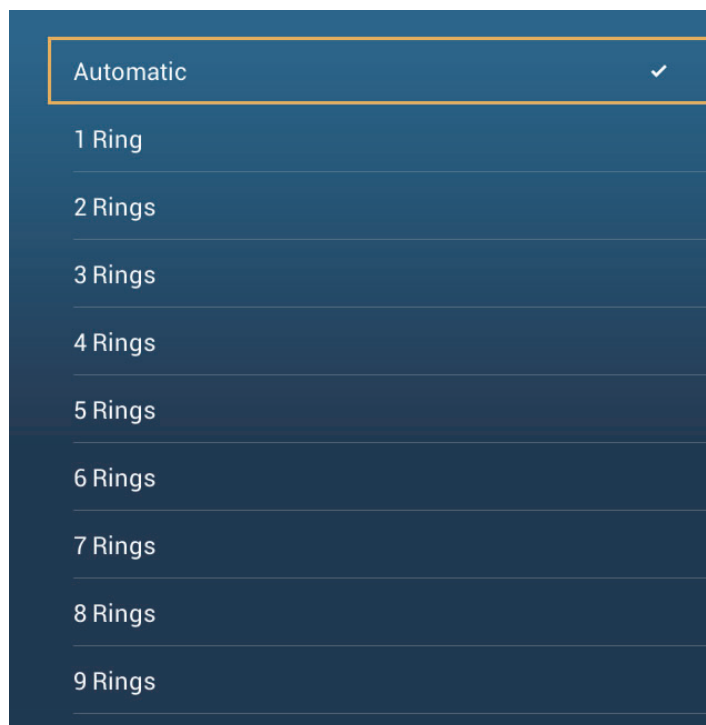
3. Tap a number. [Automatic] automatically selects the number of rings according to the range scale.
4. Tap the close button to finish.

6.8.3   How to select the range rings mode

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

True	
Relative	✓

Head-up mode

Heading line

North ("0")

Boat icon

Bearing scale

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

Heading line

Boat icon

Bearing scale

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.
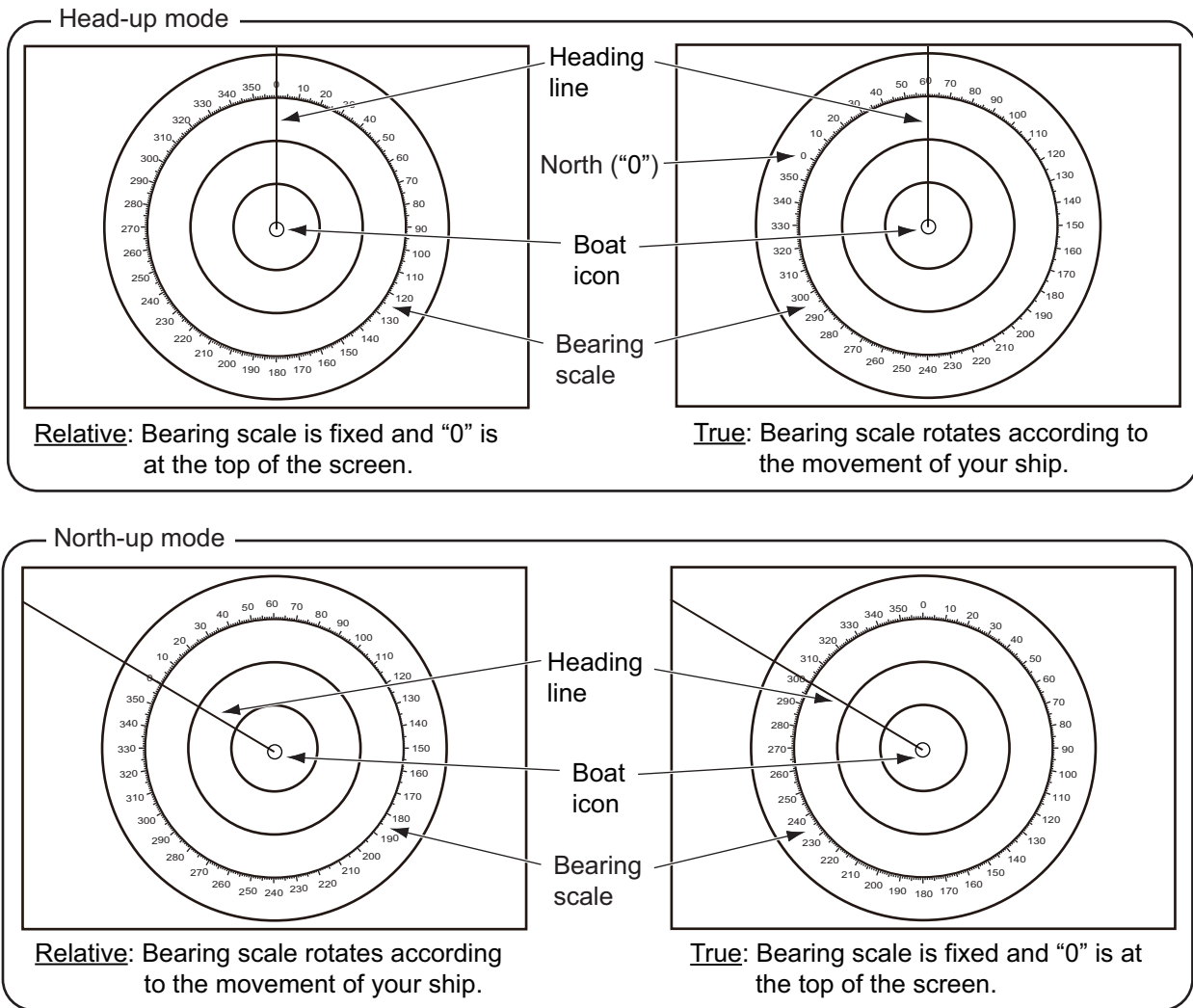
6.8.4   How to measure the range and bearing to an object

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

Range and bearing to object

| Range | 5.009 NM |
| Bearing | 302.1 ° R |

Acquire

New Point

Goto

Radar Adjust

Auto Sea Mode

Radar Filters

EBL

Object

6.8.5　How to measure the range with the VRM

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

Method 1: From the data area

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

To clear the VRM, open the pop-up menu, the tap [EBL] and [Clear].
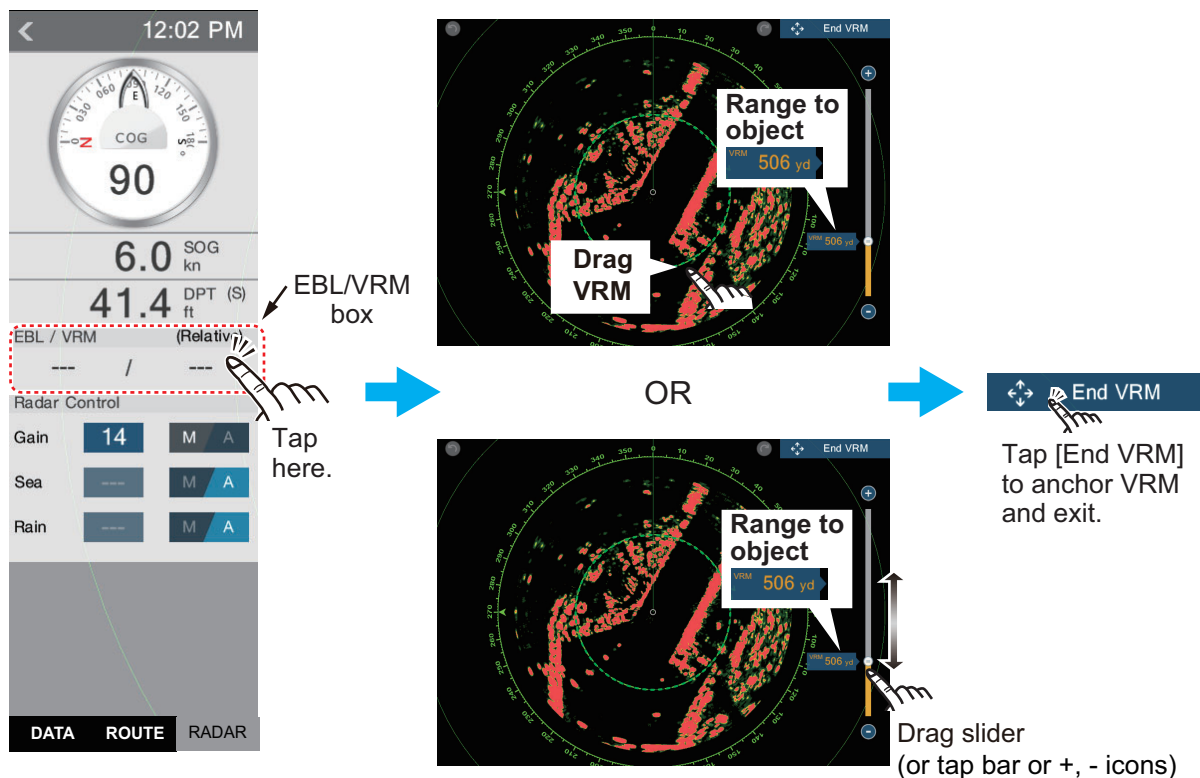
Method 2: From the pop-up menu

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

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

Tap screen to show pop-up menu.
Tap [VRM].

Tap [Adjust].

Drag VRM

Range to object
VRM 506 yd

OR

Range to object
VRM 506 yd

Drag slider
(or tap bar or +, - icons)

Tap [End VRM] to anchor VRM and exit.
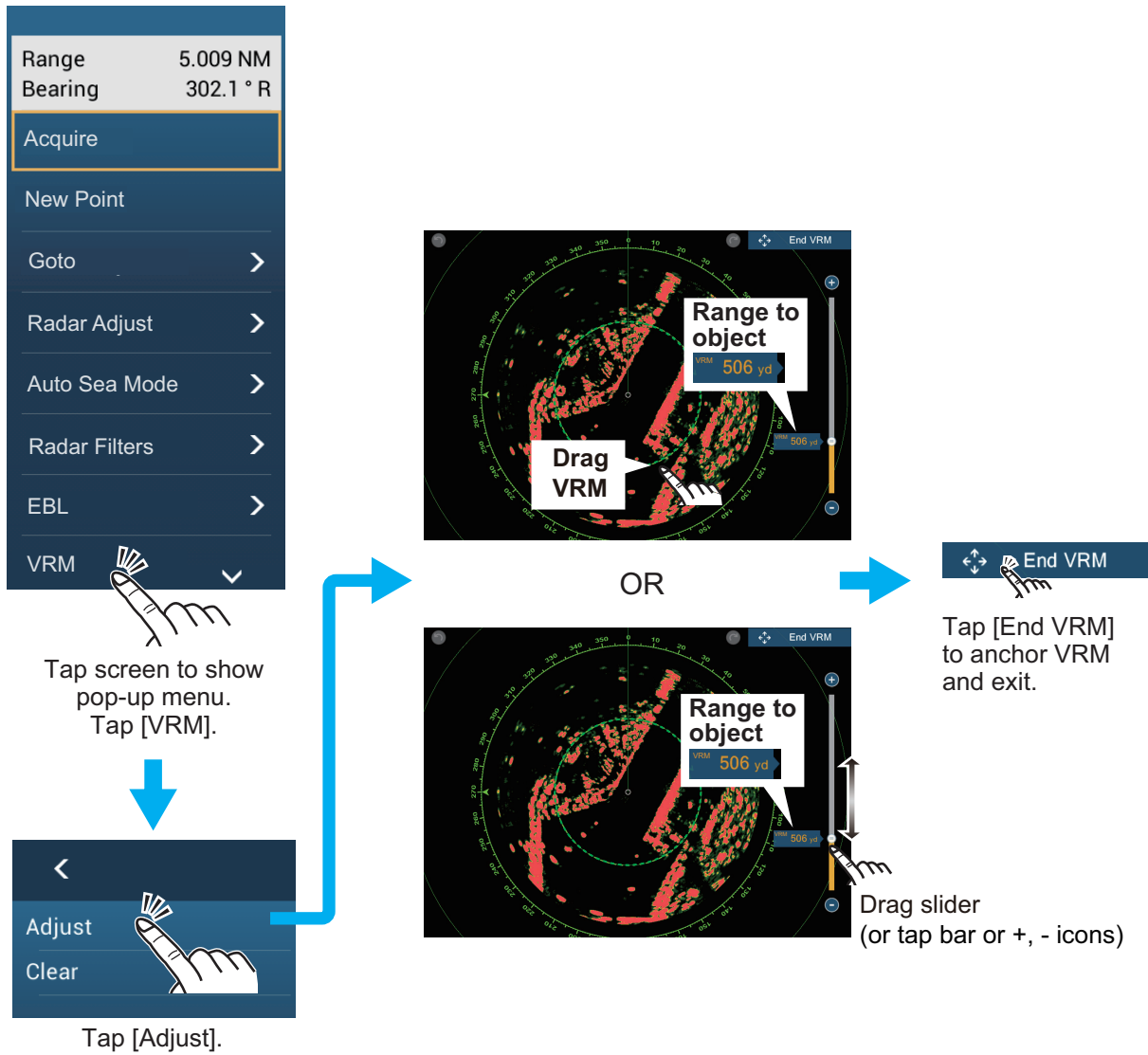
6.8.6 How to measure the bearing with the EBL

Method 1: From the data area

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

To clear the EBL, open the pop-up menu, then tap [EBL] and [Clear].
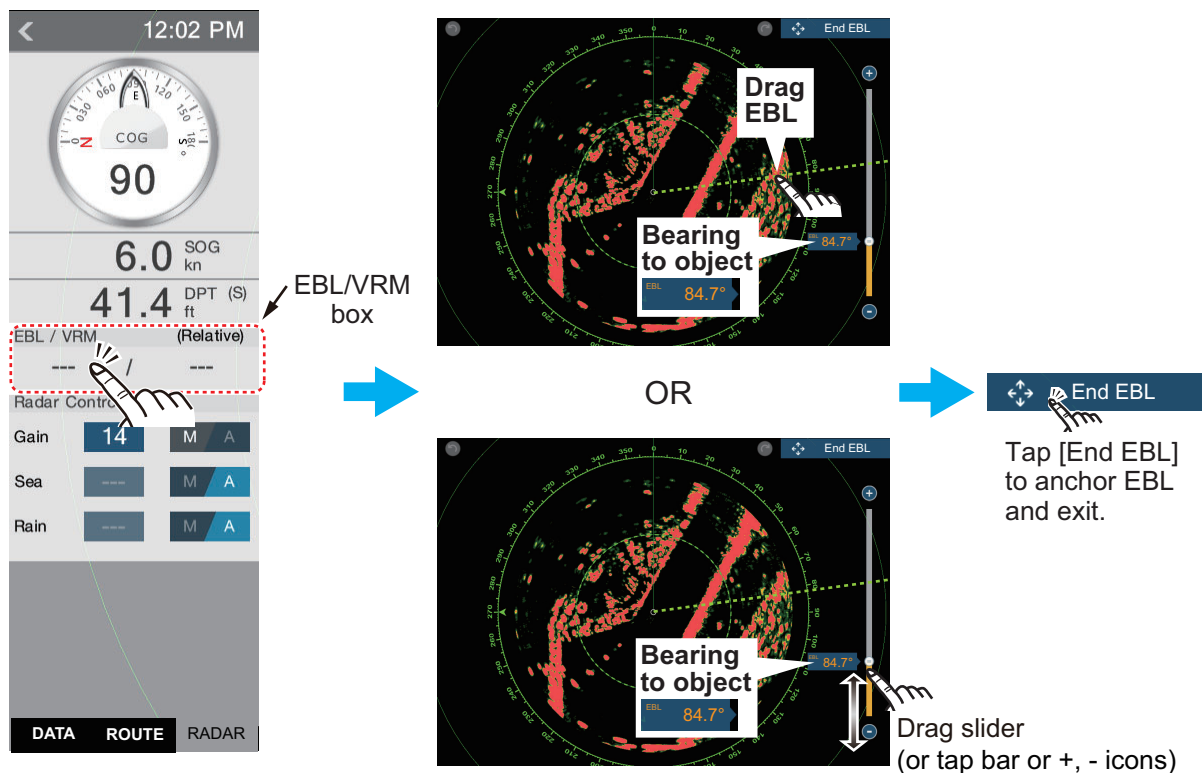
Method 2: From the pop-up menu

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

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

Range	5.009 NM
Bearing	302.1 ° R

Acquire

New Point

Goto   >

Radar Adjust   >

Auto Sea Mode   >

Radar Filters   >

EBL   >

VRM   ⌄

Tap screen to show
pop-up menu.
Tap [EBL].

<

Adjust

Clear

Tap [Adjust].

Drag EBL

Bearing to object

84.7°

EBL 84.7°

OR

Bearing to object

84.7°

EBL 84.7°

Drag slider
(or tap bar or +, - icons)

End EBL

Tap [End EBL]
to anchor EBL
and exit.
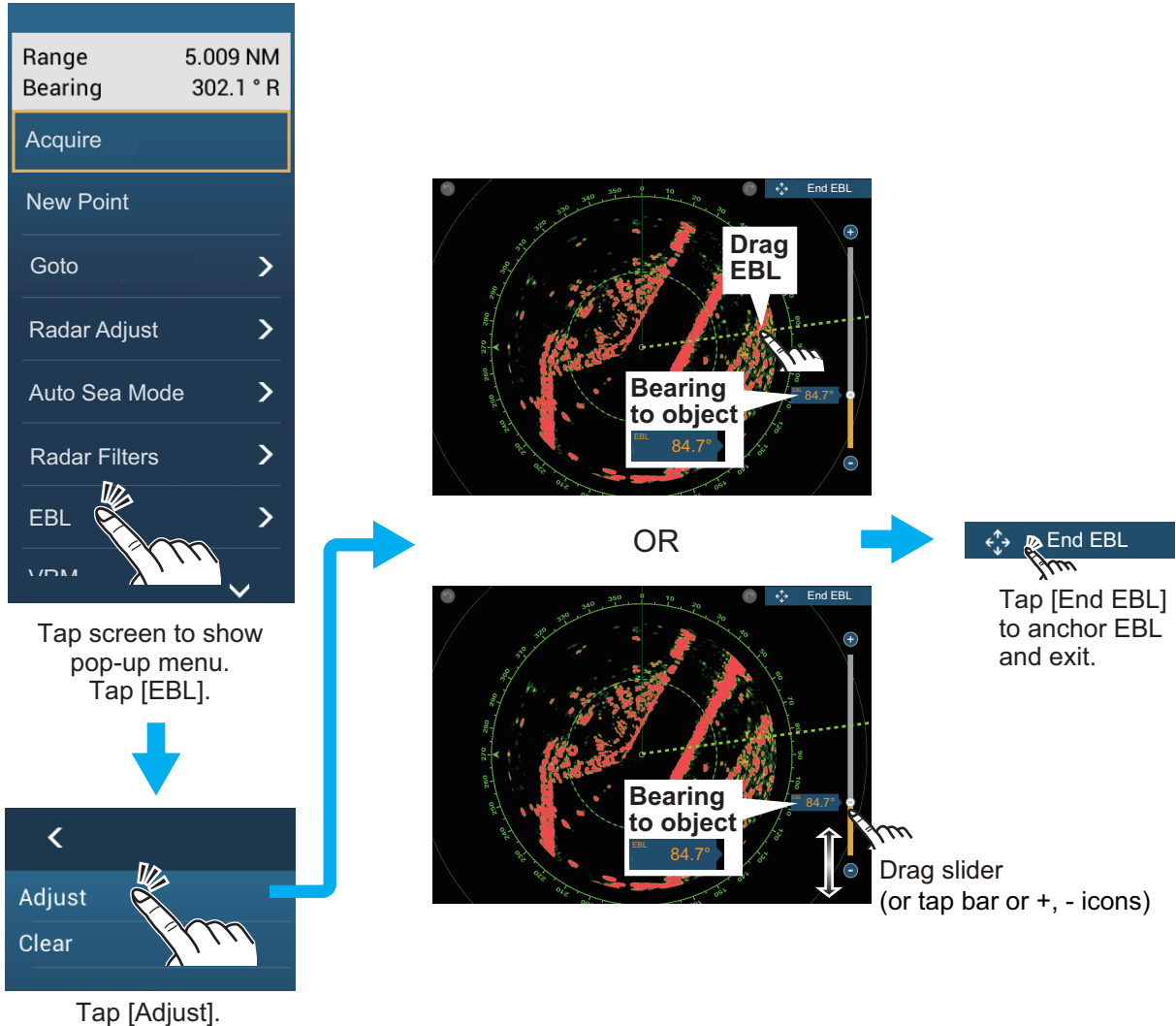
6.8.7   How to select the EBL reference

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

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

True

Relative   ✓

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

6.9 How to Measure the Range and Bearing Between Two Targets

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

1. Open the slide-out menu then tap [Distance] to display the ruler, which has two drag-able circles connected with a line.

2. Drag the circles to set them on the objects for the measurement. The range and bearing between the objects, SOG and TTG appear at the top of the screen.

Range   Bearing   Speed Over the Ground   TTG

RNG 0.738 NM | BRG 89° | SOG 6.0 kn | TTG 7'23s

Starting location   2nd location

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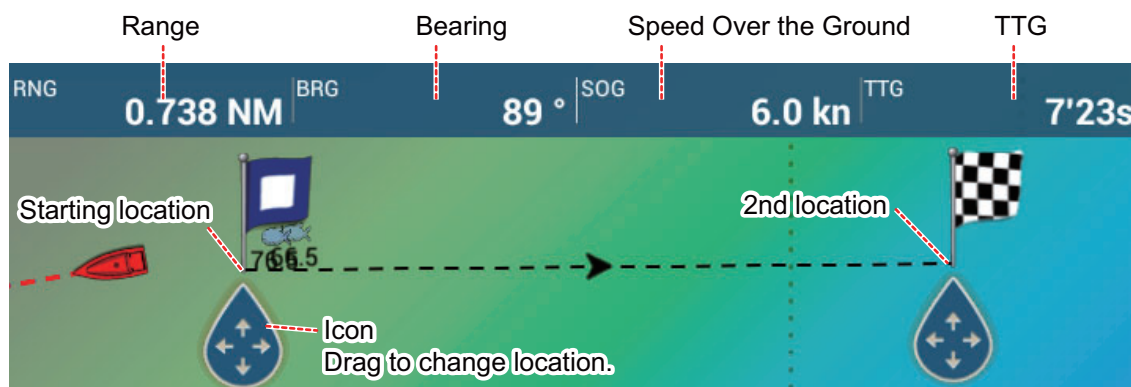
3. Tap [Cancel Ruler] at the top right-hand corner of the screen to erase the ruler and the indications.

6.10 How to Off-center the Picture

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

Pan the radar display by dragging with a finger. To return your ship to the center of the screen, tap [Center Radar] at the top right-hand corner of the screen.
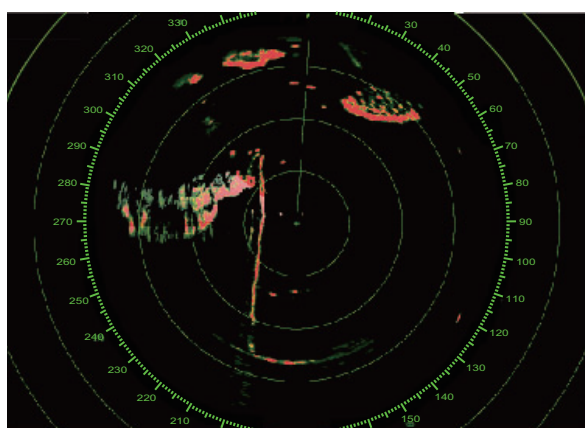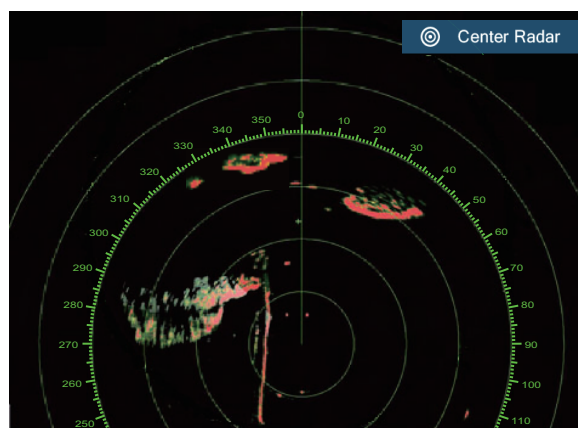
Normal picture   Picture off-centered in stern direction

6.11   Heading Line

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

| Acquire |
| New Point |
| Goto |
| Radar Adjust ❯ |
| EBL ❯ |
| VRM ❯ |
| HDG Line Off |
| Clear Trail |
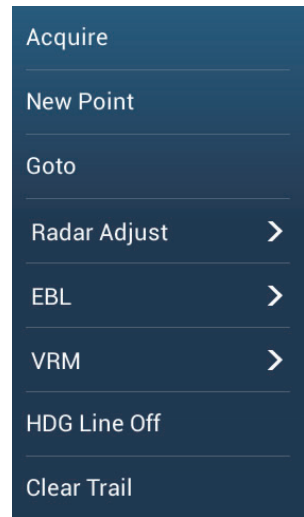
6.12   How to Reduce Radar Interference

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.
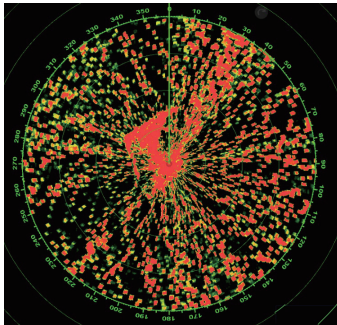
Interference example   Example with Interference Rejection enabled
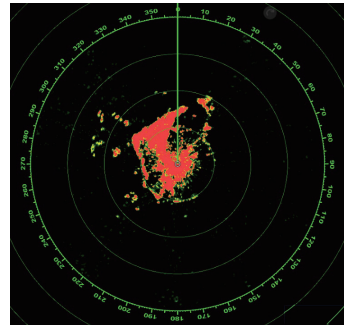
Turn off the interference rejector when there is no interference to prevent the loss of weak targets.

To use the interference rejector, open the [Layers] menu, then turn [Interference Rejection] on or off.

6.13 Echo Average

The sea clutter reduction circuit can remove wanted echoes. If this occurs, use the echo average feature. Echo average reduces the brilliance of targets within sea clutter to allow you to better discriminate targets from sea clutter.

Note 1: Echo average requires heading and position data.

Note 2: Do not use echo average during heavy pitching and rolling, to prevent loss of targets.

Note 3: Before using echo average, properly adjust the sea clutter.

Note 4: In the dual radar display, echo average works only on the left side screen, (1) in the figure below.
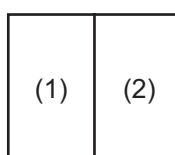
Dual display

To turn the echo average feature on or off, open the [Layers] menu, then turn [Average] off or on as required.
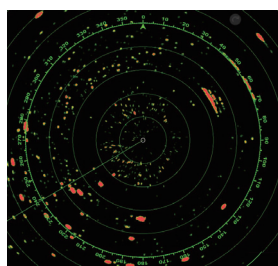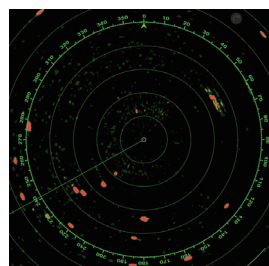
Echo Average OFF   *Echo Average ON*

6.14 Guard Zone

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

6.14.1 How to set the guard zone

Note: You can not set the guard zone with a remote control unit (MCU-002, MCU-004 or MCU-005). Use the touch operation to set the guard zone. The available range changes with the radar sensor - DRS4D-NXT, 0-24 NM; X-class radar sensors, 0-16 NM.

1. Open the [Layers] menu.
2. Turn on [Guard Zone 1] or [Guard Zone 2]. A dotted white line guard zone appears.
3. Tap on a line of the guard zone, and the pop-up menu appears.
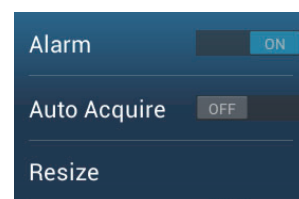
4. Tap [Resize]. Drag icons appear at the corners of the guard zone.
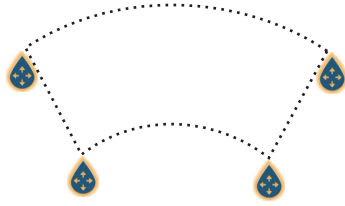
5. Drag the icons to adjust the guard zone.
   Note: To create a 360 degree zone about own ship, set all four drag icons in the same direction.

6. Tap [Done] at to finish. The icons disappear.

6.14.2 How to activate or deactivate the guard zone

1. Tap on a line of the guard zone to show the pop-up menu.

2. Turn [Alarm] on or off. The alarm is active when the guard zone lines are solid and the lines are dashed when the alarm is deactivated.

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

You can mute the audio alarm by turning off [Alarm Sound] in the [Settings] - [Alarm] menu. (see subsection 2.10.7).

6.14.3 How to hide the guard zone

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

6.15 Watchman

The watchman feature transmits the radar for one minute at a specified time interval (5, 10 or 20 minutes) to monitor the guard zone. If a target is found in the guard zone, the watchman is canceled and the radar continues to transmit. This feature helps you watch for targets in the area you set when you do not continuously require the radar.
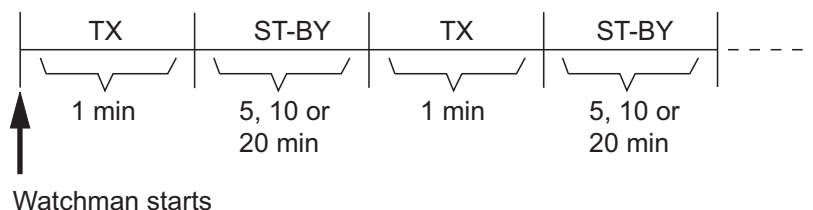
1. Set a guard zone. See section 6.14. (Watchman does not operate unless a guard zone is active. Set Watchman when the radar is in transmit state.)

2. Open the home screen, then tap [Settings] - [Radar].

3. Tap [Watchman].

5'00s

10'00s

20'00s
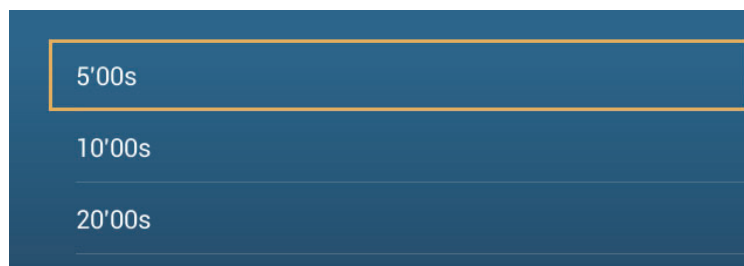
4. Tap a watchman rest interval.

5. Tap the close button to finish.

6. On the radar display, open the [Layers] menu, then turn [Watchman] on to activate the watchman function.

6.16 Echo Trail

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

Note: This function require connection to a heading sensor or valid sensor data input to the same network.
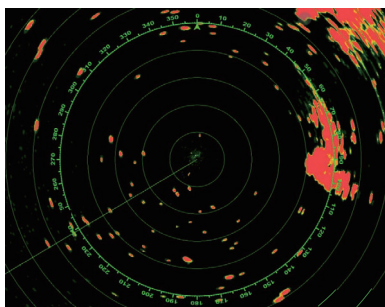
[ECHO TRAIL] set to [OFF]   [ECHO TRAIL] set to [ON]
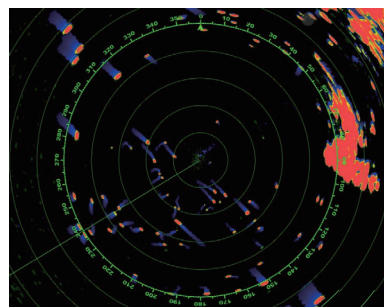
Note: In the dual radar display, echo trail works only on the left side screen (shown as (1) in the figure to the right).
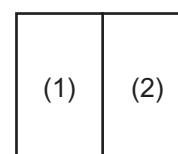
Dual display

6.16.1 How to show, hide echo trails

Open the [Layers] menu, then tap [Trail] to select [OFF] or [ON] as required.

6.16.2 How to clear echo trails

Open the pop-up menu, then select [Clear Trail].

6.16.3 How to select echo trail length

1. At the home screen, select [Settings].

2. Select the [Radar] menu.

3. Set [Trail Length], then select desired trail length.

0'15s	✔
0'30s	
1'00s	
3'00s	
6'00s	
15'00s	
30'00s	
Continuous	
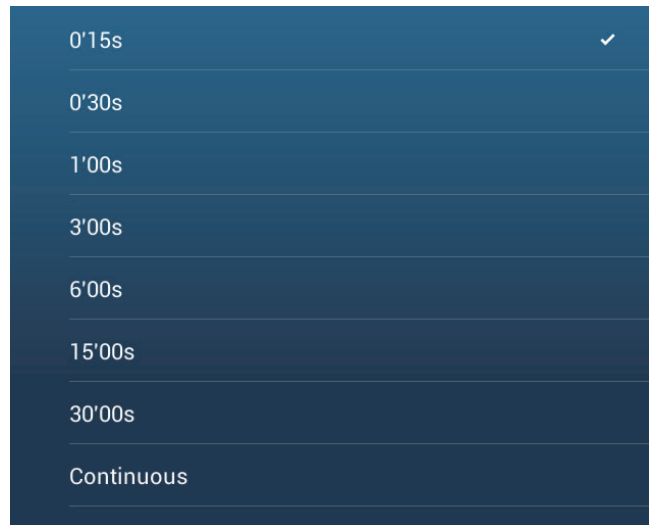
6.16.4 How to select the echo trail mode (reference)

Trail movement can be set for relative or true. Trails require position and heading information.

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.
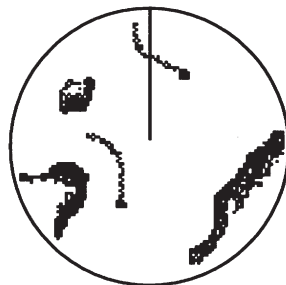
True echo trails
(No smearing of
stationary targets)
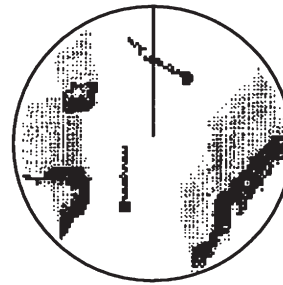
Relative echo trails
(Targets moving
relative to own ship)

Trail reference can be selected to True or Relative as follows.

1. At the home screen, select [Settings].

2. Select the [Radar] menu.

3. Set [Trail Mode] to [True] or [Relative] as required.

Relative	
True	✔
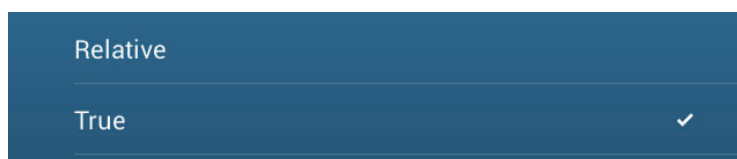
6.16.5 How to select echo trail color

1. At the home screen, select [Settings].
2. Select the [Radar] menu.
3. Set [Trail Color], then select desired trail color.

Blue	✓
Yellow	
Green	
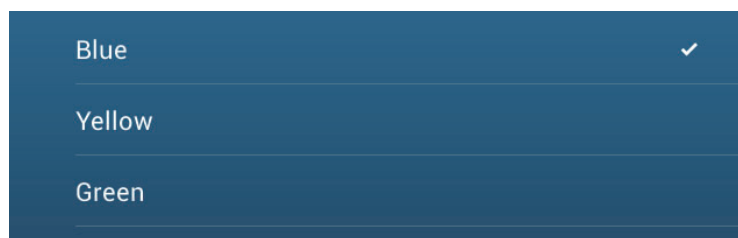
6.16.6 How to select echo trail shading

The afterglow of the target trails can be shown in a single tone or gradual shading.

Target

[Single] trail   [Multi] trail
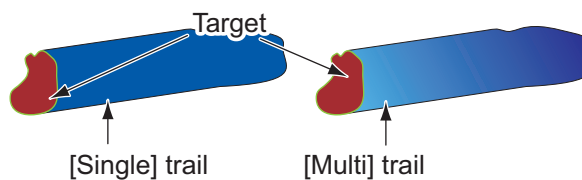
1. At the home screen, select [Settings].
2. Select the [Radar] menu.
3. Set [Trail Shade], then select [Single] or [Multi] as appropriate.

Single	
Multi	✓
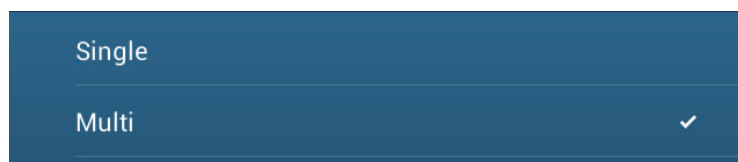
6.17 How to Show, Hide or Cancel an Active Route

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

To cancel route navigation, tap any part of the route then tap [Stop Nav] on the pop-up menu.
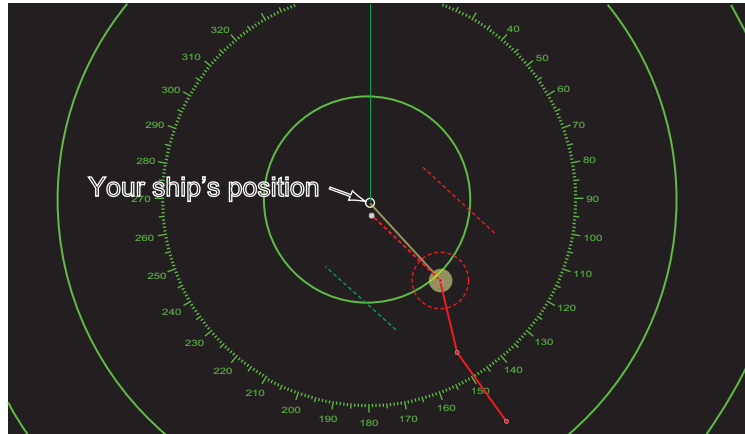
6.18 How to Show or Hide the Own Ship Icon

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

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

6.19 Echo Color

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

1. Open the home screen, then tap [Settings] - [Radar].
2. Tap [Echo Color].
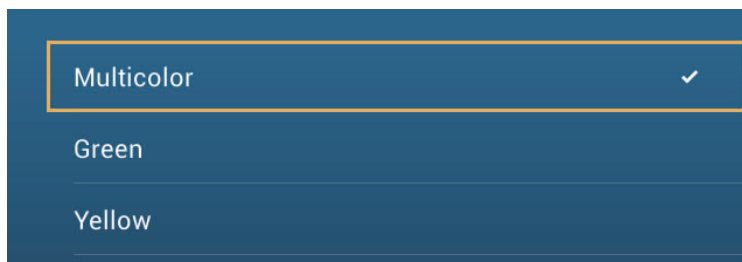
3. Tap a color.
4. Tap the close button to finish.

6.20 Background Color

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

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

2. Tap [Day Background Color] or [Night Background Color] menu.
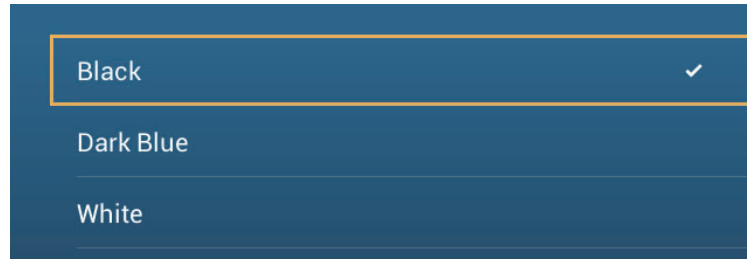
Day background color
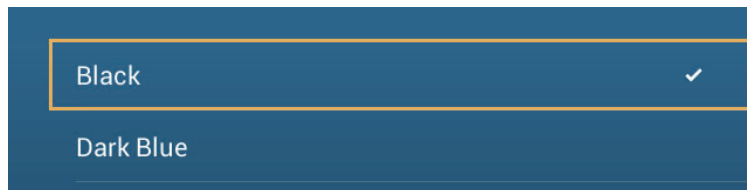
Night background color

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

6.21 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.
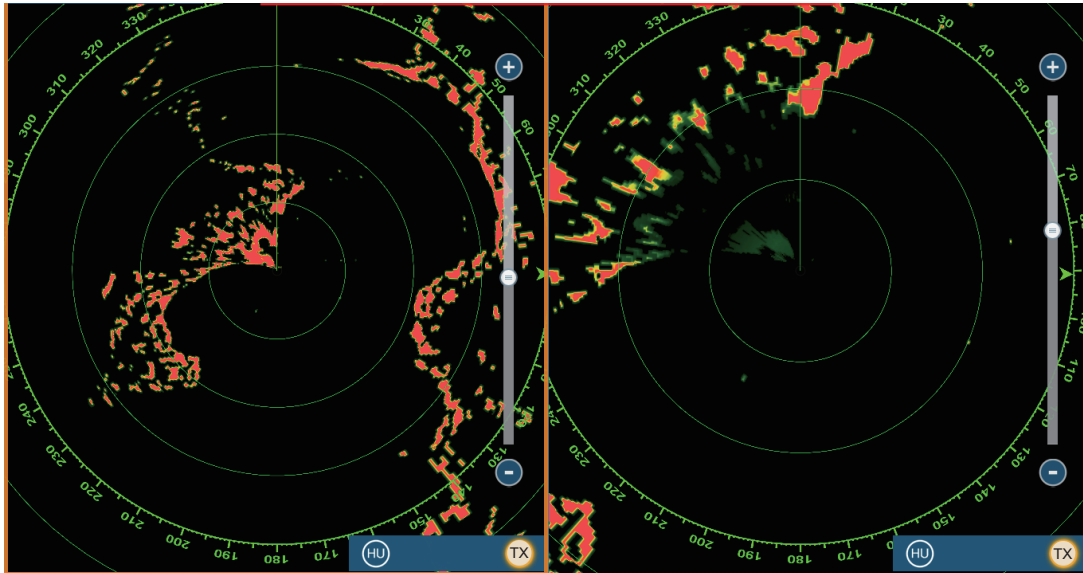
| Long range display | Short range display |

Note: Radar sensor DRS4DL/DRS4DL+ does not have the dual-range display.

To get the dual-range display, set dual-range displays on the home screen. See subsection 1.8.1 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	Status in dual range mode	
	Magnetron radar	**Solid state radar**
Route (show, hide)	Independent	Independent
AIS/ARPA (show, hide)	Independent	Independent
Auto sea mode ([Advanced] or [Coastal])	Independent	Interlocked
Gain	Independent	Interlocked
Heading line (hide temporarily)	Independent	Independent
Operation 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

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

Two-way split   Three-way split screens
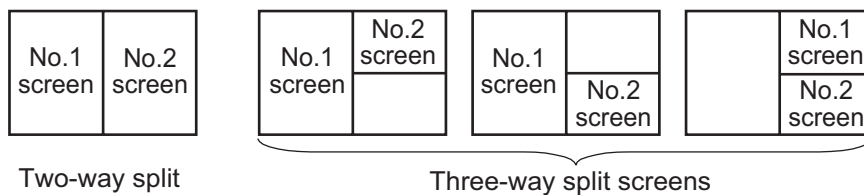
6.22 Bird Mode

The Bird mode sets up the radar for optimal detection of flocks of birds, which indicates 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 birds on the sea surface. 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.
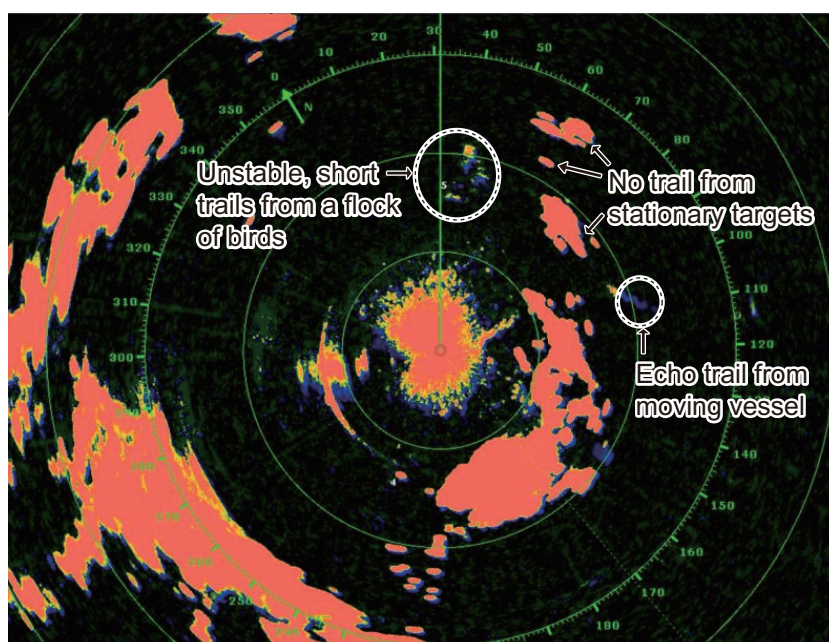
The bird mode has three settings according to the current level of sea clutter:

[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, open the [Layers] menu, then, at [Bird Mode], select the desired setting option, [Calm], [Moderate], [Rough], or [Off].

Usage precautions

- Bird mode is available with radar sensors DRS2D/4D/4A/6A/12A/25A, software version 01.18 or after. Bird mode is also available with the X-Class radar sensors (DRS6A X-Class, DRS12A X-Class, DRS25A X-Class) and the solid-state radars DRS4D-NXT/6A-NXT. The radar sensors DRS4DL/DRS4DL+ do not support 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.

6.23 Target Analyzer™

The Target Analyzer™ paints radar echoes in the colors shown in the illustration and table on the next page, to help you distinguish targets that are moving and getting close to own ship. Requires one of the following radar sensors: DRS4D-NXT, DRS6A-NXT, DRS12A-NXT or DRS25A-NXT. Radar Adjust (Gain, Sea, Rain) and Auto Sea Mode cannot be adjusted when the Target Analyzer is active.

Note: When the radial component of target velocity (see below for description) is 50 kn or higher, the target may be painted in a wrong color. For example, an approaching target whose speed is 50 kn or higher should be painted in red, but is painted in green.

Radial component of target velocity: The target velocity can be separated into two components, the radial and transverse components, as in the figure below. The radar is only able to sense the motion directly along the radial, either towards or away from the radar, because the transverse component has no effect on the phase of the returning electromagnetic wave.
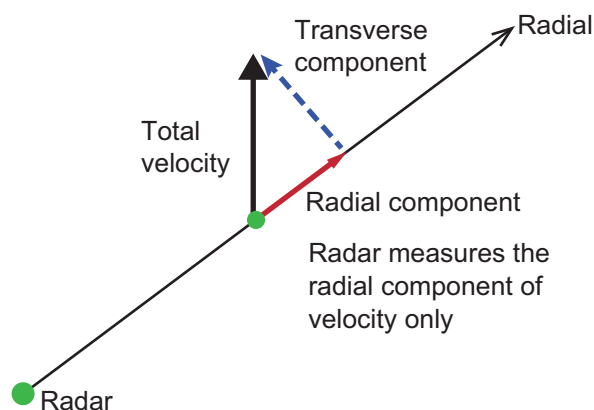
The figure below shows an actual radar image with the Target Analyzer™ activated.
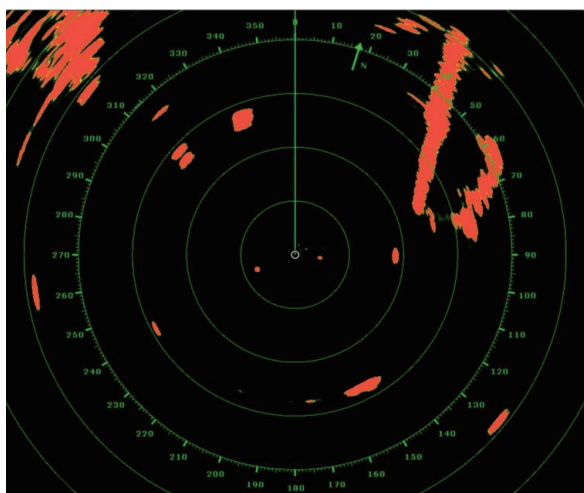
Target Analyzer™: OFF

Target Analyzer™: Target Mode
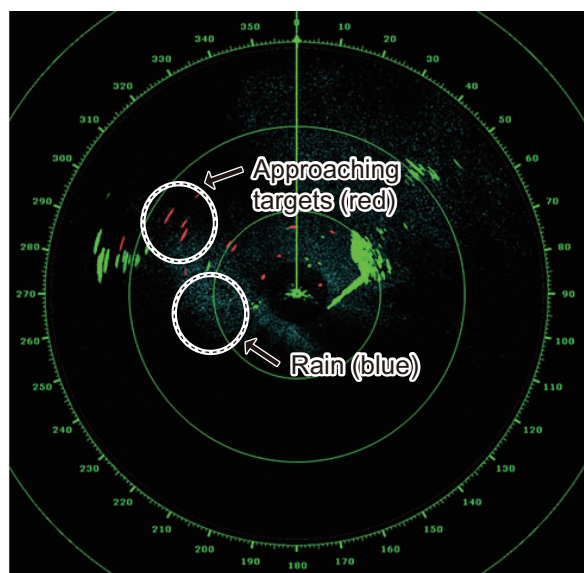
Target Analyzer™: Rain Mode

Target Mode	Rain Mode
Approaching targets: RED Other targets: GREEN	Approaching targets: RED Rain: BLUE Other targets: GREEN

Operating mode and range

Single range: 0.063 to 72 NM, Target Analyzer™, single range: 0.063 to 24 NM
Dual range: 0.063 to 12 NM, Target Analyzer™, dual range: 0.063 to 12 NM

6.23.1 How to activate or deactivate the target analyzer™

To activate the [Target Analyzer], select [Rain] or [Target] from the [Layers] menu. [Rain] emphasizes rain clutter, [Target] emphasizes target echoes.

To deactivate the [Target Analyzer], select [Off] from the [Layers] menu.

6.24 RezBoost™

The azimuth resolution of the radar echoes can be switched in the range of 1-2 times, with one of the following radar sensors: DRS4D-NXT, DRS6A-NXT, DRS12A-NXT or DRS25A-NXT. Four settings are available, [Standard], [Enhanced1], [Enhanced2], or [Enhanced 3]. Select [Enhanced 3] for better echo resolution.

1. Open the [Layers] menu.
2. At [RezBoost], select the desired setting.
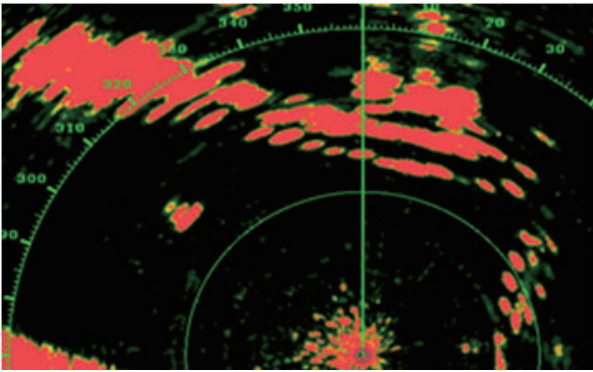
Standard setting
Conventional radar echoes
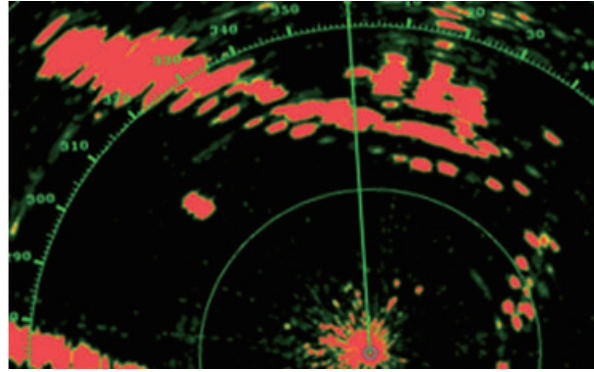
Enhanced 1 setting
Sharper than standard by 1.2 times
Equivalent to 3.4° beam width
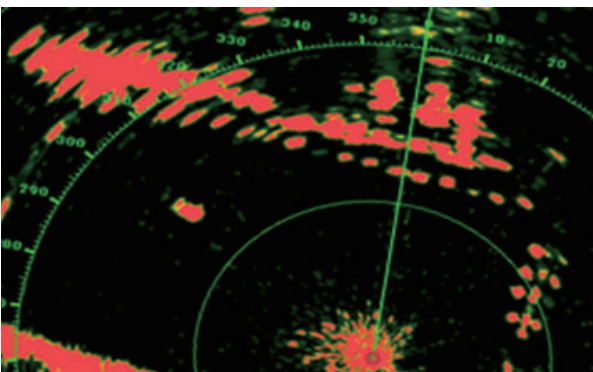
Enhanced 2 setting
Sharper than standard by 1.5 times
Equivalent to 2.7° beam width
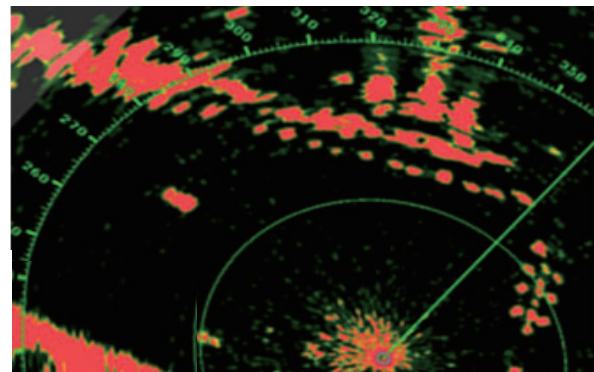
Enhanced 3 setting
Sharper than standard by 2 times
Equivalent to 2.0° beam width

Operating mode and range

Single range: 0.063 to 72 NM, Target Analyzer™ ON, single range: 0.063 to 24 NM
Dual range: 0.063 to 12 NM, Target Analyzer™ ON, dual range: 0.063 to 12 NM

6.25 Connecting With FAR-15xx/FAR-2xx7/FAR-2xx8 Series Marine Radars

Your NavNet TZTouch2 can connect with the FAR-2xx7 series and FAR-15xx series Marine Radars.

The following radar type and software version restrictions apply:

• FAR-15xx series: Non IMO-types only with software version 01.19, or later.

- FAR-2xx7 series: C-types only with software version 04.08, or later.
- FAR-2xx8 series: NavNet TZtouch3 with software version 1.06 or later and set as Master. Catch data import/export is restricted to TZX format.

Note 1: Polygon acquisition zones must be also be disabled at the radar.

Note 2: For FAR-15xx series users, the Echo Average function is only applied to images from EAV1 when displayed on your TZtouch2 unit.

When connection with the radar is established, some radar functions are available to use from the TZTouch2. See the following table for details.

Radar function	Available from the TZTouch2?	Remarks
Split-screen display	Not available	
Display AIS target data	Available	
ARPA automatic acquisition	Not Available	
ARPA manual acquisition and removal	Available	Up to 100 targets.
AUTO RAIN	Not available	
AUTO SEA	Available	ON/OFF operation only, setting adjustment must be done at the radar.
Automatic gain adjustment	Not available	
Manual rain/snow clutter removal	Available	
Manual gain adjustment	Available	
Toggle transmit and standby modes	Available	
Interference Rejector	Available	
Tuning, antenna sped and other post-installation adjustments	Not available	
Radar source selection, display of echoes	Available	
Selection of range unit	Not available	Fixed at [NM].
Changing the range	Available	Following ranges only: 0.125, 0.25, 0.5, 0.75, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 96 (nm).
Watchman feature	Not available	
ACE GAIN	Available*	*: This function is only available for the FAR-15xx series and requires ACE GAIN to be enabled from the radar.

6.26   Radar Menu

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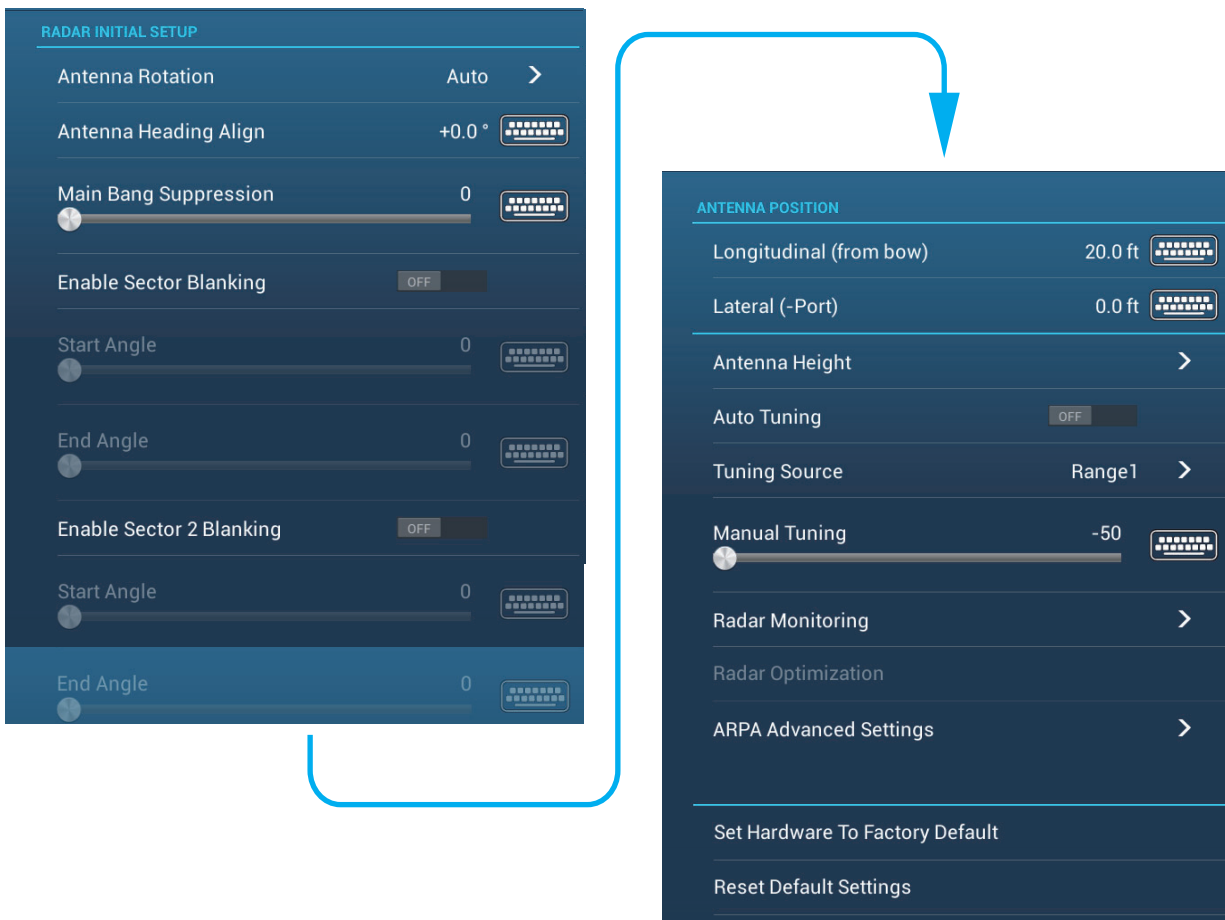
Radar Initial Setup

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

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

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

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

Antenna position

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

Other items

[Antenna Height]: Set the height of the radar antenna above the waterline. Not available (grayed out) with the radar sensor DRS4DL/DRS4DL+.

[Auto Tuning]: Activate or deactivate auto tuning for the connected radar. Not available (grayed out) with the radar sensor DRS4D-NXT

[Tuning Source]: For dual range display, select the range to use as the manual tuning source. Not available (grayed out) with the radar sensor DRS4DL/DRS4DL+, DRS4D-NXT.

[Manual Tuning]: Manually tune. Not available (grayed out) with the radar sensor DRS4D-NXT.

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

[Radar Optimization]: Automatically adjust magnetron output and tuning for the connected radar. **Be sure to do this function after replacing the magnetron**. Not available (grayed out) with the radar sensor DRS4D-NXT.

[ARPA Advanced Settings]: Sets ARPA parameters. For the service technician only. Do not change the settings. Set [TX/STBY] to [ON] to access. Not available (grayed out) with the radar sensor DRS4DL, FAR-2xx7 series radar antenna.

[Set Hardware to Factory Default]: For the service technician only.

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

6.27 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 1: The DRS4DL radar sensor does not have the ARPA function.

Note 2: For configurations using DRS4D-NXT or DRS6A-NXT sensors, the maximum number of targets that can be acquired is 100.

⚠ 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 ranges from 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)

6.27.1 How to show or hide the ARPA display

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

6.27.2 How to manually acquire a target

You can manually acquire a target from both the radar display and the radar display overlay. Up to 30 targets can be acquired manually. Tap the target to acquire to show the pop-up menu, then tap [Acquire].

Note: For configurations using DRS4D-NXT or DRS6A-NXT sensors, the maximum number of targets that can be acquired is 100.

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

ARPA Symbol	Meaning	ARPA Symbol	Meaning
Color: green	At acquisition of the target.	Vector → Color: green	30 s after the acquisition, the plotting symbol changes to a small circle, which indicates steady-state tracking. A vector (dashed line) shows the direction of the target.
Color: green	A lost target is indicated by a diamond symbol, created from two equal triangles.	Color: red	A target that meets the criteria of the CPA/TCPA alarm is changed to a dangerous target.

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

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

6.27.3 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. To disable the buzzer, set [Alarm] to [OFF] in the pop-up menu at step 2 in the below procedure.

1. Create a guard zone referring to section 6.14.
2. Tap a line on the guard zone to show the pop-up menu. Turn on [Auto Acquire]. The dotted lines for the guard zone turn into solid lines.

6.27.4 How to automatically acquire targets by Doppler

With acquisition by Doppler active, you can track up to 100 targets in total as follows.
- 40 targets by auto acquire by Doppler
- 30 targets by auto acquire by guard zones
- 30 targets by manual tracking

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.

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].

This feature requires the radar sensor DRS4D-NXT/DRS6A-NXT and position and heading inputs.

6.27.5 How to display target data

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

Simple information   *Detailed information*

6.27.6 How to stop tracking targets

You can stop tracking ARPA targets individually or all together.

Individual target

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

All targets

Open the slide-out menu, tap [ARPA], then tap [Cancel All] to delete all targets from the screen.
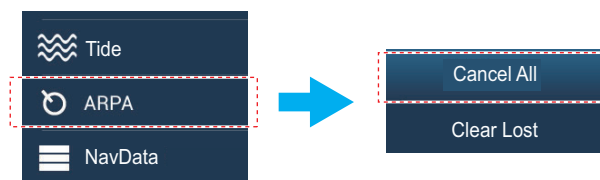
6.27.7 ARPA list

The ARPA list displays data for all ARPA targets being tracked.

How to show the ARPA list

To show the list, go the Home screen, then tap [Lists] - [ARPA]. The color bars at the left side of the list denote ARPA symbol status, green for tracking or lost target, red for dangerous target.
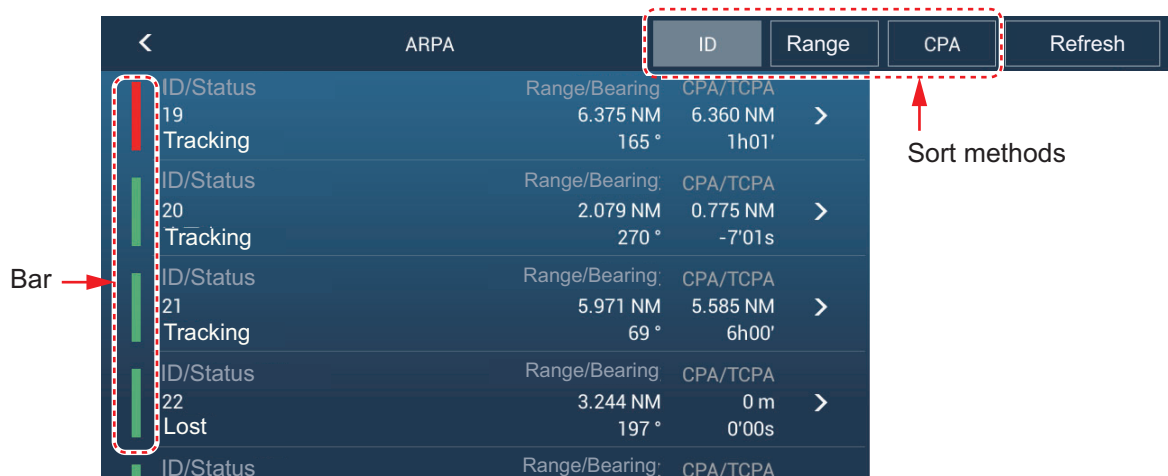
To sort the list, tap appropriate sort method button at the top of the list. **ID**: Sort by ID no. **Range**: Sort by range, closest to furthest from own ship. **CPA**: Sort in CPA order.

The [Refresh] button updates target data.

How to show detailed ARPA target information

Tap the target on the ARPA list to see its information.

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

ACTIONS

Find on Chart

How to put an ARPA target at the center of the plotter display

Tap a target on the list. Tap [Find on Chart] to put the ARPA target at the center of the plotter display.

6.27.8 How to clear lost targets

Tracking of a target cannot be continued when the echo from that target becomes lost. A lost target can be tracked after it is reacquired. Lost targets can be erased individually or collectively.

Individual target

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

Clear all targets

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

6.27.9 CPA/TCPA alarm

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

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

How to set the CPA/TCPA alarm

1. Open the home screen, then tap [Settings] - [Targets].
2. Turn on [CPA/TCPA Alarm].

3. Tap [CPA Alarm Value] or [TCPA Alarm Value] to display the software keyboard.

4. Set the value, then tap [✓] to confirm.

5. Tap the close button to finish.

How to acknowledge the CPA/TCPA alarm

The CPA/TCPA alarm sounds when the CPA and TCPA of an ARPA target are within the CPA/TCPA alarm range. The alarm indication "CPA/TCPA Alarm" appears and flashes at the top of the screen. To acknowledge the alarm and stop the audio alarm and flashing of the indication, tap the indication "CPA/TCPA Alarm" (see subsection 2.10.8). (The ARPA vector must be displayed at least 30 seconds to calculate CPA and TCPA.)

How to deactivate the CPA/TCPA alarm

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

2. Turn off [CPA/TCPA Alarm].

3. Tap the close button to finish.

6.27.10 CPA graphic display

The CPA graphic display shows the CPA between own vessel and the selected ARPA (or AIS) target with a line, called the "CPA line." You can use the CPA line to see the CPA between your vessel and ARPA targets. Whenever you change your vessel's course and speed, you can see the new positional relationship between your vessel and ARPA targets.

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 only line can be displayed at a time between ARPA and AIS targets.) The example at right shows the appearance of the CPA line on the radar display.
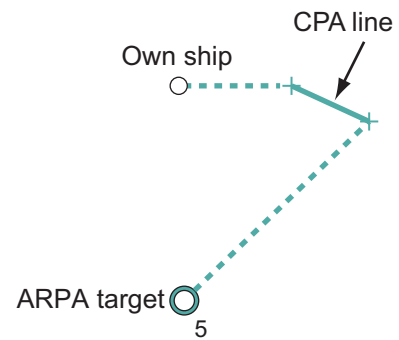
If the CPA/TCPA alarm is generated while the CPA line is in use, the CPA line and the selected target symbol turn red.

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

- The CPA line is turned off. The line can be turned off by tapping the CPA line (or own ship icon* or target) to show the pop-up menu, then select [CPA].
  * Plotter display only
- 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).

6.28 How to Interpret the Radar Display

6.28.1 False echoes

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

Multiple echoes

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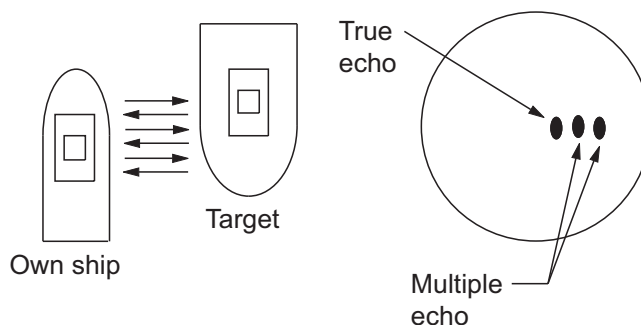
Virtual image

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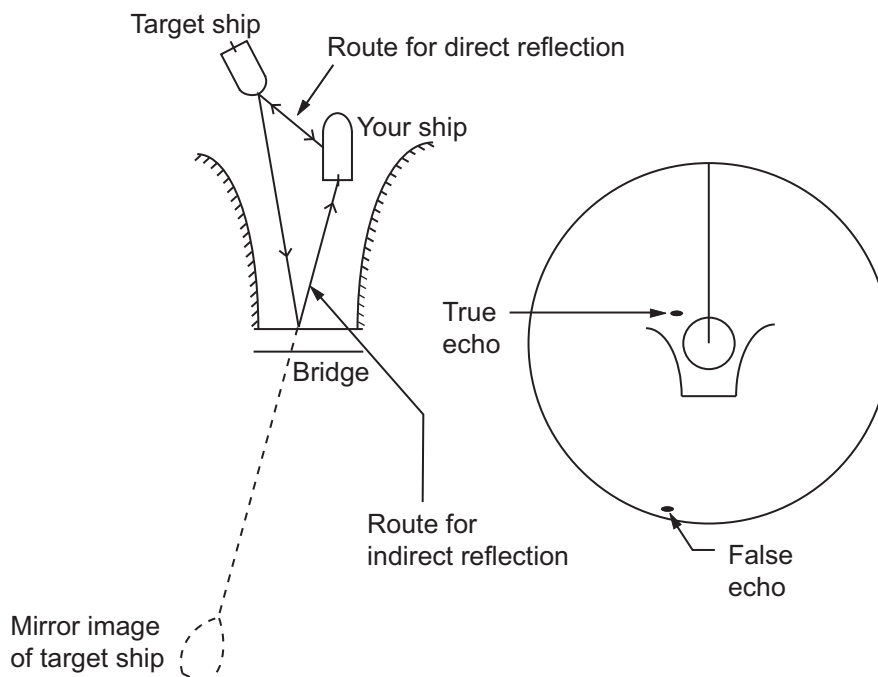
Sector blanking

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

Wharf and its echo

Radar position

Radar position

Wharf and its echo

Sector blanking occurs because wharf is hidden behind ship.

Large ship

Sector blanking occurs because obstruction (like mast) is in path of radar beam.

Size of blanking sector depends on size of obstruction and range.
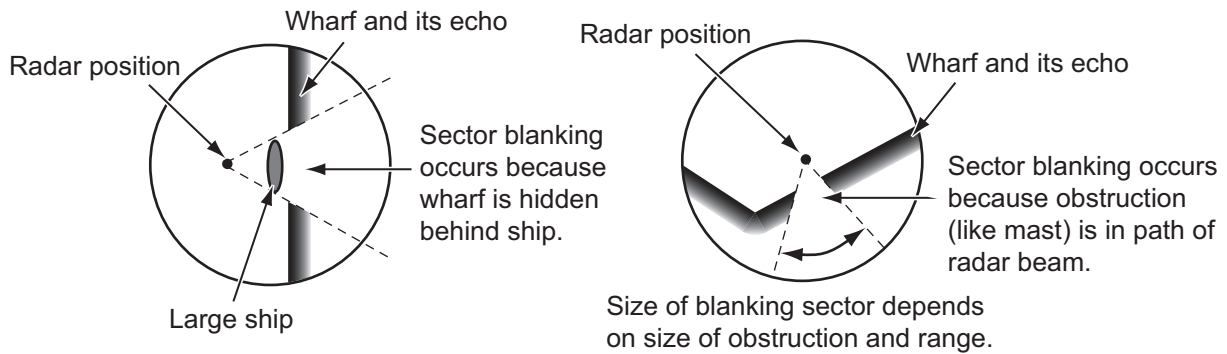
Sidelobe echoes

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.

Mainlobe (beam)

True target

Sidelobe   Sidelobe

Antenna

False echoes by sidelobes
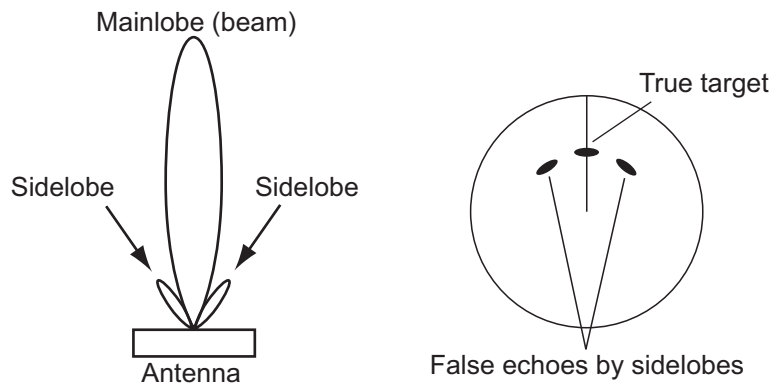
6.28.2   Search and rescue transponder (SART)

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

Screen A: When SART is distant   **Screen B: When SART is close**

Radar antenna beamwidth

Echo from SART
(Lines of 12 dots are displayed in concentric arcs.)

Own ship position

Position of SART

24 NM

Own ship position

Position of SART

1.5 NM
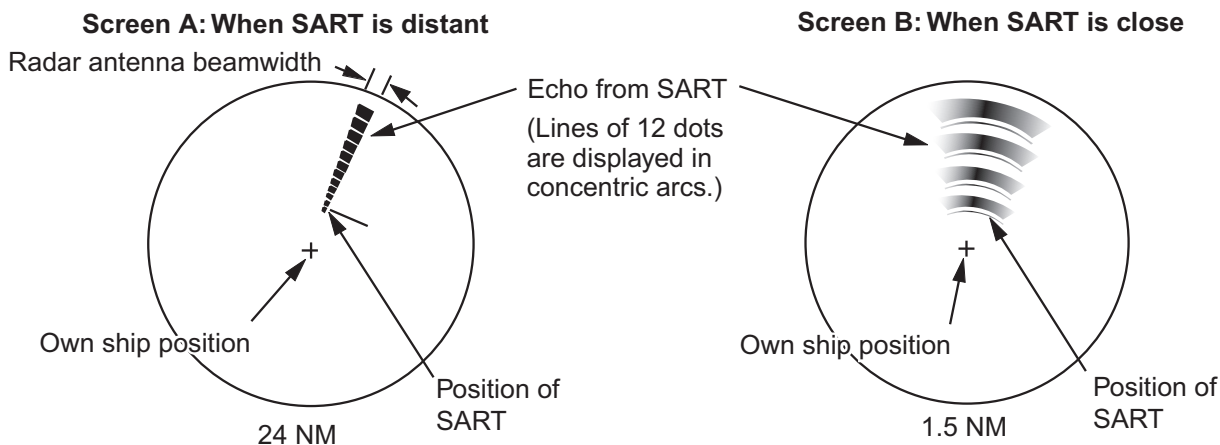
How to detect the SART response

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

6.28.3   RACON (Radar Beacon)

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

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

This page is intentionally left blank.

7. FISH FINDER (SOUNDER)

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

The fish finder is set up from the [Fish Finder] menu, which can be opened by the following two methods.

• From the Home screen, tap [Settings]→[Fish Finder].
• With the fish finder display active, open the [Layers] menu, then tap [Fish Finder Setting].

Unless otherwise written, this manual uses the first method.

Note 1: To change the fish finder source, open the [Fish Finder] menu, tap [Fish Finder Source], then tap the source to use. The source can also be selected from the [Layers] menu with [Fish Finder Source].

Note 2: The names of menu items change according to the fish finder source.

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.
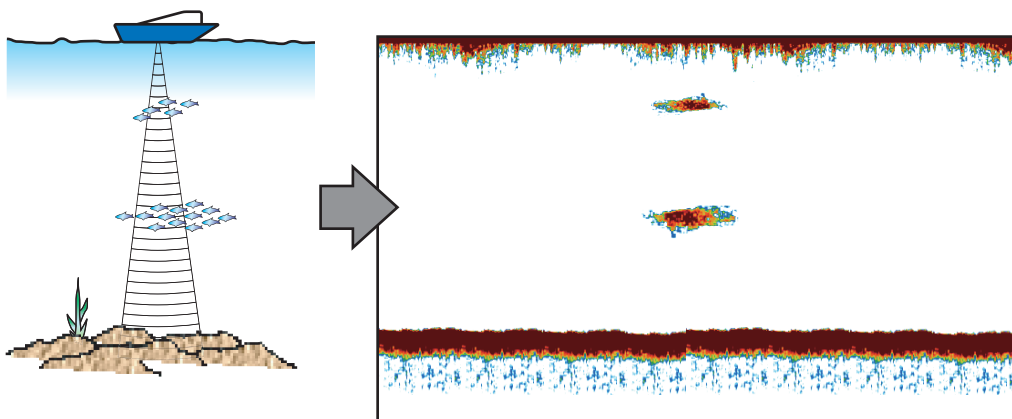
7.2 How to Transmit, Go to Stand-by

Open the pop-up menu, then tap the flipswitch [TX/STBY]. Select [ON] to transmit; [OFF] to go to stand-by. [Stand-by] appears at the screen center when in stand-by.

7.3 How to Select a Display

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

7.3.1 Single frequency display

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

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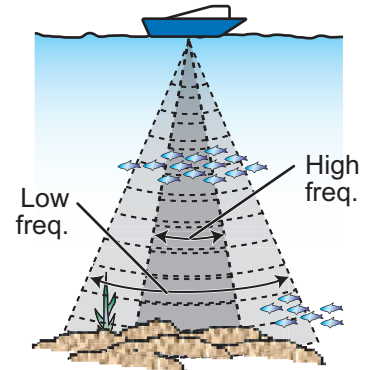
How to select a single frequency display

Tap the screen to show the pop-up menu. Tap [Mode]→[Single Freq.].
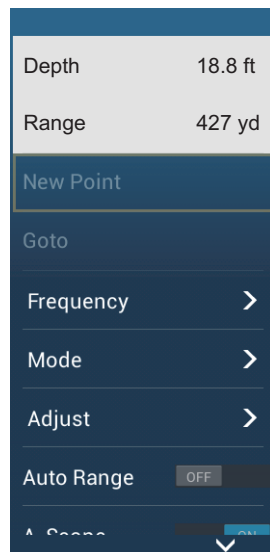
How to switch between the low and high frequency displays

To switch between the high and low frequency displays, do the following:

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

Note: This method can also be used to reverse the location of the high and low frequency pictures in the dual frequency display and switch between low and high frequency pictures in a zoom display.
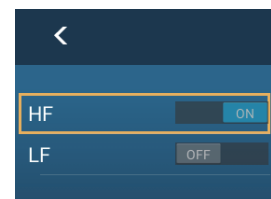
7.3.2 Dual frequency display

The dual frequency display provides both low and high frequency pictures, the low frequency on the left half (default). Use the dual frequency display to compare the same picture with two different sounding frequencies.
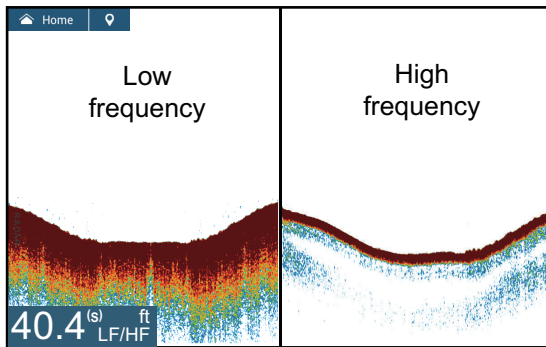
Freq. (kHz)	Beamwidth	Resolution	Detection range	Bottom tail
Low	Wide	Low	Deep	Long
High	Narrow	High	Shallow	Short

How to select the dual frequency display

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

How to set separate ranges for the low- and high-frequency displays

1. Open the [Fish Finder] menu.
2. Turn on [Split Range]. A message informs you that ACCU-FISH™ will be disabled when the split range is used.
3. Tap [OK].
4. Tap the close button on the title bar to finish.
5. Pinch the high- and low-frequency displays to change their range.
   Note: The slider bar can be used to adjust the range of the image shown on the left-half of the screen.

7.3.3 Zoom displays

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

How to activate, deactivate a zoom display

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

Bottom lock display

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

Bottom lock display   Single freq. display

Zoomed school of fish

School of fish

Zoom marker

This area zoomed and displayed on left 1/2 of screen.

Bottom shown as a straight line
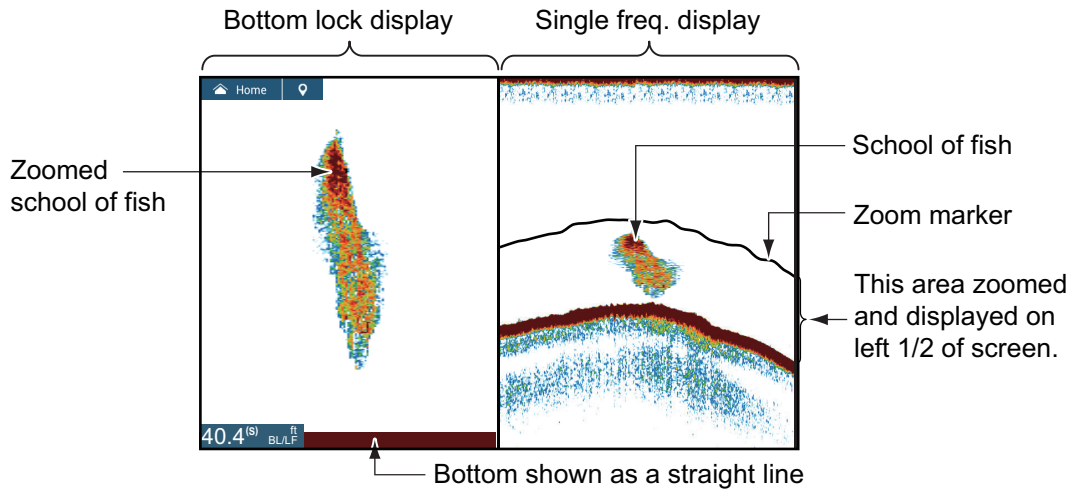
Bottom zoom display

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

Bottom zoom display   Single freq. display

Bottom

Zoom marker

Zoom marker automatically follows change in depth.
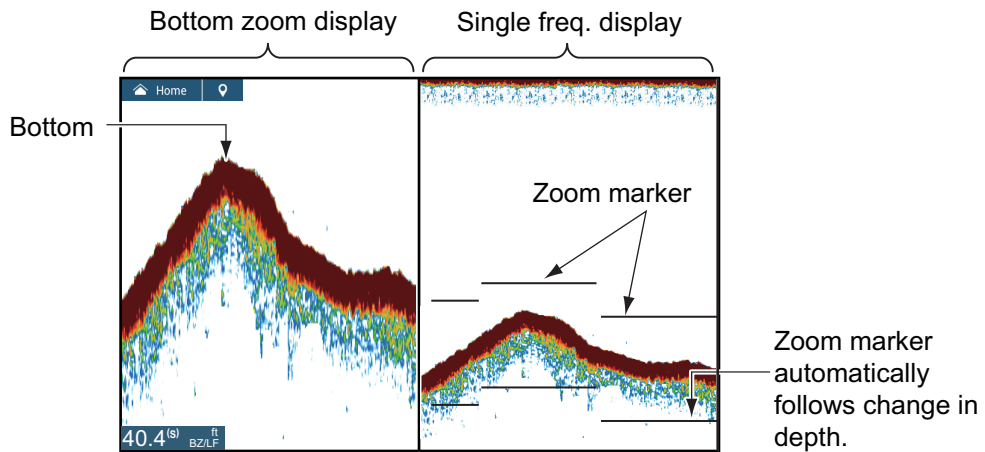
7.3.4   A-scope display (display only)

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.

Single frequency display   A-scope display
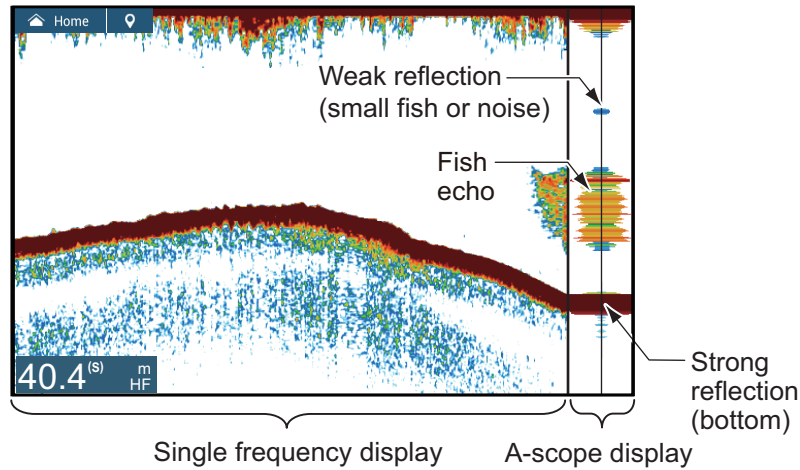
How to show or hide the A-scope display

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

A-scope peak hold

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

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

7.3.5 Bottom discrimination display

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

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

Note 1: Composition estimate accuracy may be affected when the transducer is not parallel with the seabed.

Note 2: When the bottom discrimination feature is active, picture advance speed may be affected.

Sand and rock are the most likely bottom type in this example.
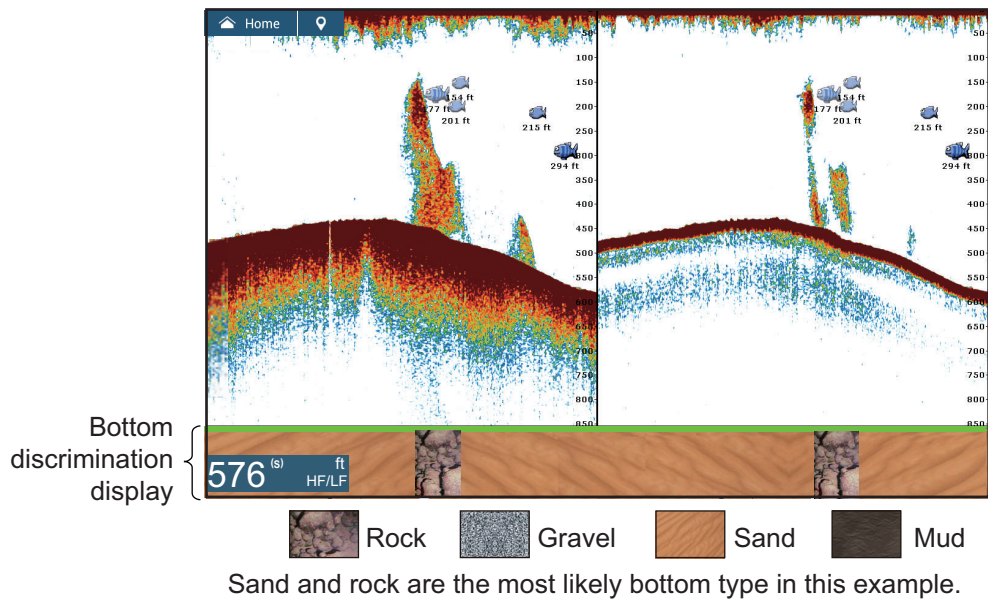
How to activate or deactivate the bottom discrimination display

1. Open the home screen, then tap [Settings] - [Sounder].
2. Tap [Fish Finder Source].
3. Tap [TZTL12F], [TZTL15F], [TZT2BB], [BBDS1] or [DFF1-UHD] as applicable.
4. Tap the close button to finish.
5. To activate or deactivate the bottom discrimination display, turn [Bottom] on or off from the pop-up menu.

7.4   Automatic Fish Finder Operation

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

7.4.1   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.

7.4.2   How to select an automatic fish finder mode

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

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

7.5   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.

7.5.1   How to select the manual mode

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

7.5.2   How to select the display range

Manual range setting

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

How to turn on or off the auto range

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

7.5.3 How to shift the range

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

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

7.5.4 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. The figures to the right show examples for gain set too high, too low and with a proper setting, for reference.

Gain can be adjusted either from the pop-up menu, of from the data box.

Note 1: This function is not available in the auto mode.

Note 2: Depending on the software version of the sounder, the gain may be applied to both past and current echoes. However, if multiple display units are connected, the gain will only be applied to current echoes if a display unit does not apply the gain to both past and current echoes.

Gain too high

Gain proper

Adjusting the gain from the pop-up menu

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

Gain too low

LF Gain
50
Current setting

Drag slider
(or tap bar
or +, - icons)
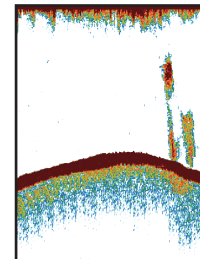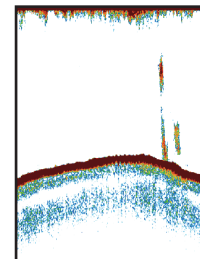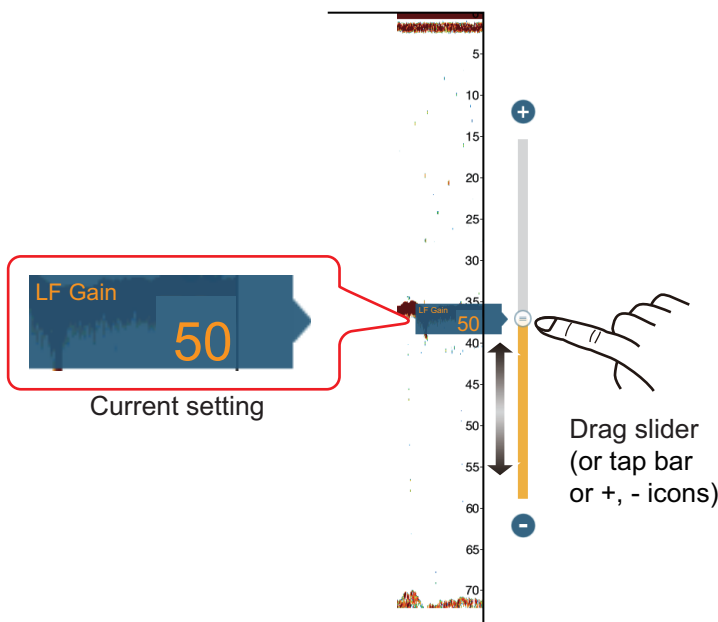
Adjusting the gain from the data area

1. Tap the data area at the location where you want to display the gain controls. The [Add NavData] menu appears.

2. Tap [Sounder Gain Control] or [Multi-Sounder Gain Control] as appropriate. The selected controls appear in the data area.

3. Tap the [Mode] box to highlight "M". The gain bar appears at the bottom-right of the screen.

4. Drag the gain slide bar to adjust the gain, as shown in the above figure.

7.5.5 How to reduce the clutter

Low intensity "spots" of noise appear over most of the screen like in the illustration shown below. These spots are caused by sediment in the water or noise. You can reduce this type of noise.
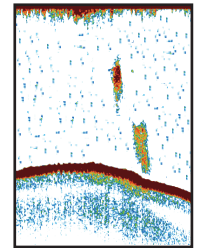
Note: This function is not available in the auto mode.

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

2. Drag the slider at [Clutter] to set the level. The larger the setting value, the greater the degree of reduction.

3. Tap the close button to finish.

7.6 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.

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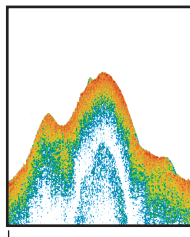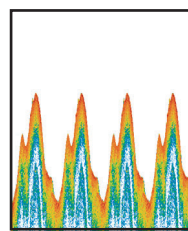
Fast   Slow

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

2. Tap [Picture Advance].

3. Tap a picture advance speed. The options in the window indicate the number of scan lines made per transmission. For example, [1/2] creates one scan line per two transmissions. [1/16] is the slowest advance speed and [4] is the fastest speed. [Stop] stops picture advance, and is useful for taking a photo of the screen.

4. Tap the close button to finish.

7.7 How to Reduce Interference

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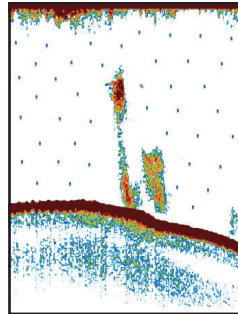
Interference from
other sounder
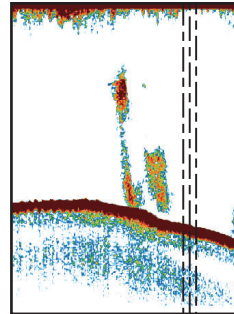
Interference from
electrical equipment

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

2. Turn on [Interference Rejection].

3. Tap [Low], [Medium], [High] or [Auto]. [High] provides the greatest interference rejection. [Auto] automatically selects suitable interference setting.

4. Tap the close button to finish.

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

7.8 How to Measure Range, Depth to an Object

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

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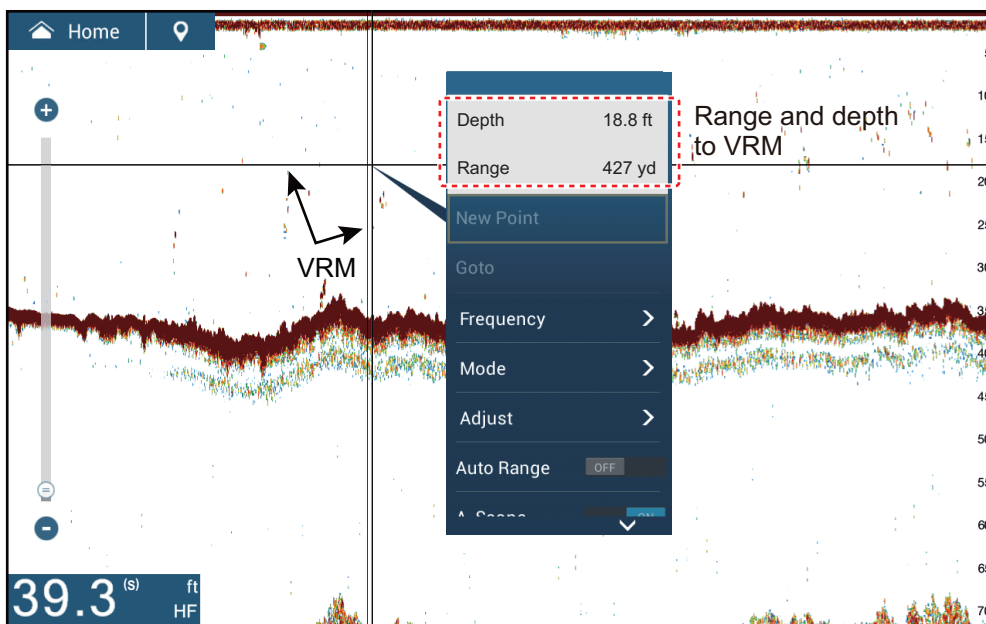
7.9 Echo History Display

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

7.10 How to Balance Echo Strength

Depending on local ultrasound characteristics, the reflection from a school of fish in deep water may appear in weaker colors than that from a school in shallow water even though their strengths are equal. To show the schools of fish in equal strengths (colors), use the TVG. The TVG can be adjusted according to water depth*, TVG level so that echoes of the same strength at different depths are shown in the same colors.
* DFF-3D only.

In the illustration shown below, for example, the TVG is set for 300 ft and the TVG level is adjusted.

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

Echoes of the same size are displayed in different sizes and colors depending on depth.

Echoes of the same size are displayed in same sizes and colors.
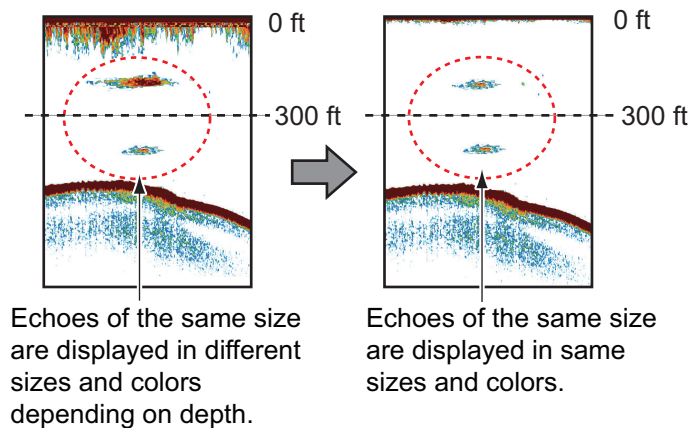
1. Open the home screen, then tap [Settings] - [Sounder].
2. Drag the slider in [TVG HF] (high frequency) or [TVG LF] (low frequency) to set the level. The menu item on the DFF-3D is "[TVG]". The TVG setting method changes with the fish finder connected.

Fish finder	TVG setting method
Internal sounder (For TZTL12F, TZTL15F or TZT2BB), DFF1, DFF1-UHD, BBDS1, DFF-3D	The higher the setting the greater the distance gain.
DFF3	The higher the setting the lower the distance gain.

3. **For DFF-3D**, tap [TVG Distance], and the software keyboard appears. Set the effective TVG distance desired, then tap [✓].
4. Tap the close button to finish.

7.11 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.

7.11.1 How to set an alarm

1. Open the home screen, then tap [Settings] - [Sounder]. Scroll the menu to show the fish finder alarms section.

2. **Fish alarm**: Tap [Range Minimum Value] or [Range Maximum Value] below [Fish Alarm] to display the software keyboard.
   Bottom lock fish alarm: Tap [Range Minimum Value] or [Range Maximum Value] below [Fish Alarm for Bottom Lock] to display the software keyboard.

3. Set the start depth in [Range Minimum Value], the end depth in [Range Maximum Value].
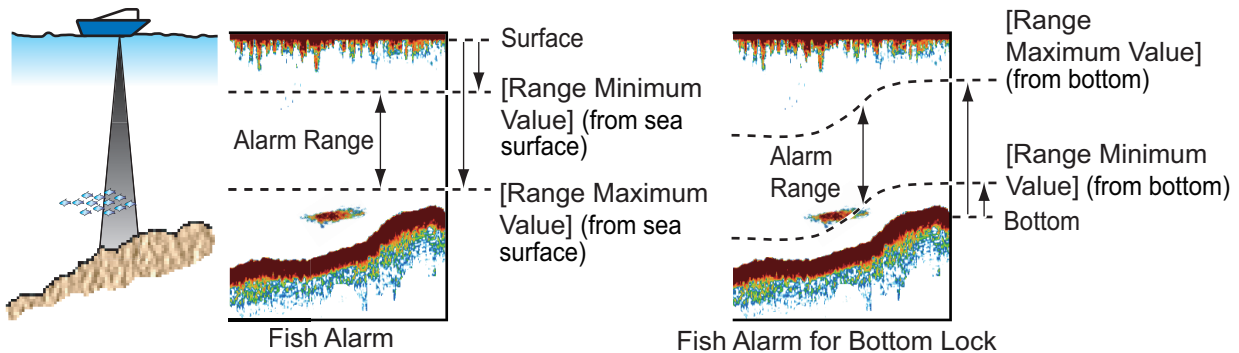
4. Tap the close button to finish.

7.11.2 How to activate or deactivate an alarm

Fish alarm

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

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

Bottom lock fish alarm

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

7.11.3 Alarm sensitivity

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

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

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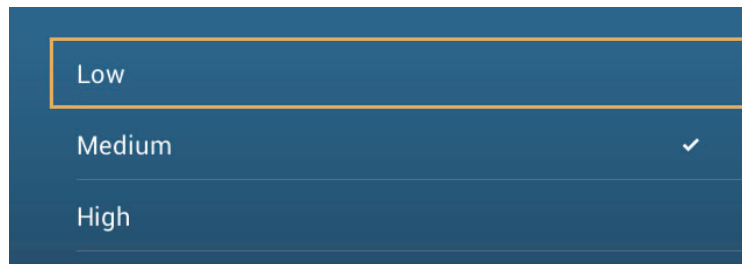
3. Tap which echo strength releases the fish and bottom lock alarms.
   [Low]: Light-blue or stronger echoes
   [Medium]: Yellow or stronger echoes
   [High]: Red and reddish-brown echoes
4. Tap the close button to finish.

7.12   ACCU-FISH™

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

Usage guidelines

- The information given by this feature is intended for reference only.
- This feature cannot be used with the inside-hull transducer since a fish may not be detected depending on the frequency of the transducer. Even if a fish is detected, the fish length indicated may be smaller than the actual length.
- ACCU-FISH™ uses both low and high frequency echoes for the measurements regardless of the frequency mode in use.
- The intensity of an echo depends on fish species. If the indicated length is different from the true length, you can apply an offset in the [Sounder] - [ACCU-FISH Size Correction] menu of the menu.
- 50 kHz and 200 kHz beams are transmitted alternately without reference to the current display mode.
- Use this feature with ship speed of 10 knots or less and depth between 2 and 100 m.
- 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.

7.12.1   How to set ACCU-FISH™

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

3. Tap [Fish Size] or [Depth].
4. Tap [ACCU-FISH Symbols].
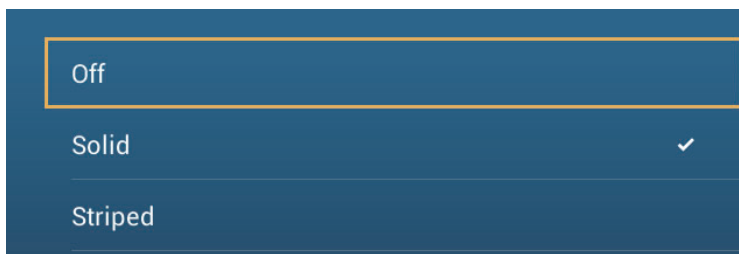
5. Tap [Solid], [Striped] or [Off] (turn off fish symbol).

Solid (small)	Solid (large)	Striped (small)	Striped (large)

154 ft   237 ft   154 ft   237 ft ← Depth (or Fish Size)
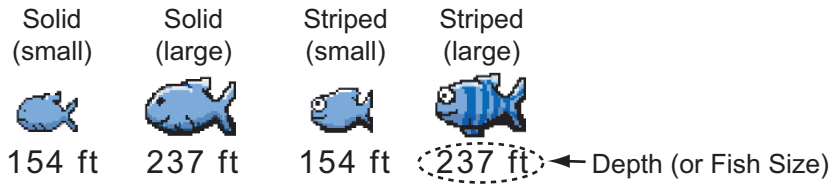
Fish size	Solid	Striped
Large fish symbol (more than 51 cm (20.08 inch))		
Small fish symbol (10 to 50 cm (3.9. to 19.69 inch))		

6. Tap the close button to finish.

7.12.2 Fish size correction

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

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

Setting	Revised size
+100	Two times
+0	1.5 times
-50	1/2
-65	1/3
-75	1/4
-80	1/5

3. Tap the close button to finish.

7.12.3 How to turn the fish symbol indication on or off

Tap the screen to open the pop-up menu. Turn [ACCU-FISH] on or off. Fish symbols and their depth values or fish lengths appear on the screen. If you selected [Off] at step 5 in subsection 7.12.1, the fish symbols are hidden and only the depth values or fish lengths appear.

7.12.4   How to display the fish information

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

Fish Size	4 in
Depth	218 ft
Bearing	270.0 °
Range	185 yd
New Point	
Goto	

4 in
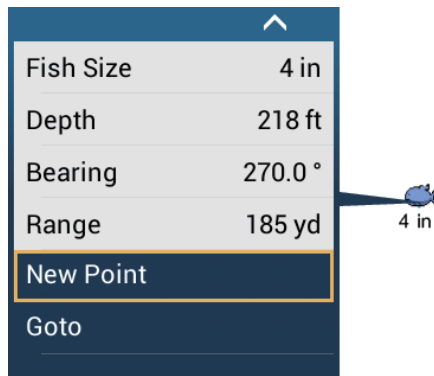
7.12.5   How to set the minimum size of ACCU-FISH™ symbols

If you are in an area where there are many fish, the screen may become congested with ACCU-FISH™ symbols. To prevent this, you can set the minimum size for the symbols. Open the [Sounder] menu. Tap [ACCU-FISH Minimum Size] to show the software keyboard. Enter the minimum size (0 to 79.98 (inch)) then tap ✓. Tap the close button (x) to finish.

7.13   RezBoost™

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

Enhanced mode   *Standard mode*
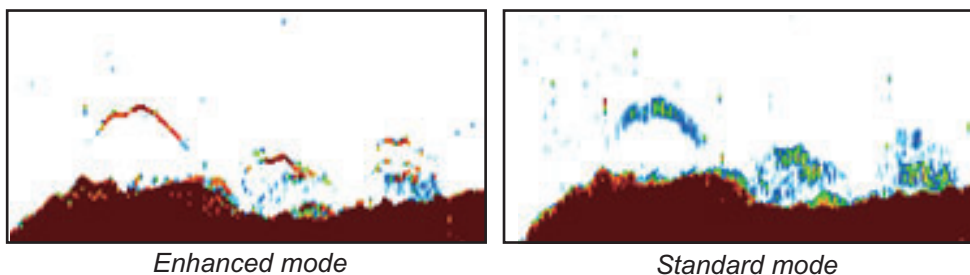
RezBoost™ is available with the following transducers.

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

To use RezBoost™, set the fish finder source (with [Fish Finder Source] on the [Sounder] menu) to [TZTL12F], [TZTL15F] or [TZT2BB] as appropriate.

How to set RezBoost™

Tap the sounder display to show the pop-up menu, then scroll the menu to show [Rez-Boost]. Tap [RezBoost], then tap [Enhanced]* or [Standard].
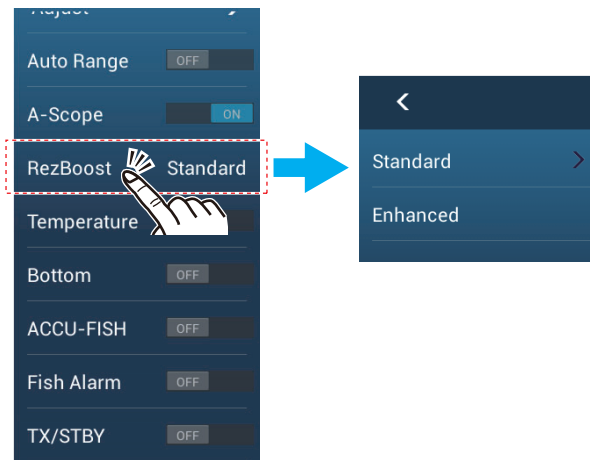
*Not available if the transducer is manually selected or a non-compliant transducer is used.

7.14 White Edge

The white edge function gives the seabed echo a white edge, making it easier to differentiate bottom-feeding fish from the seabed itself.

Note 1: The white edge function is compatible with the internal fish finder, as well as the following transducers and their software versions. Use of other transducers or software versions is not recommended.

Transducer	Software version
BBDS1	0252379-02.01, or later
DFF1	0252353-03.01, or later
DFF1-UHD	0252405-03.01, or later
DFF3	0252362-02.01, or later
DFF-3D	0252440-01.03, or later

Note 2: For DFF-3D owners, using the triple-beam display, this function is applied only to the center beam's echoes.

Note 3: When a TZT9 or TZT14 is connected to the same network, the white edge function is not available.

To activate the white edge function, do the following:

1. Tap the fish finder display to show the pop-up menu.

2. Tap [White Edge]. The white edge setting options appear.

3. Tap the desired value, or tap [OFF] to disable the white edge function.
    A larger value increases the width of the white edge.

7.15   Temperature Graph

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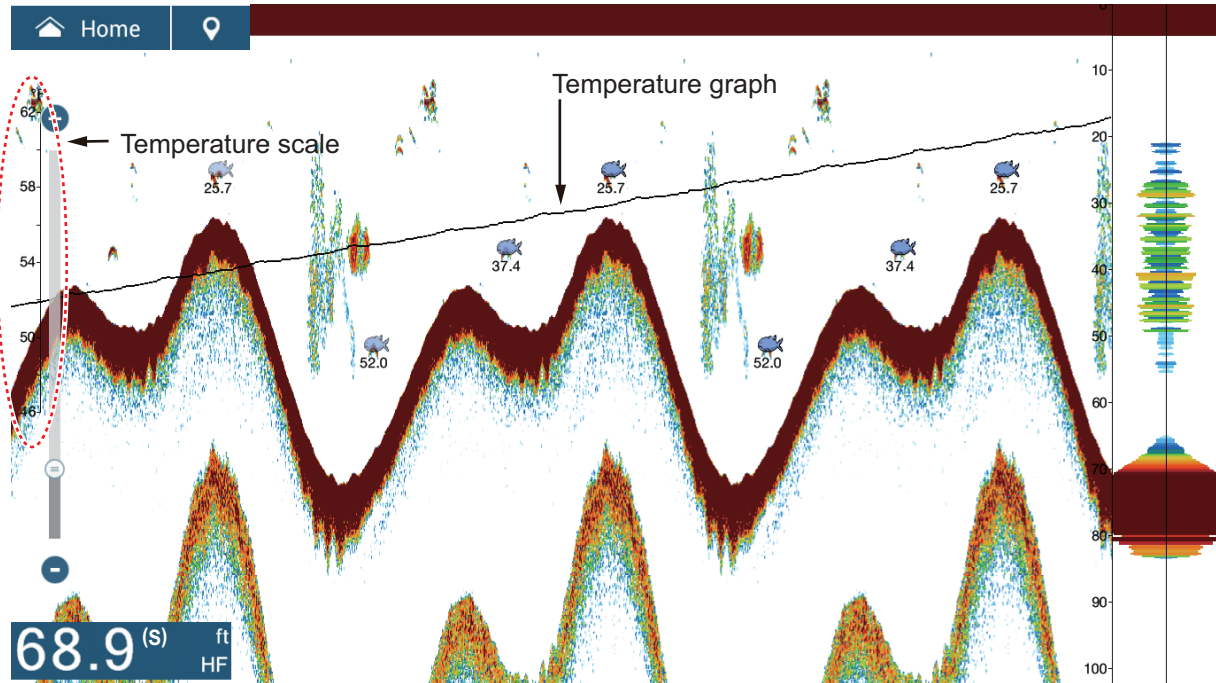
7.16 Sounder Menu

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

Fish Finder Source	TZTL12F	>
Day Background Color	White	>
Night Background Color	Dark Blue	>
Echo Color Levels	64 Colors	>
Show Range Slider	ON	
A-Scope Peak Hold	OFF	
Zoom Reference Lines	ON	
Smoothing	OFF	
Picture Advance	1	>
Range Shift	0.0 ft	
Bottom Range Shift Area	75	

Zoom Range Span	30.0 ft	
Bottom Lock Range Span	30.0 ft	
ACCU-FISH Info	Depth	>
ACCU-FISH Symbols	Solid	>
ACCU-FISH Minimum Size	0 in	
ACCU-FISH Size Correction	0	
Interference Rejection	Off	>
Clutter	0	
TVG HF	5	
TVG LF	5	
Transmit Rate Auto	OFF	
Transmit Rate Manual	20	
Sounder Transmit	OFF	

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

[Night Background Color]: Select the background color for use at nighttime. The options are [Black] and [Dark Blue].

[Echo Color Levels]: Select the number of colors shown on the screen. The selections are [8 Colors], [16 Colors] and [64 Colors].

[Show Range Slider]: Show or hide the range slider.

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

[Smoothing]: When you select [OFF], smoothed echoes are displayed, however, the screen resolution is lower. To get higher screen resolution and greater detail, select [ON].

[Bottom Range Shift Area]: Select the area where to show the bottom echo, when [Auto Range] is active. For example, setting 75% would place the bottom echo at a position equivalent to 75% from the top of the screen.

[Transmit Rate Auto]: Automatically set the transmit rate according to ship's speed, and is inoperative when there is no speed data.

[Transmit Rate Manual]: Change the TX pulse repetition rate in 21 levels (21 is highest power.). Use 20 in normal use. Lower the TX rate in shallow waters to prevent the second reflection echo.

[Sounder Transmit]: Turn on or off the sounder transmission.

Sounder initial setup

[Zero Line Rejection]: Turn the zero line (transmission line) on or off. When turned on, the transmission line disappears, which allows you to better watch fish echoes near the surface. The length of the transmission line changes with transducer used and installation characteristics.
Note: If the sounder source is [DFF3], adjust [Zero Line Range] (below) to set the area where to reject the zero line.

[Zero Line Range]: This feature adjusts the transmission line so that the transmission line disappears when the menu item [Zero Line Rejector] is turned on. For a long tail, increase the value. If the transmission line does not disappear, lower the TX power. Applicable to Network Sounder DFF3.

[Transducer Draft]: Set the distance between the transducer and the draft line to show the distance from the sea surface (Setting range: 0.0 to 99.9 ft).

[Salt Water]: Select [ON] to use this equipment in salt water.

[Fish Finder Source]: Select the sounder used, among DFF1, BBDS1, DFF3, or DFF1-UHD.

[Transducer Setup]: Select the method to setup the transducer, by model, manually, or TDID (transducer ID). See the installation manual for details.

[Transmission Power]: Interference can appear on the screen when the fish finder on your ship and another ship have the same TX frequency. To prevent this interference, lower your TX power and ask the other ship to lower their TX power. (Internal sounder and external sounder other than DFF1-UHD)

[External KP]: Turn on to sync with external keying pulse. (For external sounder)

[Bottom Level HF (LF)]: The default bottom level setting (0) determines that two strong echoes received in sequence are bottom echoes. If the depth indication is not stable in the default setting, adjust the bottom level here.

[Gain Offset HF (LF)]: If the gain setting is wrong, or there is a difference in the gain between the low and high frequencies, you can balance the gain for the two frequencies here.

[Auto Gain Offset HF (LF)]: If the auto gain offset is wrong, or there is a difference in the gain between the low and high frequencies, set an offset here to balance auto gain for the two frequencies.

[STC HF (LF)]: Delete unnecessary echoes (plankton, air bubbles, etc.) near the surface that hide the fish near the surface. The setting range is 0 to 10, and 0 is off. 10 deletes unnecessary echoes from the surface to approximately 16 ft. Make sure you do not use more STC than necessary, because you can erase the small echoes near the surface. (For DFF3, DFF1-UHD)

[Frequency Adjust HF (LF)]: You can adjust the TX frequency of both the low- and high-frequency transducers. Use this feature when your fish finder and another fish finder operate on the same frequency, causing interference. Change the frequency of your transducer by enough percentage points to remove the interference. (For DFF3)

[TX Pulse HF (LF)]: The pulse length is automatically set according to range and shift.Use a short pulse for better resolution and a long pulse when detection range is important. To improve resolution on zoom displays, use [Short 1] or [Short 2]. [Short 1] improves the detection resolution, but the detection range is shorter than with [Std] (pulse length is 1/4 of [Std]). [Short 2] raises the detection resolution, however detection range is shorter (pulse length is about 1/2 of [Std]) than [Std]. [Std] is the standard pulse length, and is suitable for general use. [Long] increases the detection range but lowers the resolution (about 1/2 compared to the [Std] pulse length). (For DFF3)

[Rx Band HF (LF)]: The RX bandwidth is automatically set according to pulse length.To decrease noise, select [Narrow]. For better resolution, select [Wide]. (For DFF3)

[Temperature Port]: Select the data source for water temperature (For DFF3, DFF1-UHD).
[MJ]: The water temperature data from the water temperature/speed sensor.
[Low Frequency]: The low frequency measured water temperature.
[High Frequency]: The high frequency measured water temperature.

[Sounder Demo Mode]: Activates, deactivates the sounder demo mode, which allows operation of the sounder with data stored in the memory. Connection of the transducer is not required. Requires connection to DFF1, BBDS1, DFF3 or DFF1-UHD.

[Set Hardware to Factory Default]: Select this menu item to restore default settings for the unit selected in [Fish Finder Source] (excludes TZTL12F/15F and TZT2BB).

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

7-21

7.17 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.
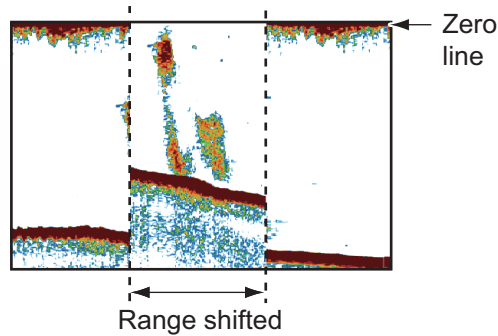
Bottom echoes

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.
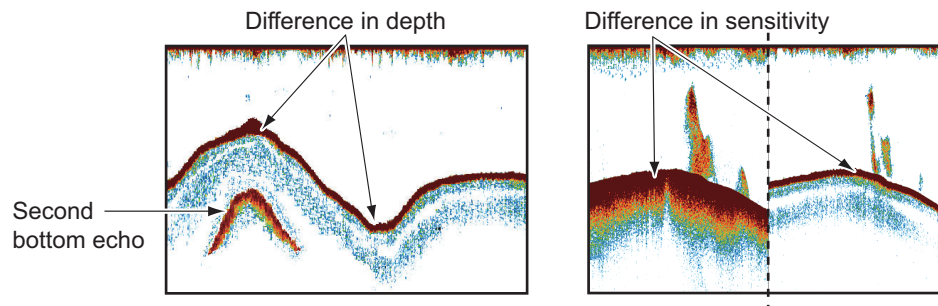
Bottom contour

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.
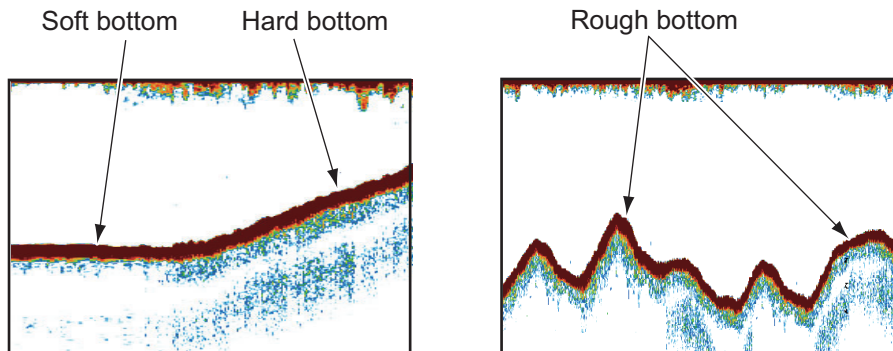
Nature of a bottom

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.

Mud & sand   Rock base
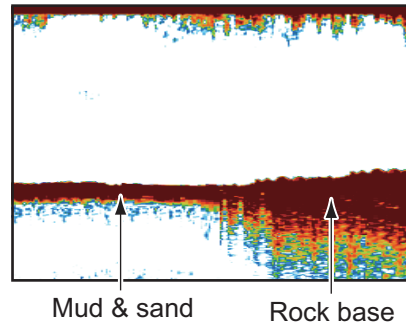
Fish volume

The size and density of a school of fish are indicators of the quantity of fish.

Large school   Small school

Size of school of fish
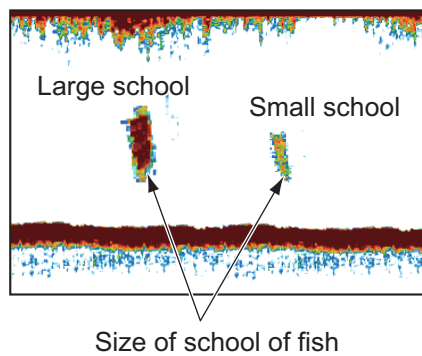
Size of a school of fish

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.

School depth and sounding time

Sounding time for a shallow school of fish

Sounding time for a deep school of fish

7-23
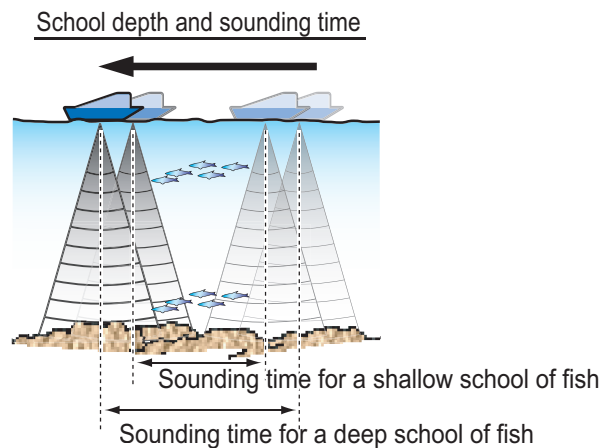
Density of a school of fish

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.
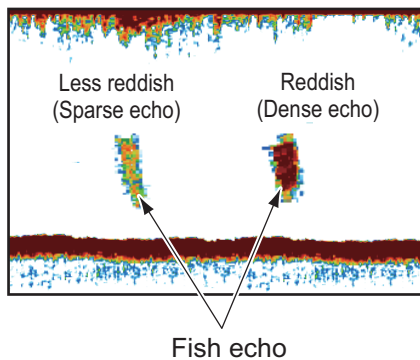
Difference in signal strength

Less reddish (Sparse echo)

Reddish (Dense echo)

Strong echo
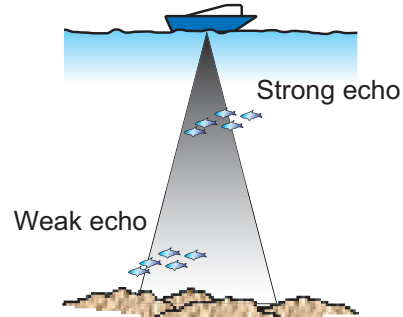
Weak echo

Fish echo

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.

Bottom fish echo
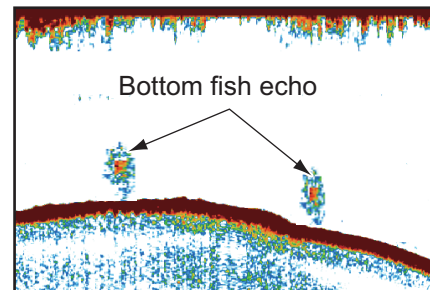
Plankton

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.

School of fish

Plankton
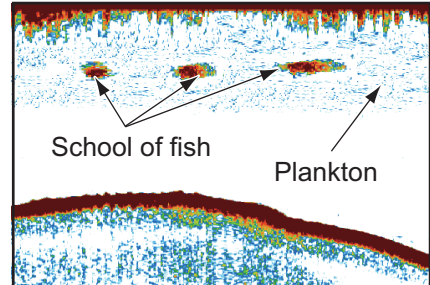
Current rip

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.

Current rip
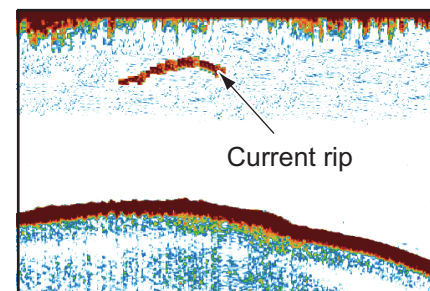
Surface noise

When the sea is rough or the ship moves over a wake, surface noise can appear at the top of the screen.

Surface noise
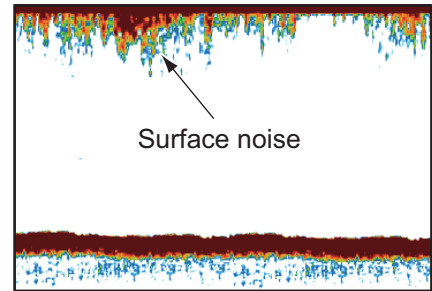
Air bubbles in the water

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.

Ultrasonic wave blocked by air bubbles
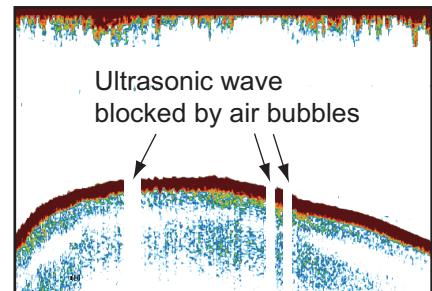
Unstable bottom echo

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.

Unstable bottom echo
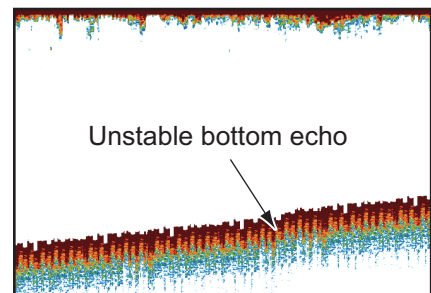
False echo

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.

Mainlobe
Sidelobe

False image
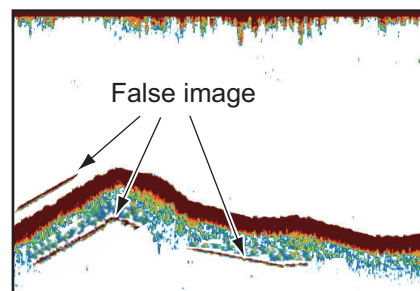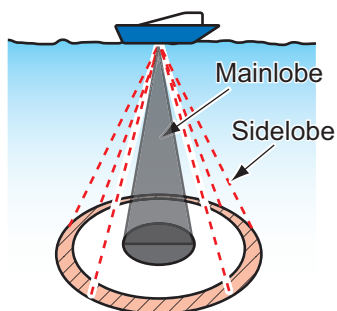
7. FISH FINDER (SOUNDER)

This page is intentionally left blank.

7-26

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 Menu Operations

This section covers the top layer of the [Multi Beam Sonar] menu. For details regarding menu operations with each of the displays, see the respective section.

Display	Section no.
Multi-Sounder	section 8.3
Side Scan	section 8.4
Cross Section	section 8.5
3D Sounder	section 8.6

8.1.1 How to start/stop transmission

You can start/stop transmissions from the multi-beam sonar by using the menu.

1. Open the Home screen, then tap [Settings]→[Multi Beam Sonar].
2. Tap the [Multi Beam Sonar Transmit] item to toggle between [OFF] and [ON].

8.1.2 How set the background color

You can set the background color for Day mode and Night mode to suit your preferences.

1. Open the Home screen, then tap [Settings]→[Multi Beam Sonar].
2. Tap [Day Background Color] or [Night Background Color] as required.
3. Tap the desired color.

8.1.3   How to adjust the bottom range shift

The bottom range shift feature changes the location at which the seabed appears on the screen. This is particularly useful when the seabed is "off-screen".

Note: This feature requires [Auto Range] to be active. See your respective Operator's Manual for details.

1. Open the Home screen, then tap [Settings]→[Multi Beam Sonar].

2. Slide the slide bar at [Bottom Range Shift Area] to adjust the value as required. The following figure shows some examples of how the settings affect the on-screen display.

A lower value places the seabed at a higher location on-screen. A higher value places the seabed at a lower location on-screen.
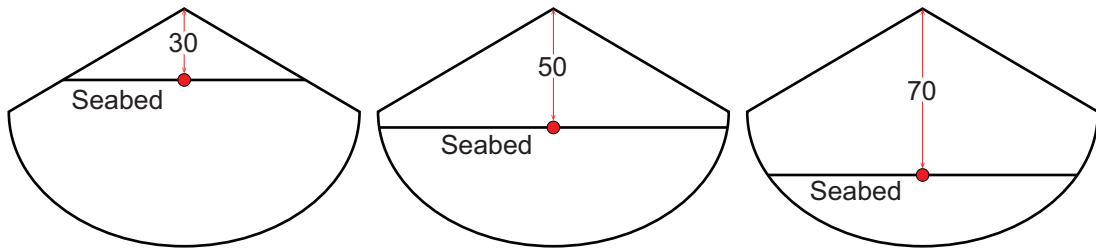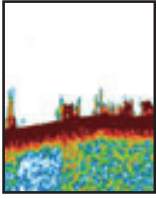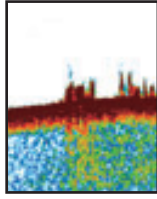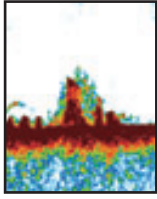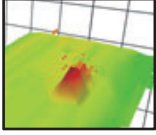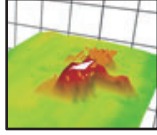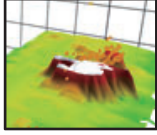
8.1.4   How to change the transmission rate

You can adjust the rate at which the sonar beam is transmitted using one of the three available settings. Each setting has distinct characteristics allowing for a broad range of applications.

Setting	Characteristics
[Manual]	Affected by the selected range. A shorter range has a faster transmission rate; a longer range has a slower rate.
[Auto]	Affected by vessel speed. Slow speeds have a slower transmission rate; high speeds have a faster rate. **Note:** Speeds of 20 kn or higher are fixed at a transmission rate of 20.
[Maximum]	Affected by detected depth. Shallows have a faster transmission rate; deeper waters have a slower rate. **Note:** Where the selected range exceeds the detected depth, the transmission rate may exceed 20.

1. Open the Home screen, then tap [Settings]→[Multi Beam Sonar].

2. Tap [Transmit Rate Mode].

3. Tap [Manual], [Auto] or [Maximum] as required.

4. If you selected [Manual], adjust the rate at [Transmit Rate Manual Value], using the slide-bar or the software keyboard. For [Auto] or [Maximum], go to step 4.

Note: Adjustments made to the transmission rate also affect how the on-screen display appears for the Multi-Sounder and 3D Sounder History features. The following figures show examples of the same object and how the echo display is affected.

Display Screen	Rate = 0	Rate = 10	Rate = 20
Multi Sounder			
3D History			

8.2   Display Screens Overview

Multi-sounder display

From the Home screen, tap the [Multi Sounder] icon to show the 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.
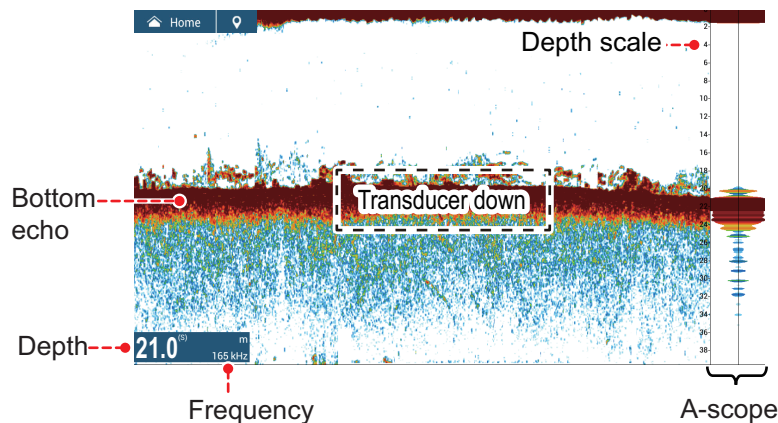
Single beam display
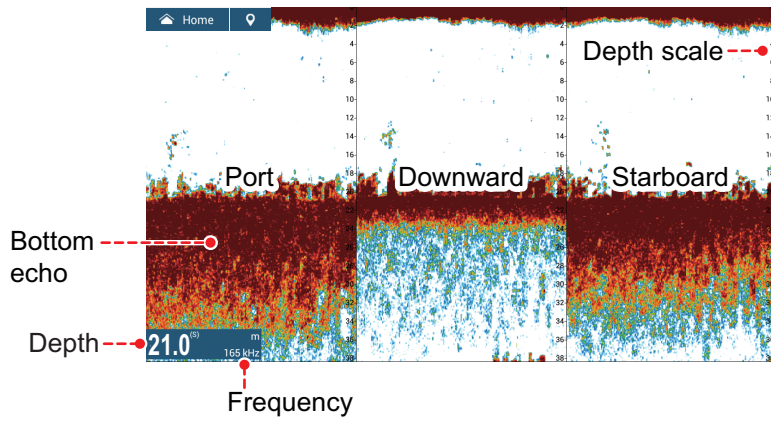
Triple beam display

Side scan display

From the Home screen, tap the [Side Scan] icon to show the 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.).
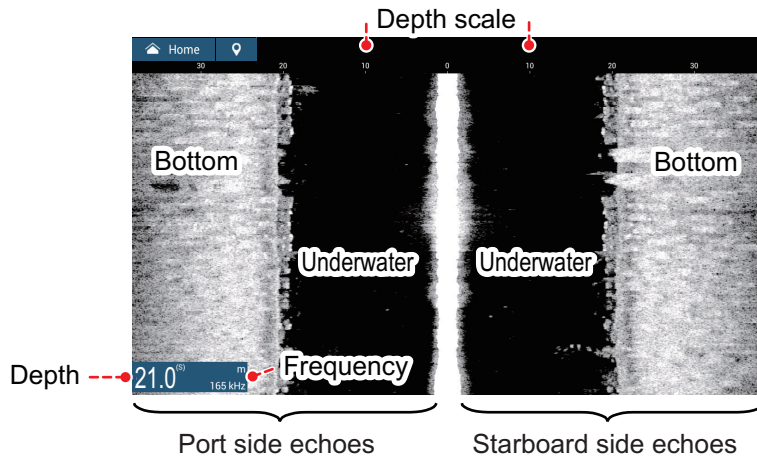
Cross section display

From the Home screen, tap the [Cross Section] icon to show the 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.
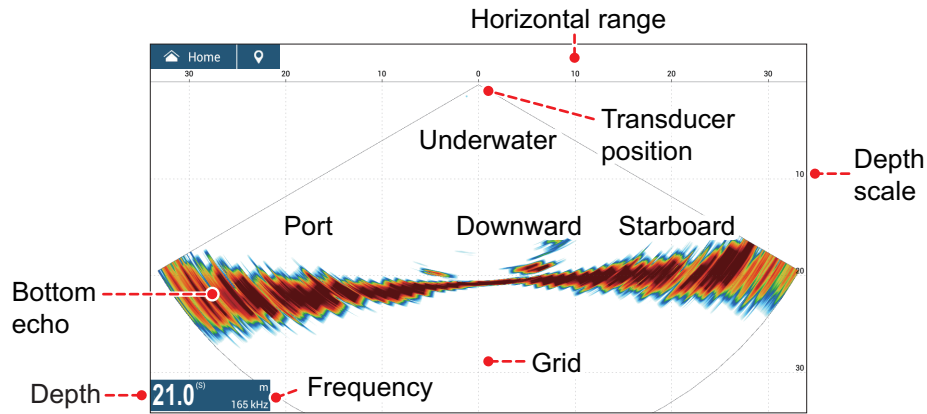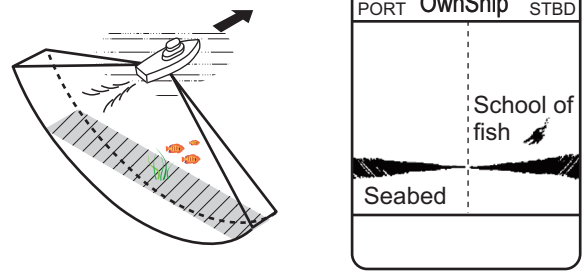
3D sounder history display

From the Home screen, tap the [3D History] icon to show the 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.

8-5
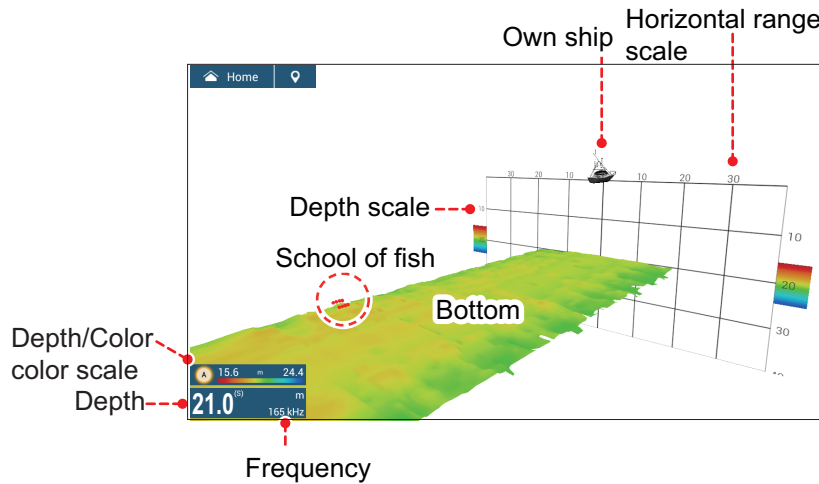
8.3 Multi-Sounder Display Operations

This section covers the functions available with the multi-sounder display. For the menu items shared with the conventional fish finder, see chapter 7. To show the menu for this function, tap the screen to show the pop up menu; or from the [Home] screen, tap [Settings]→[Multi-Beam Sonar].

8.3.1 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.

8.3.2 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.

8.3.3 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.

8.3.4 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.

8.3.5 How to change the picture advance speed

The Picture Advance setting sets how quickly vertical scan lines move across the display. When viewing a seabed with sharp rises and falls, such as a reef-bed or submerged wreck, a fast advance speed helps to "smooth" out the seabed for easier viewing. On the other hand, when viewing a smooth seabed with little to no undulations, a slow advance speed helps to identify rises and falls.

You can change the picture advance speed with one of the following methods.

From the menu

1. Open the Home screen, then tap [Settings]→[Multi Beam Sonar].
2. Tap [Multi-Sounder].
3. Tap [Picture Advance].
4. Select an advance speed to suit your requirements.

From the layers menu

1. Open the layers menu.

2. At [Picture Advance], tap the required speed.

The default speed is [1/1] (normal speed), the fastest speed is [4/1] (four times normal speed) and the slowest speed is [1/16] (sixteen times slower than normal speed). Select [Stop] to stop the picture advance for closer examination and screenshots/photos.

8.3.6   How to show or hide the scale box

The scale box, shown at the bottom left corner on the display, shows depth 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.

8.3.7   Availability of points and event marks registration, and go to a point

For operation, see chapter 4.

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

- 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
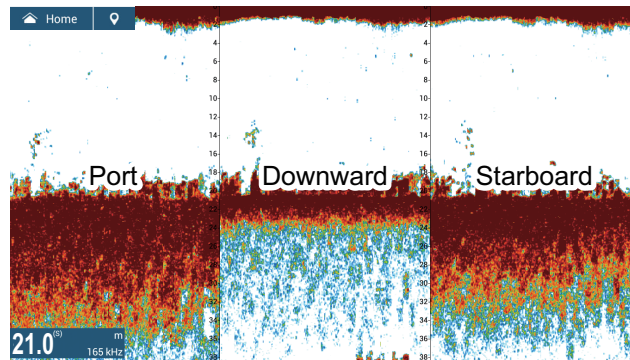
8.4   Side Scan Display Operations

This section covers the functions available with the side scan display. For the menu items shared with the conventional fish finder, see chapter 7. To show the menu for this function, tap the screen to show the pop up menu; or from the [Home] screen, tap [Settings]→[Multi-Beam Sonar].

8.4.1   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.

8.4.2   How to change echo color

1. Select [Settings] on the home screen.
2. Select [Multibeam Sonar] - [Side Scan].
3. Select [Echo Color].
4. Select [White], [Blue] or [Brown] as required.
5. Select [Close] to close the pop-up menu.

8.4.3   How to show or hide the scale box

The scale box, shown at the bottom left corner on the display, shows depth 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.

8.4.4 Availability of points and event marks registration, and go to a point

For how to register points and event marks, see chapter 4.

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

• 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

8.5 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. To show the menu for this function, tap the screen to show the pop up menu; or from the [Home] screen, tap [Settings]→[Multi-Beam Sonar].

8.5.1 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.

8.5.2 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.

8.5.3 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.
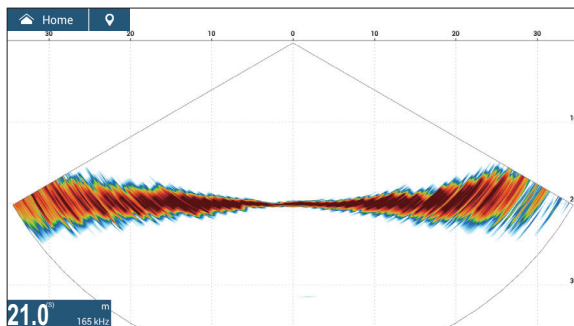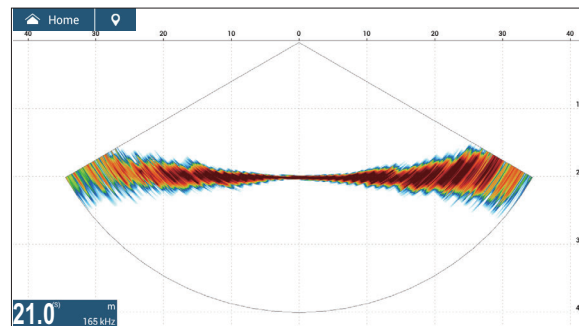
[Zoom] selected   *[Zoom] not selected*

8.5.4 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 [Settings] on the home screen.
2. Select [Multibeam Sonar] - [Cross Section].
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.

8.5.5 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 [Settings] on the home screen.
2. Select [Multibeam Sonar] - [Cross Section].
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.

8.5.6 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 [Settings] on the home screen.
2. Select [Multibeam Sonar] - [Cross Section].
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 [Settings] on the home screen.
2. Select [Multibeam Sonar] - [Cross Section].
3. Select [Temp.-based Correction], then select [ON].
   Select [OFF] to remove the correction.
4. Select [Close] to close the menu.

8.5.7 How to show or hide the scale box

The scale box, shown at the bottom-left corner on the display, shows depth 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.

8.5.8 Availability of points and event marks registration, and go to a point

For how to register points and event marks, see section 4.2.

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

- 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

8.6 3D Sounder History Display Operations

This section covers the functions available with the 3D sounder history display. The 3D sounder history is able to display up to 400 past transmissions.

For the menu items shared with the conventional fish finder, see chapter 7. To show the menu for this function, tap the screen to show the pop up menu; or from the [Home] screen, tap [Settings]→[Multi-Beam Sonar].

8.6.1 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.

8.6.2 How to move, zoom in, zoom out the viewpoint position

How to move the viewpoint

The viewpoint can be moved by dragging.
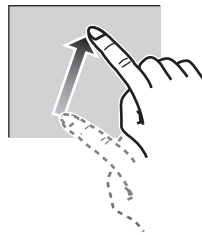
How to zoom in, zoom out
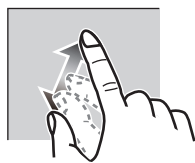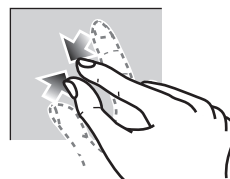
Zoom in   Zoom out

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].

8.6.3   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.
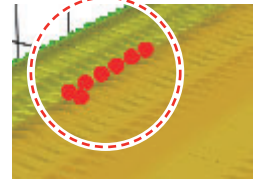
8.6.4   How to stop advancement of the display

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.

8.6.5   How to adjust the echo detection level

Adjust the echo detection level if schools of fish are detected unstably.

1. Select [Settings] on the home screen.
2. Select [Multibeam Sonar] - [3D Sounder History].
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.

8.6.6   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 [Settings] on the home screen.
2. Select [Multibeam Sonar] - [3D Sounder History].
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.

8.6.7 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 [Settings] on the home screen.
2. Select [Multibeam Sonar] - [3D Sounder History].
3. Select [Noise Filter].
4. Select [Low], [Medium] or [High] as required. The default setting is [Medium].
5. Select [Close] to close the menu.

8.6.8 How to use terrain shading

The thickness of the shading for the seabed terrain can be adjusted.

1. Select [Settings] on the home screen.
2. Select [Multibeam Sonar] - [3D Sounder History].
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
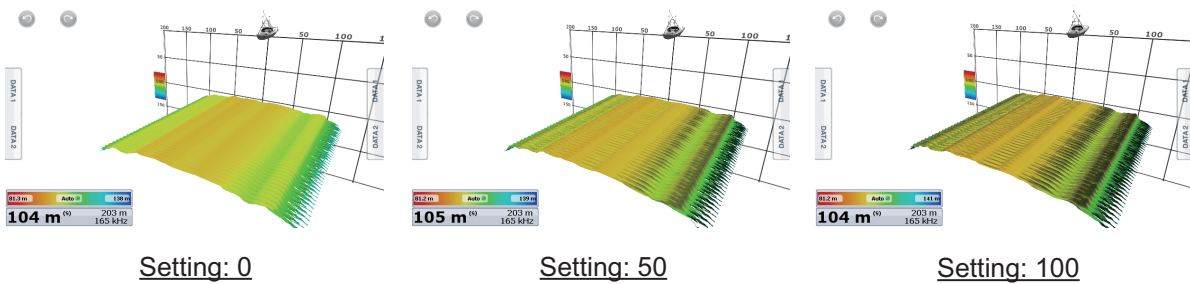
4. Select [Close] to close the menu.

8.6.9 How to change the picture advance speed

The Picture Advance setting sets how quickly vertical scan lines move across the display. When viewing a seabed with sharp rises and falls such as a reef-bed or submerged wreck, a fast advance speed helps to "smooth out" the seabed for easier viewing. On the other hand, when viewing a smooth seabed with little to no undulations, a slow advance speed helps to identify rises and falls.

You can change the picture advance speed with one of the following methods.

From the menu

1. Open the Home screen, then tap [Settings]→[Multi Beam Sonar].
2. Tap [3D Sounder History].
3. Tap [Picture Advance].
4. Select an advance speed to suit your requirements.

From the layers menu

1. Open the layers menu.
2. At [Picture Advance], tap the required speed.

The default speed is [1/1] (normal speed), the fastest speed is [4/1] (four times normal speed) and the slowest speed is [1/8] (eight times slower than normal speed). The following figure shows examples of the same object at [4/1], [1/1] and [1/4] speeds.

[1/4]   [1/1]   [4/1]
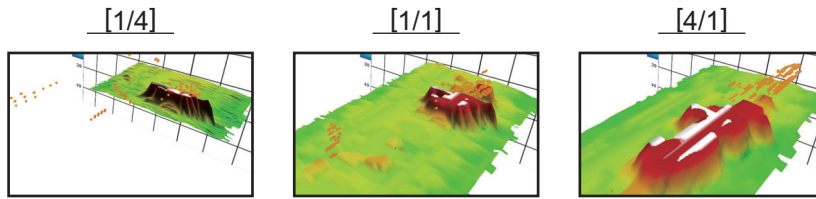
Select [Stop] to stop the picture advance for closer examination and screenshots/photos.

8.6.10 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.

Note: Objects that are detected outside of the selected color range are shown on-screen in white color.

[Color Mode] selected to [Seabed]   [Color Mode] selected to [Fish]

Depth/Color   Depth/Color Shading   Depth/Color   Depth/Color Shading
Shading display   display   Shading display   display
Color Scale   Color Scale
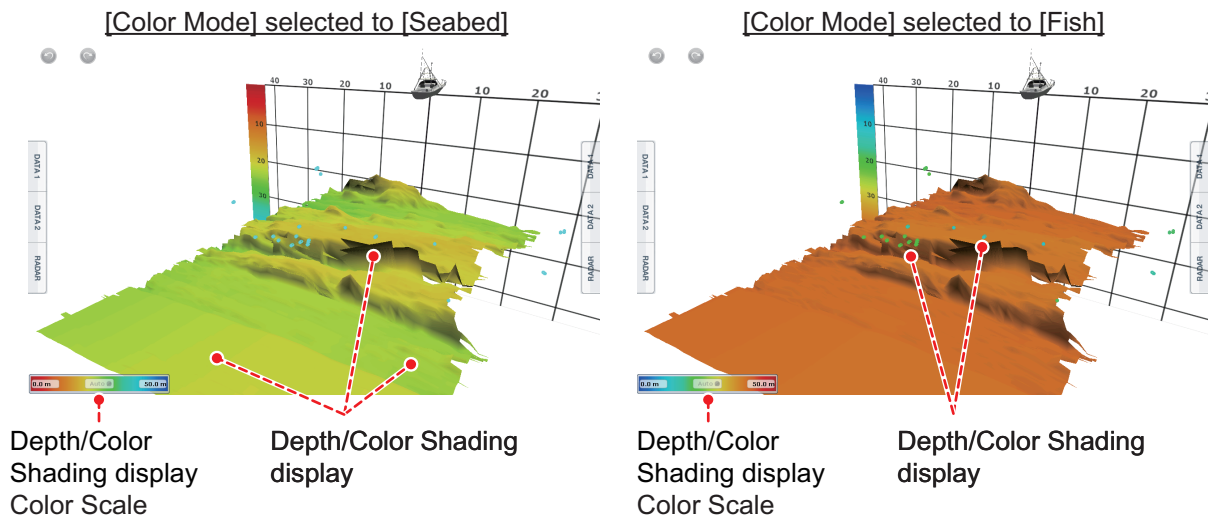
1. Tap the 3D sounder history display to show the pop-up menu.
2. Select [Color Mode].
3. Select [Seabed] or [Fish] as required.

How to set color shading

Open the menu, select Multi Beam to show the menu for setting color shading.

Seabed Color	Classic Hue	❯
Fish Monochrome Color	Gray Hue	❯
Auto Seabed Shading		ON
Minimum Value	0 m	
Maximum Value	50 m	
Auto Fish Shading		ON
Minimum Value	0 m	
Maximum Value	50 m	

[Color Mode] selected to [Seabed]

Fish Color	Classic Hue	❯
Seabed Monochrome Color	Gray Hue	❯
Auto Seabed Shading		ON
Minimum Value	0 m	
Maximum Value	50 m	
Auto Fish Shading		ON
Minimum Value	0 m	
Maximum Value	50 m	
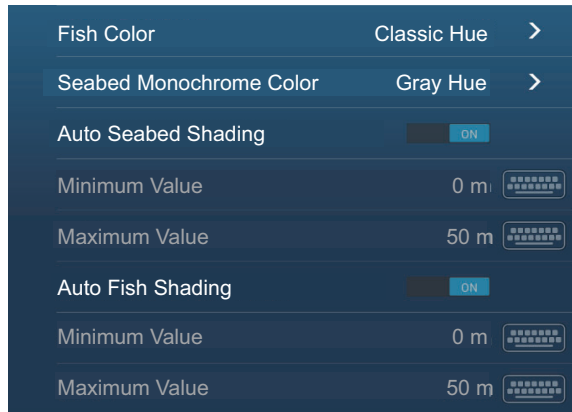
[Color Mode] selected to [Fish]

[Color Mode] selected to [Seabed]
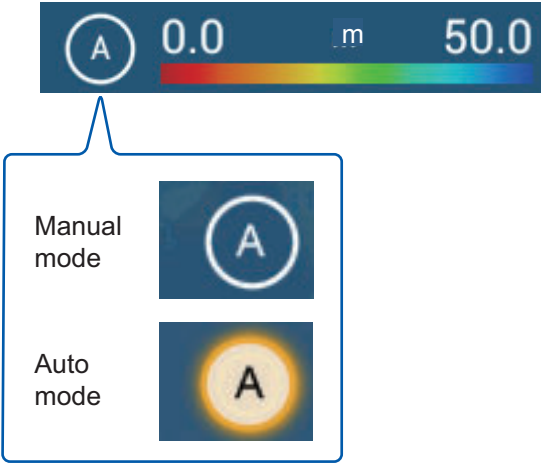
Menu item	Description	Setting options
[Seabed Color]	For setting multi tone or single tone.	[Classic Hue], [Inverted Classic Hue], [Red Hue], [Blue Hue], [Green Hue], [Yellow Hue]
[Fish Monochrome Color]	For setting single tone or single color.	[Gray Hue], [Brown Hue], [Red], [Green], [Blue], [Cyan], [Magenta], [Black Or White], [Pink], [Light Green], [Yellow]
[Auto Seabed Shading]	Use automatic or manual seabed shading. Tap [A] to switch between automatic and manual depth/color shading scale setting mode. Manual mode / Auto mode. **Note:** Objects that are detected outside of the selected color range are shown on-screen in white color.	[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 (A) 0.0 m 50.0	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] Deepest depth (A) 0.0 m 50.0	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]
[Seabed Monochrome Color]	For setting single tone or single color.	[Gray Hue] [Brown Hue]

Menu item	Description	Setting options
[Auto Fish Shading]	Use automatic or manual fish shading. Tap [A] to switch between automatic and manual depth/color shading scale setting mode. Manual mode Auto mode **Note:** Objects that are detected outside of the selected color range are shown on-screen in white color.	[ON], [OFF]
[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 	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] Deepest depth 	0 to 1200 (m)

8.6.11   How to show or hide the scale box

The scale box, shown at the bottom left corner on the display, shows depth 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.

8.6.12   Availability of points and event marks registration, and go to a point

For how to register points and event marks, see section 4.2.

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

8-19

This page is intentionally left blank.

9. FILE OPERATIONS

Points, tracks, routes and settings can be read and written, using the USB port, SD card unit or card slot on the PSD-003 Switch Box (TZT2BB only). Further, with a My Time Zero™* account, you can save settings data to the cloud. The card slot at the back of the TZTL12F/TZTL15F is exclusively for use with chart cards.

* Only boundary line data can be imported. Boundary lines can be created with TIMEZERO Marine Software.

The table below outlines the media that can be used with your unit.

Action	MicroSD		SD card (TZT2BB only)	USB port
	SD Card Unit (TZTL12F/ TZTL15F, option)	SD card converter adapter		
Write data	Yes	Yes	Yes	Yes
Read data	Yes	Yes	Yes	Yes

Note: For care and handling of microSD and SD cards see section 1.11.

<u>Handling USB flash memory</u>

• Format the USB flash memory or SD card to file system FAT32. The capacity of the media should be 32GB or less.

• Do not use a secure USB flash memory or SD card.

• Turn off the power before inserting or removing the media connected to the USB port, to prevent corruption of data.

9.1 File Format

You can select the file format to use to export data.

1. Open the home screen, then tap [Settings] - [Files].
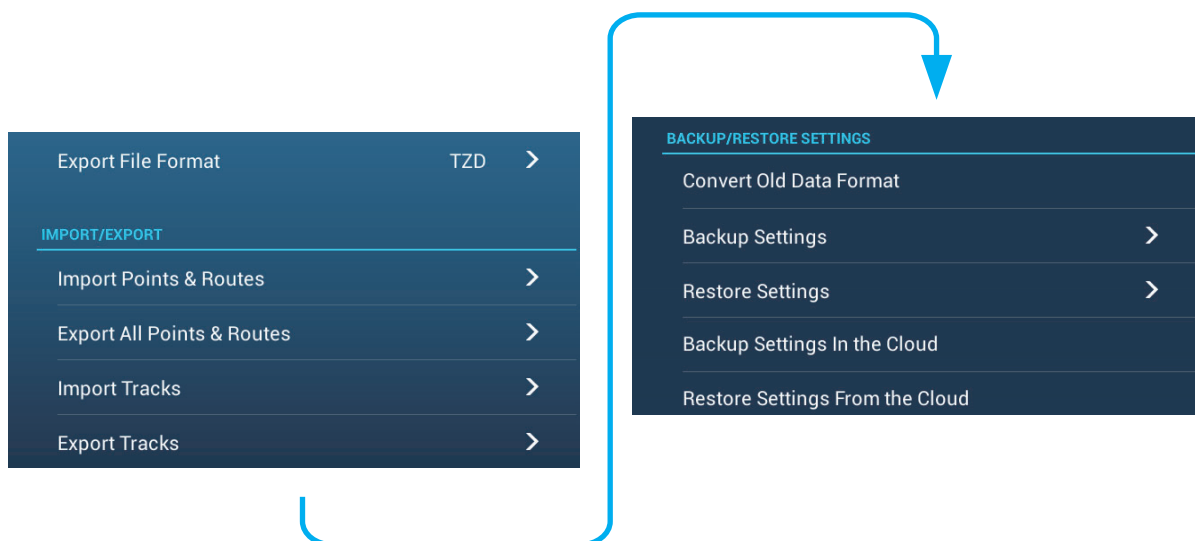
2. Tap [Export File Format].

3. Tap desired file format, among [TZX], [TZD], [CSV], [GPX].
   [**TZX**]: For NavNet TZtouch2/3
   [**TZD**]: For NavNet TZtouch2
   [**CSV**][*1]: For NavNet3D
   [**GPX**][*2]: For use with PC plotter

   *[*1]: The CSV format has the following export restrictions:
   - Points: Max. 2,000
   - Routes: Max. 200 (100 points/route)
   - Track: Max. 10,000

   [*2]: When exporting data in GPX format, it is recommended to make a note of the data contained in the file. GPX files names do not indicate their contents.

4. Tap the close button to finish.

9.2 How to Export User Objects

This unit holds a maximum of 30,000 points, 200 routes, 100 polygon areas, (boundaries), 100 circles (boundaries), 1,000 screenshots, and 1,000 catches. When the capacity for routes/points is full, new data cannot be stored. If you need to save the above-mentioned items permanently, save them to a media, following the procedure below.

1. Put the appropriate formatted media in the USB port or a slot in the SD Card Unit.
   For TZTL12F/TZTL15F users: Put a formatted microSD card in either slot on the SD Card Unit.
   For TZT2BB users: Put a formatted SD card in the right-hand slot of the Switch Box (PSD-003).

2. Open the Home screen, then tap [Settings]→[Files]→[Export User Objects].

3. Tap [SDCardRight] (or [SD CardLeft]) on the SD card unit, [External] for USB port, or [Power Switch Left] (or [Right]) for Switch Box PSD-003. You are asked if you are sure to export points and routes.

4. Tap [OK]. The message "EXPORT SUCCEEDED" appears if the exporting was successful.

5. Tap [OK].

6. Tap the close button to finish.

9.3 How to Import User Objects

You can import points, routes and boundary lines to the internal memory of this unit, using a SD card, microSD card or USB flash memory.

1. Put the appropriate media in the USB port or a slot in the SD Card Unit.
   For TZTL12F/TZTL15F users: Put a microSD card in either slot on the SD Card Unit.
   For TZT2BB users: Put a SD card in the right-hand slot of the Switch Box (PSD-003).

2. Open the Home screen, then tap →[Files]→[Import User Objects]. A list of files stored on the inserted media appears.

Points and routes files

3. Tap the file(s) to import. You are asked if you are sure to import the selected items.
4. Tap the [OK] button. The message "IMPORT SUCCEEDED" appears if the importing was successful.
5. Tap the [OK] button.
6. Tap the close button to finish.

9.4 How to Export, Import Track

How to export track

This unit saves up to 30,000 points of track data. If [Automatic Track Deleting] is OFF, new track points are not saved when the capacity for track points is reached. You can export all tracks to a SD card, microSD card or USB flash memory.

1. Put the appropriate formatted media in the USB port or a slot in the SD Card Unit.
   For TZTL12F/TZTL15F users: Put a formatted microSD card in either slot on the SD Card Unit.
   For TZT2BB users: Put a formatted SD card in the right-hand slot of the Switch Box (PSD-003).

2. Open the home screen, then tap [Settings] - [Files] - [Export Tracks]. A list of files stored on the SD card or USB flash memory appears.

Tracks file

3. Tap [SDCardRight] (or [SD CardLeft]) on the SD card unit, [External] for USB port, or [Power Switch Left] (or [Right]) for Switch Box PSD-003. You are asked if you are sure to export points and routes.

4. Tap a tracks file. You are asked if you are sure to export tracks.

5. Tap the [OK] button. The message "EXPORT SUCCEEDED" appears if the exporting was successful.

6. Tap the [OK] button.

7. Tap the close button to finish.

How to import tracks

You can import the tracks stored on a media to the internal memory of this unit.

Note 1: Imported track is transfered to each NavNet TZtouch2 unit. Track cannot be shared among units in the network.

Note 2: For TZT2BB configurations with dual monitors, tracks cannot be shared between the monitors.

1. Put the appropriate media in the USB port or a slot in the SD Card Unit.
    For TZTL12F/TZTL15F users: Put a microSD card in either slot on the SD Card Unit.
    For TZT2BB users: Put a SD card in the right-hand slot of the Switch Box (PSD-003).

2. From the Home screen, tap [Settings] - [Files] - [Import Tracks].

Tracks file

3. Tap the tracks file to import. You are asked if you are sure to import tracks.

4. Tap [OK]. The message "IMPORT SUCCEEDED" appears if the exporting was successful.

5. Tap [OK].

6. Tap the close button to finish.

9.5 How to Backup the Equipment Settings

You can save the settings data to the SD card inserted in SD card unit or the media inserted in the USB port to use the settings on other NavNet TZtouch2 units.

1. Put the appropriate formatted media in the USB port or a slot in the SD Card Unit.
    For TZTL12F/TZTL15F users: Put a formatted microSD card in either slot on the SD Card Unit.
    For TZT2BB users: Put a formatted SD card in the right-hand slot of the Switch Box (PSD-003).

2. Open the home screen, then tap [Settings] - [Files] - [Backup Settings].

3. Tap [SDCardRight] (or [SD CardLeft]) on the SD card unit, [External] for USB port, or [Power Switch Left] (or [Right]) for Switch Box PSD-003. The message "EXPORT SUCCEEDED" appears if the exporting was successful.

4. Tap the [OK] button.

5. Tap the close button to finish.

9.6   How to Load the Equipment Settings

You can load saved settings data from an appropriate media to this unit, and share them with the NavNet TZtouch2 units in the NavNet network.

1. Put the appropriate media in the USB port or a slot in the SD Card Unit.
   For TZTL12F/TZTL15F users: Put a microSD card in either slot on the SD Card Unit.
   For TZT2BB users: Put a SD card in the right-hand slot of the Switch Box (PSD-003).

2. Open the home screen, then tap [Settings] - [Files] - [Restore Settings]. A list of user settings stored on the card in the SD card unit or media in the USB port appears.

   SDCARDRIGHT

   UserSettings_2014-01-01_12h26m09s
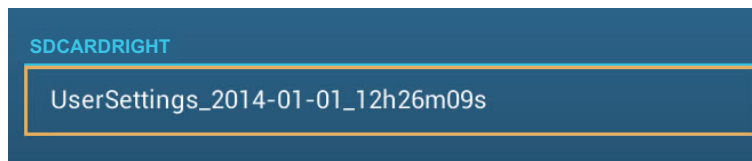
3. Tap the file to load. A confirmation message appears.

4. Tap the [OK] button. The message "IMPORT SUCCEEDED" appears if the importing was successful.

5. Tap the [OK] button.

6. Tap the close button to finish.

9.7   My TimeZero Cloud Data Service

With the TimeZero™ cloud data service, you can share data (settings, points, routes and tracks) stored in your TimeZero™ cloud account with another NavNet TZtouch2 (requires software version 3.01 or after). To use the TimeZero™ cloud data service, connect to the internet and create a TimeZero™ account.

9.7.1   How to save settings/data to the cloud

Do as follows to save settings data to the cloud.

1. Open the home screen, then tap [Settings]→[General].

2. Tap [Login] at the SOCIAL NETWORK section and login to your TimeZero™ account.

3. Tap "<" on the title bar to return to the [Settings] menu.

4. Tap [Files]→[Backup Settings in the Cloud] or [Backup Data in the Cloud] as appropriate. If a message announces that there is settings data in the cloud, tap the [OK] button to write over the settings data in the cloud.

9.7.2 How to retrieve settings/data from the cloud

Do as follows to retrieve settings data from the cloud.

1. Open the home screen, then tap [Settings]→[General].

2. Tap [Login] at the SOCIAL NETWORK section and login to your TimeZero™ account.

3. Tap "<" on the title bar to return to the [Settings] menu.

4. Tap [Files]→[Restore Settings From the Cloud] or [Backup Data in the Cloud] as appropriate. If there is no data in the cloud, an appropriate message appears. Tap the "OK" button to erase the message.

9.8 How to Convert NavNet vx2 Data

NavNet vx2 data (points, routes, tracks) can be converted for use with NavNet TZtouch2. Save the data to a microSD card or USB flash memory then do as follows:

1. Put the appropriate media in the USB port or a slot in the SD Card Unit.

2. From the Home screen, tap [Settings] - [Files] - [Convert Old Format Data]. The message "YOUR APPLICATION WILL RESTART AFTER THE CONVERSION. DO YOU WANT TO CONVERT OLD DATA" appears.

3. Tap the [OK] button. The equipment restarts and upon completion the [Data Converter] window appears.
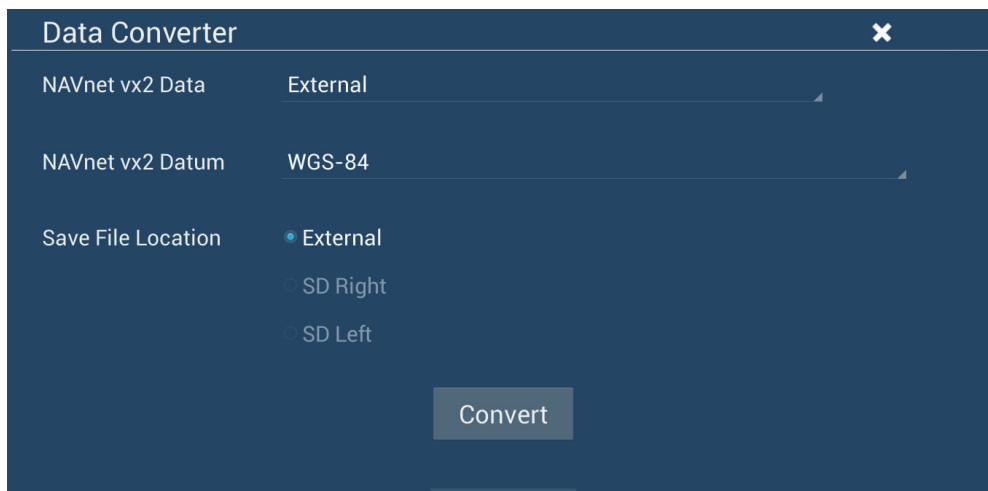
4. Select the location of the source data ([External], [SD Right], or [SD Left]) at [Navnet vx2 Data].

5. At [Navnet vx2 Datum], select the geographical datum under which to convert the data.

6. At [Save File Location], select where to save the converted files ([SDCardRight] or [SD CardLeft] for the SD card unit, [External] for the USB port, [Power Switch Left] or [Power Switch Right]) for the Switch Box).

7. Tap the [Convert] button to convert the data.

Tracks, points and routes are converted and saved to separate .csv" files. You can now import the data files to NavNet TZtouch2. See section 9.3 (points and routes) or section 9.4 (tracks).

This page is intentionally left blank.

10. CAMERA/VIDEO/EXTERNAL EQUIPMENT

The camera/video function allows you to use your unit to play back images from a video player, on-board camera, network camera, DVD player and other compatible devices. The image from a network camera can be seen by all NavNet TZtouch2 MFD units in the NavNet network, however it cannot be seen on the NavNet series MFD. Image size, brightness, contrast and the color of images can be adjusted.

The TZT2BB has the ability to display high quality HDMI pictures via the HDMI IN port. By using the TZT2BB as a "router" you can also control external equipment for on-board monitoring and digital switching.

The FUSION-Link product from Fusion Entertainment allows compatible NavNet TZtouch2 displays to interface and achieve control of specialized FUSION marine entertainment equipment.

Note: Sound output requires connection to speakers (local supply).

10.1 How to Display a Video Image

To show the camera display, go to the Home screen, then tap [Settings] - [Camera]. Turn on the [Connected] flipswitch at [ANALOG CAMERA 1] or [ANALOG CAMERA 2], or connect a network camera. Return to the Home screen, then tap the camera display icon to activate the camera display.

See section 10.7.

Camera display

10.2 Video Signal Type

There are five types of video signals which can be connected to this equipment.

- **Digital signal (HDMI)**: Images from surveillance cameras, on-board cameras and video playback.
  Note 1: This feature is only available for the TZT2BB.
  Note 2: For TZT2BB configurations with dual monitors, only one monitor can display the HDMI input at any time.
- **Analog signal**: Images from surveillance cameras, on-board cameras and video playback.
- **Digital signal (IP)**: Images from a network camera.
  Note: Turn on the network camera first, then turn on the MFD.
- **Axis Quad Server**: The image from an Axis Quad Server, which can feed up to four lines of video signals simultaneously.
- **FLIR**: Images from a FLIR brand infrared camera

FLIR camera compatiblity

The following FLIR cameras can be connected to the multi function display. (As of 1/2019.)

Model	Type
M132	IP camera
M232	
M324CS	Analog camera
M324S	
M400	

Note: The ClearCruise™ function of FLIR cameras is inoperative with the multi function display.

10.3 How to Set the Video Display

10.3.1 How to set the video signal

HDMI Input

Note: This feature is only available for the TZT2BB.

HDMI Input: Set to [ON] when video equipment is connected to the HDMI IN ports.

Touch Output: See section 10.6.

HDCP: Switch to [ON] when connecting HDCP playback devices such as DVD and Blu-ray players.

Video Input 1/Video Input 2 (analog, FLIR)

ANALOG CAMERA 1

Connected   ON

NickName   CAMERA 1 ⌨

ANALOG CAMERA 2

Connected   ON

NickName   CAMERA 2 ⌨

Connected: Turn on to use the device (video equipment, FLIR camera) connected to the VIDEO-IN1, VIDEO-IN2 port.

Nickname: If desired, you change the name of the analog camera(s). The default names are [CAMERA1], [CAMERA 2]. You can use a maximum of 20 characters. To change a name, tap [NickName] to show the software keyboard. Change the name, then tap [✓] to finish. The name is reflected to the following locations.

• The name that appears at the bottom right corner of the camera display.
• Home screen→[Settings]→[Camera]→[FLIR Installation]→[Video Source]
• Pop-up menu that appears when you tap the camera display.

IP camera

The IP address and the signal name for the IP camera signal can be changed as shown below. Additionally PTZ control can be turned on or off.

Note: [PTZ Control] should only be used when the connected camera is compatible with the PTZ function. Activating the [PTZ Control] function when the camera is not compatible may cause problems with this equipment's regular functions.

IP CAMERA 1

NickName   IP CAMERA 1 ⌨

IP Camera   172.31.200.3 ⌨

PTZ Control   ON

IP CAMERA 2

NickName   IP CAMERA 2 ⌨

IP Camera   172.31.200.4 ⌨

PTZ Control   OFF

IP CAMERA 3

NickName   IP CAMERA 3 ⌨

IP Camera   172.31.200.5 ⌨

PTZ Control   OFF

IP CAMERA 4

NickName   IP CAMERA 4 ⌨

IP Camera   172.31.200.6 ⌨

PTZ Control   OFF

Nickname: If desired you can change the name of the IP camera(s). The default names are [IP CAMERA 1], [IP CAMERA 2], [IP CAMERA 3], [IP CAMERA 4]. You can use a maximum of 20 characters. To change a name, tap [NickName] to show the software keyboard. Change the name, then tap [✓] to finish. The name is reflected to the following locations.

• The name that appears at the bottom right corner of the camera display.

• Pop-up menu that appears when you tap the camera display.

IP Camera: Enter the IP address of the IP camera, using the software keyboard. Tap [✓] to finish.

PTZ Control: Turn this item on to enable PTZ (Pan, Tilt, Zoom) control of the camera.

10-4

Axis Quad Server digital signal

A maximum of two Axis Quad Servers can be connected. Each server can be set individually with the menus [AXIS QUAD SERVER] and [SECOND AXIS QUAD SERVER], respectively.
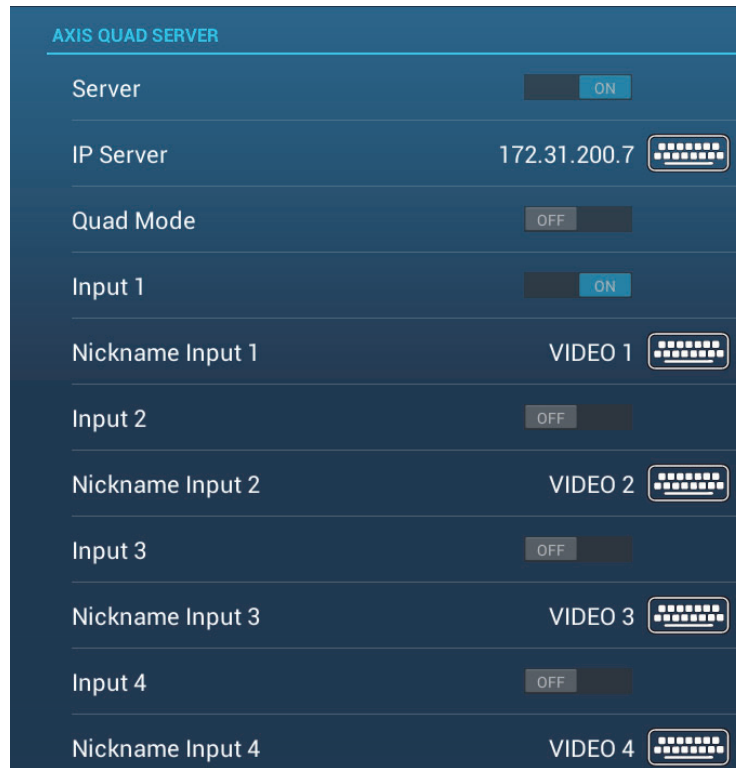
Server: Turn this item on to receive the signal from the Axis Quad Server.

IP Server: Enter the IP address of the server, using the software keyboard. Tap [✓] to finish.

Quad Mode: Turn this item on to feed four channels simultaneously to one display.

Input 1 (2, 3, 4): Turn this item on to feed each of the four channels of the server individually.

Nickname: If desired you change the name of the Axis Quad Server(s). The default names are [VIDEO 1], [VIDEO 2], [VIDEO 3], [VIDEO 4]. You can use a maximum of 20 characters. To change a name, tap [Nickname Input 1] (2, 3, 4) to show the software keyboard. Change the name, then tap [✓] to finish. The name is reflected to the following locations.

FLIR camera

Images from an infrared camera allow you to navigate easily at night or in bad weather. Open the home screen, then tap [Settings]→[Camera]→[FLIR Installation].

Scan IP	
FLIR IP	0.0.0.0 ⌨
Video Source	NONE 〉
Camera Model	
Camera Offset (Right-left)	+0.0 ° ⌨
Camera Offset (Up-Down)	+0.0 ° ⌨
Automatic Zoom	OFF
Zoom Distance	328 ft ⌨
Camera Altitude	9.8 ft ⌨
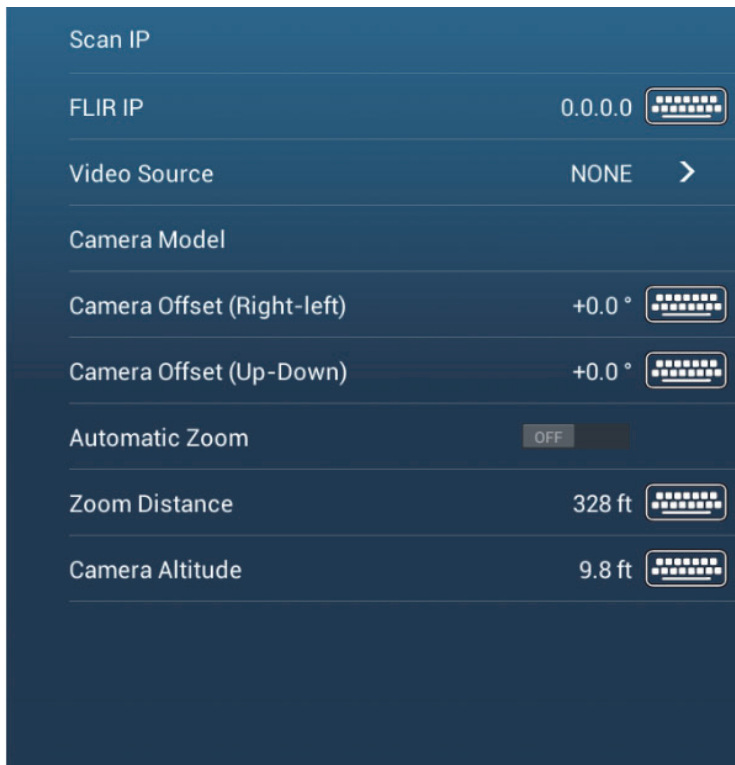
Note: To use the PTZ function of the FLIR camera with the NavNet TZtouch2, a setting (Nexus CGI Interface, port: 8090) is required at the FLIR camera. See the operator's manual of the FLIR camera for details.

Scan IP: Tap [Scan IP] to scan the IP address automatically when connecting an FLIR camera.

FLIR IP: Enter the IP address manually with the software keyboard then tap [✓].

Video Source: Select the port where your FLIR camera is connected.

Camera Model: Select the FLIR camera model connected to your MFD.
• FLIR M-Series: M132, M324CS, M324S
• FLIR M200: M232
• FLIR M400: M400

Camera Offset (Right-left): Adjust the side position of the FLIR camera.

Camera Offset (Up-Down): Adjust the up-and down position of the FLIR camera.

Automatic Zoom: Turn on to turn on the automatic zoom.

Zoom Distance: Set the distance to zoom automatically.

Camera Altitude: Set the altitude for the FLIR camera.

10.3.2 How to adjust the image size

You can adjust the image size from the pop-up menu.

1. In the camera mode, tap the screen to show the pop-up menu. The items shown on the pop-up menu depend on the camera connected.

2. Tap the camera display to adjust. For multiple camera installation, see section 10.3.3.
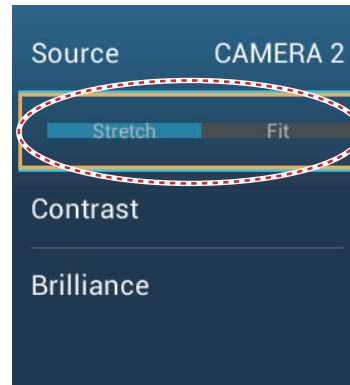
3. Tap [Stretch] or [Fit].
   [Stretch]: Shrink or enlarge the image to fit the monitor's width.
   [Fit]: Shrink or enlarge the image to fit the monitor's height. The aspect ratio is kept, so a black bar appears on the right and left sides of the picture. This is normal; it is not a sign of malfunction.

10.3.3 How to switch your video inputs

If you have more than one camera installed, you can switch your video inputs from the camera screen.

1. On a camera display, tap the screen to show the pop-up menu.
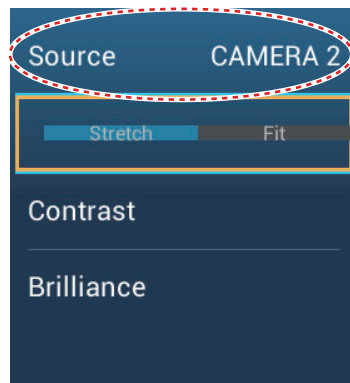
2. Tap the display name to show the pop-up menu for selection of camera display.
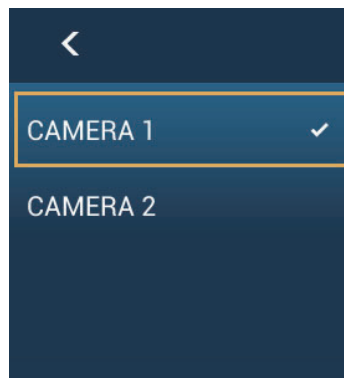
3. Tap the camera display desired, then tap <.

10.3.4   How to adjust the video image

Tap the screen to show the pop-up menu. Tap [Contrast] or [Brilliance] on the pop-up, then drag the slider to adjust.

Current setting → (ex. Contrast)

Drag slider (or tap bar, +, - icons)
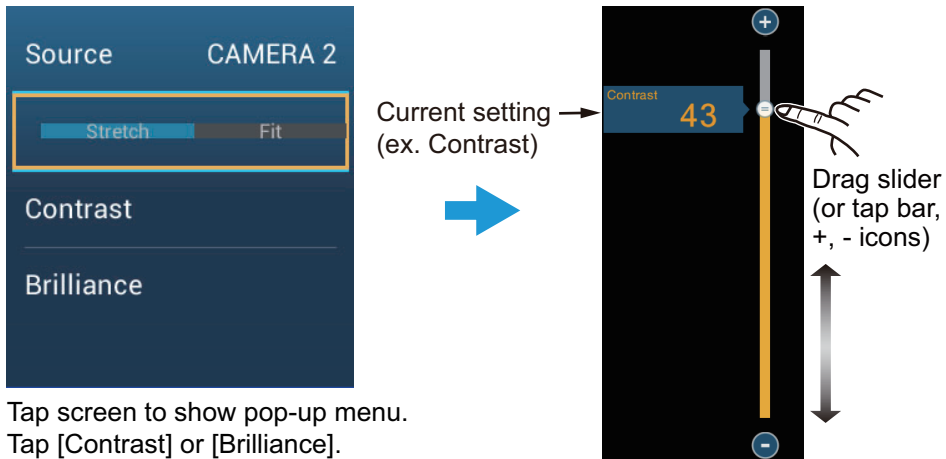
Tap screen to show pop-up menu.
Tap [Contrast] or [Brilliance].

10.4   Control of FLIR Camera

[Camera FoV] menu

You can display the field of view by the FLIR camera on the plotter display.

1. Tap the boat icon to display the pop-up menu.
2. Tap [Cone]. The boat icon is put inside a red translucent circle.
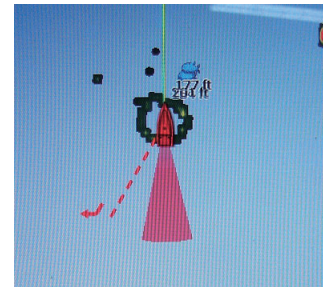
[Move Camera] and [Lock Camera] menus

You can rotate the FLIR camera about the position you select (touch) on the plotter or radar display. Open the pop-up menu then tap [Lock Camera]. To track the position, tap [Move Camera] on the pop-up menu. To disable the camera tracking, tap [Unlock Camera] on the pop-up menu.

Operations from the pop-up menu

On the camera display, you can use the pop-up menu to adjust image size (see section 10.3.2) and zoom in or zoom out. Additionally, you can tap [HOME] to restore camera reference position. For the pop-up menu items [Mode], [Scene] and [Surveillance Mode], see the FLIR Operator's Manual.
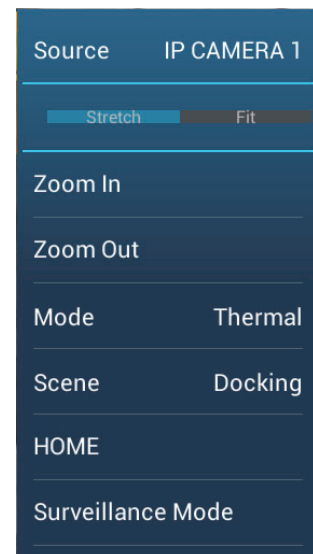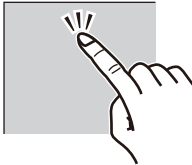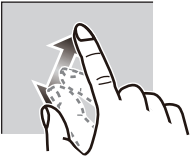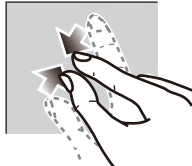
10.5 Touch Control on the Camera Display

Operations available with connection of an analog camera, Axis Server 241Q

Operation		Function
Tap		Opens the pop-up menu.

Operations available with connection of a FLIR camera

Operation		Function
Tap		Points camera to direction tapped.
Long tap		Opens the pop-up menu.
Drag		Rotates camera while dragging.
Pinch	 Zoom in Zoom out	Zoom in/zoom out the camera image (infrared only).

10.6   Operating External Equipment

You can control external equipment (such as on-board monitoring and digital switching) by connecting the external equipment via the HDMI Input ports, and the touch monitors via the USB ports on the TZT2BB.

Note: This feature is not available for the TZTL12F/TZTL15F.
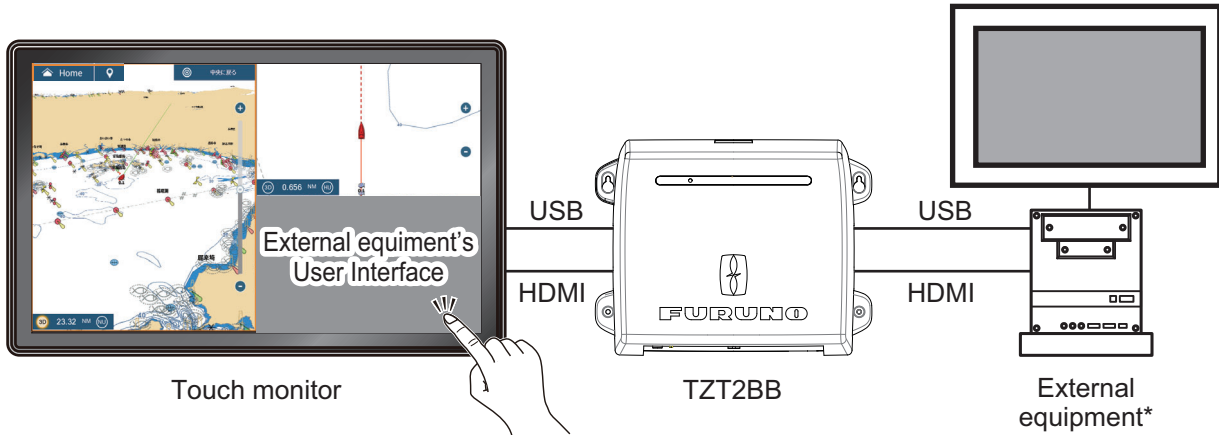
*: External equipment must be touch-operation capable.

Configuration example

How to set up operation of external equipment

1.   From the Home screen, tap [Settings] - [Camera].
2.   Set [HDMI Input] and [Touch Output] to [ON].

How to show the external equipment's display

From the Home screen, tap the Camera icon. The external equipment's display appears.

Pop-up menus

With the external equipment display shown, tap the menu icon (▤) at the top-right of the screen. The pop-up menu shown below-right appears.

Move: Moves the menu icon. You can also long tap the menu icon to move the icon. The icon changes to show flashing arrows (⬦), indicating that the icon can now be moved. Drag the icon to the desired location, then tap the icon. The flashing arrows disappear and the icon is anchored to the location.

Source: See section 10.3.3.

Stretch/Fit: See section 10.3.2.

Contrast/Brilliance: Not used with external equipment operation.
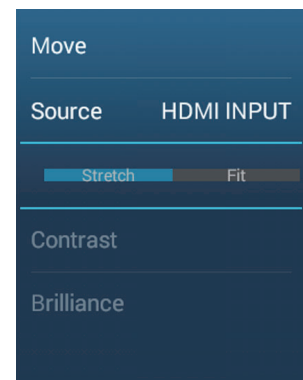
11. FUSION-Link

The FUSION-Link™ product from FUSION Entertainment allows compatible NavNet TZtouch3 displays to interface and achieve control of specialized FUSION marine entertainment equipment. The following FUSION-Link™ products are compatible with the multi function display, as of 1/2019.

Series name	Model
750 series	MS-AV750, MS-UD750
755 series	MS-AV755, MS-UD755
Apollo series	MS-RA770, MS-SRX400

Note 1: The Apollo series units have a built-in WiFi, however connect the unit to the LAN. The PartyBus™ feature of the Apollo is inoperative with the multi function display.

Note 2: For audio output, a speaker (locally arranged) must be connected to a FUSION-Link compatible device.

11.1 FUSION Display

The FUSION display can be accessed two ways.

- **From the Home screen**

Fusion display

- **Two finger tap (long) on screen**
  Set [Two Finger Log Tap Function] to [Fusion], on the [General] menu, to use this feature. See section 1.16 for the procedure.

Zones 1 and 2 volumes synched.

Zones 1 and 2 volumes independent.

: Select tracks or albums.

: Repeat one or all.

Drag slider to adjust volume. Globally adjust volume.

Close button

Swipe to change source.

Show or hide [MENU] panel.

Show or hide [ZONES] panel.

Show or hide [TONES] panel (tone controls).

Tap: Goto previous title.
Hold down: Go back.
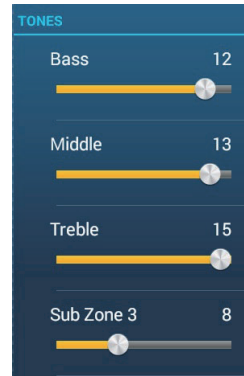
Playback

Tap: Goto next number.
Hold down: Fast forward.

Lower volume.

Mute/unmute.

Raise volume.

Example1: iPod, full screen

Drag bar to adjust squelch.

Tap to select CH16.

Channel selection mode

Hide or show menu.
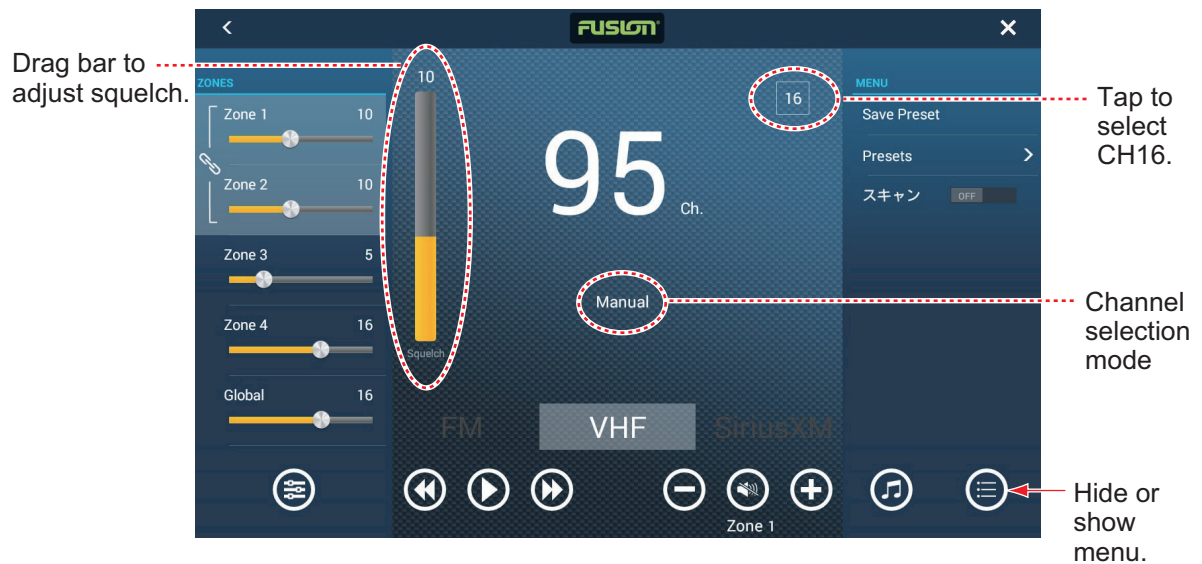
Select channel.

Tap: Switch channel selection mode between preset and manual.
Long tap: After selecting channel in manual mode, long tap to register the channel as preset channel.

Lower volume.

Mute/unmute.

Raise volume.

Example2: VHF, full screen

11.2 FUSION Operation Bar

The FUSION controls can be accessed two ways:

• Tap Fusion on the slide-out menu.

Tap to show or hide the
FUSION operation bar.
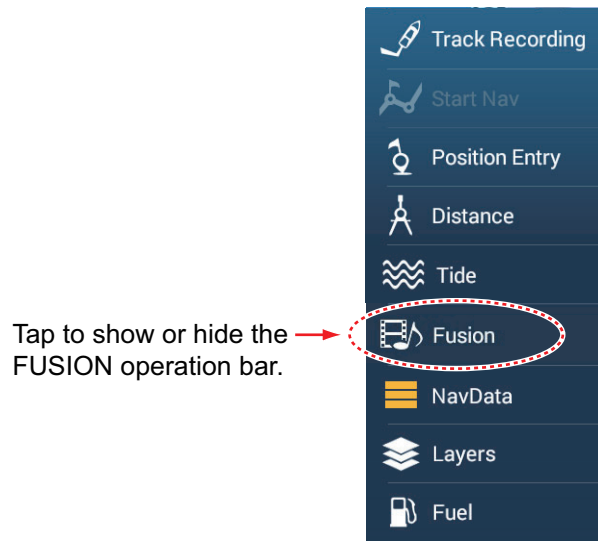
• Tap (long tap) the screen with two fingers.
  Note: [Two Finger Long Tap Function] ([General] menu) must be set to [Fusion Bar] to use this method.
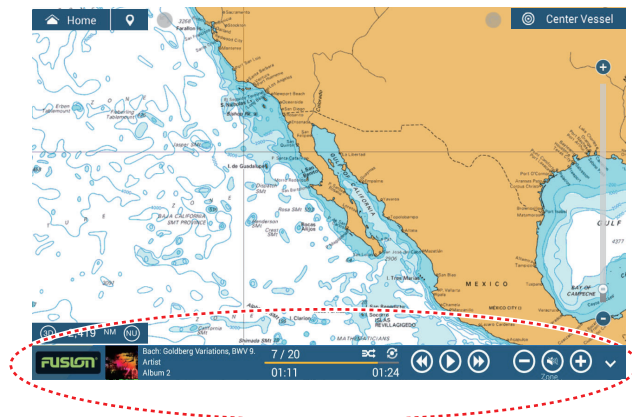
Tap to go to full screen
FUSION display.

Tap to hide bar.

For iPod

For VHF

11.3 FUSION Settings

Open the Home screen, tap [Initial Setup], then scroll down to find the [FUSION] section. Set the [FUSION] items referring to the descriptions shown below.
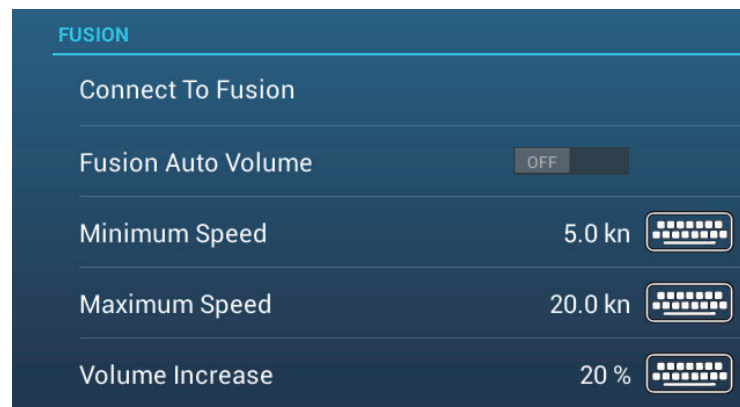
[**Connect to Fusion**]: Connects to your FUSION equipment.

[**Fusion Auto Volume**]: Set to [ON] to allow the NavNet TZtouch3 unit to control the FUSION volume.

[**Minimum Speed**]: Set the minimum speed that triggers the volume auto control.

[**Maximum Speed**]: Set the maximum speed that triggers the volume auto control.

[**Volume Increase**]: Set the amount of extra volume to output when the speed is that set at [Maximum Speed].

This page is intentionally left blank.

12. INSTRUMENT-RELATED DIS-PLAYS

With connection of appropriate sensors, this equipment provides three types of specialized displays:

Instrument display: This display provides conventional navigation and environment data. Analog and digital displays, highway display, NAVpilot data, etc. can be shown. The display can be programmed to a full screen or three-way split screen.

CZone display: This display offers, in a full screen display, control of the Power Products' CZone equipment (shipboard power management system) connected in the NavNet network.

Yamaha engine status display: This display provides engine information about compatible Yamaha engines, in a full screen display.

12.1 Instrument Display

Set the instrument display on the home screen referring to section 1.7.1. Tap the instrument display icon to show the instrument display.

Instrument display
(3-way screen)

Instrument display
(full screen)
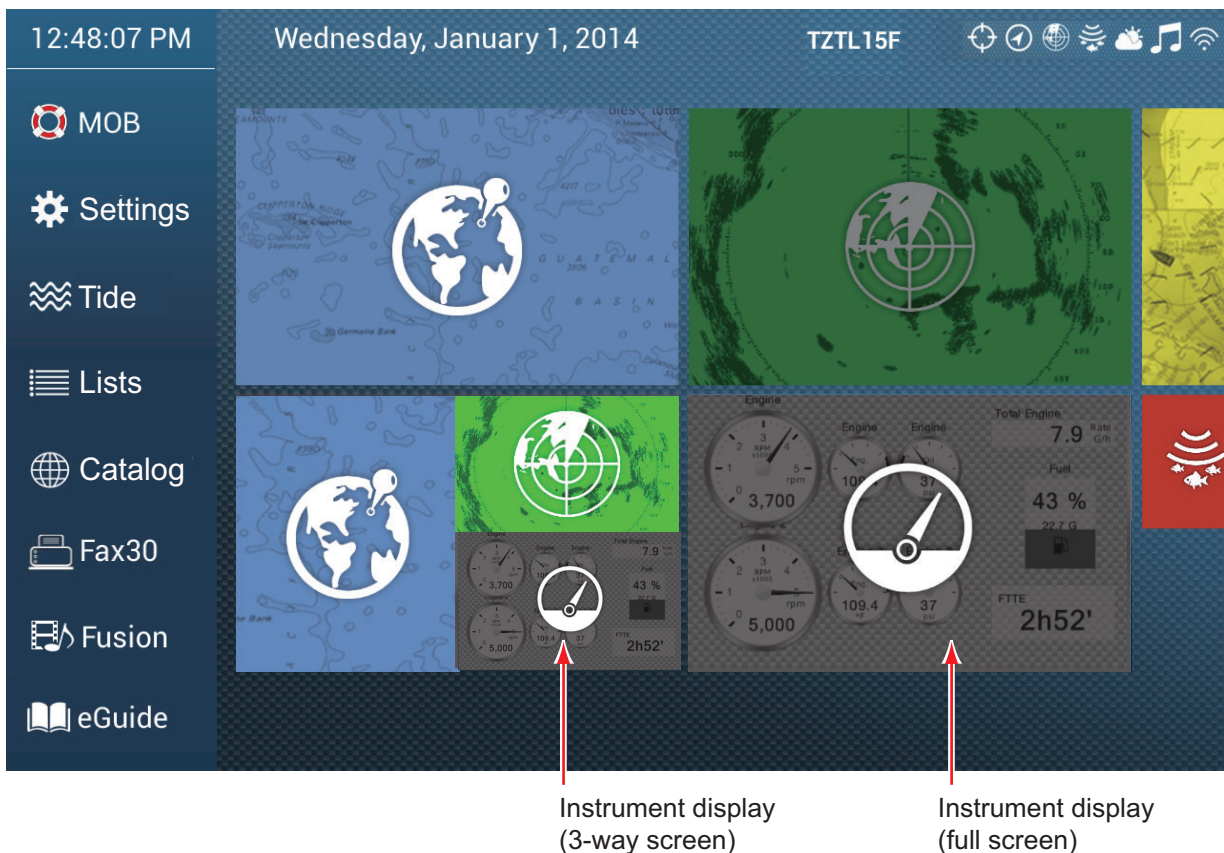
12.1.1   Full-screen instrument displays

Sailing instrument display
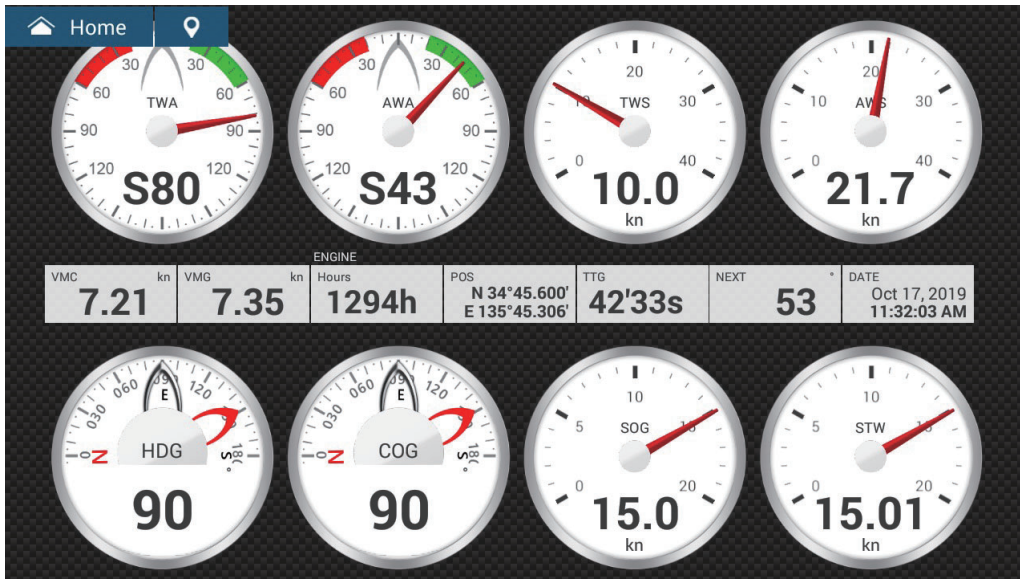
Cruising instrument display
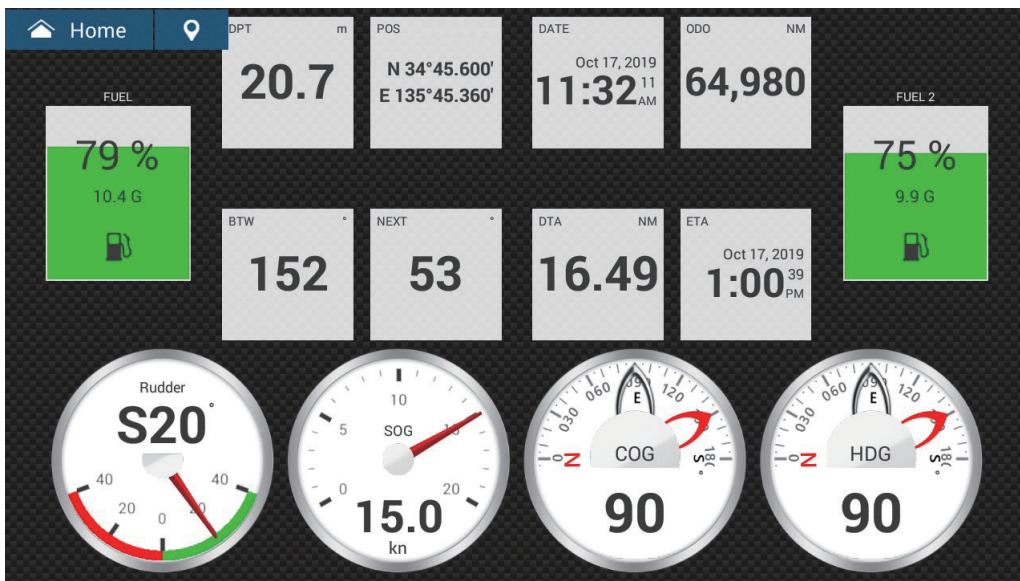
Single outboard instrument display
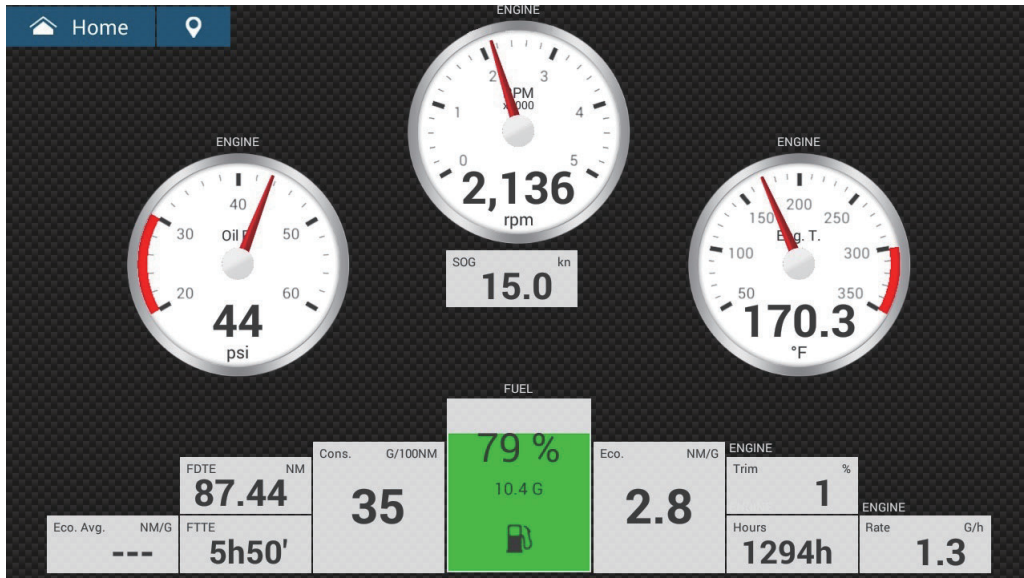
Twin outboard instrument display
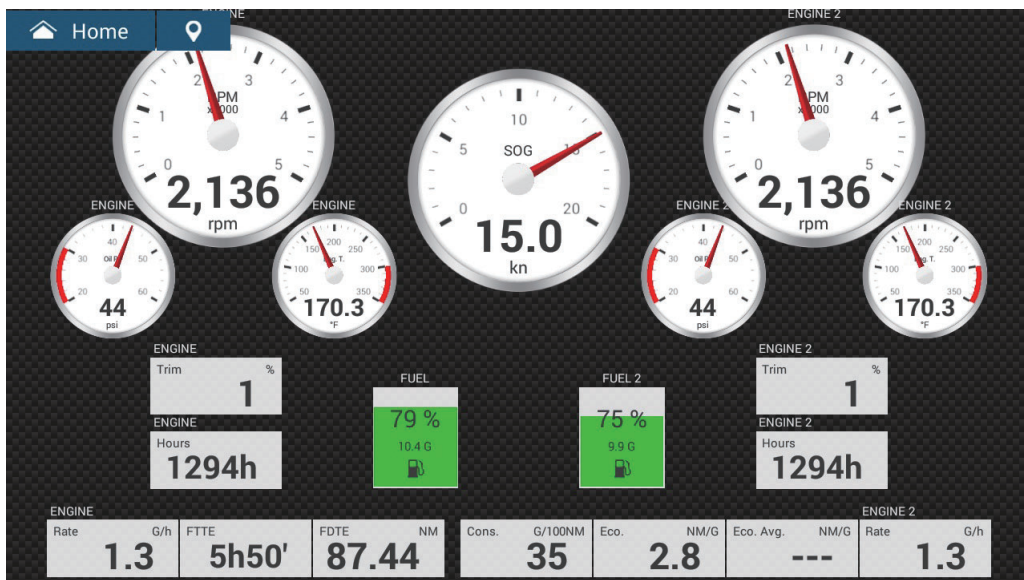
Triple outboard instrument display
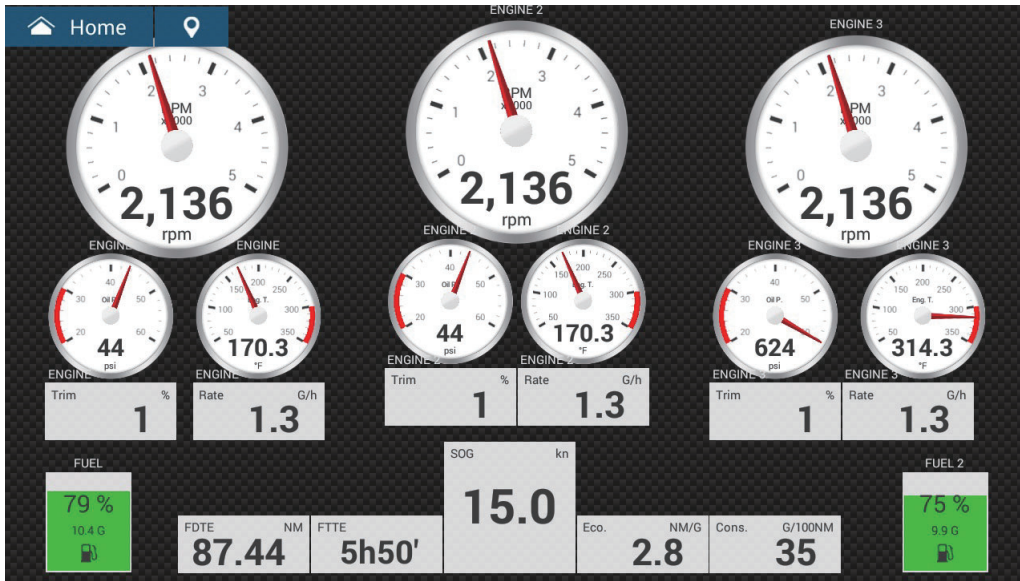
Quad outboard instrument display
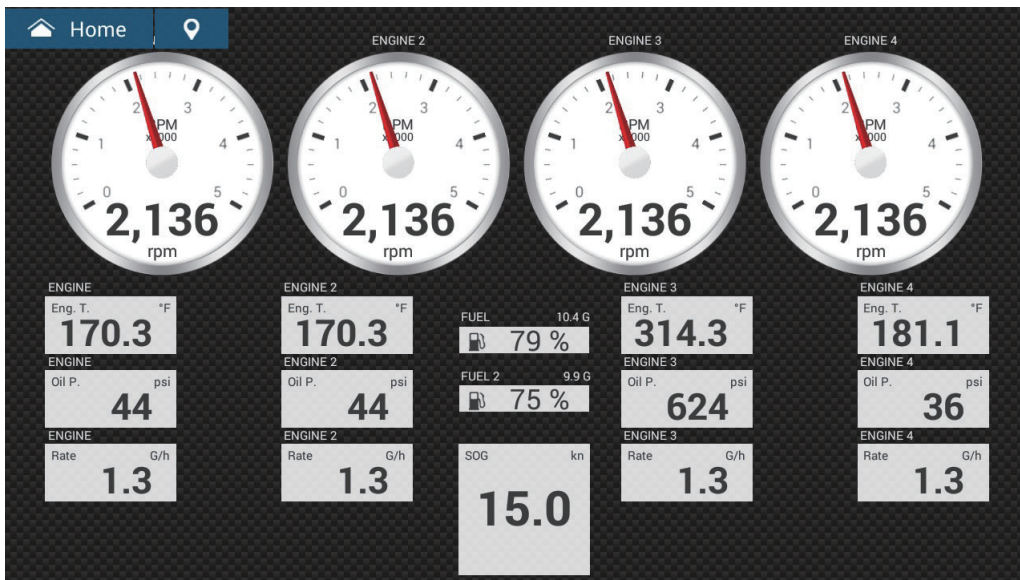
Single inboard instrument display

Highway instrument display

Twin inboard instrument display

12.1.2 Three-way, four-way split screen instrument display

Navigation instrument display
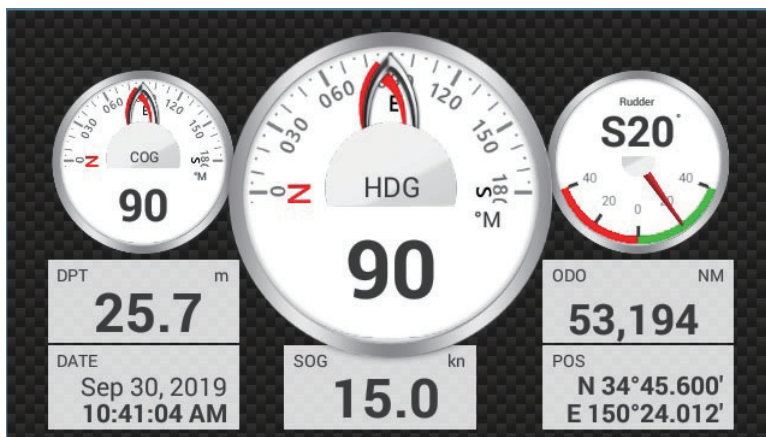
Graphs instrument display
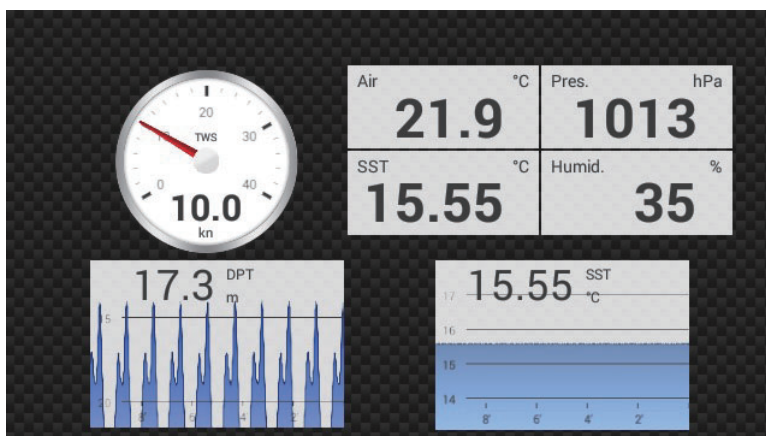
Environment instrument display
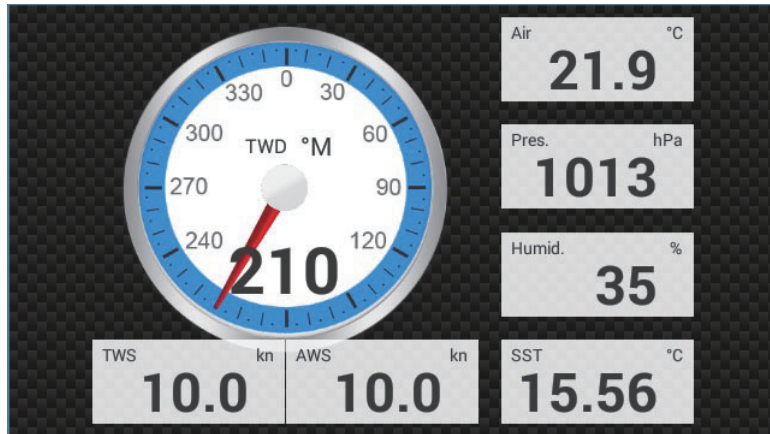
Wind instrument display
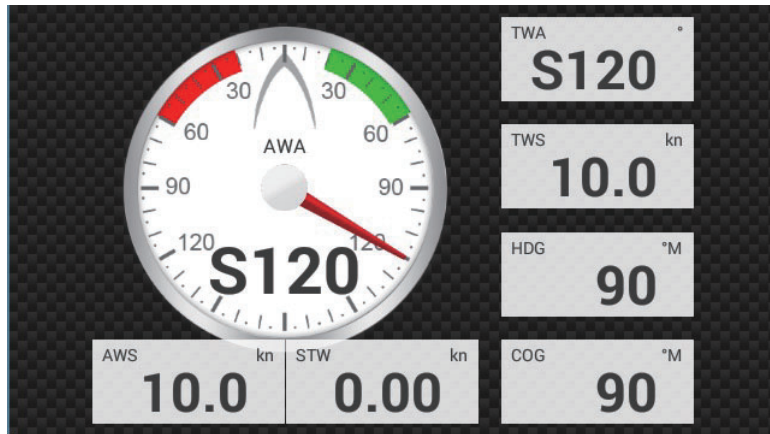
Numeric instrument display

Highway instrument display

NAVpilot instrument display
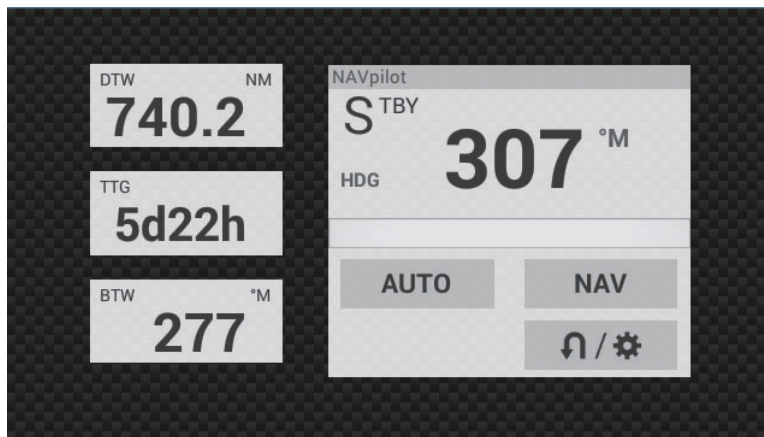
Single engine instrument display
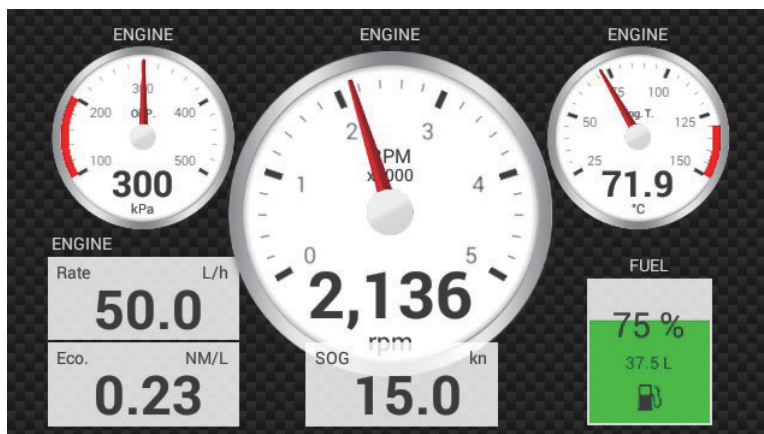
Twin engines instrument display
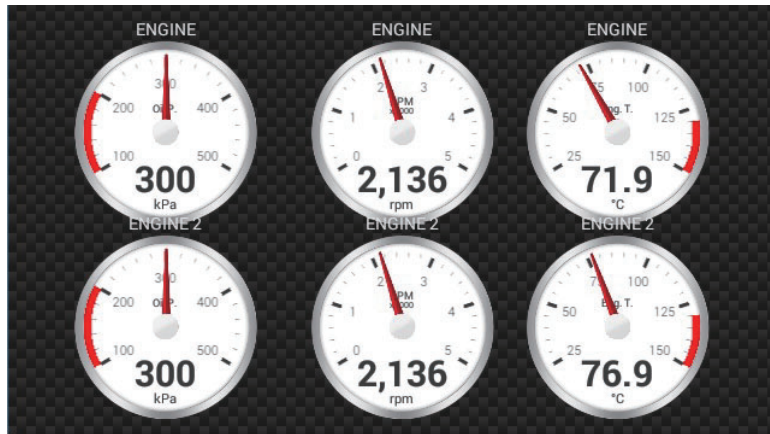
Triple engines instrument display
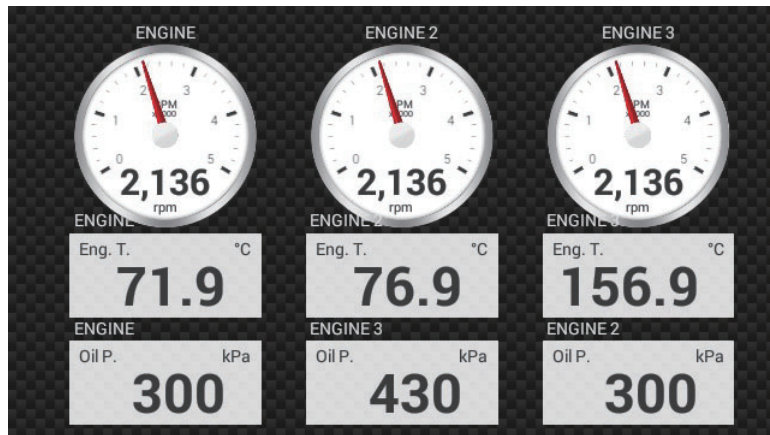
Tank instrument display

The tank display shows the fuel level in both analog and digital formats. The analog display indicates an increase or decrease in fuel level and changes color according to the percentage of fuel remaining.

Green: 10% - 100% Red: 0% - 10%
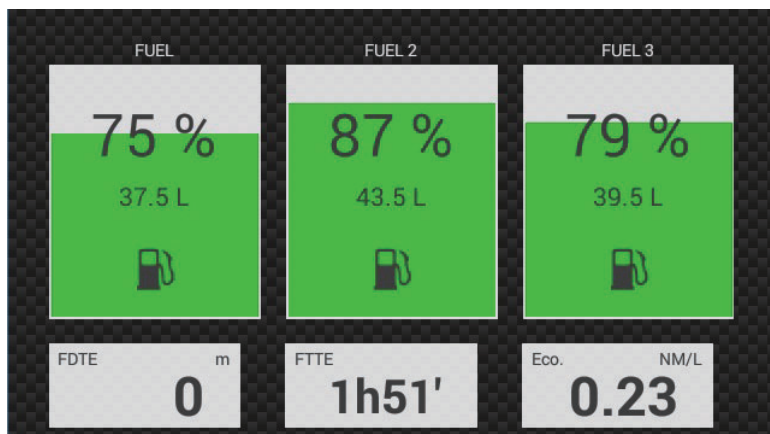
12.1.3   How to switch between instrument displays

Three-way and four-way split screens

Note: The four-way split screens is only available for the TZT2BB.

The default display screens in the three-way and four-way split screen are [Navigation], [Historical Graphs], [Environment Numerical], [Wind], [Numeric], [Highway], [NAVpilot], [Single Engine], [Twin Engines], [Triple Engines], and [Tank]. The availability of a display depends on your system configuration.

You can switch between the displays by swiping downward at the bottom of the display, or tapping the screen to display the pop-up menu shown below and tapping the display of your choice.
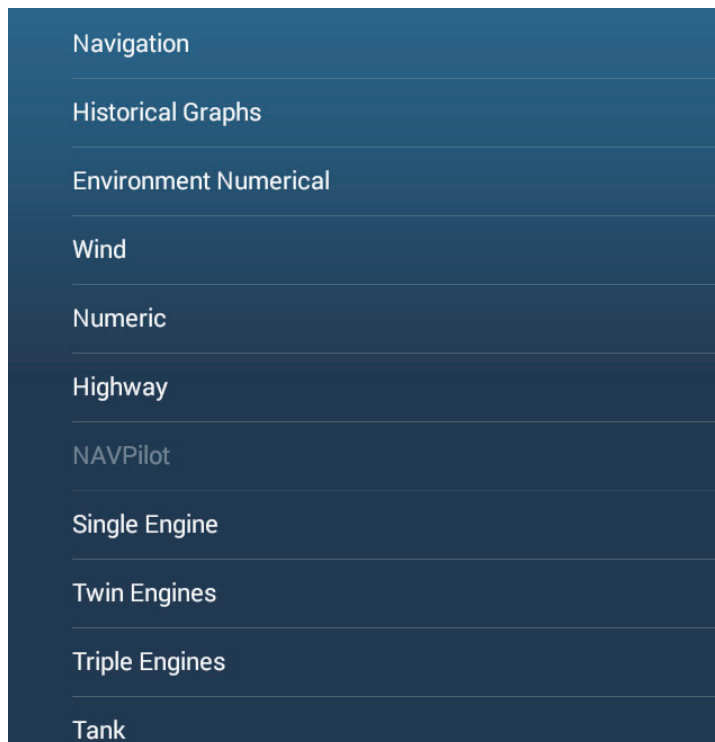
Full screen

The default full screens are [Full 1], [Full 2], [Single Engine], [Twin Engines], [Triple Engines], [Quad Engines] and [Historical Graphs]. (The availability of the displays depends on your system configuration.) You can switch between the displays by swiping downward at the bottom of the display, or tapping the screen to display the pop-up menu shown below and tapping the display of your choice.

Full 1

Full 2

Single Engine

Twin Engines

Triple Engines

Quad Engines

Historical Graphs

Edit Page

Rename Page

Remove Page

Add Page
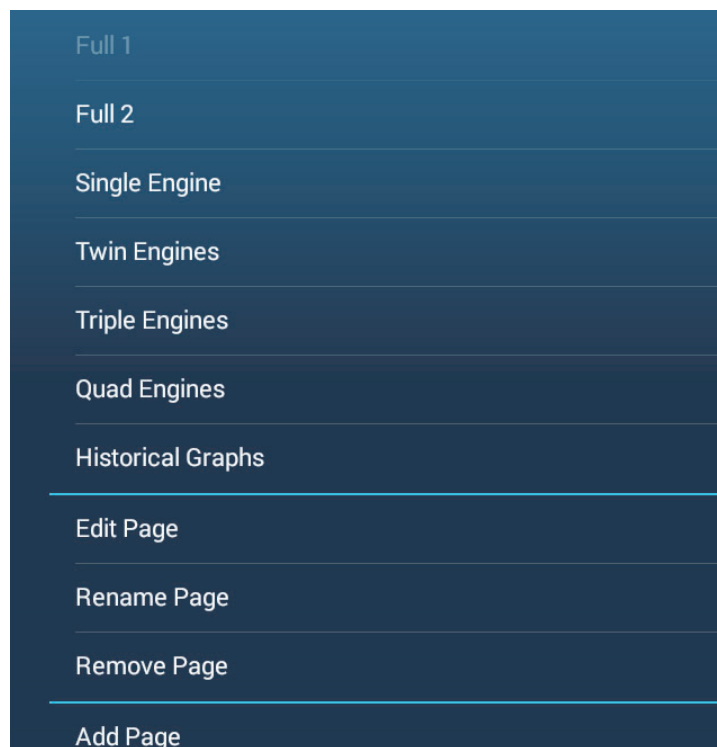
12.1.4   How to edit the instrument display

The instrument displays are fully customizable. You can edit the displays as follows:

- Remove an indication from a display
- Add an indication to a display
- Rearrange the indications in a display
- Rename a display
- Delete a display
- Remove a display
- Add a custom display

Note: To restore the default instrument displays, go to the Home screen, then tap [Settings] - [Initial Setup] - [Graphic Instruments Setup] - [Reset Instrument Pages]. All default displays are restored and any custom displays are deleted.

How to prepare for editing

To start the editing process, tap anywhere on an instrument display to show the pop-up menu, then tap [Edit Page] on the menu. A blue line circumscribes each indication in the display, as shown in the figure below. Edit the display referring to the procedures in the coming sections. To save your changes, tap anywhere on the instrument display to show the pop-up menu, then tap [End Edit] on the menu.

12-11
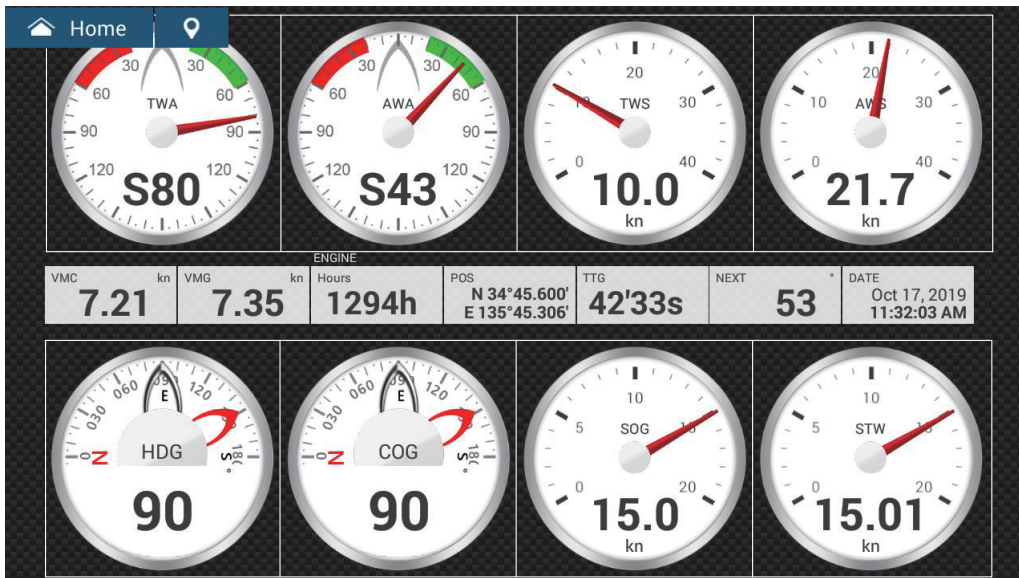
How to rearrange the indications in an instrument display

Drag and drop the indications to your liking.

How to edit, remove an indication in an instrument display

1. Prepare the display for editing as shown in "How to prepare for editing" on page 12-11.

2. Tap the indication to process to show the [Edit Instrument] pop-up menu.
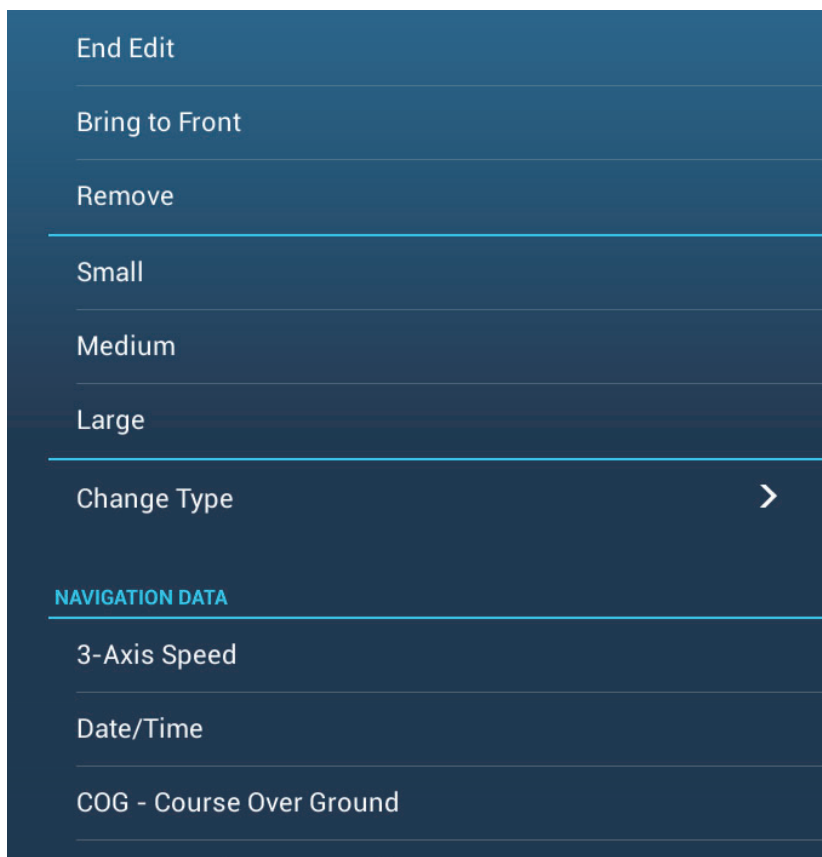
3. Do one of the following depending on your objective:

   - **Bring to front**: If two indications are occupying the same location, you can se-
     lect one to bring to the front. Tap the indication to bring to the front, then tap
     [Bring to Front].

   - **Remove the indication**: Tap [Remove].

   - **Change the indication**: Tap required data in the [NAVIGATION DATA],
     [ROUTE INFORMATION], or [WIND AND WEATHER].

   - **Change the indication type**: Tap [Change Type] to show the [Edit Instrument]
     pop-up menu, shown on the next page.
     [GRAPHIC] changes the size of a graphic indication or changes a numeric indi-
     cation to the corresponding graphic indication.
     [NUMERIC] changes the size of a numeric indication or changes a graphic in-
     dication to the corresponding numeric indication.
     [HISTORICAL GRAPH]**: displays the selected data in a graph.
     [TANK]: sets the size of the tank indication.
     [HIGHWAY], [NAVPILOT]* select respective display size.
     *: Requires connection of a FURUNO NAVpilot.
     **: Tank/engine data is not displayable as a graph.
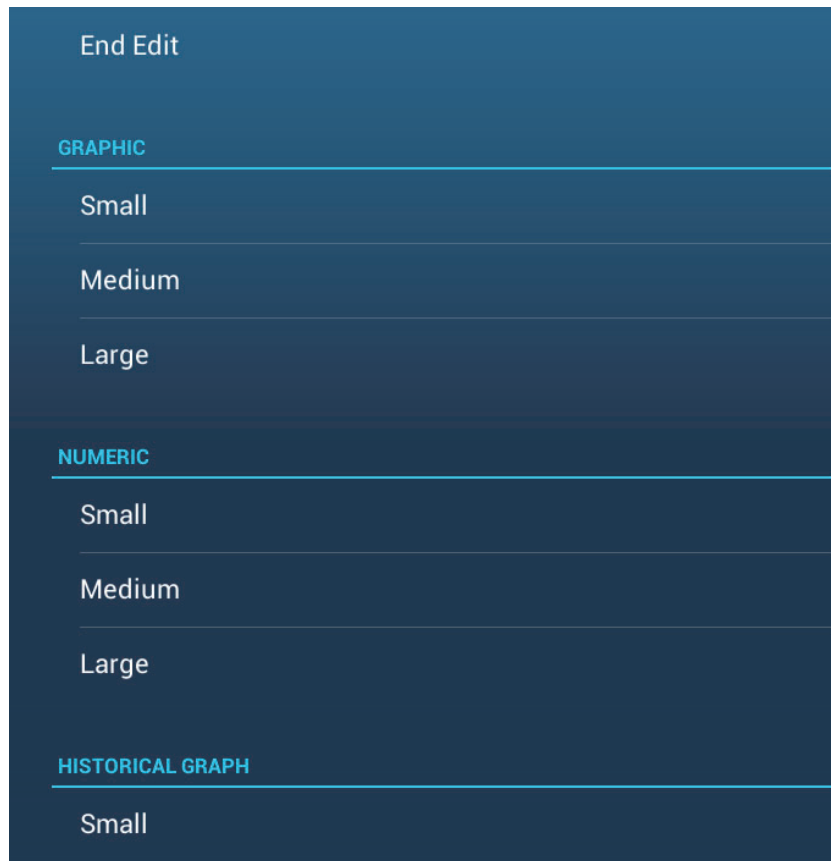
   - **Change the graph's plotting period and range**: Tap [Plot Period] to change
     the time over which the graph's data is plotted (x axis). Tap [Plot Range Value]
     to change the range for the data display in the graph (y axis).
     Note: Depending on the range and period selected, some data may be dis-
     played with steep peaks and troughs when converted into graph format.

How to add an indication to an instrument display

1. Prepare the display for editing as shown in "How to prepare for editing" on page 12-11.

2. Tap an unoccupied position on the display to show the [Add Instrument] pop-up menu. (If there is no space available, remove an unnecessary indication following the procedure in "How to edit, remove an indication in an instrument display" on page 12-12.).
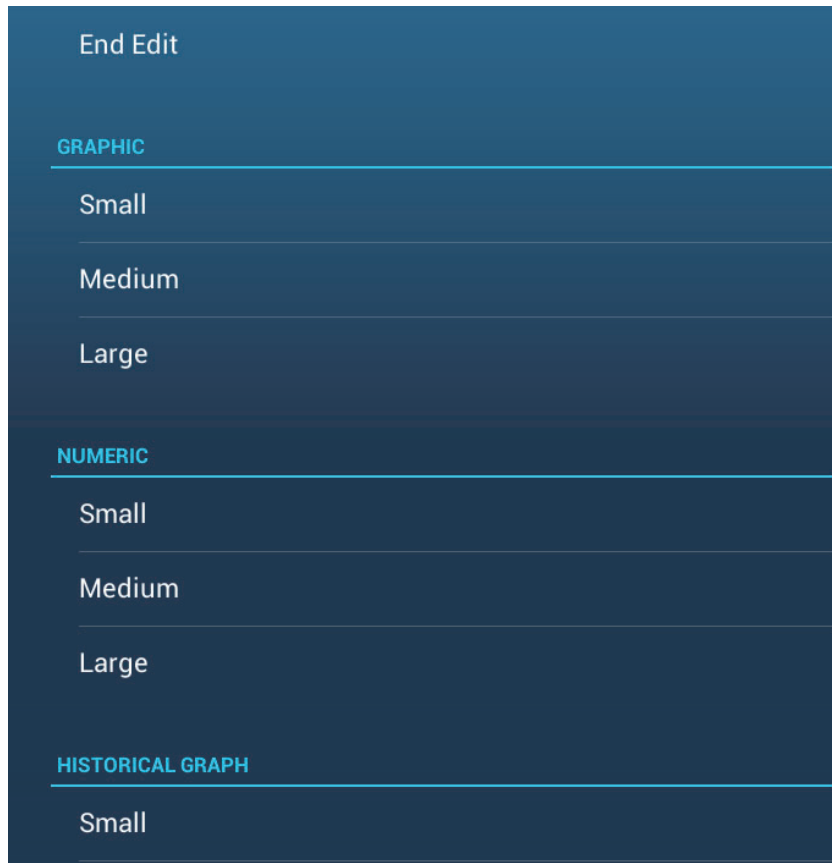
3. Tap a size in [GRAPHIC], [NUMERIC], [HIGHWAY], [HISTORICAL GRAPH], [TANK] or [NAVPILOT] (if available).
    For [GRAPHIC] and [NUMERIC], an indication is automatically selected. These are an analog/digital clock with month and day, and the time and date, respectively.
    For [HISTORICAL GRAPH] and [TANK], the indication is also automatically selected. These are COG and fuel, respectively.

4. To change the graphic or numeric indication, see "How to edit, remove an indication in an instrument display" on page 12-12.

How to rename an instrument display

Show the instrument display that you want to rename. Tap the display to show the pop-up menu, then tap [Rename Page] on the menu. The software keyboard appears. Change the name, then tap [✓] to confirm the name and close the keyboard.

How to remove an instrument display

Show the instrument display that you want to remove. Tap the instrument display to show the pop-up menu, then tap [Remove Page] on the menu.

How to add an instrument display

Ten full size and six split screen instrument displays are preset in this equipment. If the displays do not meet your requirements, you may add custom displays as necessary. A maximum of ten each of full screen and split screen displays is available.

1. Tap the instrument display to show the pop-up menu, then tap [Add Page] on the menu.
   Note: If you have reached the capacity for the screen configuration selected, [Add Page] is grayed out. Remove an unnecessary page referring to "How to remove an instrument display" on page 12-14.

2. The software keyboard appears; enter a name for the page then tap [✓]. A blank page appears.

3. Tap the blank page to show the [Add Instrument] pop-up menu.

End Edit

GRAPHIC

Small

Medium

Large

NUMERIC

Small

Medium

Large

HISTORICAL GRAPH

Small
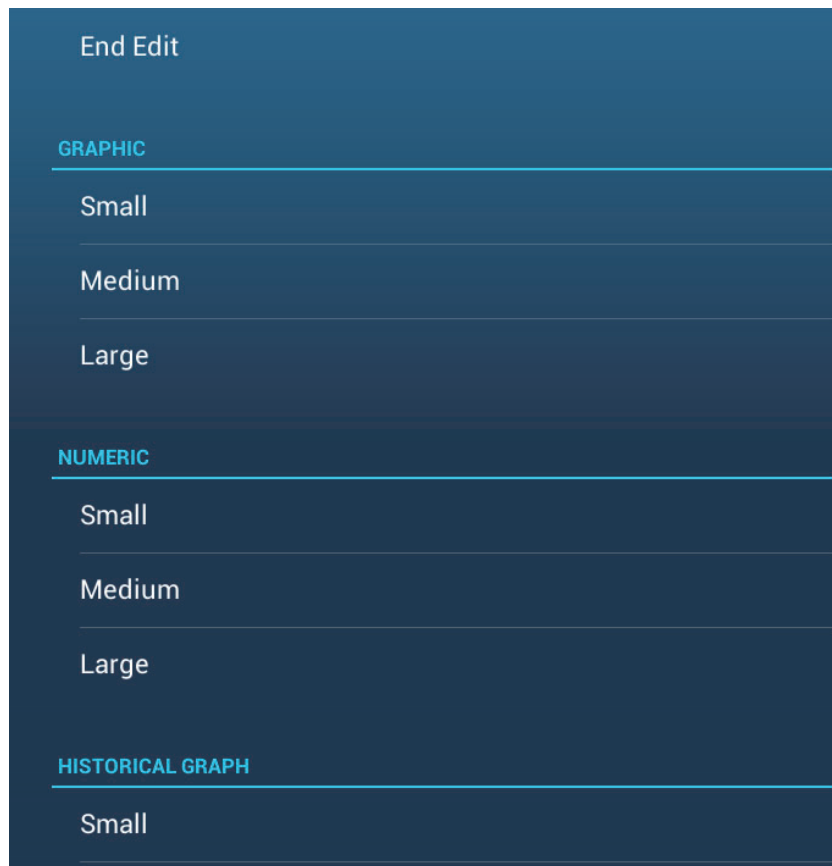
4. Tap the item to add.

5. Repeat step 4 to add other items.

6. After you have added all items required, tap [End Edit].

The page name appears in the [Choice of The Config Type] pop-up menu.

12-15

12.1.5   Instrument theme

The instrument theme is available in black or white. To change the theme, go to the home screen and tap [Settings] - [General]. Set [Instrument Theme] to [Black] or [White]. The setting also controls the graphic format navigation data displays in the data area.

Black   *White*
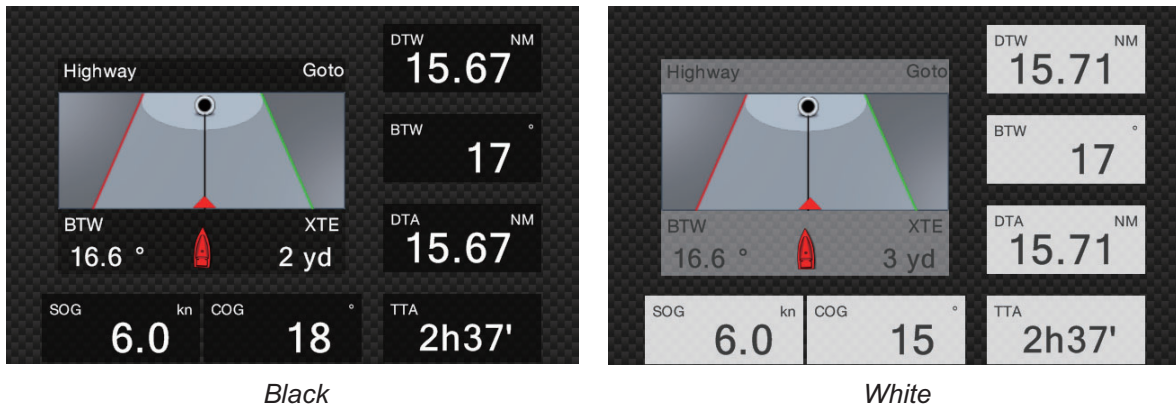
12.1.6   Fuel management system

This equipment can calculate the remaining fuel from the total fuel and the fuel consumption rate. This function requires the NMEA 2000 sentence PGN127489 (Engine Fuel Rate).

Note: The remaining fuel calculation is for reference purposes. Do not use the results for navigation planning or emergency purposes. During an entire voyage, select one NavNet Ztouch2 unit for the calculation at start-up. The calculation of remaining fuel is not done when the unit is powered off.

How to manually enter fuel tank capacity

1. From the home screen, tap [Settings]→[Initial Setup].
2. At [Total Fuel Capacity], enter your vessel's total fuel capacity.
3. Set the flipswitch of [Manual Fuel Management] to [ON].
4. Tap [OK] to finish.

Fuel management from the Slide-out menu

You can check remaining fuel and update fuel amount from the [Slide-out] menu.

Manual Fuel Management	✕
Total Fuel Remaining (volume)	0.0 G
Total Fuel Remaining (%)	0 %
UPDATE FUEL AMOUNT	
Fill up all tanks	
Add Fuel	
Remove Fuel	
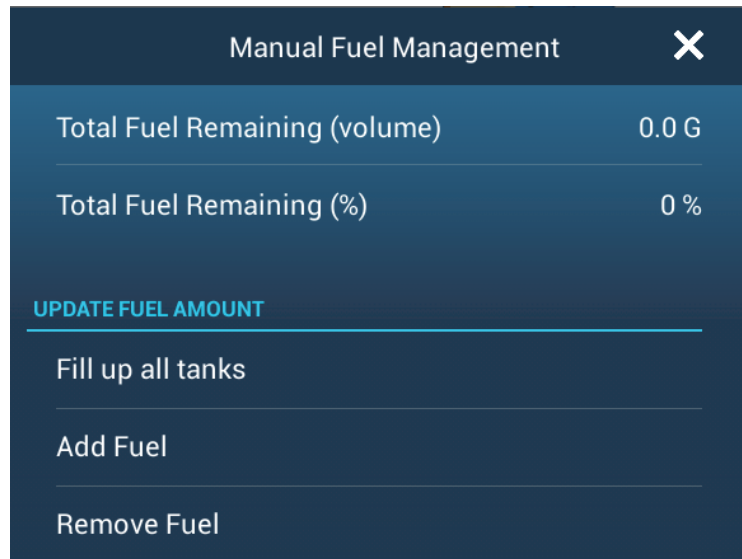
Check remaining fuel:

See [Total Fuel Remaining (volume)], [Total Fuel Remaining (%)].

How to fill up all tanks:

1. Tap [Fill up all tanks]. You are asked "Are you sure you want to set the remaining fuel volume to full tank capacity?"
2. Tap the [OK] button.

How to add fuel:

1. Tap [Add Fuel], and the software keyboard appears.
2. Enter the amount of fuel to add, then tap [✓].

How to remove fuel:

If you enter the wrong amount of fuel, use the item [Remove Fuel] to enter the amount of fuel to remove. Enter the amount to remove, then tap [✓].

12.1.7 SC-33 data display

When a SC-33 Satellite Compass™ is connected to the same network, you can use a box in the data area as a dedicated SC-33 display. See section 1.10.7 for details.

12.2   CZone

The NavNet TZtouch2 can control Power Products' CZone equipment connected in the NavNet network. CZone is a shipboard power management system.

This equipment controls [CZone Control], [CZone Modes] and [CZone Monitoring].

- **CZone Control**: Controls the power of individual CZone equipment.
- **CZone Modes**: Controls the power of multiple CZone equipment.
- **CZone Monitoring**: Shows temperature, pressure, fuel tank and battery state of CZone equipment.

The table below shows the points of control of each CZone system.

System name	Instrument display	Data area	Slide-out menu
CZone Control	Yes	No	Yes
CZone Modes	Yes	Yes	Yes
CZone Monitoring	Yes (display only)	Yes (display only)	No

12.2.1   How to use CZone

After confirming the following two items, set up your NavNet system to use CZone.C

- This equipment is connected to the CZone system and NavNet network by NMEA 2000 interface.
- CZone equipment have been properly set.

How to add/edit CZone pages

Add or edit CZone pages in the following instances:

- First use of CZone
- Setting changed at the CZone system

1. From the home screen, tap [Settings]→[Initial Setup]→[Graphic Instruments Setup]→[Add Default CZone Pages]. You are asked if it is OK to add or edit CZone pages.
2. Tap the [OK] button.
3. Tap the X button on the title bar to close the menu.

About the DIP switches

For the serviceman. Do not change the settings.

12.2.2 CZone control

Display and operations from the instrument display

1. On the home screen, tap the instrument display icon. If there is no instrument display icon, see section 1.8.1 for how to add the icon.

2. Tap the display screen, to show the following pop-up menu.

<	Choice Of The Config Type	✕

Full 1

Full 2

Single Engine

Twin Engines

Triple Engines

Quad Engines

CZone Control

CZone Modes

CZone Monitoring

Edit Page

Rename Page

Remove Page
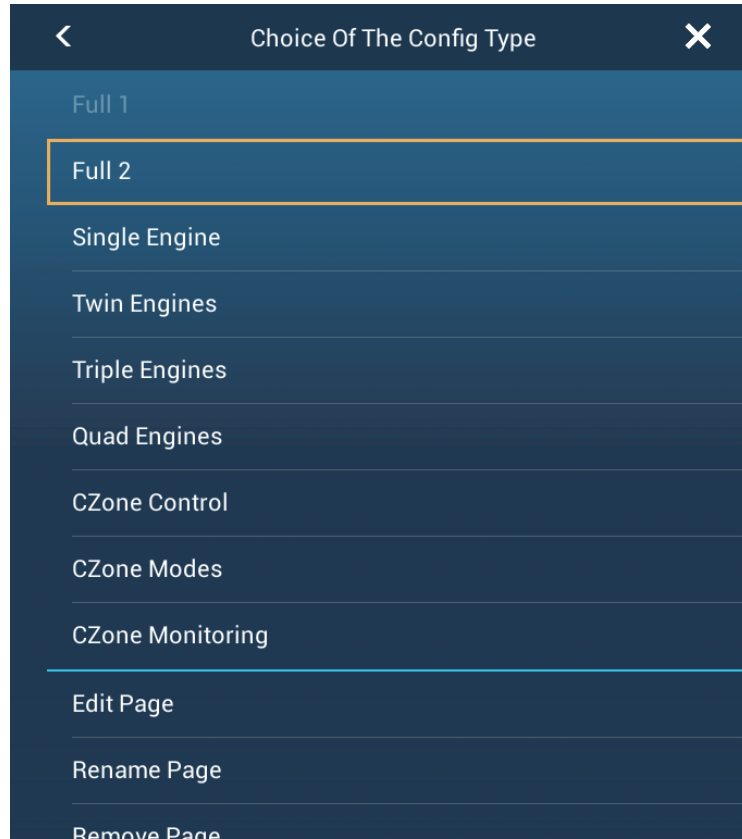
3. Tap [CZone Control] to show the [CZone Control] screen. Use [ON], [OFF], [←], [↑], [↓], [→] to control CZone equipment.
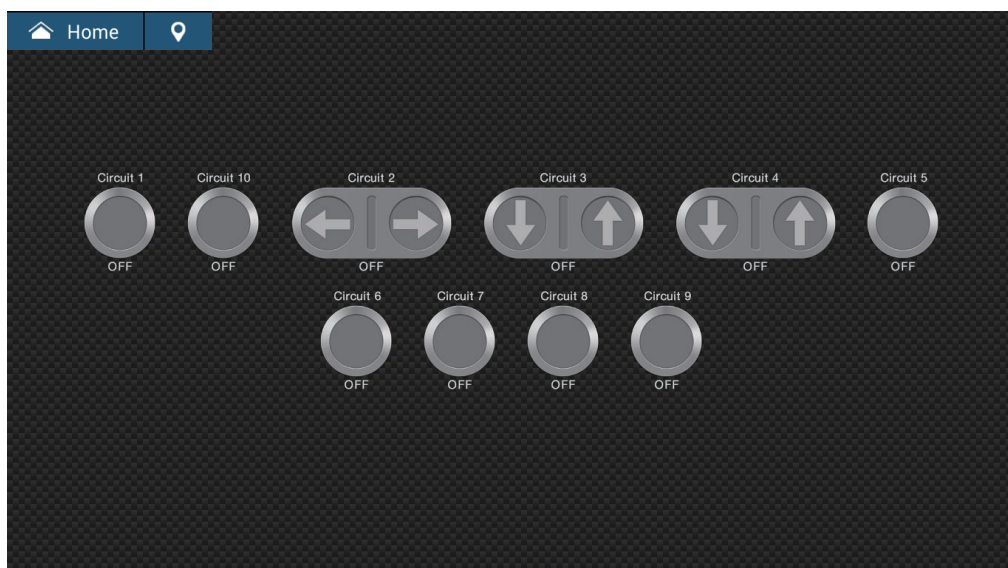
CZone Control screen (example)

You can customize the CZone Control, CZone Modes and CZone monitoring screens. See section 12.1.4.
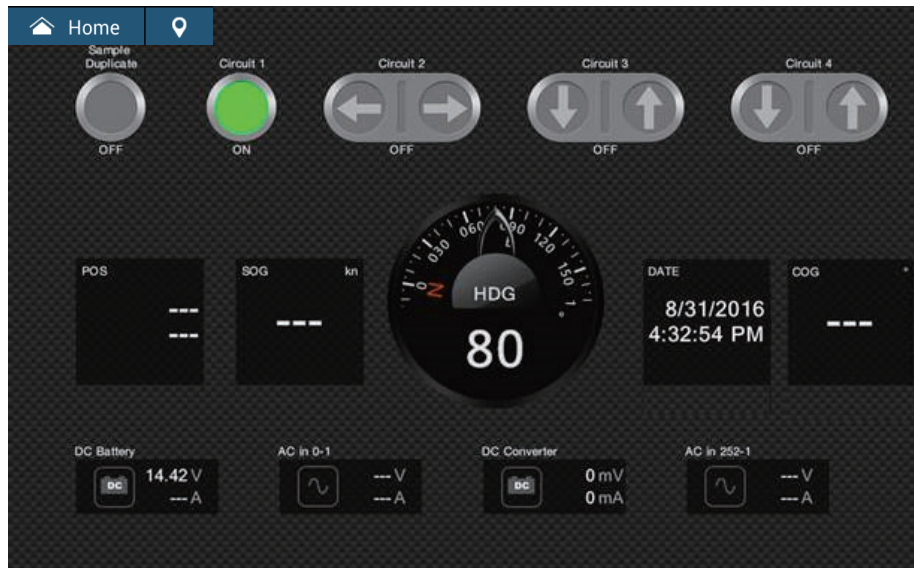
Customized screen (example)

Display and operations from the slide-out menu

1. Open the slide-out menu.
2. Tap [CZone Control] to show the following menu.
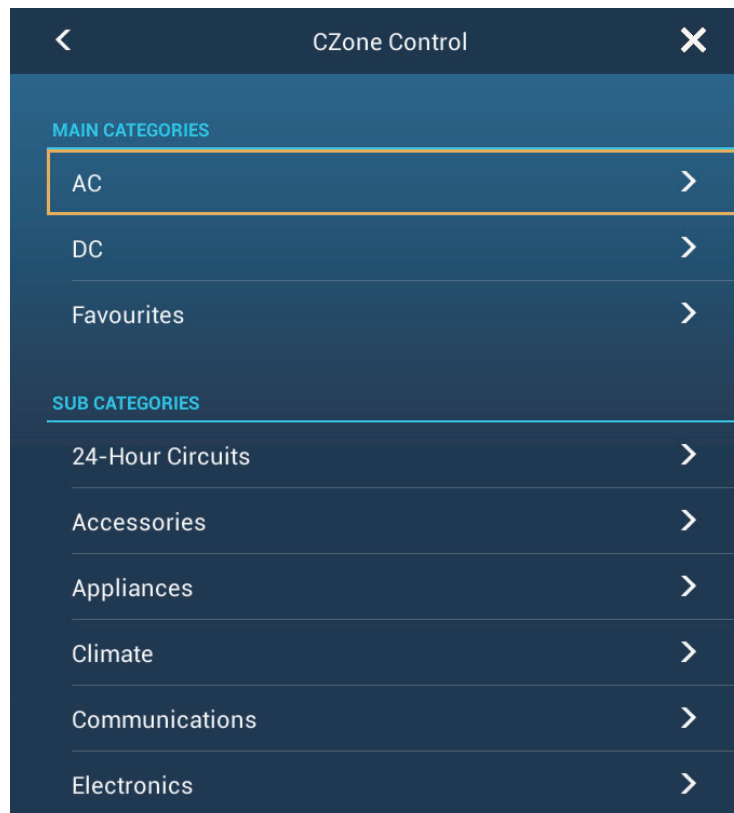
3. Swipe up or down or tap ">" to select an item in the [SUB CATEGORIES] section.
4. Use [ON], [OFF], [←], [↑], [↓], [→] to control CZone equipment.
5. Tap the X button on the title bar to close the menu.

12.2.3 CZone modes

Display and operations from the instruments display

1. On the home screen, tap the instrument display icon. If there is no instrument display icon, see section 1.8.1 for how to add the icon.

2. Tap the screen to show the following pop-up menu.
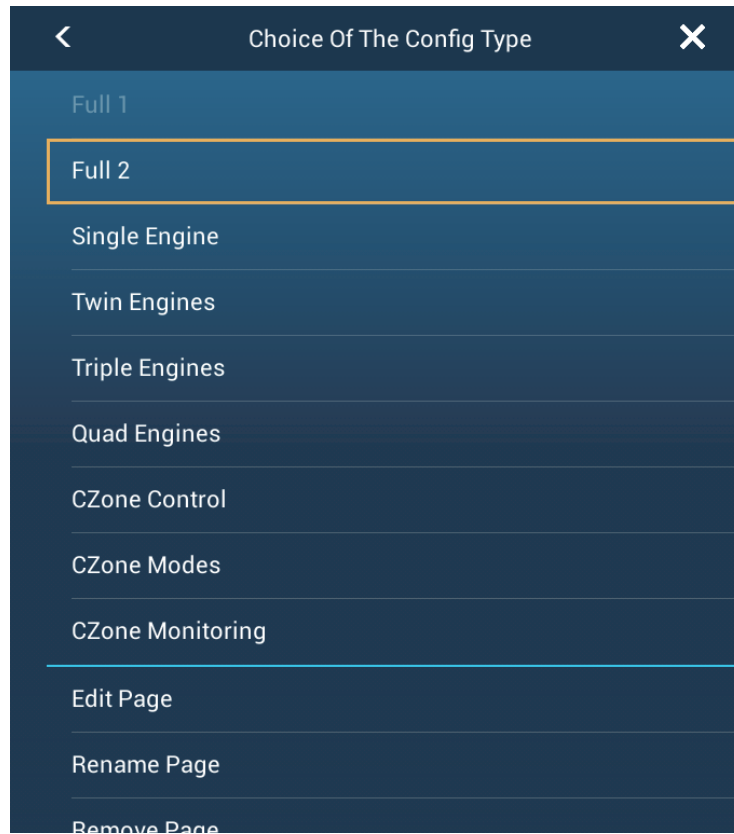
3. Tap [CZone Modes] to show the following screen. Tap the [ON], [OFF] button to operate a CZone equipment.
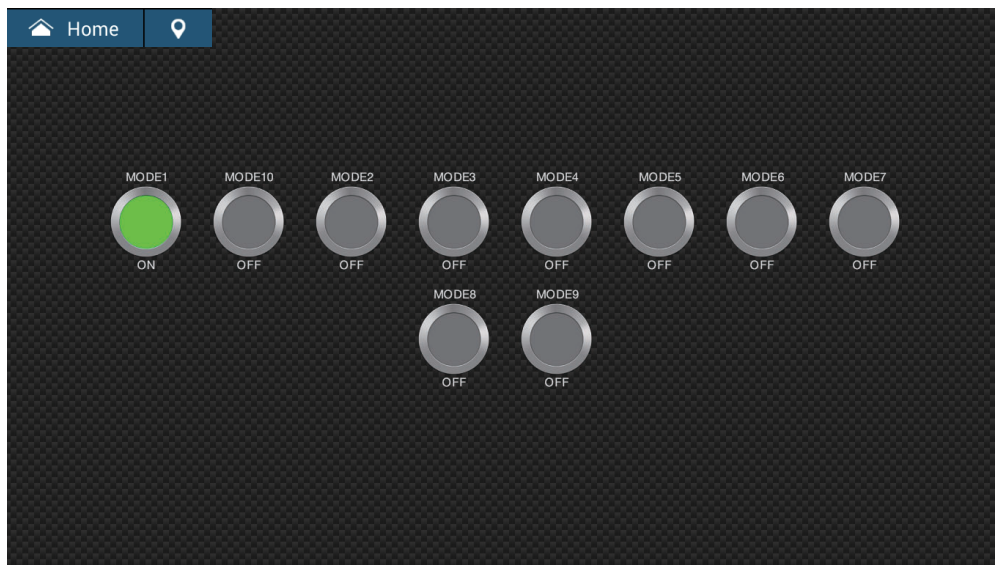
You can customize the CZone Control, CZone Modes and CZone monitoring screens. See section 12.1.4.
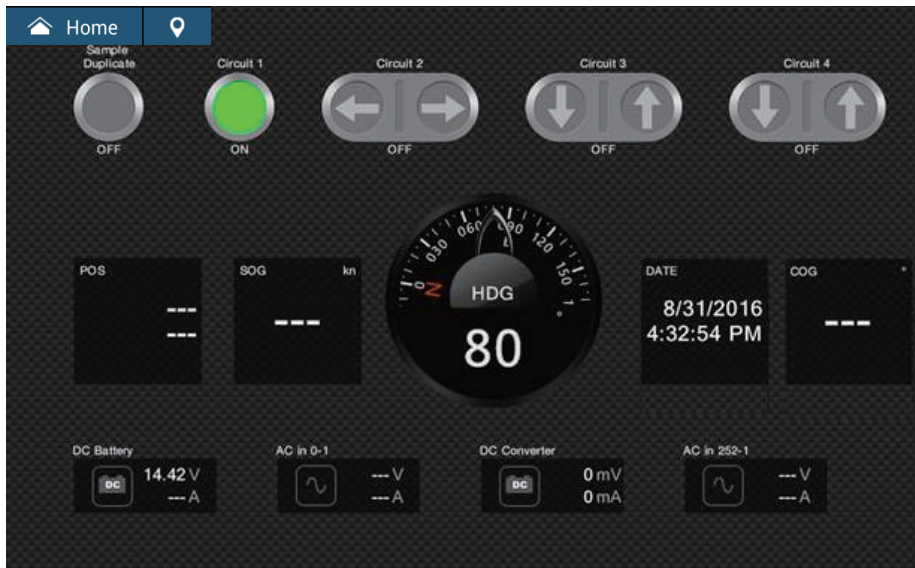
Customized screen (example)

4. Tap the X button on the title bar to close the menu.

Display and operations from the data area

1. Show the data area.
2. Tap a vacant area in the data area to show the [Add Nav Data] menu.
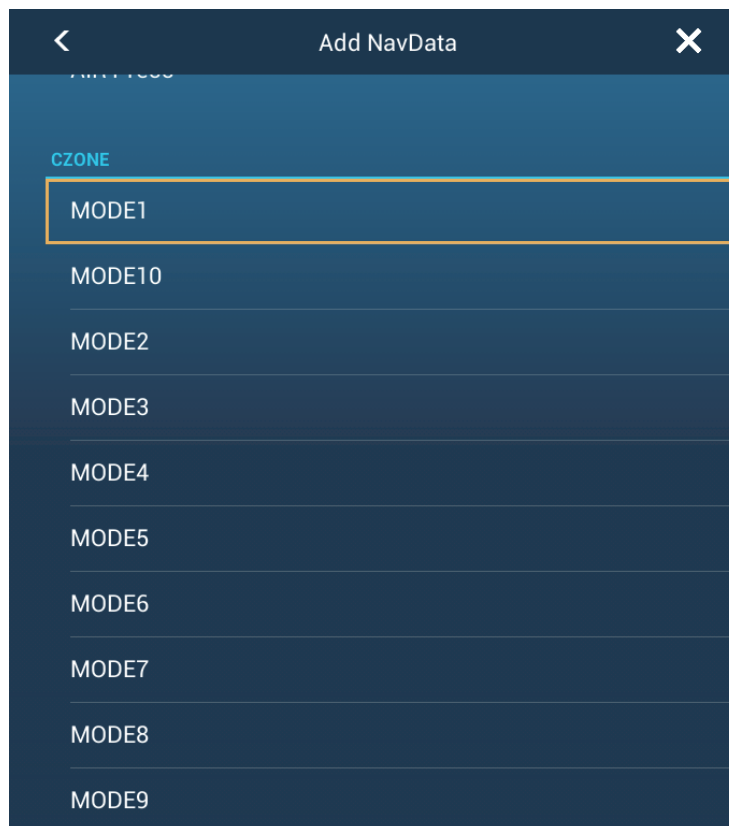
3. Tap the display mode to add. The selected item appears at the bottom of the data area.

4. Tap the added item to control corresponding CZone device.

Display and operations from the slide-out menu

1. Open the slide-out menu.

2. Tap [CZone Modes] to show the following menu.
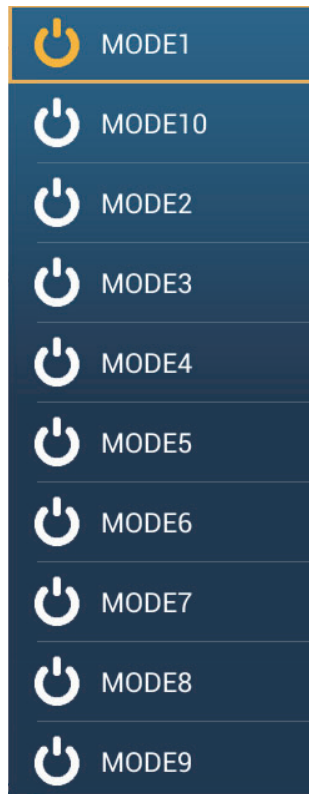
3. Tap the mode to use.

4. Tap the X button on the title bar to close the menu.

12-23

12.2.4　CZone monitoring

<u>Display on the instruments display</u>

1. On the home screen, tap the instrument display icon. If there is no instrument display icon, see section 1.8.1 for how to add the icon.

2. Tap the screen to show the following pop-up menu.
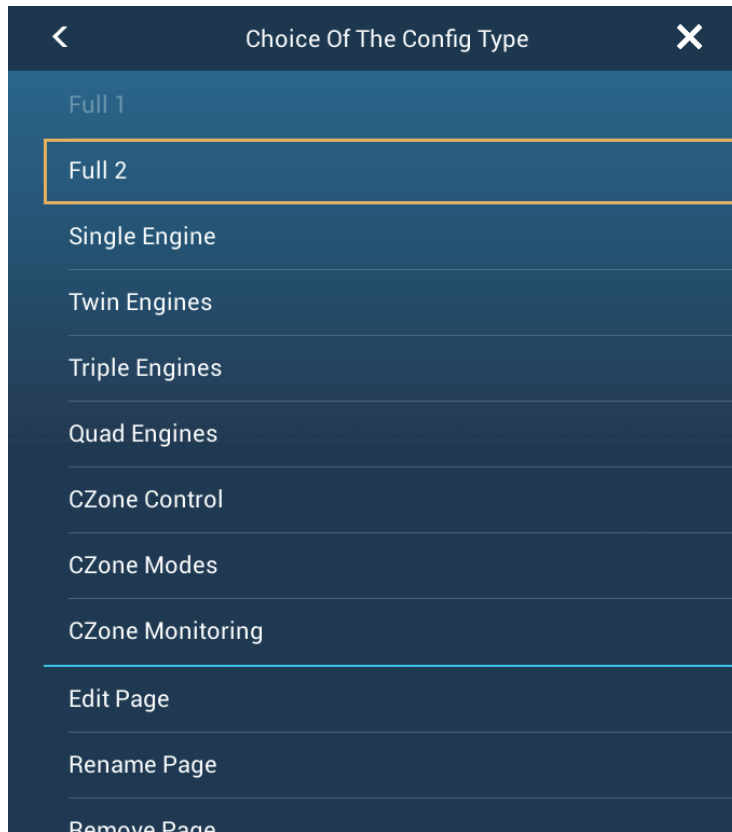
3. Tap [CZone Monitoring] to show the following screen.
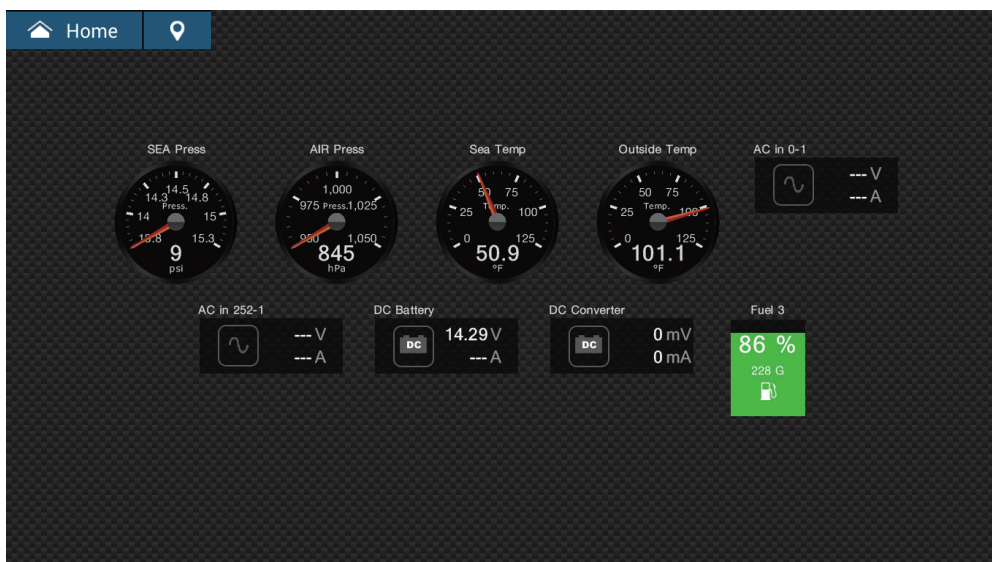
You can customize the CZone Control, CZone Modes and CZone monitoring screens. See section 12.1.4.
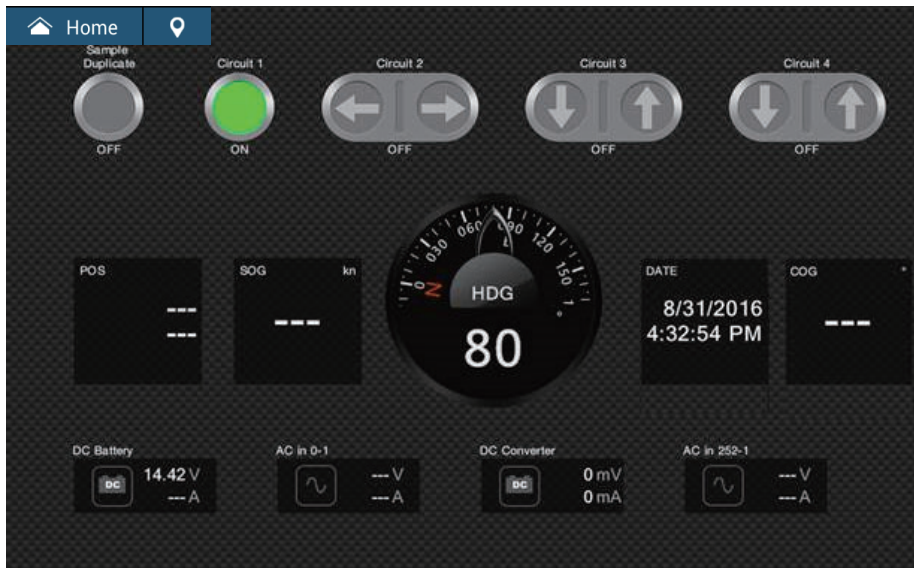
Customized screen (example)

4. Tap the X button on the title bar to close the menu.

Display and operations from the data area

1. Show the data area.

2. Tap a vacant area in the data area to show the [Add Nav Data] menu.

3. Tap the display mode to add. The selected item appears at the bottom of the data area. In the example below, water temperature data is shown. To add or delete data, see section 1.10.2 (add data) or section 1.10.4 (delete data).
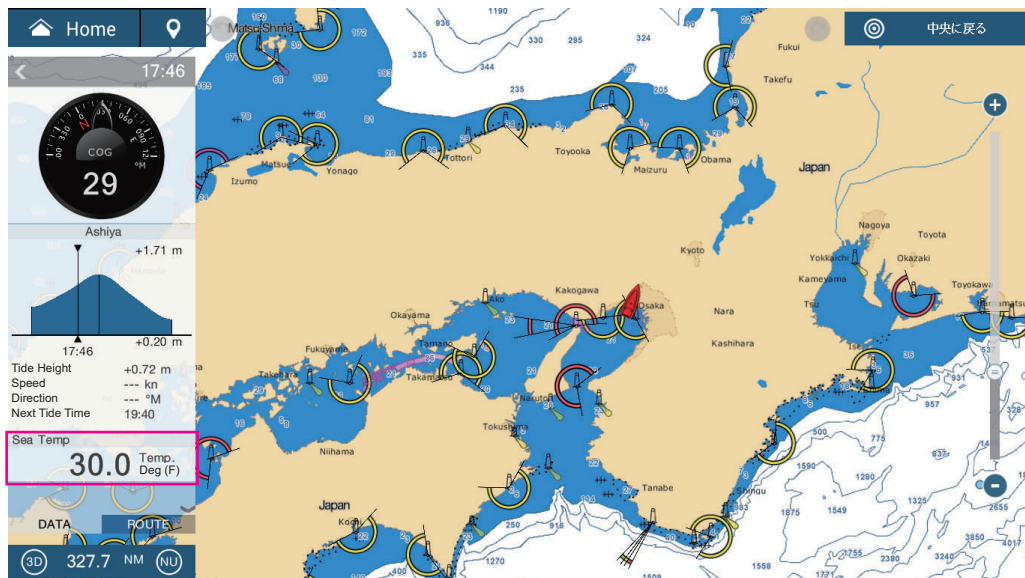
12.3   Yamaha Engine Status Display

When interfaced with a Yamaha outboard engine(s) compatible with Command Link®
and Command Link Plus®, the NavNet TZtouch2 can display engine information on
the full-screen or quarter screen, dedicated Yamaha engine status displays. There are
two types of displays, the **engine combo display,** and the **boat status display**.

Note: The example figures in this section are taken using the full-screen display.

The **engine combo display** shows critical engine system data, including shift posi-
tion, engine RPM, boat speed, engine trim level, available fuel in gallons, fuel level (up
to six tanks), fuel flow, fuel economy and other vital engine functions such as oil pres-
sure, water pressure and battery voltage.

The **boat status display** shows provides important information such as trip distance,
speed, fuel flow, fuel economy, gallons used, rudder info, depth, and other informa-
tion.

Yamaha engine information can also be shown on the conventional instrument dis-
play, using the NMEA 2000 PGN sentences 127488 (Engine Parameters, Rapid Up-
date) and 127489 (Engine Parameters, Dynamic).

The information for a maximum of four engines is available. Set the number of engines
and other engine-related information on the [YAMAHA ENGINE SETUP] menu, in the
[Initial Setup] menu. For details, see the NavNet TZtouch2 installation manual.

12.3.1   How to show the display

Add the Yamaha engine status display icon to the home screen (if it has not already
been done), referring to section 1.8.1. Tap the Yamaha engine status display icon on
the home screen to show the display.
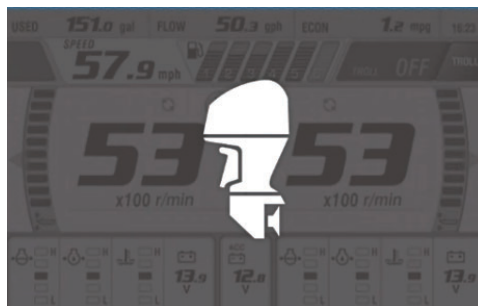
12.3.2 Display examples

Each display type is divided into three sections: upper, middle and lower. The error message area at the top of a display shows engine error messages.

For detailed descriptions of the displays, see the Operator's Manual for the Yamaha engine.

Engine combo display (example: twin engine)

Boat status display

12-27
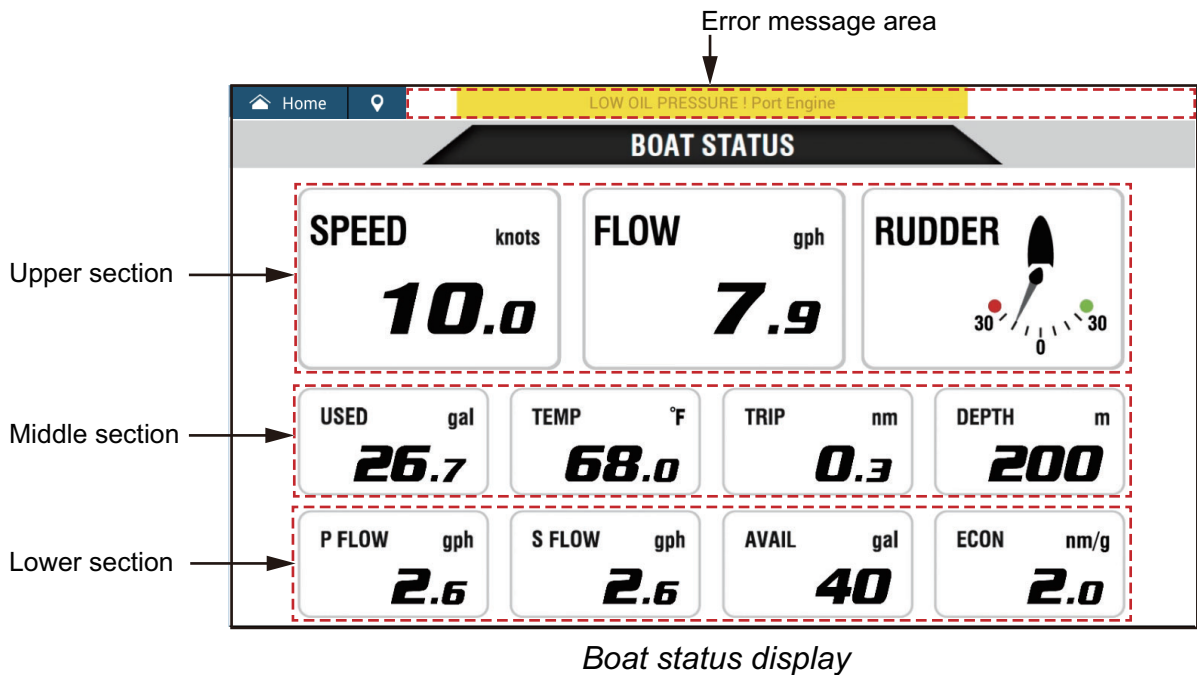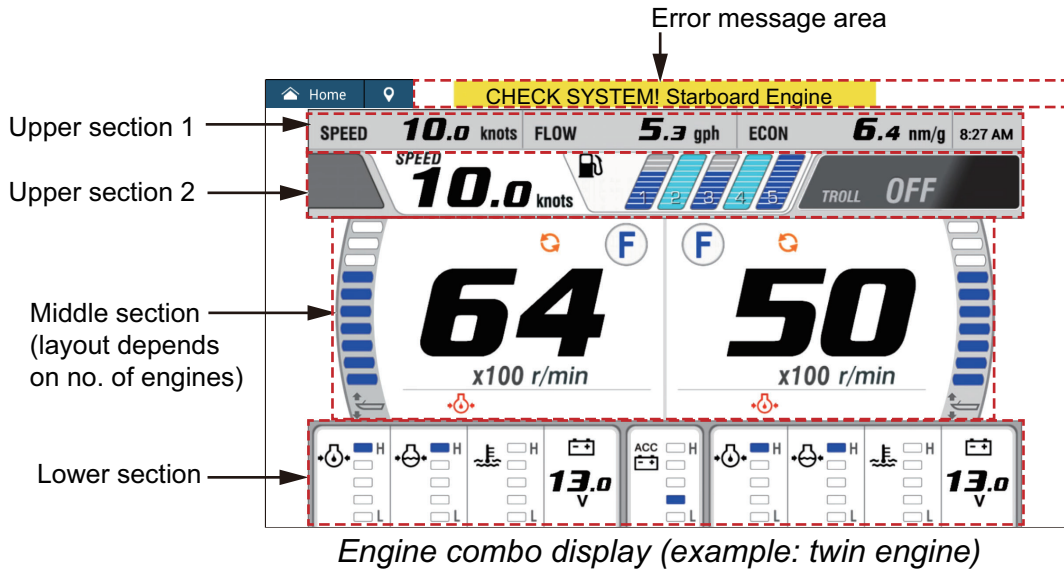
12.3.3   How to switch between displays

You can switch between displays by two methods:

- Swipe screen from bottom up or top down.
- Tap the screen to show the pop-up window, then tap the indication in the window, as in the example below.

Pop-up window
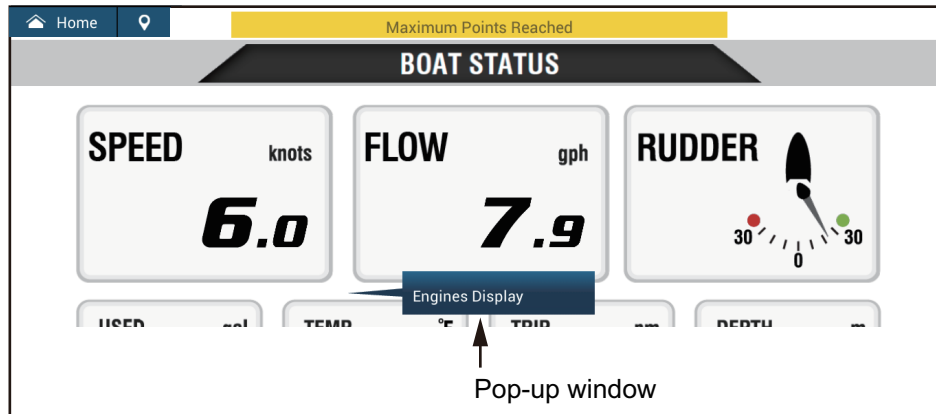
12.3.4   How to select the data to display in a data box

Tap a data box in a Yamaha engine display, and a pop-up menu appears. Tap the desired data on the pop-up menu to show it in the selected data box. The example below shows the pop-up menu available with the boat status display.

For the engine combo display, only the data boxes in the top and lower sections can be changed.
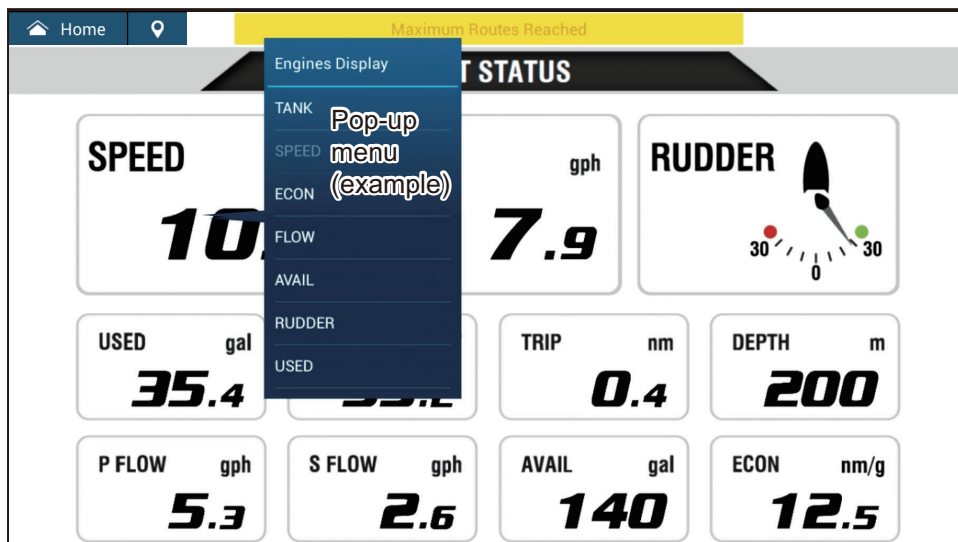
12.3.5 Troll mode

The Troll mode is also integrated into the display, allowing you to control trolling speed from the engine combo display. Tap the Troll mode ON switch at the top right corner on the engine combo display to activate the mode. The Troll mode operation panel appears at the bottom of the display. Use the controls on the panel to operate the Troll mode, referring to the illustration below.

For details, see the Operator's Manual for the Yamaha engine.

Troll mode ON switch

| USED | 0.0 L | SPEED | 0.0 knots | TRIP | 53.5 mile | 1:31 |

SPEED 0.0 knots

TROLL ON | TROLL

BOAT STATUS

TRIP 53.5 mile
SPEED 0.0 knots
USED 0.0 L

600
r/min

TROLL

Troll mode operation panel

Change engine RPM (50 RPM steps)

Troll mode OFF switch

Hide Troll mode operation panel
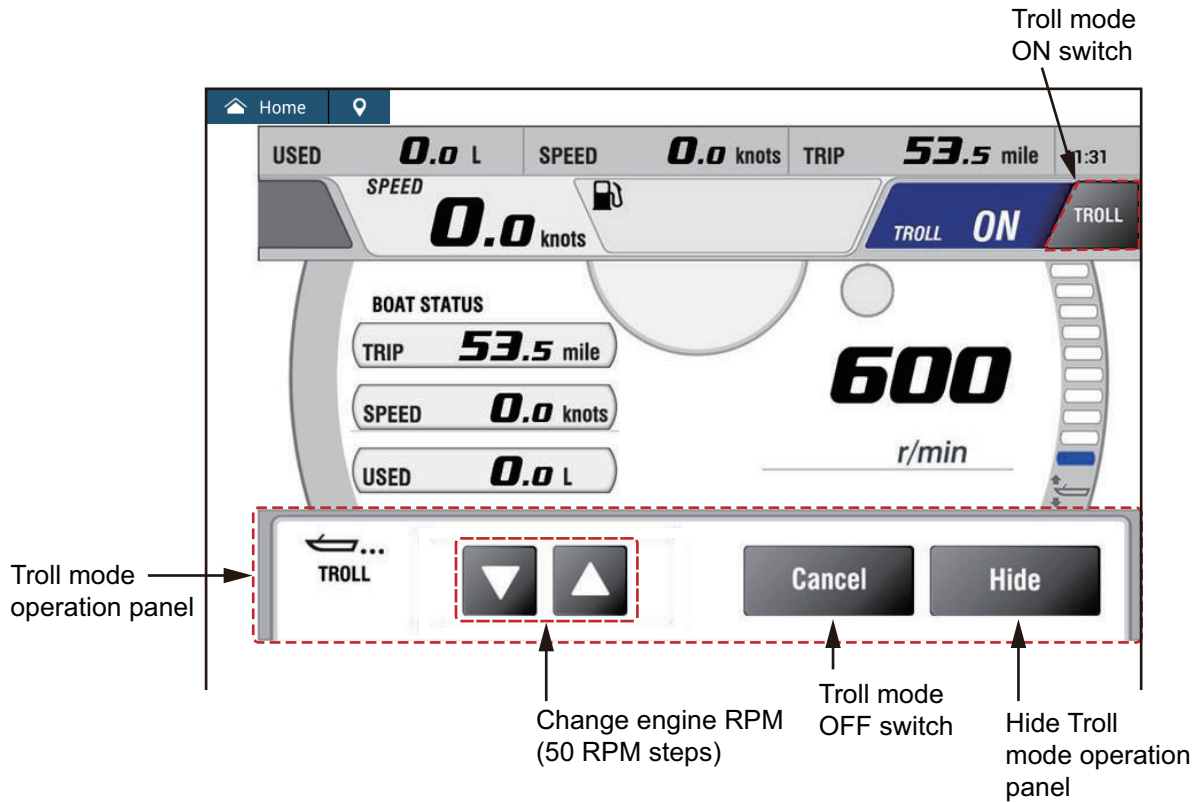
12.3.6   Trouble codes

Trouble codes generated by the engine can be reviewed on the [YAMAHA ENGINE SETUP] menu, in the [Initial Setup] menu. For detailed information, see the Operator's Manual for the Yamaha engine.

<	Trouble Codes	✕
PORT ENGINE		
250-168-4	Battery voltages low Check battery and wiring. Shift to Neutral! Open bypass valve to disabled motor. Consult Yamaha dealer.	
250-9-14	Engines too close In joystick: Main power OFF 20 sec, turn ON, check steering. In normal mode: Shift to neutral! Open bypass valve to disabled motor. Consult Yamaha dealer.	
250-424-0	SCU to PCU communication Shift to Neutral! Open bypass valve to disabled motor. Consult Yamaha dealer.	
164-254-14	Program memory Consult Yamaha dealer.	
187-240-2	Program memory	

12.3.7   Alarm list

When an engine alarm is violated, you can see the name of the offending alarm on the [Alarms] list. See section 2.10.8 for details.

13. WEATHER OPERATIONS

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.

13.1 Weather Display Introduction

Your NavNet TZtouch2 has a built-in NavCenter weather data, via an Ethernet connection, and optional weather data via the FURUNO BBWX SiriusXM weather receiver.

Note: For BBWX SiriusXM weather receiver operations, see section 13.3.

How to select the weather display

The weather display is overlaid on the 2D plotter display. Select the weather display on the home screen, by tapping the weather display icon.

Weather display

13.2 NavCenter Weather

You can download the NavCenter data from the internet via Wireless LAN. See section 1.19 for how to connect to the internet.

13.2.1 How to set up for NavCenter weather

1. Open the home screen, then tap [Settings] - [Weather].
2. Tap [Load Weather File].
    Note: The option [Sirius] appears when connecting a FURUNO BBWX series weather receiver.
3. Tap [NavCenter] then tap < to return to the menu.
4. Tap [Tidal Step].

5'00s	
10'00s	✓
15'00s	
20'00s	
30'00s	
1h00'	
2h00'	
3h00'	
6h00'	
12h00'	

5. Tap the update interval (which determines how often tidal data are captured) for the tide icon.

6. Tap [Duration of Animation].

0'05s	
0'10s	
0'15s	
0'20s	
0'30s	
0'45s	✓
1'00s	
2'00s	
3'00s	
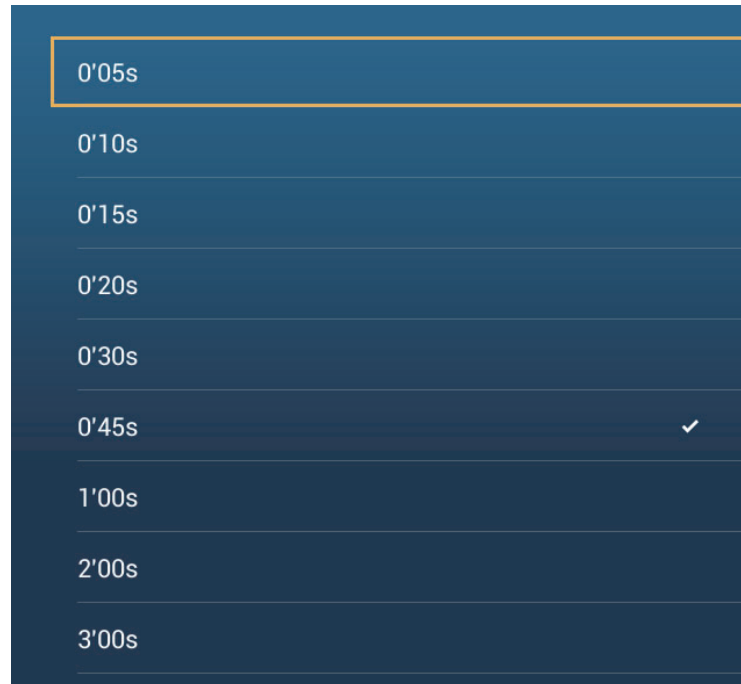
7. Tap the update interval for the animation. The larger the time, the slower the animation moves.

13.2.2 How to download the NavCenter weather data

1. Open the home screen, then tap [Settings] - [General].
2. Tap [Wireless LAN Settings].
3. Turn on [Wireless].
4. After the internet connection is established, tap the close button to exit.
5. Open the home screen, then tap [Settings] - [Weather].

NAVCENTER DOWNLOAD

Model	USA ❯
Forecast Days	4 ⌨
Wind	ON
Waves	ON
Cloud	ON
Rain/Snow	ON
Air Temperature	OFF

Pressure	ON
500mb	OFF
Sea Surface Temperature	ON
Oceanic Currents	OFF
Altimetry	OFF
Plankton	OFF

13-3
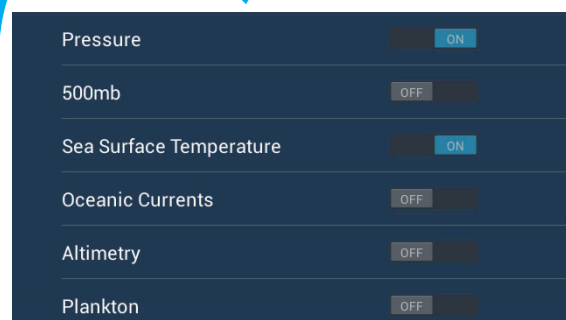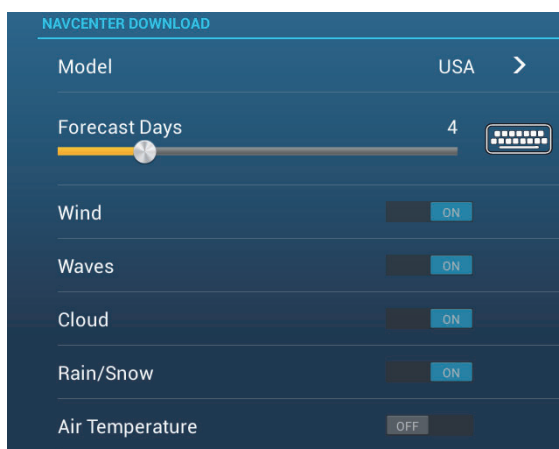
6. Tap the data model from [Model] in the [NAVCenter Download] section. (The options are [USA] and [Worldwide].)

7. Drag the slider in [Forecast Days] to select how many days' data to download.

8. Turn on the items to receive, from [Wind] to [Plankton].

9. For [Sea Surface Temperature], set the following menu items.
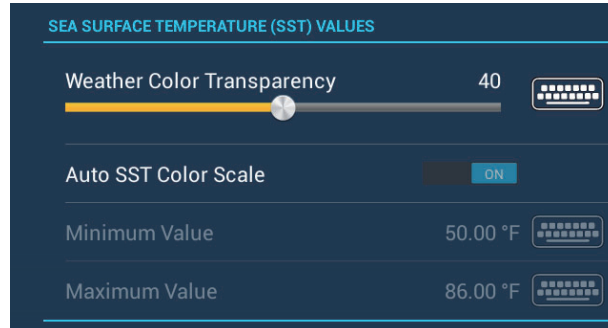
[Weather Color Transparency]: Adjust the degree of transparency for the weather overlay. Use a large figure to increase the degree of transparency.
[Auto SST Color Scale]: Activate this feature to adjust the SST color scale automatically according to the sea surface temperature.
[Minimum Value]: Set the minimum value for the SST color when [Auto SST Color Scale] is deactivated.
[Maximum Value]: Set the maximum value for the SST color when [Auto SST Color Scale] is deactivated.

10. Tap the close button to finish.

11. Open the weather display, then tap the screen to show the pop-up menu. Tap [Get Latest Wx].

The notification bar at the top of the screen flashes "Weather Update in Progress" during the downloading. If the downloading was successful, the message " DOWN-LOAD SUCCEEDED" appears. Tap [OK] to finish.

13.2.3 How to display the NavCenter weather 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].
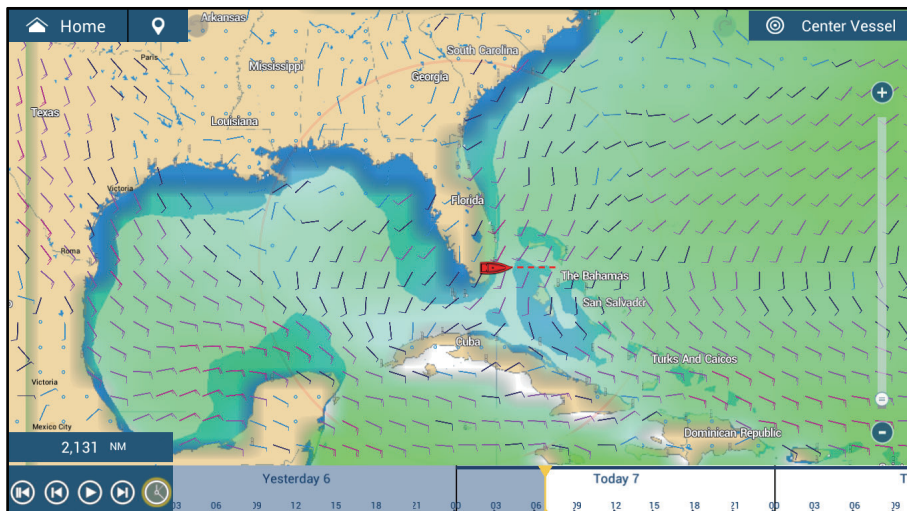
1. Tap the screen to show the pop-up menu then tap [Wx Data].

2. Tap the menu item(s) to display its data.

3. Tap the playback button (see the figure below for location) on the animation bar. to playback the animation display.

4. You can operate the animation display with the animation bar at the bottom of the screen.

Tap to return to beginning of animation display.
  Tap to fast rewind animation display.
    Tap to playback the animation display.
      Tap to fast forward the animation display.

The time scale moves.
Tap to set the time scale to the current time and display the current data.

Tap to temporarily stop the animation display.
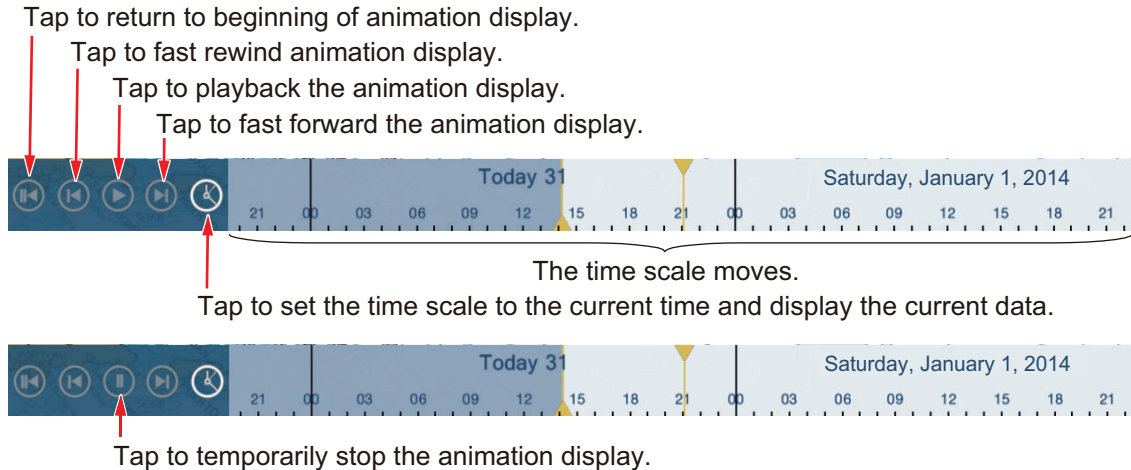
13.2.4 How to load a weather file

You can load a weather file saved on a microSD card, SD Card (TZT2BB only) or USB flash memory.

1. Put the appropriate formatted media in the USB port or a slot in the SD Card Unit.
    For TZTL12F/TZTL15F users: Put a formatted microSD card in either slot on the SD Card Unit.
    For TZT2BB users: Put a formatted SD card in the right-hand slot of the Switch Box (PSD-003).

2. Open the home screen, then tap [Settings] - [Weather] - [Load Weather File].

3. Tap the data to load then tap [OK].

4. After the equipment has loaded the selected data, tap the close button to finish.

13.3 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 FURUNO BBWX SiriusXM weather receiver service is advisory in nature. You, the customer, agree to release FURUNO ELECTRIC CO., LTD., SiriusXM 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, go to https://www.siriusxm.com/marine-weatheragreement, or call 1-855-796-9847 to have a copy sent to you.

You can put a point on the weather display. Tap the screen where to put a point, then tap [New Point] on the pop-up menu.

Before using your SiriusXM satellite weather receiver...

- Purchase a SiriusXM satellite weather service subscription. Contact SiriusXM satellite radio INC. for additional information.
- Purchase a SiriusXM satellite radio service subscription. Contact SiriusXM satellite radio INC. for additional information.
- After installation of the FURUNO BBWX SiriusXM weather receiver, make sure to check the NavNet TZtouch2 sensor list to make sure the BBWX appears in the sensor list.

	Name	NickName	Version	IP	HostName
	TZTL12F	TZTL12F	02.04:02.04:01.26 V3:	172.031.252.003	MF252003
	BBWX4	BBWX4		172.31.200.20	
	TZT14	TZT14	04.03:25.01:01.01	172.031.252.001	MF252001
	TZTL15F	TZTL15F	02.04:02.04:01.25 V3:	172.031.252.002	MF252002

If the receiver does not appear in the list, check the Antenna LED on the FURUNO BBWX SiriusXM weather receiver and the connection between the two units. The LED is solid violet when a normal antenna connection is detected, and off or flashing violet in case of antenna short circuit.

- Connect the FURUNO BBWX SiriusXM weather receiver and the NavNet TZtouch2 displays then turn on both of those units. Your unit then receives WX data from the weather receiver, which takes approximately 30 minutes.

13.3.1 How to set up for SiriusXM weather

1. Open the home screen, then tap [Settings] - [Weather] - [Weather Data Server].
2. Tap [Sirius] then tap < to return to the menu.
3. Tap [Sirius Weather Radar].
4. Tap the SiriusXM weather radar to use, [US Now Radar] (USA) or [CanadRad] (Canada). [US Now Radar] shows the type and level of precipitation. The amount of precipitation increases with level.

Precipitation indication on USNowRadar.

Weather radar color	Precipitation type	Level
Light green	Rain	15-19 dBz
Medium green	Rain	20-29 dBz
Dark green	Rain	30-39 dBz
Yellow	Rain	40-44 dBz
Orange	Rain	45-49 dBz
Light red	Rain	50-54 dBz
Dark red	Rain	over 55 dBz
Light blue	Snow	5-19 dBz
Dark blue	Snow	over 20 dBz
Light pink	Mixed	5-19 dBz
Dark pink	Mixed	over 20 dBz

Precipitation indication on CanadianRadar

Weather radar color	Level (mm per hour)
Transparent (low precipitation)	0.00 to 0.20 mm/hr
Light green	0.21 to 1.00 mm/hr
Medium green	1.01 to 4.00 mm/hr
Dark green	4.01 to 12.00 mm/hr
Yellow	12.01 to 24.00 mm/hr
Orange	24.01 to 50.00 mm/hr
Light red	50.01 to 100 mm/hr
Dark red	over 100.01 mm/hr

5. Tap the close button to finish.

13.3.2 How to display the SiriusXM weather data

[Wx Radar] (Weather radar)

NOWRAD and Canadian weather radar information are put on top of your chart (see subsection 13.3.1). To display the weather radar, turn on [Wx Radar] from the layer menu.

Wx radar display
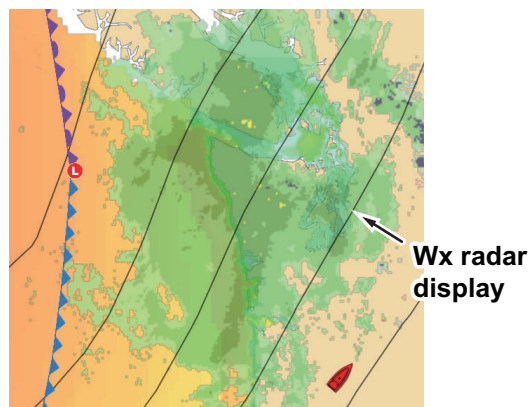
[Adv Wx Data] (Advanced weather)

The advanced weather display provides the weather data; [Buoys], [City], [Storm], [Lighting] or [Storm Tracks] or [Marine Zone]. For the icons of these data, see section 13.4.

1. Tap the screen to show the pop-up menu, then tap [Adv Wx Data].
2. Tap a menu item to display its data.
3. Repeat steps 1 and 2 to select all menu items desired.
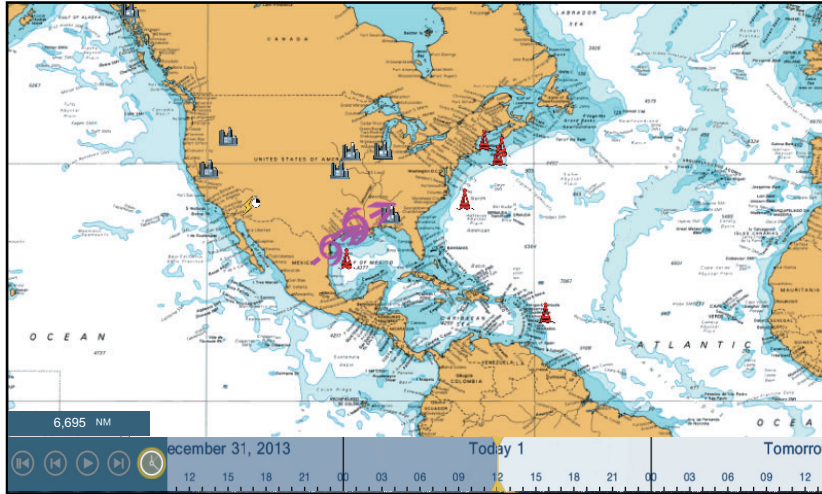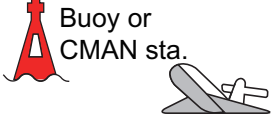
[Anim Radar] (Animation radar)

The animation radar display provides the past weather radar information. To show the animation radar display, tap [Anim Radar] on the pop-up menu. To stop the animation display, tap [End Anim] at the top right-hand corner of the screen.

13.4   Weather Icons (SiriusXM Weather)

The table below shows the weather icons that appear on the SiriusXM weather display. You can show or hide these icons from the pop-up menu, with [Wx Data].

Icon	Meaning
	Storm cast
	Lightning
Buoy or CMAN sta.	Surface observation stations
	Wind
	City
	Currents
	Storm tracks
etc.	Surface pressure

13.5 Weather Data (NavCenter or SiriusXM Weather)

The table below shows the weather data available for displaying according to weather data server (NavCenter or SiriusXM weather).

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
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.
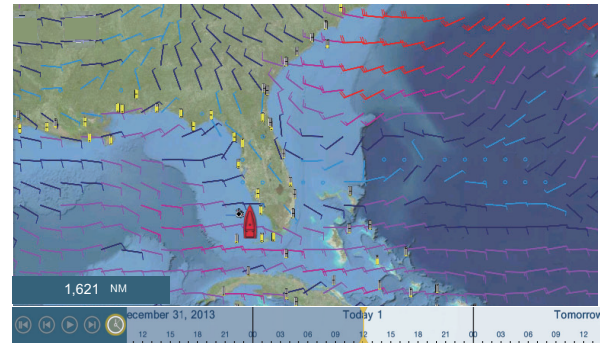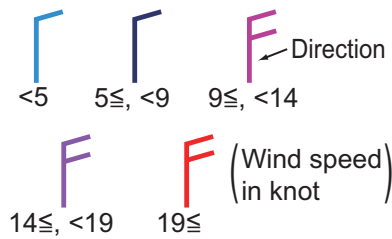
[Waves]: The waves forecast displays wave height with color. 0 foot (minimum) is displayed in light blue, 35 feet (maximum) in red.
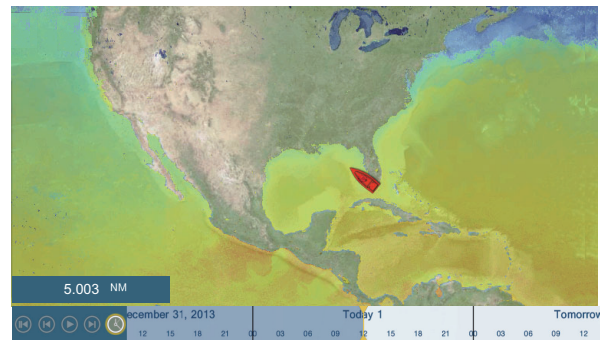
[Cloud]: The cloud forecast displays cloud images. 8% of cloud amount (minimum) is displayed in white, 100% (maximum) in black. The cloud amount under 8% is transparent.
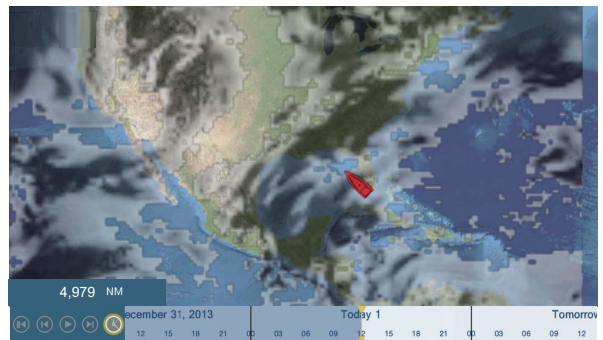
[Rain/Snow]: The rain/snow forecast displays rain/snow images. 0.1 mm/hour of rainfall/snowfall (minimum) is displayed in green, 5 mm/hour (maximum) in dark violet.
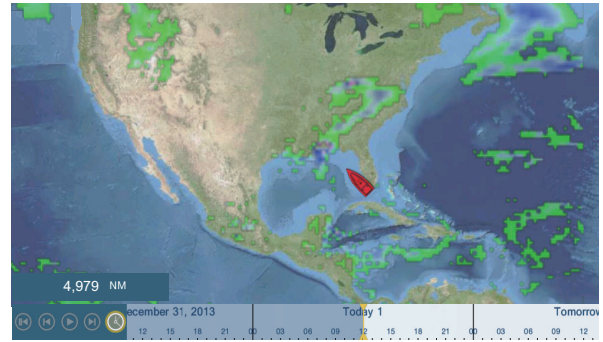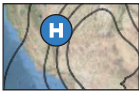
[Air Temp]: The air temp forecast displays the air temperature by color. -45°C (-49°F) (minimum) is displayed in dark violet, 45°C (113°F) (maximum) is displayed in red.
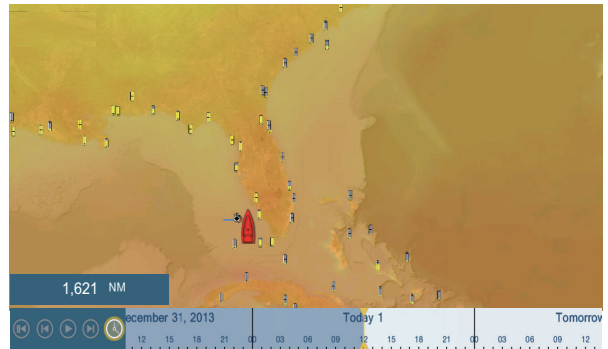
[Pressure]: The pressure forecast displays surface pressure.
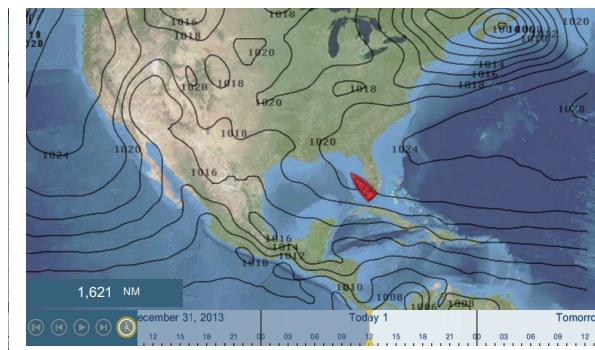
Pressure icon	Meaning
	High pressure
	Low pressure
	Warm front
	Cold front
	Occluded front
	Stationary front

13-11

Pressure icon	Meaning
	Trough
	Squall line
	Dry line
	Isobars

[500mb]: The 500mb forecast displays the contour lines over 500 mb.
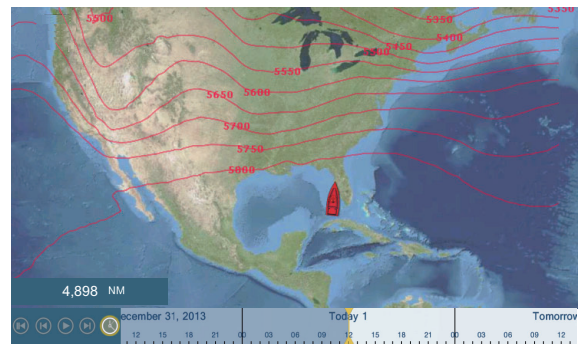
[SST] (Sea surface temperature): This data layer shows the temperature of the sea surface in shades. Lower temperatures are in dark blue, higher in red. On the screen, you can turn on or off the automatic SST scale with tapping [A].
Set the minimum or maximum value for which to show SST. See page 3-5 for how to set the value. This is available when [Auto] is off.
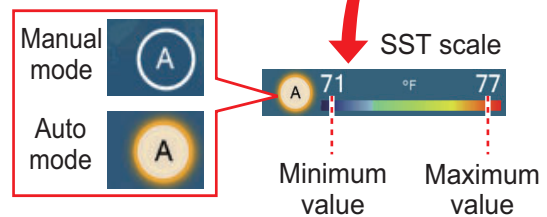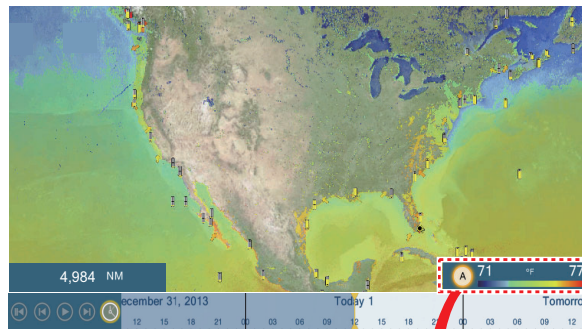
Tap "A" to select automatic or manual adjustment fo the SST scale.
Manual mode: Use the slider bar to set scale.
Auto mode: SST scale automatically set according to the depth shading selection set in the menu ([Settings]→[Plotter]).

[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).
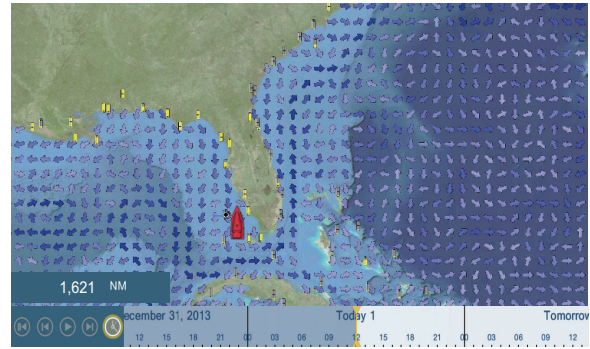
[Altimetry]: The altimetry forecast displays the sea height anomalies by color. The large anomalies are displayed in red, smaller ones in light green.
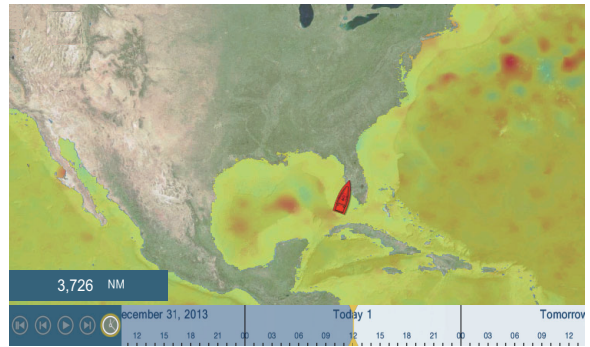
[Plankton]: The plankton forecast displays the plankton growth in tones of green. The darker the green, the greater the density of plankton.

13.6   SiriusXM Weather Diagnostics

Your FURUNO BBWX SiriusXM weather receiver can be checked for proper operation as shown below.

1.   From the home screen, tap [Settings]→[Initial Setup] to show the [Initial Setup] menu.

2.   Scroll down to the [SIRIUS DIAGNOSTIC] window, then tap [Sirius Weather Diagnostic]. The count for each weather item is shown.

13.7 SiriusXM Satellite Radio

The SiriusXM satellite radio provides round-the-clock, 100% commercial-free music from every genre plus sports, news, talk and comedy.

13.7.1 How to enable the radio

Method 1: From the home screen

Go to the home screen and tap the [Sirius] icon to show the full screen SiriusXM radio controls. See the next page.

Method 2: From the home screen

Open the slide-out menu, then tap the [Sirius Audio] icon to show or hide the audio control bar. See the next page.
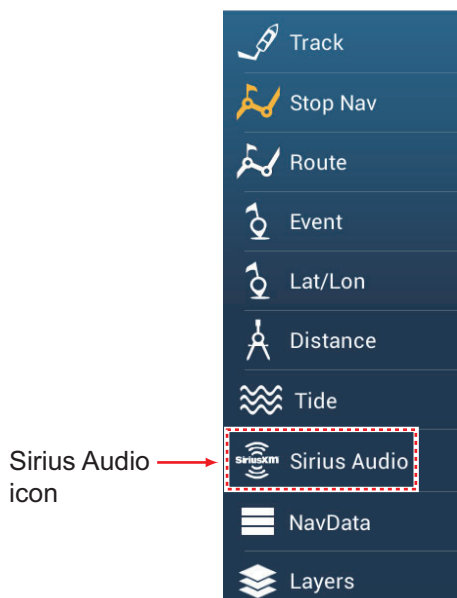
13.7.2 How to operate the radio controls

Full screen controls

Channel, music genre

Signal strength

Sound setting

Symphony Hall

CH 76
Jzz/Stndrd/Clscl

Title, artist

Kick the Can
Jerry Goldsmith

Preset channels

1 76   2 72   3 ---   4 ---   5 ---   6 ---

Select category.

Raise volume.

Channel selection*

Mute, unmute.

Lower volume.
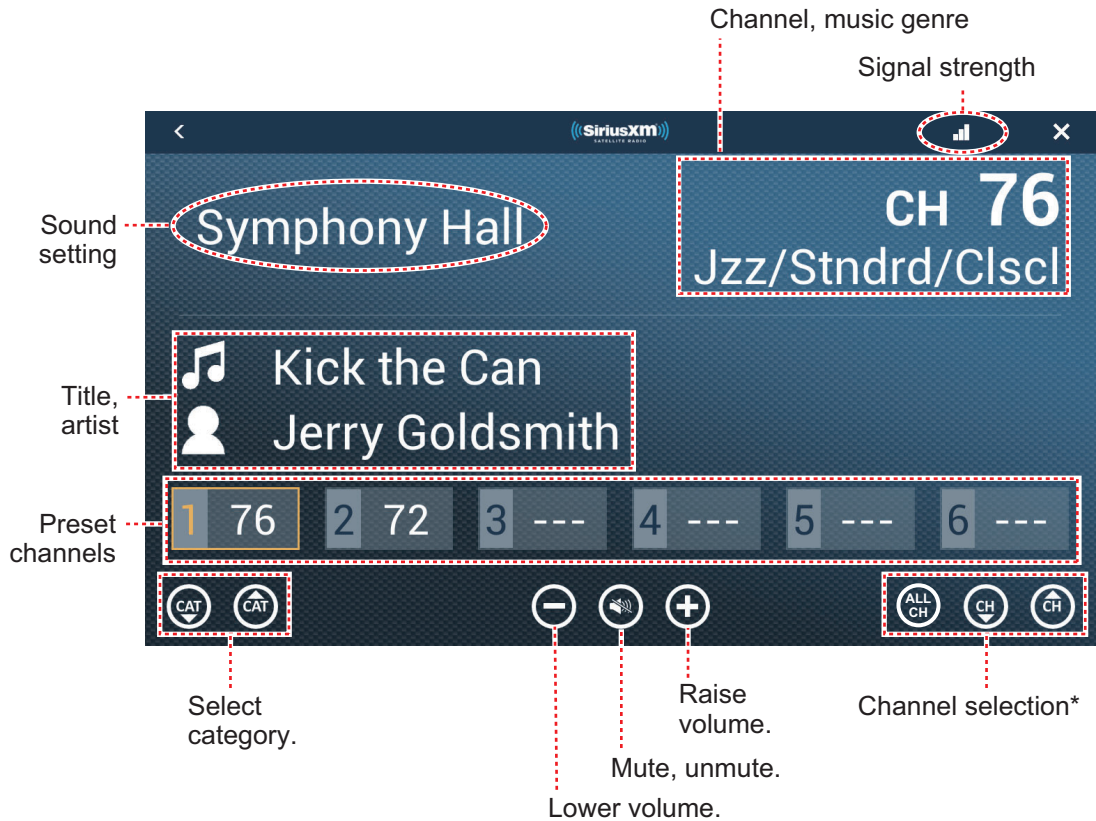
*: The channel ▲ and ▼ down buttons cycle through the available channels within the selected category. To allow the system to cycle through all categories and channels, tap the ALL CH button. Tap the button again to return to category-based channel selection.

Audio control bar controls

Preset channels

Artist, title

Channel, music genre

Raise volume.

Mute, unmute.

Lower volume.

13-15

13.7.3 Radio diagnostics

Your SIriusXM satellite radio can be checked for proper operation as shown below. This test is intended for the service technician.

1. From the home screen, tap [Settings]→[Initial Setup] to show the [Initial Setup] menu.

2. Scroll down to the [SIRIUS DIAGNOSTIC] window, then tap [Sirius Radio Diagnostic]. The count for each weather item is shown.

```
Kernel Version:Thu May 15 03:33:55 EDT 2014
Sensors:1.02V 0.0258V 5V 1.84V
Radio Antenna Status:0
Radio Sirius ID:DKKX04H0
Radio Signal Strength:0 1
Radio Activation Status:1 0f -1
Radio Sirius ID - Data:DKKX04H0
Radio Activation Status - Audio:1 0f -1
Service Level:3
Position:UNKNOWN
XM Activation:1 255
XM Capabilities:5
XM Module Type:1.2.1
XM Module status:47b0f
XM DSI status:448:4 442:1 420 421 443:4 444:4 445:1 422 423 424 425 426 427 429 430 431 432 433 446:4 447:4 311:1 280
281 600:1 440 441 442 443 440:1 400 401 402 403 441:1 410 411 412 413
XM Channel:5 5
XM Volume:21 0
XM Configuration:1 2 2 0 1 0 0 0 0 0
XM HW Rev:2.0.0
XM SW Rev:9.12.4
XM SXI Rev:2.2.0
XM BB Rev:49.0.0
XM HD Rev:1.0.0
XM RF Rev:1.2.0
Storage: 474744 KiB total 403060 KiB free 15% used
```

14. AIS, DSC MESSAGE

14.1 What is AIS?
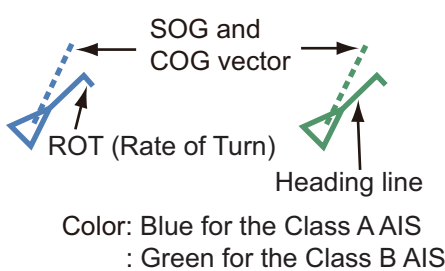
AIS (Automatic Identification System) is a system that continuously transmits the identification and position of your ship to AIS-equipped ships within VHF range. All such ships also receive data from other AIS-equipped ships and display their positions and other relevant information. The AIS broadcasts this information over a VHF transceiver. The information is as shown below.

- Position
- Name of ship
- Course over ground
- Position of position-fixing equipment
- Heading

- Call sign
- Speed over ground
- Name of position-fixing equipment
- Rate of turn

14.2 How to Show or Hide the AIS Symbols

1. On the radar display or plotter display, open the [Layers] menu.
2. Turn [AIS Targets] on or off.

14.3 AIS Target Symbols

Target type	Symbol	Description
Activated AIS target	SOG and COG vector ROT (Rate of Turn) Heading line Color: Blue for the Class A AIS : Green for the Class B AIS TX marker (callout)	COG is indicated on the symbol with a dotted line. **Note:** An AIS symbol that has a "TX marker" (callout) above it indicates that vessel has transmitted an AIS message.
Dangerous AIS target	Color: Red	The target whose CPA and TCPA are smaller than the [CPA Alarm Value] and [TCPA Alarm Value], which are set in the [Settings] - [Targets] menu, is indicated as a dangerous target.

Target type	Symbol	Description
Lost AIS target	 Color - AIS target: Blue for the Class A AIS : Green for the Class B AIS	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.
No CPA/ TCPA target	 Color: Blue for the Class A AIS : Green for the Class B AIS	AIS symbols are shown in broken lines in the following cases:? • No water or ground tracking speed of your ship, or there is no speed data. All AIS symbols are shown in broken lines. • No speed data from AIS target. The symbol of the corresponding AIS target is shown in broken lines. A target with neither a reported heading nor COG is oriented toward the top of the operational display area.

Note: This unit is equipped with the Blue Force Tracking (BFT) function.

Other AIS symbols that may appear are shown in the table below.

Symbol	Meaning
	AtoN
	Base Station
	Aircraft
	SART

14.4　Proximity AIS Target Alarm

The proximity AIS target alarm alerts you when an AIS target is within the distance you specify, and is applicable to both displayed and not displayed targets. When an AIS target is within the distance set, the alarm indication "Proximity AIS Alarm" flashes in the status bar and the audio alarm sounds. (See subsection 2.10.8).

1.　Open the home screen, then tap [Settings] - [Targets].
2.　Turn on [Proximity AIS Target Alarm].
3.　Tap [Proximity AIS Target Alarm Value] to open the software keyboard.
4.　Set the alarm value, then tap [✓].
5.　Tap the close button to finish.

14.5　How to Ignore Slow Moving AIS Targets

The proximity AIS target alarm may often sound in areas of heavy vessel traffic. You can prevent frequent release of the alarm against slow, non-threatening targets by specifying the maximum target speed that triggers the alarm. Any target whose speed is lower than set here does not trigger the alarm.

1.　Open the home screen, then tap [Settings] - [Targets].
2.　Tap [Ignore Alarms for AIS Slower than...] to open the software keyboard.
3.　Set a speed, then tap [✓]. The setting range is 0.0 - 9.9 (knots).
4.　Tap the close button to finish.

14.6　How to Display an AIS Safety Message

When you receive an AIS safety message (addressed or broadcast) from an AIS transponder equipped vessel, the Status bar displays the flashing message "New Text Telegram(s)". Tap the Status bar to display the message. The AIS symbol for the vessel that transmitted the message is put at the center of the screen and a pop-up window appears, showing the AIS safety related message. You can delete the message by tapping [Delete Message].
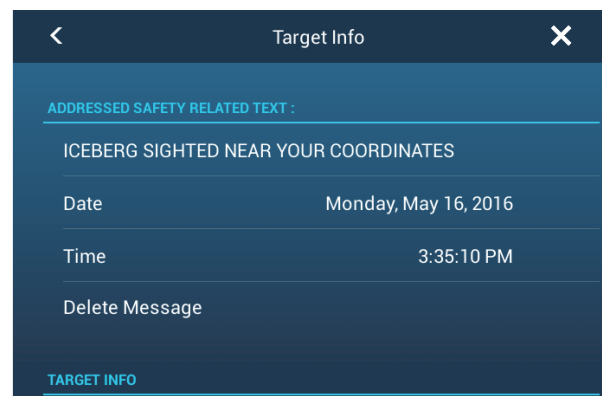
You can disable the AIS message notifications by setting AIS Message Notification in the [Home]→[Settings]→[Targets] menu to [OFF].

14.7　How to Display AIS Target Data

Tap an AIS target (plotter or radar display) to display the simple information in the pop-up menu.

For detailed information, tap the target, then tap [Info] on the pop-up menu to show the [Target Info] window.

Name	FURUNO
MMSI	124365890
COG	342.0°
SOG	0.0 kn
Range	7.293 NM
Bearing	325.2°
CPA	5.992 NM
TCPA	-41'30s
Last Update	30'42s

New Point

CPA   ON

Info

‹	Target Info	✕
TARGET INFO		
NickName		⌨
Name	ISLAND CHIEF	
MMSI	366838990	
Call Sign	WDA7043	
COG	29.1 °	
SOG	0.0 kn	
CPA	2,446 NM	
TCPA	-4d09h	
Range	2,405 NM	
Bearing	258 °	
Destination	LOCAL	
Vessel Type	Towing	
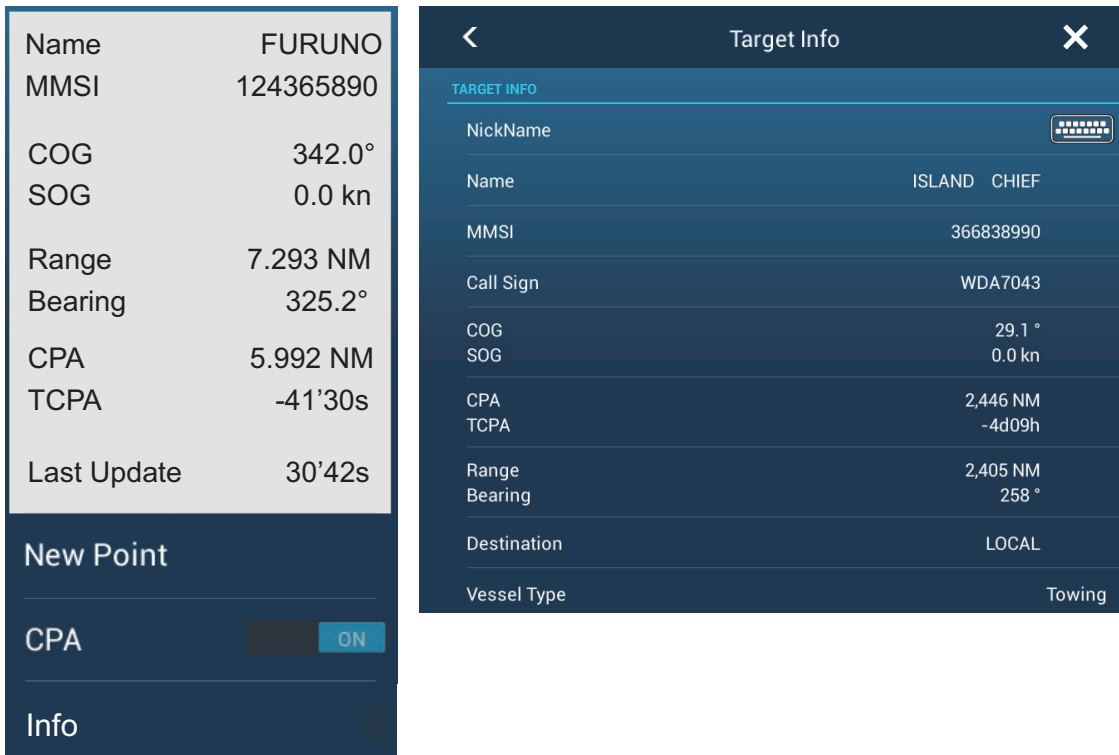
Simple information

14.8   How to Show or Hide the Target IDs

You can show or hide the target ID of AIS targets.

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

2. Turn [Display Target IDs] on or off.

3. Tap the close button to finish.

14.9   AIS List

The AIS list provides information about the AIS targets you are receiving navigation data from.

How to open the AIS list

Open the home screen, then tap [Lists] and [AIS].

The vertical bar at the right side of the list is colored according to that vessel's AIS transponder type or vessel's status.
Blue: Class A AIS transponder
Green: Class B AIS transponder
Red: Dangerous AIS target

You can sort the list with the buttons on the title bar of the window.
[Name]: AIS targets sorted in alphanumeric order.
[Range]: AIS targets sorted by range in ascending order.
[CPA]: AIS targets sorted by CPA in ascending order.

	AIS	Name	Range	CPA	Refresh	✕

List sort buttons

A

Name/MMSI	Range/Bearing	CPA/TCPA	
AHRENSHOOP 341400000	3.864 NM 284°	0.814 NM 26'09s	>
AMERICA FEEDER 277367000	17.34 NM 11°	16.71 NM 31'59s	>
ANAIS 518111000	1.847 NM 268°	0.730 NM 11'13s	>
ATLANTIC 372012000	4.545 NM 288°	0.619 NM 30'49s	>

B

Name/MMSI	Range/Bearing	CPA/TCPA	
BIMIMI CAT 334309000	4.541 NM 288°	0.595 NM 30'52s	>
Name/MMSI	Range/Bearing	CPA/TCPA	⌄

[Refresh] updates the list.

Note: AIS SART target appears at the top of the list.

How to display the detailed information for an AIS target

Tap the AIS target on the AIS list then tap [Detail]. The name of the AIS is shown in the title bar and navigation data appears in the [TARGET INFO] section.

<	FURUNO ✕

TARGET INFO

NickName	⌨
Name	FURUNO
MMSI	000886617
Call Sign	HO4721
COG	0.0 °
SOG	0.0 kn
CPA	2.115 NM
TCPA	-4h41'
Range	28.17 NM
Bearing	266 °
Destination	MIAMI, FL.
Vessel Type	Cargo ships - Carrying DG, HS, or MP, IMO hazard or pollutant category A

How to find an AIS target on the plotter display

Tap the AIS target on the AIS list, then tap [Find On Chart]. The plotter display opens and the selected AIS target is zoomed in.

How to edit an AIS nickname

1. Tap the AIS target to edit its nickname.
2. Tap [Edit Nickname] to display the software keyboard.
3. Enter the nickname. You can use a maximum of 20 alphanumeric characters.
4. Tap [✓].
5. Tap the close button to finish.

14.10 When an AIS SART is Received...

When an AIS SART is received (including re-received ones), the message "AIS SART Alarm" appears flashing in Status bar. Tap the Status bar to acknowledge the message. Then, the AIS SART is

ACTIONS
Goto
TARGET INFO
NickName ⌨

put at the center of the screen and the pop-up shown above appears. To set the AIS SART as destination, tap [Goto] on the pop-up.
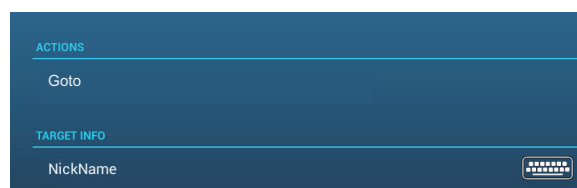
14.11 CPA/TCPA Alarm

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

Make sure that the gain, sea and rain controls are correctly adjusted before you use this alarm. CPA/TCPA alarm ranges must be set correctly according to the size, tonnage, speed, turning performance and other characteristics of your ship.

How to set the CPA/TCPA alarm

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

How to acknowledge the CPA/TCPA alarm

The CPA/TCPA alarm sounds when the CPA and TCPA of an ARPA target are within the CPA/TCPA alarm range. The alarm indication "CPA/TCPA Alarm" appears and flashes at the top of the screen. To acknowledge the alarm and stop the audio alarm and flashing of the indication, tap the indication "CPA/TCPA Alarm" (see subsection 2.10.8). (The ARPA vector must be displayed at least 30 seconds to calculate CPA and TCPA.)

How to deactivate the CPA/TCPA alarm

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

14.12 How to Register an AIS or DSC Target to the Buddies List

The buddies list provides a quick reference to ships' MMSI and nickname. For example, you might want to enter the MMSI and nickname of partner ships or ships that often operate in your area.

How to add an MMSI no. to the buddies list

1. Open the home screen, then tap [Settings] - [Targets].
2. Tap [Buddies List (AIS & DSC)].

3. Tap [Add Buddy] to open the numeric software keyboard.
4. Enter the MMSI number, then tap [✓].
5. Tap the MMSI number just entered to show the software keyboard.
6. Enter the nickname, then tap [✓].
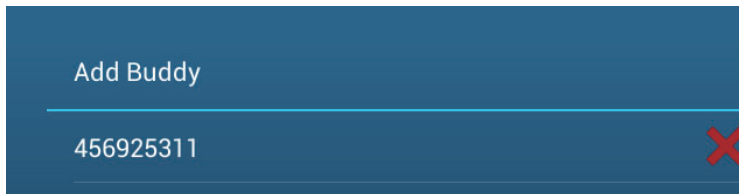
7. Tap the close button to finish.

How to delete an entry from the buddies list

1. Open the home screen, then tap [Settings] - [Targets].
2. Tap [Buddies List (AIS & DSC)].
3. Tap the red "X" (to the right of the nickname) of the buddy to delete.
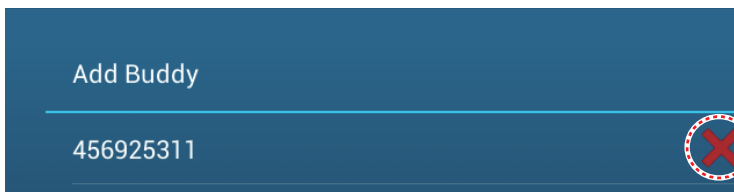
Tap to delete buddy from list.

4. You are asked if you are sure to delete the buddy. Tap [OK].
5. Tap the close button to finish.

14.13 CPA Graphic Display

The CPA graphic display, which requires own position and heading data, draws a line between own ship position and the selected AIS target. This feature lets you monitor an AIS target's heading and speed changes. The display is useful as an anti-collision aid, especially in congested waters.

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, and its color is the same as the color of the target symbol. The example belows the appearance on the plotter 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.
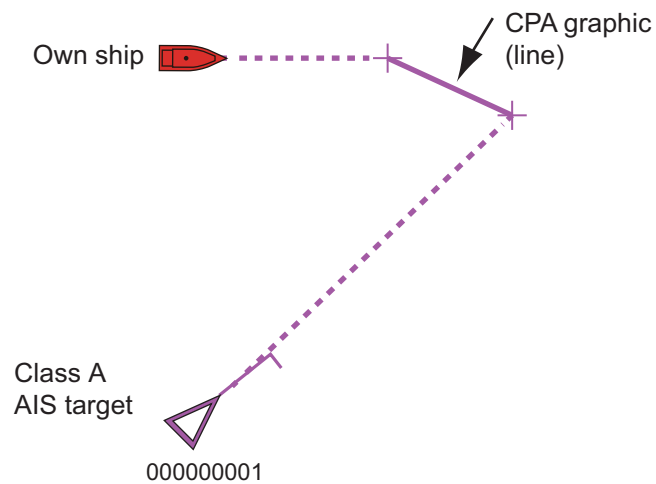
The CPA graphic display feature is not available in the following conditions:

- The CPA line is turned off. The line can be turned off by tapping the CPA line (or own ship icon* or target) to show the pop-up menu, then select [CPA].
  * Plotter display only
- 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.

14.14 AIS Transponder FA-30, FA-50

The FURUNO AIS Transponder FA-30 (or FA-50) installs in the NavNet TZtouch2 network and can be controlled from a NavNet TZtouch2 display. To access the menu for the transponder, do as shown below. See the respective operator's manual for details.

1. Connect the FA-30 (or FA-50) to the NavNet TZtouch2 network.
2. Open the home screen, then tap [Settings] - [Initial Setup].
3. Tap [FA30 Browser] or [FA50 Browser].

BROWSER INSTALLATION

FAX30 Browser

FA30 Browser

FA50 Browser

Select an "FA" browser

FA-30 Browser

FA-30

Port Setup
Own Vessel Data
Sensor Status
Test
For Service

FURUNO

OR

FA-50 Browser

FA-50

Initial Setup
Own Vessel Data
RX Message Log
Alarm Status
Sensor Status
Tests
Silent
For Service

FURUNO
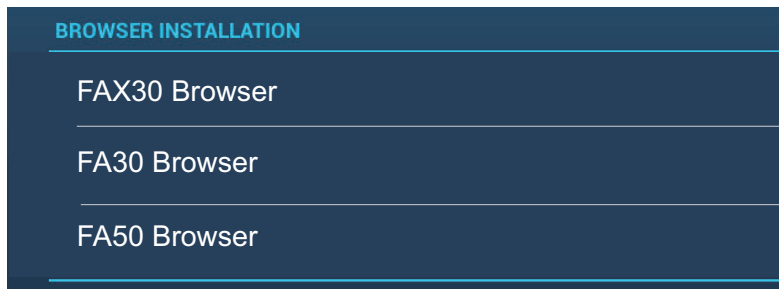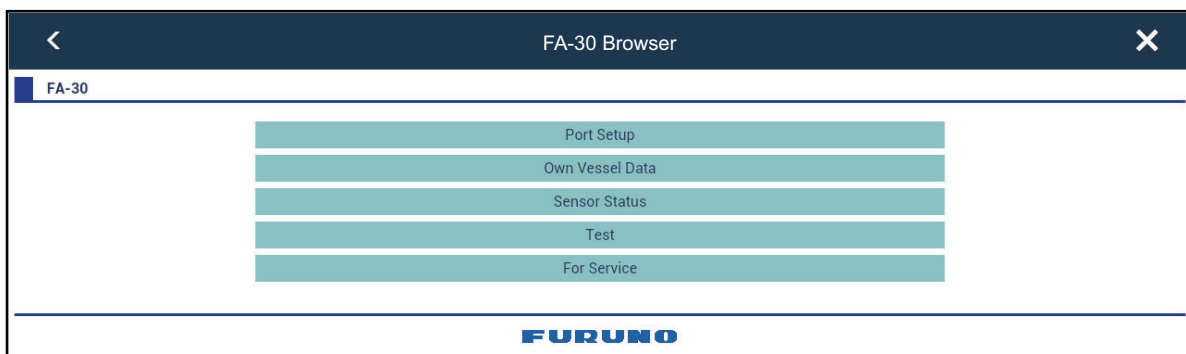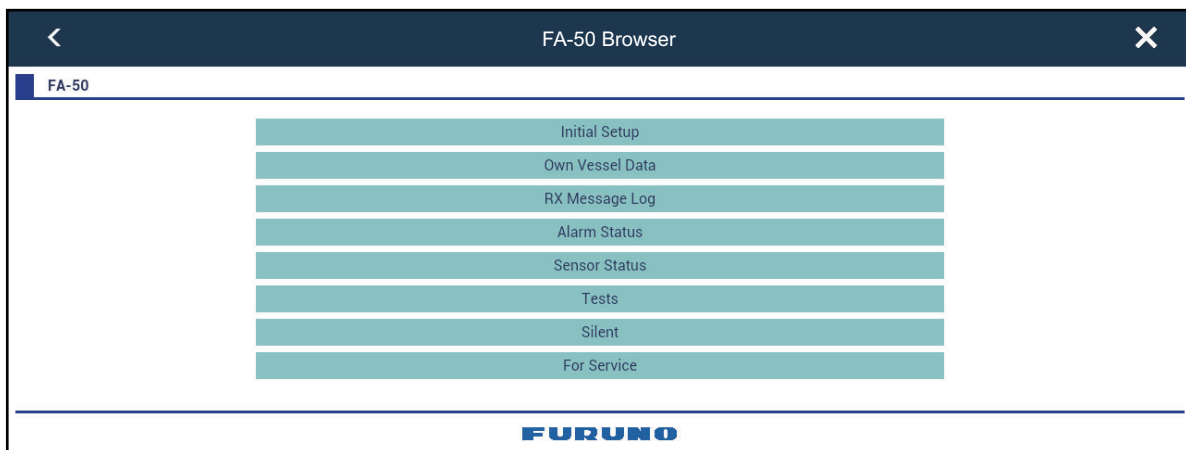
14.15 DSC Message Information

The DSC (Digital Selective Calling) message information feature provides, on the plotter and radar displays, the MMSI no. and position* of the ships that have transmitted a DSC message to you. A hexagon-shaped marker marks the position of the ship at the time the DSC was transmitted to you. The marker is color-coded according to the type of DSC message sent, red for distress and green for non-distress.

* Position at the time of message transmission. Position information is not updated.

Red: DSC marker for
a distress message

Green: DSC marker for
a non-distress message

333336789 ← MMSI no. → 333335678
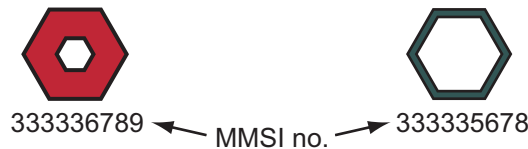
This feature requires connection of a DSC capable radiotelephone that outputs the DSC sentence in NMEA0183 or NMEA2000 format.

14.15.1 DSC distress message notification

When a DSC distress message 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.

14.15.2 How to go to a DSC point

Tap the DSC marker to go then tap [Go To] on the pop-up menu.

14.15.3 How to display DSC information

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

Name	ANAIS
MMSI	518111000
COG	0.0 °
SOG	0.0 kn
Range	25.81 NM
Bearing	214.4 °
CPA	14.61 NM
TCPA	-25'35s
Last Update	1'58s
New Point	
Info	

NickName	FURUNO
MMSI	387654321
COG	0.0 °
SOG	0.0 kn
CPA	5.992 NM
TCPA	41'30s
Range	7.293 NM
Bearing	325.2°
Last Update	30'56s
Lat	N 34°36.000'
Lon	E 135°12.000'
Nature Of Distress	---

Simple information   *Detailed information*

14-11

14.15.4 The DSC list

The DSC list shows the name, MMSI, range, bearing, CPA and TCPA of vessels from which you have received a DSC message.

1. Open the home screen, then tap [Lists] - [DSC].

List sort buttons
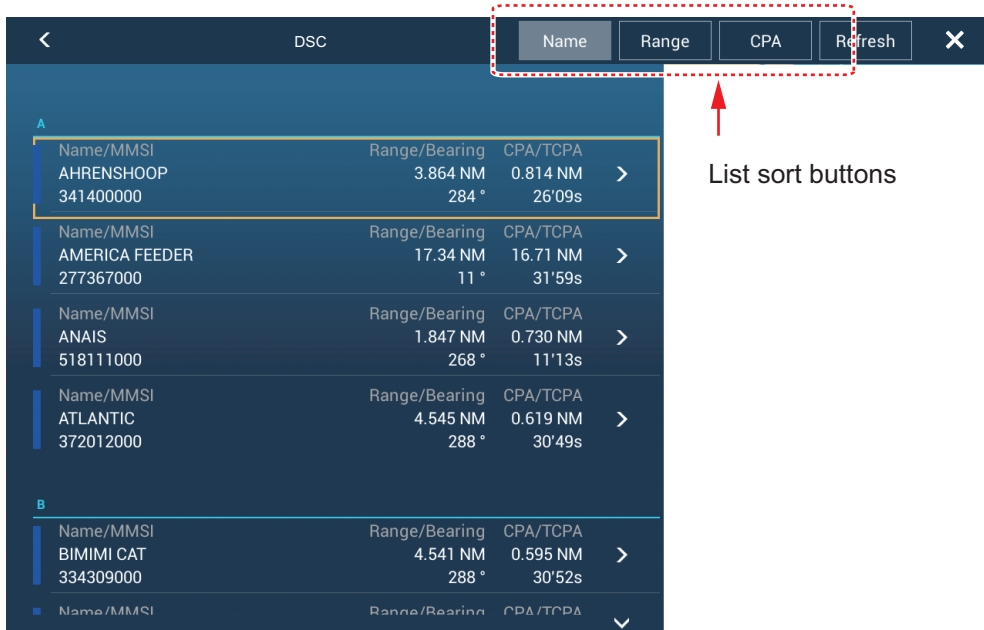
2. Tap [Name], [Range] or [CPA] at the top of the list to sort the list.
   [Name]: DSC targets sorted in alphanumeric order.
   [Range]: DSC targets sorted by range in ascending order.
   [CPA]: DSC targets sorted by CPA in ascending order.
   [Refresh] updates the list.

To see the detailed information for a DSC target, tap a DSC then tap [Detail]. To put a DSC marker at the center of the plotter display, tap the DSC target, then tap [Find On Chart].

14.15.5 How to make a DSC call (FM-4800 users only)

If your NavNet TZtouch2 network has a FM-4800 VHF Radiotelephone connected, you can send a DSC message to a DSC target.

Tap the target to show the pop-up menu, then tap [DSC CALL].

15. OTHER FUNCTIONS

Once you have become acquainted with your equipment, you can set it according to your needs. You can change system configuration, change how the equipment operates and displays information, etc.
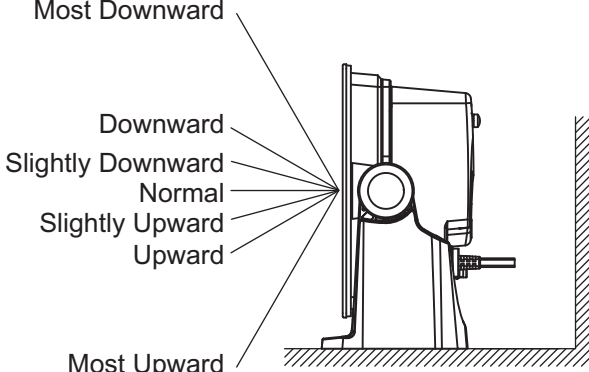
15.1 General Menu

The [General] menu contains items that once preset do not require frequent adjustment. The below example menu is taken from the TZTL12F/15F, some menu items may differ, or not appear, on the TZT2BB.

Two Finger Tap Function	Full Screen	>
Two Finger Long Tap Function	Screen Capture	>
Move Tool On Long Push	ON	
Password Lock	OFF	
Connect to the Internet	When Necessary	>
Wireless LAN Settings		>
Display Additional TD in NavData	OFF	
Edge Swipe Guide	ON	
User Interface Auto-Hide	0'10s	>
Scale & Layout	Normal	>
Instrument Theme	Black	>
Brilliance Synchronization	ON	
Auto Scroll	OFF	
Cross Cursor Speed	0	
Allow Remote Control	Full Control	>
Local Time Offset	UTC + 00:00	
Time Format	Auto	>
INTERNALMEMORY: Seattle_TZT3_DRS25A-NXT_T...		>
Stop Demo		
Manual Demo	OFF	
Show Welcome Screen		

Show Welcome Screen at startup	ON	
Demo Slide Show	ON	
Demo Speed	6.0 kn	
Screen Viewing Angle Adjustment	Normal	>
Language	English (United States)	>
Check for Software Update		
MY TIMEZERO		
Logged As	(Not Logged)	
Login		
Logout		
Enable Cloud Synchronization	ON	
MY FRIENDS		
Nickname		
Manage My Friends		
DATA USAGE		
Points	6 / 30000	
Routes	13 / 200	
Areas & Lines	49 / 100	
Circles	25 / 100	
Photos	0 / 1000	
Catches	0 / 1000	
Track Points	10697 / 30000	
Reset Default Settings		

Note: For monitors connected to the TZT2BB via the HDMI OUT2 port, the menu items [Connect to the Internet] and [Wireless LAN Settings] do not appear in the [General] menu.

Menu item	Function	Options
[Move Tool on Long Push]	Enable the "move" function with long-push of an object. Applicable to points (excluding Sounder), temporary waypoints, route waypoints, guard zone, EBL, VRM and external equipment menu icon ( ).	[ON], [OFF]
[User Interface Auto-Hide]	Select the timeout for the home icon on the [Layers] menu, slide-out menu, pop-up menu, and camera screen (full screen). **Note:** The home icon always appears on the split screen camera display and other displays.	[0'03 s], [0'05 s], [0'10 s], [0'15 s]
[Auto Scroll]	In the [ON] setting, the chart is appropriately and automatically scrolled when the cursor goes out of the display area.	[ON], [OFF]
[Cross Cursor Speed]	Adjust the cross cursor speed.	-7 to +7
[Allow Remote Control]	Sets the permission level for NavNet Remote. [Off]: Connection with NavNet Remote not allowed. [View Only]: Can view the screen remotely, but cannot operate and functions. [Full Control]: Can operate the entire system by remote.	[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 how to display time, in 12 or 24 hour format. [Auto] automatically inserts AM, PM indication in 24 hour clock, when the language is English.	[Auto], [24 Hours], [12 Hours]
[Demo File]	Select the demo file (internal or external) to use in the demo mode. For external data, set the applicable media in the SD Card Unit or the USB port.	
[Manual Demo]*	[OFF]: Use the data file selected at [Demo File]. Your vessel moves according the data in the data file. [ON]: Your vessel moves at the speed set at [Demo Speed] below.	[ON], [OFF]
[Demo Slide Show]	No use.	
[Demo Speed]	Set the ship's speed to use in the demo mode, when [Manual Demo] is [ON].	0 to 20 kn
[Screen Viewing Angle Adjustment] **Note:** Not available for TZT2BB.	Automatically adjust the display contrast, etc. according to your viewing angle. 	[Most Downward], [Downward], [Slightly Downward], [Normal], [Slightly Upward], [Upward], [Most Upward]

Menu item	Function	Options
[Check for Soft-ware Update]	Checks if your software is up-to-date. See section 15.5.	-
[Reset Default Settings]	Restore default settings for the items of the [Gen-eral] menu.	-

* In the demo mode, plotter display, you can relocate the boat icon to the location tapped. Tap the screen where you want to relocate the boat icon, then tap [Move Boat] on the pop-up menu.

15.2 Units Menu

The [Units] menu sets the unit of measurement for speed, distance, depth, etc.

Bearing Display	True	>
True Wind Calculation Reference	Surface	>
Position Format	DDD°MM.mmm'	>
Loran C Station & GRI		>
Short/Long Change Over	0.5 NM	⌨
Range (Long)	Nautical Mile	>
Range (Short)	Yard	>
Depth	Foot	>
Height/Length	Foot	>

Fish Size	Inch	>
Temperature	Fahrenheit Degree	>
Boat Speed	Knot	>
Wind Speed	Knot	>
Atmospheric Pressure	HectoPascal	>
Oil Pressure	Pound per Square Inch	>
Volume	Gallon	>
Reset Default Settings		

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]	Enter Loran C Station and GRI. Available when [Position Format] is se-lected to [Loran-C].
[Short/Long Change Over]	Set the distance at which to switch between short and long range (set-ting range: 0.0 to 2.0 NM). If the setting is 0.5, for example, short range is automatically selected when the long range unit is 0.4 or less. The setting "0.0" fixes the unit to long range.
[Range (Long)]	[Nautical Mile], [Kilometer], [Mile]
[Range (Short)]	[Foot], [Meter], [Yard]
[Depth]	[Foot], [Meter], [Fathom], [Passi Braza]
[Height/Length]	[Foot], [Meter]
[Fish Size]	[Inch], [Centimeter]
[Temperature]	[Fahrenheit Degree], [Celsius Degree]
[Boat Speed]	[Knot], [Kilometer per Hour], [Mile per Hour], [Meter per Second]
[Wind Speed]	[Knot], [Kilometer per Hour], [Mile per Hour], [Meter per Second]

Menu item	Options
[Atmospheric Pressure]	[HectoPascal], [Millibar], [Millimeter of Mercury], [Inch of Mercury]
[Oil Pressure]	[KiloPascal], [Bar], [Pound per Square Inch]
[Volume]	[Gallon] (Gallon & Gallon/Hour), [Litre] (Litre & Litre/Hour)
[Reset Default Settings]	Restore default settings for the [Units] menu.

15.3 Initial Setup Menu

The [Initial Setup] menu, which is mainly for use by the installer of the equipment, sets up the system according to the sensors connected. These adjustments require some knowledge of marine electronics equipment. If you are unsure of your abilities, have a qualified marine electronics technician make the adjustments. Inadequate adjustment can affect performance.

GPS POSITION section

Menu item	Description	Options (setting range)
[Longitudinal (from bow]	Enter the GPS antenna positioning bow-stern (Longitudinal) and port-starboard (Lateral) position from the origin.	0 m to 999 m
[Lateral GPS Position (-Port)]		-99 m to +9 m

BOAT INFORMATION section

Menu item	Description	Options (setting range)
[Boat Length]	Set the length of your boat.	0 (m) to 999 (m)
[Size of Static Icon]	Set the size of static (such as own ship) icons.	50 to 150
[Depth Display]	Select the start point for depth measurement. Selection is indicated in the depth box as "(K)" for [Under Keel] and "(S)" for [Under Sea Level].	[Under Keel], [Under Sea Level]
[External Transducer Draft]	Set the draft external transducers other than internal fish finder, networked or multi-beam sonar. **For internal/network transducers**, set the draft from Home screen→[Settings]→[Sounder]→[Transducer Draft]. **For multi-beam sonars**, set the draft from Home screen→[Settings]→[Multi-beam Sonar]→[Initial Setup]→[External Transducer Draft].	0.0 (m) to 99.9 (m)
[Keel Draft]	Set the keel draft.	0.0 (m) to 99.9 (m)

INSTRUMENTS SETUP section

Menu item	Description	Options (setting range)
[Engine & Tank Automatic Setup]	See "Engine & Tank Automatic Setup" below.	
[Engine & Tank Manual Setup]	See "Engine & Tank Automatic Setup" on the next page.	
[Graphic Instruments Setup]	See "Graphic Instruments Setup" below.	

[Engine & Tank Automatic Setup]: The system will automatically detect engines and tanks connected to the same network. This is the recommended method for setting up engines and tanks.

[Engine & Tank Manual Setup]:

Menu Item	Description	Options (setting range)
[Nickname]	Change the nickname for the engine or tank.	
[Used For Propulsion]	Select which engine/tank is used to calculate the distance which may be traveled using the remaining fuel. [ON] uses the engine/tank for calculations, [OFF] ignores the engine/tank.	[ON], [OFF]
[Reset]	Resets the engine/tank details to default	[OK], [Cancel]

Graphic Instruments Setup:

[Graphic Instruments Setup] - [Maximum Boat Speed], [Maximum Wind Speed]

Menu Item	Description	Options (setting range)
[Maximum Boat Speed]	Set the transducer's maximum detectable speed.	1 kn to 99 kn
[Maximum Wind Speed]	Set the transducer's maximum detectable speed.	1 kn to 99 kn

[Graphic Instruments Setup] - [Depth]

Menu Item	Description	Options (setting range)
[Minimum Depth]	Set the transducer's minimum detectable depth.	1 m to 19 m
[Maximum Depth]	Set the transducer's maximum detectable depth.	20 m to 2000 m

[Graphic Instruments Setup] - [Sea Surface Temperature]

Menu Item	Description	Options (setting range)
[Minimum Sea Surface Temperature]	Set the transducer's minimum detectable temperature.	0.00°C to 99.99°C
[Maximum Sea Surface Temperature]	Set the transducer's maximum detectable temperature.	0.01 to 99.99°C

[Graphic Instruments Setup] - [Propulsion Engine]

Menu Item	Description	Options (setting range)
[Max. RPM]	Set the maximum rpm of your engine to show on the RPM display.	1 rpm to 20,000 rpm
[Red Zone Oil Pressure]	Set the starting value for the red zone area of the oil pressure meter.	0 kPa to 998 kPa
[Max. Oil Pressure]	Set the maximum oil pressure of your engine.	1 kPa to 999 kPa
[Min. Temperature]	Set the minimum temperature for your engine.	0.00°C to 99.00°C
[Red Zone Temperature]	Set the starting value for the red zone area of the engine temperature indicator.	0.01°C to 999.00°C

[Graphic Instruments Setup] - [Other Engine]

Menu Item	Description	Options (setting range)
[Max. RPM]	Set the maximum rpm of your engine to show on the RPM display.	0 rpm to 20,000 rpm
[Red Zone Oil Pressure]	Set the starting value for the red zone area of the oil pressure meter.	0 kPa to 999 kPa
[Max. Oil Pressure]	Set the maximum oil pressure of your engine.	0 kPa to 999 kPa
[Min. Temperature]	Set the minimum temperature for your engine.	0°C to 99°C
[Red Zone Temperature]	Set the starting value for the red zone area of the engine temperature indicator.	0°C to 999°C

CZONE section

Menu item	Description
[Add Default CZone Pages]	Create, edit C-Zone pages.
[CZone DIP Switch Settings]	Set this unit's DIP switches. For the serviceman. Do not change the settings.

Menu item	Description	
[Reset Instrument Pages]	Resets all instrument pages to default.	[OK], [Cancel]
[Reset Default Settings]	Resets applicable settings to default.	[OK], [Cancel]

MANUAL FUEL MANAGEMENT section

Menu item	Description	Options (setting range)
[Total Fuel Capacity]	Enter the total fuel capacity of your tank(s).	0 to 9,999(L).
[Manual Fuel Management]	Set to [ON] for manual fuel management. See the Operator's Manual.	[OFF], [ON].

IF-NMEAFI SETUP section

Menu item	Description	Options (setting range)
[Select IF]	Select [IF-NMEAFI] to set the analog data that is input from the IF-NMEAFI.	
[Category]	Select the category for the analog sensor to set.	[Wind], [ST800_850], [Fuel], [FreshWater], [WasteWater], [LiveWell], [Oil], [BlackWater]
[Resistance Full]	The resistance, in Ohms, when the tank is full.	0 (ohm) to 300 (Ohm)
[Resistance Mid]	The resistance, in Ohms, when the tank is half full.	0 (ohm) to 300 (Ohm)
[Resistance Empty]	The resistance, in Ohms, when the tank is empty.	0 (ohm) to 300 (Ohm)
[Capacity]	The capacity of the tank.	0 (G) to 2650 (G)
[Fluid Instance]	NMEA2000 Instance Number of the tank	0 to 5
[Self test]	Test results are displayed.	
[Set Hardware To Factory Default]	Resets the converter selected at [Select IF] to factory default.	[OK], [Cancel]

DATA ACQUISITION section

Menu Item	Description	Options (setting range)
[GP330B WAAS Mode] [WS-200 WAAS Mode]	Select [ON] to use the WAAS mode for the corresponding GPS antenna.	[ON], [OFF]
[Data Source]	Select the source for each data to input to the system. If two or more sources are connected for a data, select one using the pull-down dialog box. (FURUNO sensors are shown at the upper part of the list.)	
[Sensor List]	Show the information for sensors connected to your equipment. Also, you can set a "Nickname" for them here.	
[NMEA0183 Output]	Select [ON] to output NMEA sentences.	
[NMEA 2000 PGN Output]	Select [ON] for the PGNs (Parameter Group Number, CAN bus (NMEA2000) message) to output from the CAN bus port.	
[Sky View]	Show the condition of GPS and GEO (WAAS) satellites on the [GPS SkyView] display. The bearing and elevation angle of all GPS and GEO satellites (if applicable) in view of your receiver appear. For the serviceman. **Note:** The [GPS SkyView] display can also be shown by tapping the GPS icon (shown right) on the home screen.	

INTERNAL GPS SETUP section (TZTL12F/TZTL15F only)

Menu Item	Description
[WAAS Mode]	Set to [OFF] when using external GPS.

SC-30 SETUP section

Menu item	Description	Options (setting range)
[WAAS Mode]	Select [ON] to use the WAAS mode.	[ON], [OFF]
[Heading Offset]	Enter the offset value for heading.	-180° to +180°
[Pitch Offset]	Enter the offset value for pitching.	-90° to +90°
[Roll Offset]	Enter the offset value for rolling.	-90° to +90°

NETWORK SENSOR SETUP section

The [NETWORK SENSOR SETUP] section allows you to set up compatible FURUNO NMEA2000 sensors. Calibrations and offsets applied in this menu are also applied to the sensor itself.

Tap the sensor to access its menus and settings. For details regarding the menu structure and set up of each sensor, see the appropriate operator's manual, supplied with the sensor.

CALIBRATION section

Menu item	Description	Options (setting range)
[Heading]	Offset heading data.	-180.0° to +180.0°
[Speed Through Water]	Calibrate speed data. Enter amount in percentage.	-50° to +50°
[Wind Speed]	Offset wind speed data. Enter amount in percentage.	-50° to +50°
[Wind Angle]	Offset wind angle data.	-180.0° to +180.0°
[Sea Surface Temperature]	Offset sea surface temperature data.	-10° to +10°

DATA DAMPING section

Menu item	Description	Options (setting range)
[COG & SOG]	Set data damping time. The lower the setting the faster the response to change.	0 to 59 seconds
[Heading]		
[Speed Through Water]		
[Wind Speed&Angle]		
[Rate of Turn]		

FUSION section

Menu item	Description	Options (setting range)
[Connect to Fusion]	Connect to your Fusion equipment.	
[Fusion Auto Volume]	Set to [ON] to allow this unit to control the Fusion volume.	
[Minimum Speed]	Set the minimum speed threshold. Exceeding this speed activates volume auto control.	0.0 kn to 19.9 kn
[Maximum Speed]	Set the maximum speed threshold.	0.1 kn to 99.0 kn
[Volume Increase]	Set the amount of extra volume to output.	10% to +50%

BROWSER INSTALLATION section

Menu item	Description	Option (setting range)
[FAX30 Browser]	Show the Facsimile Receiver FAX-30 display.	
[FA30 Browser]	Show the AIS Receiver FA-30 display.	
[FA50 Browser]	Show the AIS Receiver FA-50 display.	

Others menu items

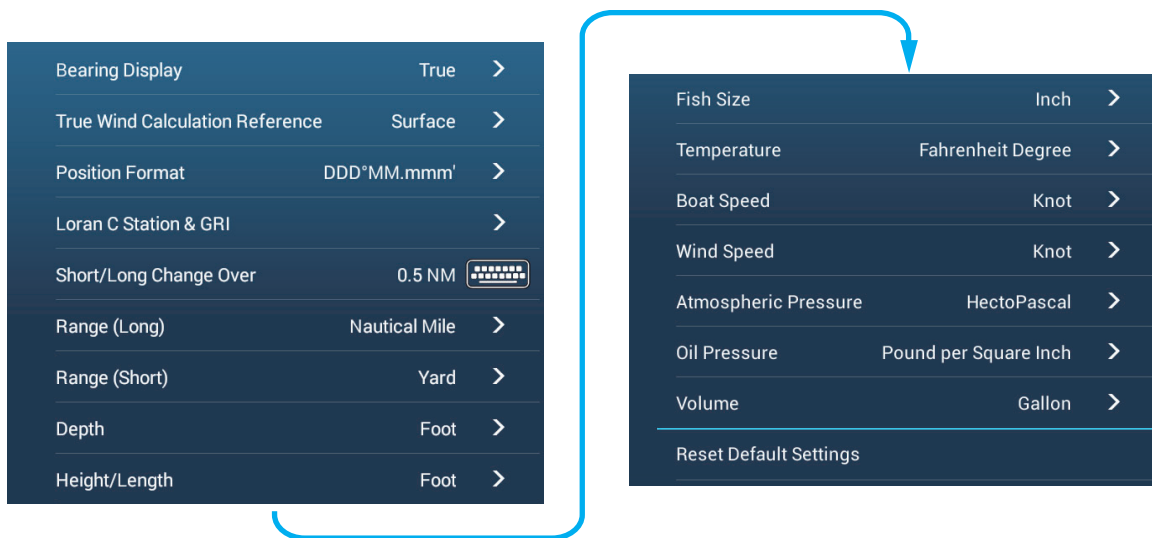| Menu item	Description	Option (setting range)
[Chart Master Device]	Set to ON to set this equipment as the chart master and share one System ID and chart unlock code in the network. **Note 1:** For monitors connected to the TZT2BB via the HDMI OUT2 port, the menu items [Connect to the Internet] and [Wireless LAN Settings] do not appear in the [General] menu. **Note 2:** If you change the setting for [Master Chart Device] to [OFF], the message "Charts have to be unlocked again if you change the Chart Master device. Are you sure you want to proceed?" appears. Tap [OK] to change the device, or tap [CANCEL] to cancel.	
[System ID]	The system ID for this device within the network.	
[IP Address]	IP address for this unit within the network.	
[Quick Self Test]	Test the equipment.	
[Certification Mark]	Show the certification marks this equipment has received.	
[ServiceMan]	Requires login password. For the service technician only.	
[Event Input Configuration]	These menu items are not used.	
[Update Network Equipments]	Updates all NavNet equipment in the network. For the service technician.	
[Remote Controller Configuration]	When there are multiple units in the NavNet network, the Remote Controller MCU-004/MCU-005 can select the display to show on the unit with Remote Controller connection. Further, the cycling order of displays can be set. See section 1.2.2 (MCU-004) and section 1.2.3 (MCU-005).	
[Adjust Display Resolution]	Adjust the output resolution from the TZT2BB to match the connected monitor's resolution. **Note:** This menu item does not appear for TZTL12F/TZTL15F systems.	
[Sirius Radio Diagnostic]	Check the satellite radio of the FURUNO BBWX weather receiver for proper operation. See section 13.7.3.	
[Sirius Weather Diagnostic]	Check the weather section of the FURUNO BBWX weather receiver for proper operation. See section 13.6.	
[Reset Default Settings]	Reset the system to default settings.	

15.4 Facsimile Receiver FAX-30

The FURUNO Facsimile Receiver FAX-30 installs in the NavNet TZtouch2 network and can be controlled from a NavNet TZtouch2 display. Below are the steps to start fax operation.

1. Connect the FAX-30 to the NavNet TZtouch2 network.

2. Open the home screen, then tap "Fax30" (left side of screen).

3. Tap [WX FAX] or [NAVTEX].
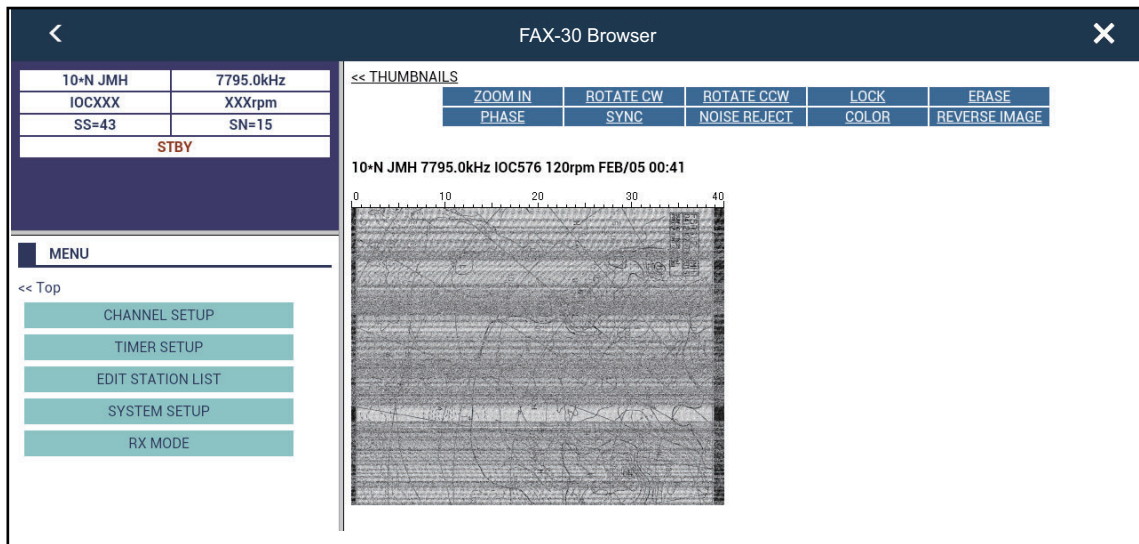
4. Refer to the Operator's Manual of the FAX-30 for operation information.

The FAX-30 display can only be accessed by one NavNet TZtouch2 unit at a time. When another NavNet TZtouch2 display accesses the FAX-30, control of the FAX-30 is given to that display after the picture has stopped completely. This sequence takes approximately one minute.

15.5 How to Check for Software Updates

You can check for software updates via the internet.

1. Referring to section 1.19, connect to the internet.

2. Open the home screen, then tap [Settings] - [General] - [Check for Software Update] The following window appears.

After the checking is completed, one of the following messages appear:

• When your unit has the latest software: "THE LATEST SOFTWARE IS INSTALLED ON THIS DEVICE."

• When newer software is available: "A SOFTWARE UPDATE IS AVAILABLE. PLEASE VISIT NAVNET.COM TO DOWNLOAD IT."

3. Tap the [OK] button.

4. Tap the close button to finish.

15.6 How to Manage Your Charts

The NavNet TZtouch2 uses the same Mapmedia charts as NavNet 3D. Even though NavNet TZtouch2 is a master-less system in networking, for charts one NavNet TZtouch2 unit should be set as Chart Master to share the System ID, which will be necessary to obtain a chart unlock code from Mapmedia.

15.6.1 How to view your charts

Tap the Home icon to show the home screen, then tap [Catalog] to display your charts catalog.
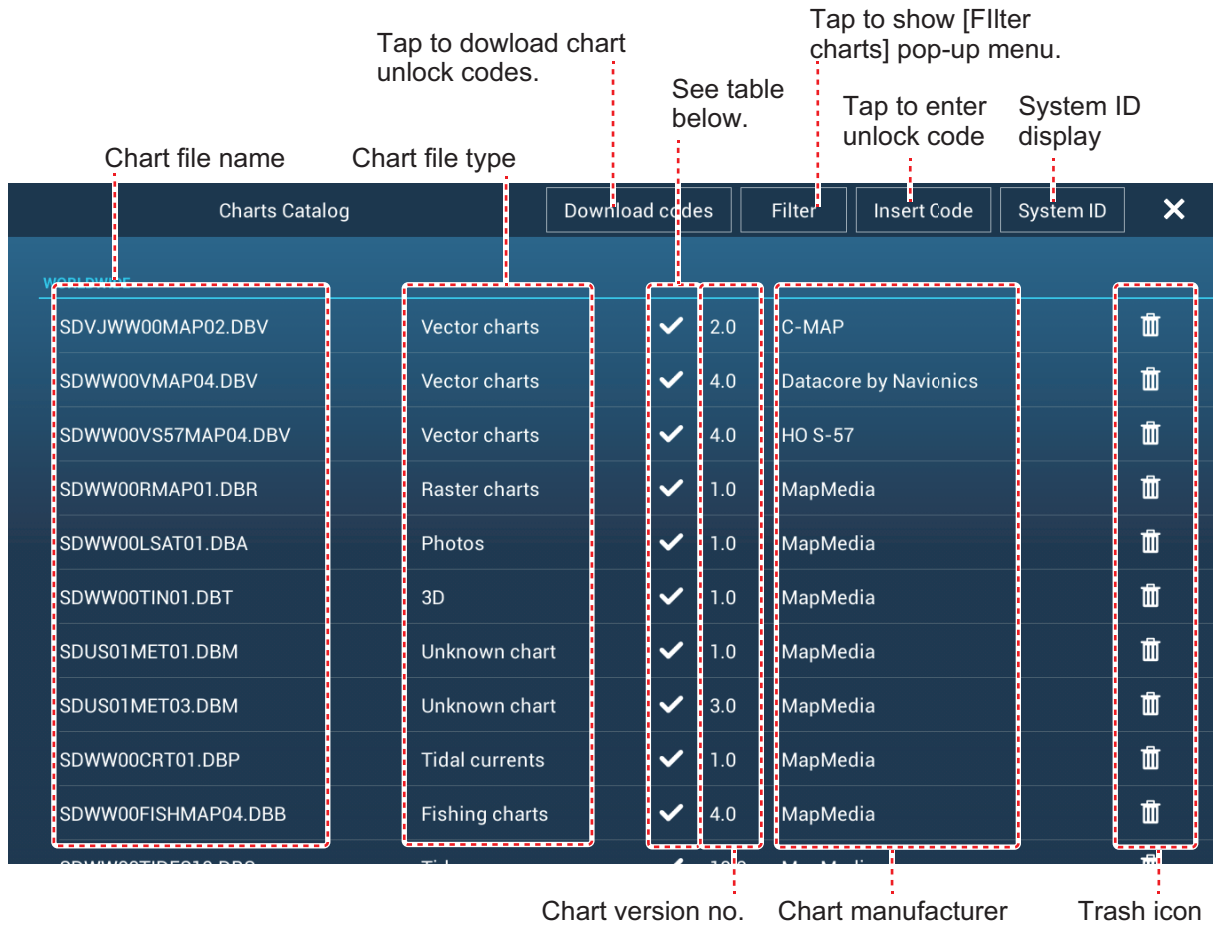
Chart status icon	Meaning	Chart status icon	Meaning
✔	Free chart. An unlock code is not necessary.	🔓	Unlock code entered.
🔒	Unlock code is necessary to use the chart. Tap the [Insert Code] button at the top of the [Charts Catalog] screen. Enter the unlock code then tap [✔] to finish.	⚠	Chart cannot be used because it is corrupted.

15.6.2   How to hide unnecessary charts on the chart catalog list

1. Tap [Filter] on the chart catalog list title bar to show the [Filter charts] window.
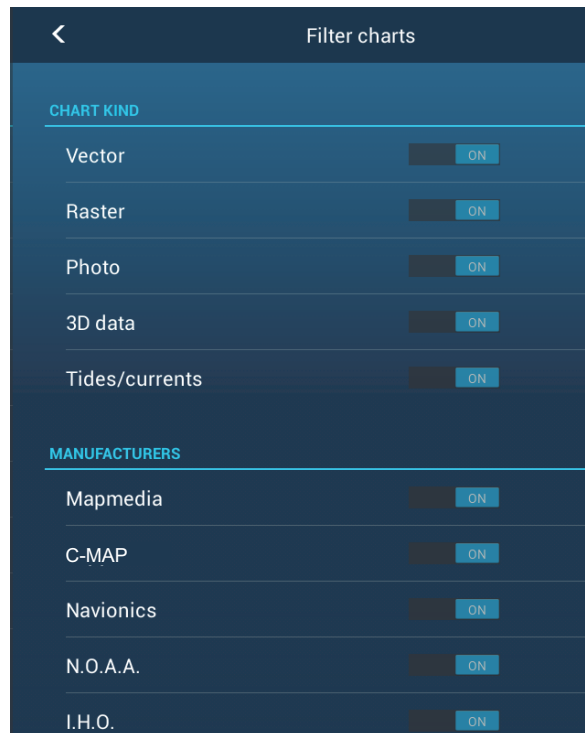
2. Turn off the flipswitches of charts that you want to hide. The factory setting shows all charts. To restore all charts, tap [Reset Filters].
3. Tap < on the title bar to return to the chart catalog list.
4. Tap the close button close the chart catalog list.

15.6.3   How to update or add charts

Free (USA and NOAA) and for-fee NavNet TZtouch2 compatible charts are provided by FURUNO and Mapmedia. Go to the URLs shown below to download chart data.

Download the chart file to your desktop. Unzip the file, then copy it to the root of a microSD card. Insert the card into one of the SD card slots on the display unit, or a slot in the SD Card Unit (SDU-001). For the detailed procedure, refer to the instructions on the FURUNO website.

A for-fee chart requires that you enter its chart unlock code. Go to the Home screen and tap [Catalog] to show the [Charts Catalog] display. Tap the [Insert Code] button then enter the chart unlock code from the software keyboard.

Where to obtain chart data:
Mapmedia
http://www.mapmedia.com/charts-catalog.html

15.6.4   How to delete charts

Before replacing a chart you should delete the old chart data on every NavNet TZtouch2 unit. Only delete the chart data that you intend to replace or no longer require.

Open the charts catalog. Tap the trashcan icon of the chart to delete. You are asked "ARE YOU SURE YOU WANT TO DELETE THIS FILE?" Tap [OK] to delete the file.

This page is intentionally left blank.

16. 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.

16.1 Maintenance

Routine maintenance helps keep your equipment in good condition and prevents future problems. Check the items shown in the table below on a regular basis to help keep your equipment in good condition for years to come.

Check item	Check point	Remedy
Cables	Cable connection, corrosion	Connect the cables that have loosened. Replace any damaged cables.
Cabinet	Dust on the cabinet	Remove dust with a dry clean cloth. Do not use commercial cleaners to clean the equipment - they can remove paint and markings.
LCD	Dust on the LCD	Wipe the LCD carefully to prevent scratching, using tissue paper and an LCD cleaner. To remove dirt or salt deposits, use an LCD cleaner, wiping slowly with tissue paper so as to dissolve the dirt or salt. Change paper frequently so the salt or dirt will not scratch the LCD. Do not use solvents such as thinner, acetone or benzene for cleaning. Also, do not use degreaser or anti-fog solution, as they can strip the coating from the LCD.
	Waterdrops on the LCD	Waterdrops on the LCD can slow touch response. Wipe the LCD with a dry cloth to remove the water.
Radar antenna	Foreign material on the radar antenna	Foreign material can reduce sensitivity. Clean the antenna with a cloth wetted with freshwater. Do not use commercial cleaners to clean the radiator - they can remove paint and markings.
Transducer	Transducer face	Marine growth on the transducer face can reduce sensitivity. Remove any growth with a wooden stick or fine grade sandpaper.

16.2   Fuse Replacement

The fuse in the fuse holder in the power cable protects the equipment from high electric current and equipment fault. If you cannot turn on the power, check the fuse to see if it has blown. Find the reason for the blown fuse before you replace the fuse. If the fuse blows again after the replacement, contact your dealer for advice.

⚠ **WARNING**

Use the proper fuse.
Use of the wrong fuse can cause fire or electrical shock.

Name	Type	Code No.	Remarks
Fuse	FGBO-A 125V 5A PBF	000-155-853-10	12 VDC, 24 VDC

16.3   Life of Parts

Magnetron

When a magnetron reaches the end of its life, targets do not appear on the radar display. If long-range performance appears to have declined, contact your dealer about replacement of the magnetron.

Radar Sensor	Magnetron	Code No.	Approx. Life
DRS2D	E3590	000-164-574-11	5,000 hours
DRS4D	E3571	000-146-867-11	5,000 hours
DRS4DL/ DRS4DL+	80-0691	001-266-460	5,000 hours
DRS4A	MAF1421B	000-158-786-11	5,000 hours
DRS6A	MAF1422B	000-158-788-12	5,000 hours
DRS6A X-Class	MAF1422B	000-158-788-12	5,000 hours
DRS12A	MAF1565N	000-174-559-10	5,000 hours
DRS12A X-Class	FNE1201	001-245-890	5.000 hours
DRS25A	MG5436(E2V)	000-140-762-10	5,000 hours
DRS25A X-Class	MG5436	001-205-570	5,000 hours

The total time of power-on ("ON TIME") and transmission ("TX TIME") are displayed on the radar screen during the stand-by mode.

LCD (TZTL12F/TZTL15F only)

The life of the LCD for the TZTL15F is approximately 18,000 hours; for the TZTL12F it is approximately 25,000 hours. The actual life of the LCD is affected by the operating environment (temperature, humidity, etc.). When nearing the end of its life-span, the LCD brilliance does not adjust correctly. When this occurs, contact your local dealer for advice.

Fan

The approximate life of the fan is as shown in the table below, and the actual life depends on ambient temperature. When the fan does not rotate sufficiently, an applicable message appears in the status bar. Turn off the power and contact your dealer about replacement of the fan.

Item	Type	Code No.	Estimated Life	Remarks
FAN MOTOR	MFB52A-12HA-002	000-175-998-10	Approx. 21,000 hours	For TZTL12F, TZTL15F, TZT2BB (Internal fan)
	LF50C12FFR02A	000-194-101-10	Approx. 40,000 hours	For TZT2BB (External fan)

16.4 Troubleshooting

This section provides simple troubleshooting procedures that the user can follow to restore normal operation. If you cannot restore normal operation, do not check inside the unit. Have a qualified technician check the equipment.

16.4.1 General troubleshooting

Problem	Remedy
You can not turn on the power.	• Check for blown fuse. • Check that the power connector is tightly fastened. • Check for corrosion on the power cable connector. • Check for the power cable for damage. • Check battery for correct voltage output. • For TZTL12F/TZTL15F, use a bare finger to turn on the power. (The power cannot be turned with gloved hands.)
Picture is not displayed properly.	Turn the power off, then on again. If the picture is still improper, contact your local dealer for instructions.
Nothing appears on the screen after you press the power switch.	Check if the unit is plugged into the power source.
The display has frozen.	Push the power switch until the power goes off. Turn the power on again.
TZT2BB monitor does not display images correctly.	Turn the power off then on again. If the picture is still improper, contact your dealer for instructions.
Nothing appears on the TZT2BB monitor screen after you press the power switch.	• Check the monitor power. • Check connections between the monitor and the processor unit.

16.4.2 Radar troubleshooting

Problem	Remedy
The radar cannot transmit.	• Tap the [TX] icon again. (The icon is filled in white when the radar is in transmit state.) • Check that the antenna cable is tightly fastened. • Check if the radar source is correct.
Marks and characters appear, but echoes do not appear.	• Check the antenna cable for damage and loose connection. • If the picture is frozen, turn the power off and on again.
Picture is not updated or the picture freezes.	• Check the antenna cable for damage and loose connection. • If the picture has frozen, turn the power off and on again.
You adjusted the receiver gain, but radar echoes are too weak.	The life span of the magnetron in the radar sensor is over. Have a technician check the magnetron.
You changed the range, but the radar picture does not change.	• Try to change the range again. • Turn the power off and on again.
Poor discrimination in range.	Adjust the sea control.
Range rings are not displayed.	Check if [Range Rings] is turned on in the [Layers] menu.
You tapped the [TX] icon to transmit. The "TX screen" appears momentarily, but the radar soon goes into stand-by.	The overload protection has activated. To restore normal operation, turn off all equipment in the network. Wait a few seconds then turn on all the equipment.

16.4.3 Plotter troubleshooting

Problem	Remedy
Position is not fixed.	Check for interfering objects near the display unit that might be blocking reception.
The track of your ship is not plotted.	Check if [Tracks] is turned on in the [Layers] menu.
Forgot the chart unlock code, or chart lock is reset.	Connect to the internet, then tap [Home]→[Catalog]→[Download codes]. The codes are automatically applied.

16.4.4 Fish finder troubleshooting

Problem	Remedy
You selected a fish finder display, but no picture appears.	• Check that the transducer cable is tightly fastened. • Check that the fish finder source is correct. • If you are using a network fish finder, check that it is properly connected.
Marks and characters appear, but no picture appears.	Check if the transducer cable is tightly connected.
Picture appears but zero line does not appear.	• The picture is shifted. Check the shift setting. • Check if the draft setting ([Settings] - [Sounder] - [Transducer Draft]) is zero or higher.
The picture sensitivity is too low.	• If you are in the manual mode, check the gain setting. • Check the transducer face for marine life and air bubbles. • Bottom is too soft to return an acceptable echo.
The depth indication does not appear.	• For manual operation, adjust the gain and range to display the bottom echo in reddish-brown. • Adjust the bottom level HF/LF.

Problem	Remedy
Noise or interference shows on the display.	• Make sure the transducer cable is not near the engine. • Check the ground for tight connection, corrosion. • Check if another fish finder near your boat has the same frequency as your fish finder. • Try to reject the interference with [Interference Rejection] in the [Settings] - [Sounder] menu.

This page is intentionally left blank.

APPENDIX 1 MENU TREE

Settings menu   Default settings indicated in **bold italic**.

— General —— Two Finger ———— None, **Full Screen**, Screen Capture,
              Tap Function   Event Mark, Home, Settings, Lists, Tide
           —— Two Finger Long — None, Full Screen, Screen Capture,
              Tap Function   Event Mark, **Home**, Settings, Lists, Tide
           —— Move Tool On Long Push (OFF, **ON**)
           —— Password Lock (**OFF**, ON)
           —— Connect to ———— Never, At Startup, **When Necessary**
              the Internet
           —— Wireless ————— Wireless — Wireless Mode (**Connect to existing LAN**,
              LAN Settings   Mode   Create Local Network)
                              —— Enable —— Wireless (**OFF**, ON)
                                 Wireless
                              —— Scan*1
                              —— Currently Connected Network*1   *1: Shown only when
                              —— Available WLAN Networks*1   [Enable Wireless] is
                                                                        set to [ON].
           —— Display Additional TD in NavData (**OFF**, ON)
           —— Edge Swipe Guide (OFF, **ON**)
           —— User Interface ——— 0'03s, 0'05s, **0'10s**, 0'15s
              Auto-Hide
           —— Scale & Layout ——— Smallest, Small, **Normal**, Large
           —— Instrument Theme —— White, **Black**
           —— Brilliance Synchronization (OFF, **ON**)
           —— Auto Scroll (**OFF**, ON)
           —— Cross Cursor Speed (-7 to 7; **0**)
           —— Allow Remote ———— Off, View Only, **Full Control**
              Control
           —— Local Time Offset (-12:00 to +13:00; **+00:00**)
           —— Time Format ———— **Auto**, 24 Hours, 12 Hours
           —— Demo File (*Select the file to use for demo mode*)
           —— Stop Demo
           —— Manual Demo (**OFF**, ON)
           —— Show Welcome Screen
           —— Show Welcome Screen at startup (OFF, **ON**)
           —— Demo Slide Show (OFF, **ON**)   *2: Requires internet connection.
           —— Demo Speed (0.0 kn to 50.0 kn; **6.0 kn**)
           —— Screen Viewing Angle Adjustment (Most Downward, Downward, Slightly Downward,
                                                Normal, Slightly Upward, Upward, Most Upward)
           —— Language (**English (United States)**, English (United Kingdom), Others)
           —— Check for Software Update*2
           —— MY TIMEZERO (Logged As, Login, Logout, Enable Cloud Synchronization)
           —— MY FRIENDS (Nickname, Manage My Friends)
           —— DATA USAGE (Shows number of Points, Routes, Area & Lines, Circles, Photos,
                           Catches and Track Points used with total available.)
①   —— Reset Default Settings

①

── Routes ──── Default Route Color (Red, *Blue*, Green, Yellow, Magenta, Orange,
         Cyan, Black)
    ── Route Thickness (1 - 10 or 2 - 11, *2*) (1 - 10=2D mode, 2 - 11=3D mode)
    ── Routes Density (Low, *Medium*, Full)
    ── Navigate with Autopilot* (*ON*, OFF)   *Requires NAVpilot.
    ── Autopilot Step* (2 - 30(°), *10*)
    ── Ask to Enter Route Name (*ON*, OFF)
    ── Fuel Max Range (*ON*, OFF)
    ── Laylines (ON, *OFF*)
    ── Route Auto Zoom (*ON*, OFF)
    ── WPT Switch Mode (*Circle and Cross Line*, Circle, Cross Line)
    ── Switching Circle Radius (0 - 3278(ft), *200*)
    ── Waypoint Crossing Notification (ON, *OFF*)
    ── End of Route Notification (ON, *OFF*)
    ── End or Route Operation (*Stop Navigation*, Continue Navigation)
    ── Intelligent Route Waypoint Centering (*ON*, OFF)
    ── Display XTE Lines (*ON*, OFF)
    ── XTE Value (1 - 3278(ft), *200*)
    ── Cruising Speed for Planning (0 - 99(kt), *5*)
    ── Delete All Points & Routes
    ── Reset Default Settings

── Points ──── Display Points Names (*ON*, OFF)
    ── Default Point Symbol (Select the default icon for point.)
    ── Default Point Color (Red, Blue, Green, *Yellow*, Magenta, Orange, Cyan, Black)
    ── Point Size (50 - 200(%), *100*)
    ── Icons Set (*Modern*, Classic)
    ── Points Density Low, *Medium*, Full)
    ── Data to Be Recorded in Event Comment (*None*, Date, SST, Date And SST)
    ── Record Event1 Automatically (ON, *OFF*)
    ── Default Event 1 - 6 Symbol

Event2 default symbol

Event3 default symbol

Event4 default symbol

Event5 default symbol

Event6 default symbol

Event1 default symbol
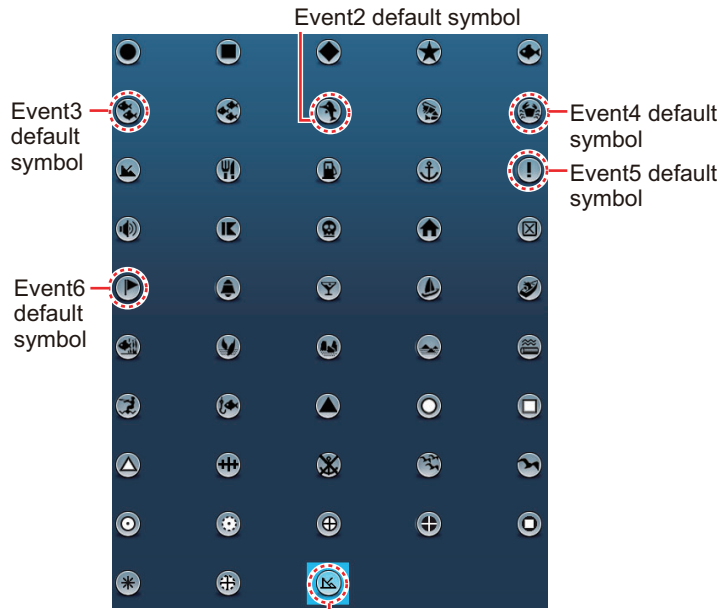
    ── Default Event 1 - 6 Color

Red	Blue	Green	Yellow	Purple	Orange	Light-blue	Black
Event1 default color	Event2 default color	Event3 default color	Event4 default color	Event5 default color	Event6 default color		

    ── Delete All Points & Routes
    ── Delete All Boundaries
    ── Reset Default Settings

①

①

Plotter
- Grid Interval (*Off*, Very Small, Small, Medium, Large, Very Large)
- Show Scale Slider (OFF, *ON*)
- Tide/Current Icons Size (50 - 150(%), *100*)
- NavData Transparency (0 - 80(%), *10*)
- PhotoFusion Transparency (0 - 80(%), *15*)
- Tide Range for PhotoFusion (0.0 - 60(ft), *0*)
- Tidal Currents Transparency (0 - 80(%), *25*)
- Radar Transparency (0 - 80(%), *20*)
- Range Link (ON, *OFF*)
- Echo Color (*Multicolor*, Green, Yellow)
- Depth Shading Transparency (0 - 80(%), *50*)
- Auto Depth Shading Color Scale (*ON*, OFF)
- Minimum Value* (0000 - 33000(ft), *0*)   * Operable when [Auto Depth
- Maximum Value* (00000 - 33000(ft), *200*)   Shading Color Scale] is turned off.
- Depth Color Shade (*Classic Hue*, Inverted Classic Hue, Red Hue, Blue Hue,
   Green Hue, Yellow Hue)
- Auto Alti 3D Exaggeration (ON, *OFF*)
- 3D Alti Exaggeration** (1 - 20, *3*)   ** Operable when [Auto Alti 3D
- Reset Default Settings   Exaggeration] is turned off.

Vector
Chart
- Chart Object Size (50 - 200(%), *100%*)
- Chart Color Palette (S52, *Standard*, Sunlight)
- Chart Symbols (*S52*, International)
- Shallow Contour (0.0, 3.3, 6.6, 9.8, 13.1, 16.4, 19.7, 23.0, 26.2, 29.50, 32.8 (ft))
- Safety Contour (0.0, 3.3, 6.6, 9.8, 13.1, 16.4, 19.7, 23.0, 26.2, 29.50, 32.8,
   49.2, 65.6, 98.4, 164 (ft))
- Deep Contour (0.0, 3.3, 6.6, 9.8, 13.1, 16.4, 19.7, 23.0, 26.2, 29.50, 32.8,
   49.2, 65.6, 98.4, 164, 328, 656, 984, 1,640 (ft))
- 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, 3.3, *6.6*, 9.8, 13.1, 16.4, 19.7,
      23.0, 26.2, 29.5, 32.8, 49.2, 65.6, 98.4(ft))
- Obs. Depth Below Safety (ON, *OFF*)
- Display Seabed (ON, *OFF*)
- Cautionary Areas (ON, *OFF*)
- Reset Default Settings

①

AP-3

①

— S-52 ——— S-52 Vector Chart Display Mode (***Custom***, Base, Standard, Other, Fishing)
Display —— 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, Cur., etc (***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 (BBWX series only)
—— Marine Warnings (BBWX series only)
—— Tropical Info (BBWX series only)
—— Sirius Diagnostic (BBWX series only)
—— Tidal Step (5'00s, ***10'00s***, 15'00s, 20'00s, 30'00s, 1h00', 2h00', 3h00', 6h00', 12h00')
—— Duration of Animation (0'05s, 0'10s, 0'15s, 0'20s, 0'30s, ***0'45 s***, 1'00s, 2'00s, 3'00s)
—— 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 (15 - 120(°F), ***50***°)
        —— Maximum Value (15 - 120(°F), ***90***°)
① —— Reset Default Settings

AP-4

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)
                  ├─ Rings Interval (**Auto**, 1, 2, 3, 4, 5, 6, 7, 8, 9)
                  ├─ Show Range Slider (**ON**, OFF)
                  ├─ Own Ship Icon (**ON**, OFF)
                  ├─ Bearing Scale Mode (**Relative**, True)
                  ├─ EBL Reference (True, **Relative**)
                  ├─ Watchman (**5 minutes**, 10 minutes, 20 minutes)
                  ├─ Trail Color (**Blue**, Yellow, Green)
                  ├─ Trail Length (**0'15s**, 0'30s, 1'00s, 3'00s, 6'00s, 15'00s, 39'00s, Continuous)
                  ├─ Trail Shade (Single, **Multi**)
                  ├─ Trail Mode (Relative, **True**)
                  ├─ Antenna Rotation (**Auto**, 24 RPM)
                  ├─ Antenna Heading Align (-179.9 - +180.0(°), **0**)
                  ├─ Main Bang Suppression (0 - 100, **0**)
                  ├─ Enable Sector (1, 2) Blanking (ON, **OFF**)
                  ├─ Start Angle*1 (0 - 359(°), **0**)
                  ├─ End Angle*1 (0 - 359(°), **0**)
                  ├─ Longitudinal (from bow) (0 - 3275(ft), **20**)
                  ├─ Lateral (-Port) (-320 - 320(ft), **0**)
                  ├─ Antenna Height*6*7 (For DRS: Under 3 m, **3 m - 10 m**, Over 10 m)
                  ├─ Auto Tuning*3 (**ON**, OFF)
                  ├─ Tuning Source*3/*6*7 (**Range1**, Range2)
                  ├─ Manual Tuning*2 / *3 (-50 - 50, **-50**)
                  ├─ Radar Monitoring (Open the radar monitor window.)
                  ├─ Radar Optimization*3 / *5/ *6
                  ├─ 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)
                  ├─ Set Hardware to Factory Default
                  └─ Reset Default Settings
└─ Targets ─────── Display Target IDs (**ON**, OFF)
                  ├─ Ignore Alarms for AIS Slower than... (**1 kn**)
                  ├─ Target Icon Size (50, **100**, 200)
                  ├─ Ais Message Notification (**ON**, OFF)
                  ├─ CPA/TCPA Alarm (ON, **OFF**)
                  ├─ CPA Alarm Value (**0.5 NM**)
                  ├─ TCPA Alarm Value (**10 min**)
                  ├─ CPA Graphic Display (**ON**, OFF)
                  ├─ 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 (1, 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 [TX/STBY] is [ON].
*6: [TX Channel] in case of sensor radar sensor DRS4D-NXT. Options are **AUTO**, 1, 2, 3.
*7: Not available for DSR4DL+.

① — Sounder ——
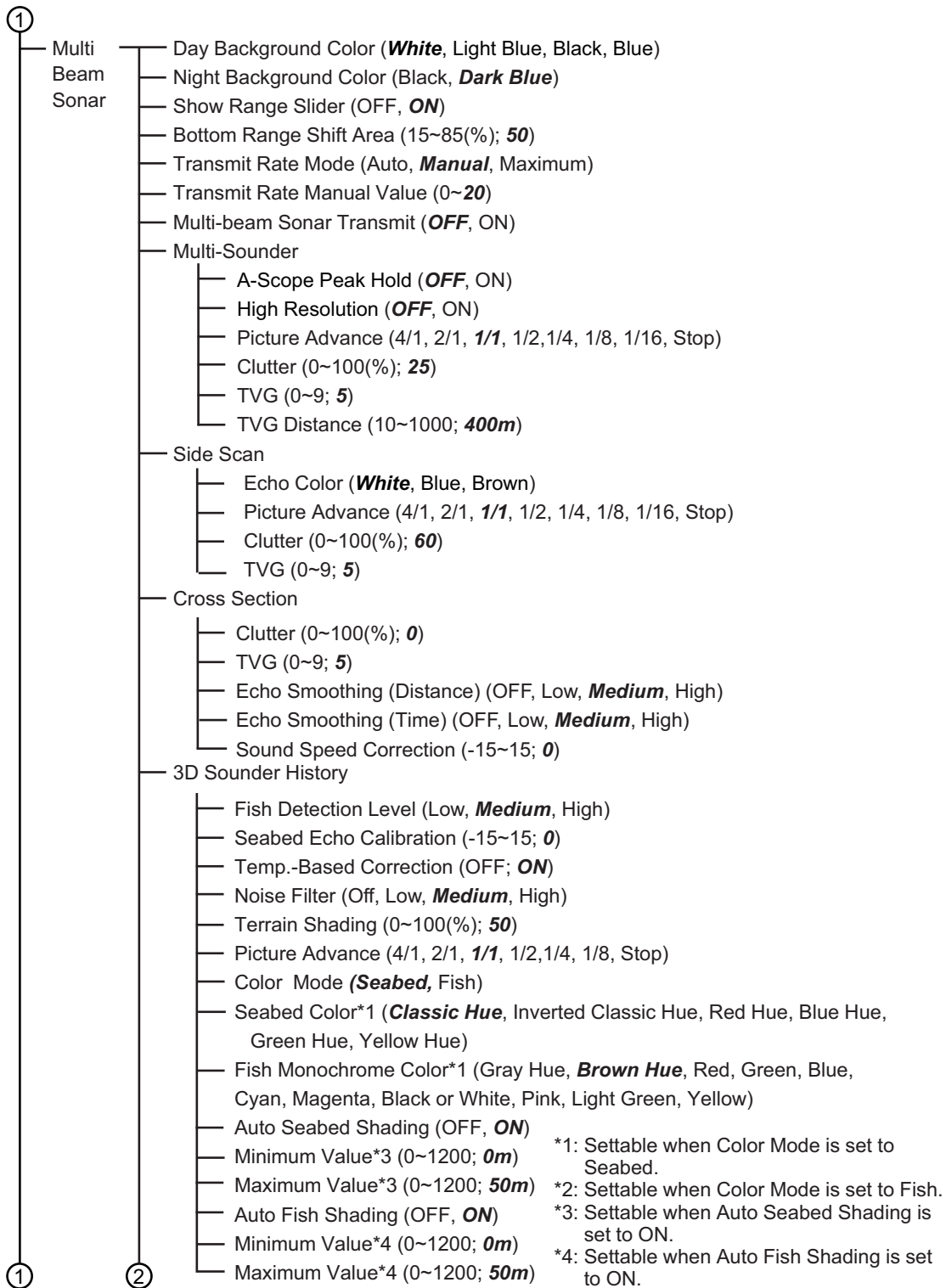- Fish Finder Source (*TZTL*, network sounder name if connected)
- Day Background Color (*White*, Light Blue, Black, Dark Blue)
- Night Background Color (Black, *Dark Blue*)
- Echo Color Levels (8 Colors, 16 Colors, *64 Colors*)
- Show Range Slider (*ON*, OFF)
- A-Scope Peak Hold (ON, *OFF*)
- Zoom Reference Lines (*ON*, OFF)
- Smoothing (ON, *OFF*)
- Picture Advance (4, 2, *1*, 1/2, 1/4, 1/8, 1/16, Stop)
- Range Shift (0 - 999(ft), *0*)
- Bottom Range Shift Area (15 - 85(%), *75*)
- Zoom Range Span (6 - 350(ft), *30*)
- Bottom Lock Range Span (6 - 350(ft), *30*)
- ACCU-FISH Info (*Depth*, Fish Size)
- ACCU-FISH Symbols (Off, *Solid*, Striped)
- ACCU-FISH Minimum Size (00.00~79.98(in); *00.00*)
- ACCU-FISH Size Correction (-80 - 100(%), *0*)
- Interference Rejection (Off, Low, Medium, High, *Auto*)
- Heaving Correction (ON, *OFF*; external sounder only)
- Clutter (0 - 100(%), *0*)
- TVG HF (0 - 9, *5*)
- TVG LF (0 - 9, *5*)
- Transmit Rate Auto (ON, *OFF*)
- Transmit Rate Manual (0 - 20, *20*)
- Sounder Transmit (*ON*, OFF)
- Fish Alarm (ON, *OFF*)
  - Range Minimum Value (0 - 3600(ft), *0.0*)*
  - Range Maximum Value (0 - 3600(ft), *10.0*)*
- Fish Alarm for Bottom Lock (ON, *OFF*)
  - Range Minimum Value(0 - 360(ft), *0.0*)*
  - Range Maximum Value (0 - 360(ft), *1.0*)*
- Fish Alarm Level (Low, *Medium*, High)
- Zero Line Rejection (*ON*, OFF)
- Zero Line Range (1.4 - 2.5, *2.0*)
- Transducer Draft (0.0 - 99.9(ft), *3.0*)
- Salt Water (*ON*, OFF)
- Fish Finder Source (*TZTLxx*, network sounder name if connected)
- Transducer Setup (Open the dialog box for transducer setting.)
- Transmission Power (Other than DFF1-UHD: 0 - 10, *10*, DFF1-UHD: OFF, Max, *Auto*)
- External KP (ON, *OFF*) (External sounder only.)
- Bottom Level HF (-40 - +40)*1
- Bottom Level LF (-40 - +40)*1
- Gain Offset HF (-50 - +50)*1
- Gain Offset LF (-50 - +50)*1
- Auto Gain Offset HF (-5 - +5)*1
- Auto Gain Offset LF (-5 - +5)*1
- STC HF (0 - 10)*2
- STC LF (0 - 10)*2
- Frequency Adjust HF (-50 - 50)*3
- Frequency Adjust LF (-50 - 50)*3
- TX Pulse HF (Short 1, Short 2, Standard, Long)*3
- TX Pulse LF (Short 1, Short 2, Standard, Long)*3
- RX Band HF (Narrow Standard, Wide)*3
- RX Band LF (Narrow, Standard, Wide)*3
- Temperature Port (MJ Port, Low Frequency, High Frequency)*3
- Sounder Demo Mode (*OFF*, Shallow, Deep)
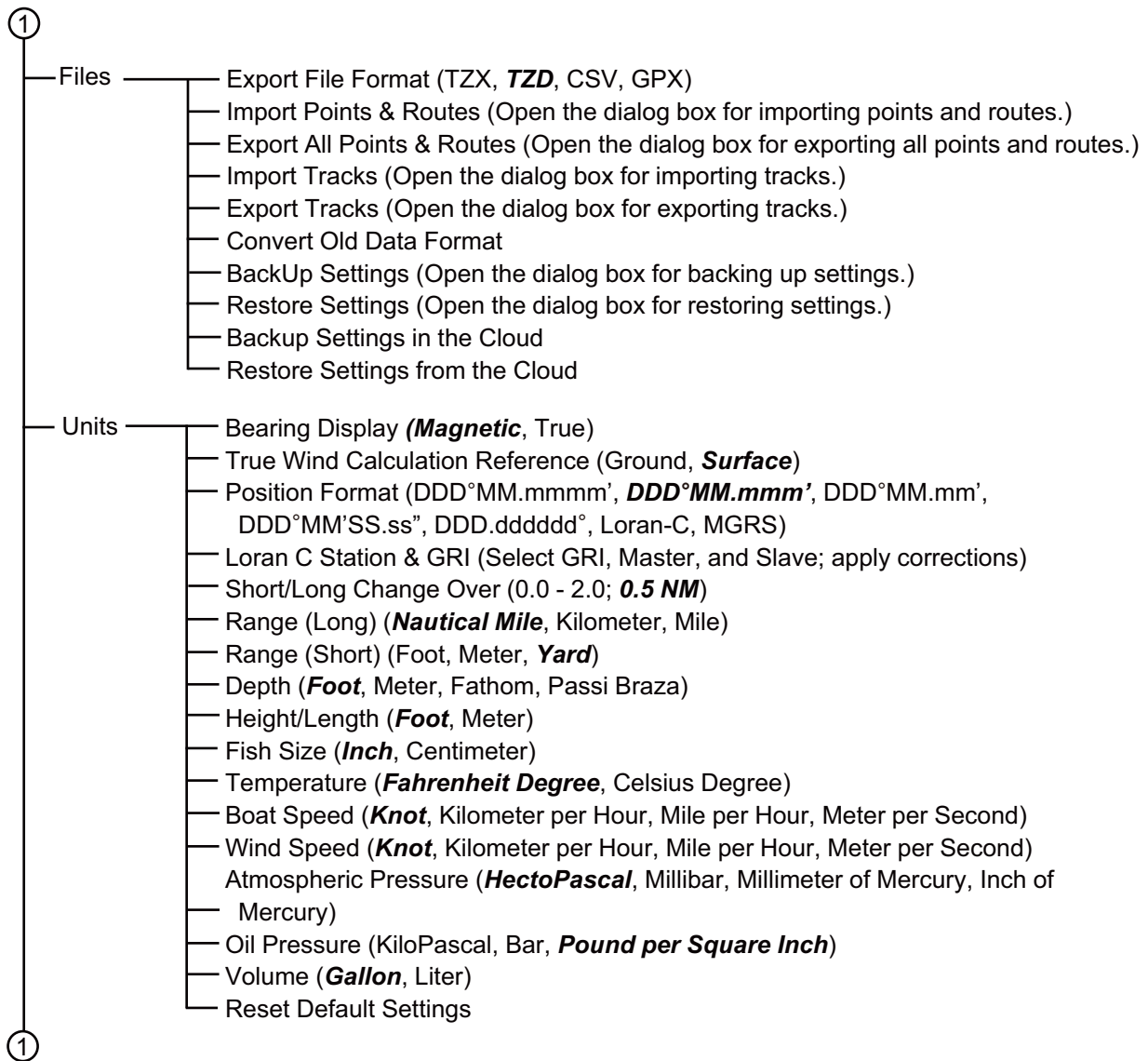- Set Hardware to Factory Default (External sounder only)
- Reset Default Settings

* Value for internal sounder. Different with external sounder.

*1 Internal sounder, DFF1, DFF3, BBDS1, DFF1-UHD
*2 DFF3, DFF1-UHD
*3 DFF3

①

① ─ Multi Beam Sonar

- Day Background Color (*White*, Light Blue, Black, Blue)
- Night Background Color (Black, *Dark Blue*)
- Show Range Slider (OFF, *ON*)
- Bottom Range Shift Area (15~85(%); *50*)
- Transmit Rate Mode (Auto, *Manual*, Maximum)
- Transmit Rate Manual Value (0~*20*)
- Multi-beam Sonar 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(%); *25*)
  - 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(%); *60*)
  - TVG (0~9; *5*)
- Cross Section
  - Clutter (0~100(%); *0*)
  - TVG (0~9; *5*)
  - 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 (0~100(%); *50*)
  - Picture Advance (4/1, 2/1, *1/1*, 1/2,1/4, 1/8, Stop)
  - Color Mode (*Seabed,* 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, Black or White, Pink, Light Green, Yellow)
  - Auto Seabed 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*)

*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.
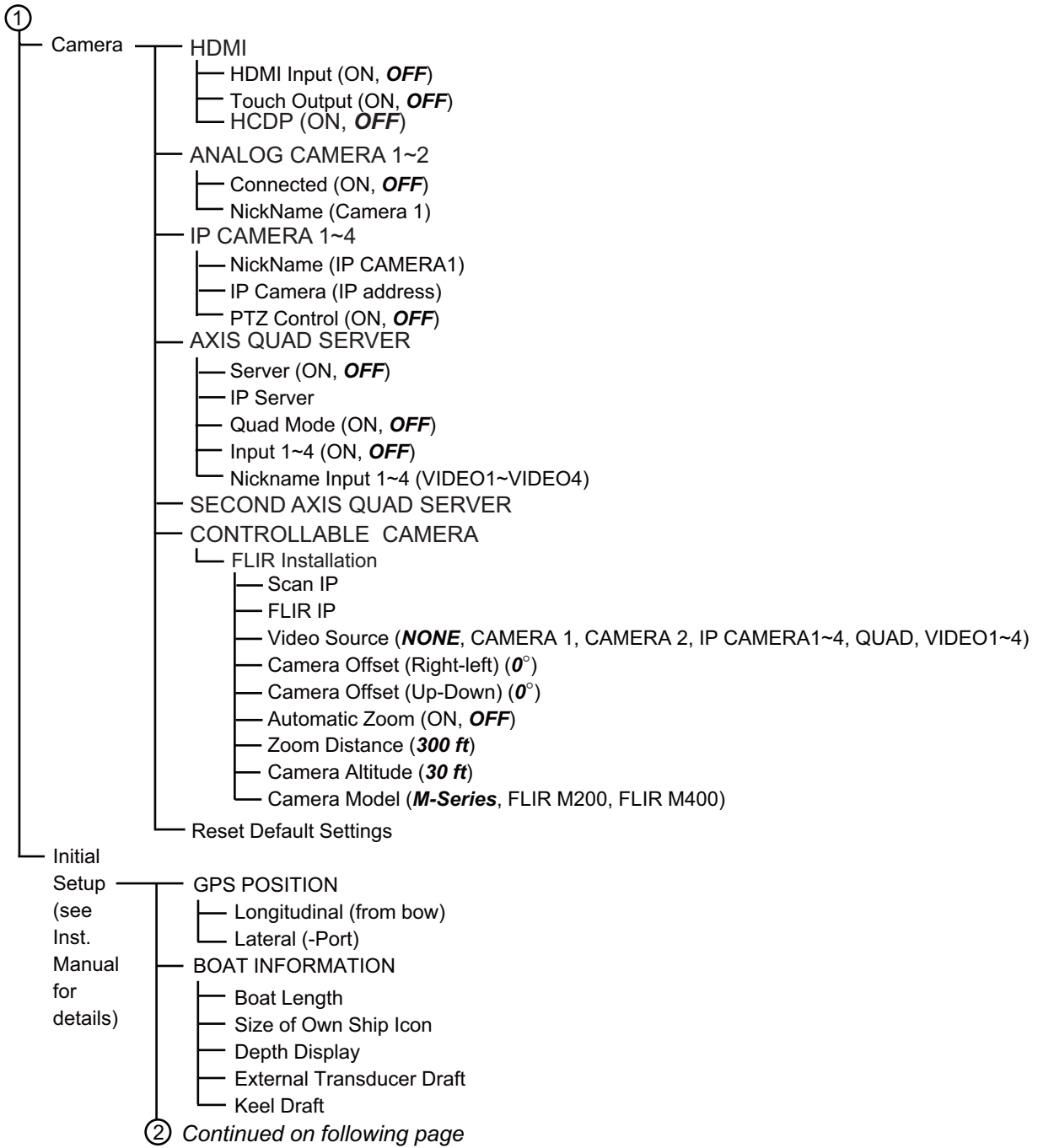*4: Settable when Auto Fish Shading is set to ON.
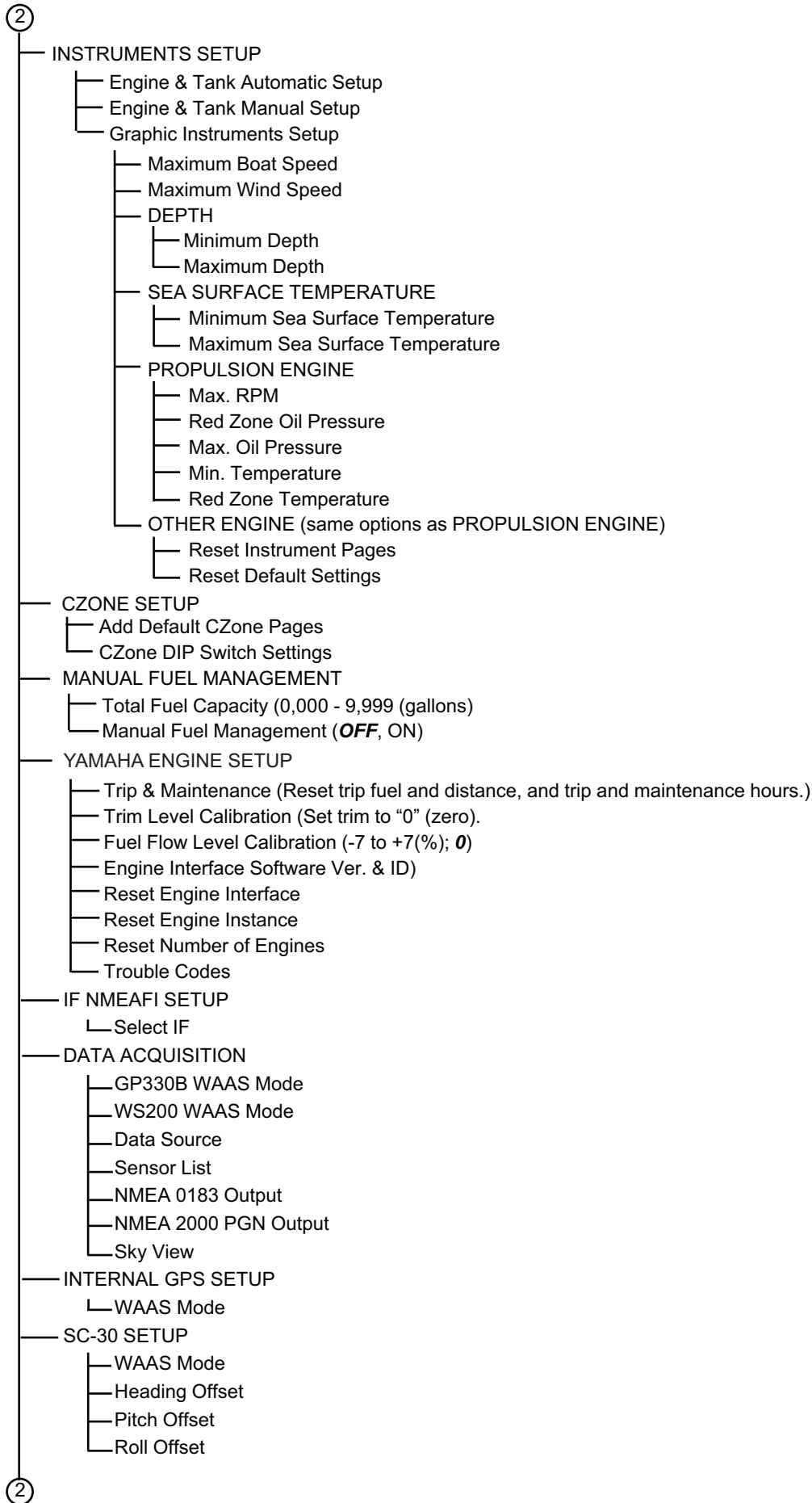
AP-7

① ② *Continued from previous page*

Fish Finder Alarms
— Fish Alarm (**OFF**, Single Beam, Triple Beam)
— Range Minimum Value (0~1200; **0m**)*
— Range Maximum Value (0~1200; **10m**)*
— Fish Alarm Level (Low, **Medium**, High)*

*: Settings have no effect when
Fish Alarm is set to OFF.

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, **Standard**, Long)
— DFF-3D Monitoring
— Set Hardware to Factory Default
— Reset Default Settings

Alarm
— Hardware Alarm (**ON**, OFF)
— Cross Track Error Alarm (ON, **OFF**)
— Depth Alarm (ON, **OFF**)
— Depth Alarm Value (0 - 900(ft), **30**)
— Sea Surface Temperature Alarm (**Off**, Over, Under, Within, Out of)
— Temperature Alarm Value (32 - 140($^\circ$F), **70.00**)
— Temp. Alarm Range Min Value (15 - 160($^\circ$F), **60.0**)
— Temp. Alarm Range Max Value (15 - 160($^\circ$F), **70.0**)
— Temp. Shear Alarm Value (0 - 15($^\circ$F), **1.0**)
— Speed Alarm (**Off**, Over, Under)
— Speed Alarm Value (0 - 99.9(kn), **10.0**)
— Anchor Watch Alarm (ON, **OFF**)
— Anchor Watch Alarm Value (1 - 3300(ft), **150**)
— Wind Speed Alarm (**Off**, Apparent, True)
— Wind Speed Alarm Value (0.0 to 99.9; **10 kn**)
— Own Ship Alarm Zone (OFF, **ON**)
— Own Ship Alarm Zone Warning (1 to 5000; **300 m**)
— Low Fuel Alarm (ON, **OFF**)
— Low Fuel Alarm Level (10-50%; **20%**)
— Notification Sound (**ON**, OFF)
— Notify when NAVpilot is engaged (**ON**, OFF)
— Alarm Sound (**ON**, OFF)
— Sound Alarm Until Acknowledged (**ON**, OFF)
— Save Log File (Save log file to micro SD card.)
— Reset Default Settings

①

①

—Files ——— — Export File Format (TZX, *TZD*, CSV, GPX)
— Import Points & Routes (Open the dialog box for importing points and routes.)
— Export All Points & Routes (Open the dialog box for exporting all points and routes.)
— Import Tracks (Open the dialog box for importing tracks.)
— Export Tracks (Open the dialog box for exporting tracks.)
— Convert Old Data Format
— BackUp Settings (Open the dialog box for backing up settings.)
— Restore Settings (Open the dialog box for restoring settings.)
— Backup Settings in the Cloud
— Restore Settings from the Cloud

—Units ——— — Bearing Display *(Magnetic*, True)
— True Wind Calculation Reference (Ground, *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 GRI, Master, and Slave; apply corrections)
— Short/Long Change Over (0.0 - 2.0; *0.5 NM*)
— Range (Long) (*Nautical Mile*, Kilometer, Mile)
— Range (Short) (Foot, Meter, *Yard*)
— Depth (*Foot*, Meter, Fathom, Passi Braza)
— Height/Length (*Foot*, Meter)
— Fish Size (*Inch*, Centimeter)
— Temperature (*Fahrenheit Degree*, Celsius Degree)
— Boat Speed (*Knot*, Kilometer per Hour, Mile per Hour, Meter per Second)
— Wind Speed (*Knot*, Kilometer per Hour, Mile per Hour, Meter per Second)
   Atmospheric Pressure (*HectoPascal*, Millibar, Millimeter of Mercury, Inch of
—   Mercury)
— Oil Pressure (KiloPascal, Bar, *Pound per Square Inch*)
— Volume (*Gallon*, Liter)
— Reset Default Settings

①

① Camera ── HDMI
    ── HDMI Input (ON, *OFF*)
    ── Touch Output (ON, *OFF*)
    ── HCDP (ON, *OFF*)
  ── ANALOG CAMERA 1~2
    ── Connected (ON, *OFF*)
    ── NickName (Camera 1)
  ── IP CAMERA 1~4
    ── NickName (IP CAMERA1)
    ── IP Camera (IP address)
    ── PTZ Control (ON, *OFF*)
  ── AXIS QUAD SERVER
    ── Server (ON, *OFF*)
    ── IP Server
    ── Quad Mode (ON, *OFF*)
    ── Input 1~4 (ON, *OFF*)
    ── Nickname Input 1~4 (VIDEO1~VIDEO4)
  ── SECOND AXIS QUAD SERVER
  ── CONTROLLABLE CAMERA
    └── FLIR Installation
      ── Scan IP
      ── FLIR IP
      ── Video Source (*NONE*, CAMERA 1, CAMERA 2, IP CAMERA1~4, QUAD, VIDEO1~4)
      ── Camera Offset (Right-left) (*0°*)
      ── Camera Offset (Up-Down) (*0°*)
      ── Automatic Zoom (ON, *OFF*)
      ── Zoom Distance (*300 ft*)
      ── Camera Altitude (*30 ft*)
      ── Camera Model (*M-Series*, FLIR M200, FLIR M400)
  ── Reset Default Settings

── Initial
Setup ── GPS POSITION
(see   ── Longitudinal (from bow)
Inst.   └── Lateral (-Port)
Manual ── BOAT INFORMATION
for   ── Boat Length
details)   ── Size of Own Ship Icon
           ── Depth Display
           ── External Transducer Draft
           └── Keel Draft

AP-10

②
├─ INSTRUMENTS SETUP
│   ├── Engine & Tank Automatic Setup
│   ├── Engine & Tank Manual Setup
│   └── Graphic Instruments Setup
│   ├── Maximum Boat Speed
│   ├── Maximum Wind Speed
│   ├── DEPTH
│   │   ├── Minimum Depth
│   │   └── Maximum Depth
│   ├── SEA SURFACE TEMPERATURE
│   │   ├── Minimum Sea Surface Temperature
│   │   └── Maximum Sea Surface Temperature
│   ├── PROPULSION ENGINE
│   │   ├── Max. RPM
│   │   ├── Red Zone Oil Pressure
│   │   ├── Max. Oil Pressure
│   │   ├── Min. Temperature
│   │   └── Red Zone Temperature
│   └── OTHER ENGINE (same options as PROPULSION ENGINE)
│   ├── Reset Instrument Pages
│   └── Reset Default Settings
├─ CZONE SETUP
│   ├── Add Default CZone Pages
│   └── CZone DIP Switch Settings
├─ MANUAL FUEL MANAGEMENT
│   ├── Total Fuel Capacity (0,000 - 9,999 (gallons)
│   └── Manual Fuel Management (*OFF*, ON)
├─ YAMAHA ENGINE SETUP
│   ├── Trip & Maintenance (Reset trip fuel and distance, and trip and maintenance hours.)
│   ├── Trim Level Calibration (Set trim to "0" (zero).
│   ├── Fuel Flow Level Calibration (-7 to +7(%); *0*)
│   ├── Engine Interface Software Ver. & ID)
│   ├── Reset Engine Interface
│   ├── Reset Engine Instance
│   ├── Reset Number of Engines
│   └── Trouble Codes
├─ IF NMEAFI SETUP
│   └── Select IF
├─ DATA ACQUISITION
│   ├── GP330B WAAS Mode
│   ├── WS200 WAAS Mode
│   ├── Data Source
│   ├── Sensor List
│   ├── NMEA 0183 Output
│   ├── NMEA 2000 PGN Output
│   └── Sky View
├─ INTERNAL GPS SETUP
│   └── WAAS Mode
└─ SC-30 SETUP
    ├── WAAS Mode
    ├── Heading Offset
    ├── Pitch Offset
    └── Roll Offset

②

AP-11

②
— NETWORK SENSOR SETUP (Shows compatible FURUNO devices.)
— CALIBRATION
    — Heading
    — Speed Through Water
    — Wind Speed
    — Wind Angle
    — Sea Surface Temperature
— DATA DAMPING
    — COG & SOG
    — Heading
    — Speed Through Water
    — Wind Speed & Angle
    — Rate of Turn
— FUSION
    — Connect to Fusion
    — Fusion Auto Volume
    — Minimum Speed
    — Maximum Speed
    — Volume Increase
— BROWSER INSTALLATION
    — FAX30 Browser
    — FA30 Browser
    — FA50 Browser
— Chart Master Device*1
— System ID
— IP Address
— Quick Self Test
— Certification Mark
— ServiceMan
— Event Input Configuration (*Off*, Event, MOB)
— Remote Controller Configuration*2
— Adjust Display Resolution*3
— Update Network Equipments
— SIRIUS DIAGNOSTIC*4
    — SIrius Radio Diagnostic
    — Sirius Weather Diagnostic
— Track Synchro Enable
— Reset Default Settings

*1: Not shown for monitors connected to HDMI OUT2 port on the TZT2BB.
*2: Requires Remote Controller MCU-004 or MCU-005.
Not shown otherwise.
*3: This menu item does not appear for TZTL12F/TZTL15F systems.
*4: Requires FURUNO BBWX series Marine Weather Receiver.
Not shown otherwise.

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)

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 20 cm or more away from person's body.
• This device must not be co-located or operating in conjunction with any other antenna or transmitter.

Innovation, Science and Economic Development Canada (ISED)

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
(1) This device may not cause interference.
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil contient un ou plusieurs émetteurs / récepteurs exempts de licence qui sont conformes à la norme « exempts de licence RSS (s) » Canadienne d'Innovation, Sciences et Développement économique. L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage.
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Caution: Exposure to Radio Frequency Radiation
This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment and meets RSS-102 of the ISED radio frequency (RF) Exposure rules. This equipment should be installed and operated keeping the radiator at least 20 cm or more away from person's body.

Cet équipement est conforme aux limites d'exposition aux rayonnements énoncées pour un environnement non contr êolé et respecte les règles d'exposition aux fréquences radioélectriques (RF) CNR-102 de l'ISED. 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.

AP-14

SPECIFICATIONS OF MULTI FUNCTION DISPLAY
TZTL12F/15F

1 GENERAL

1.1	Display	
	TZTL12F	12.1-inch wide TFT color LCD, 1280 x 800 (WXGA)
	TZTL15F	15.6-inch full-wide TFT color LCD, 1366 x 768(FWXGA)
1.2	Brightness	1300 cd/m^2 typical (TZTL12F), 1000 cd/m^2 typical (TZTL15F)
1.3	Display colors	16,770,000 colors (plotter), 64 colors (echo), 16 colors (radar)

2 PLOTTER FUNCTION

2.1	Display mode	Course plot, NAV data (includes instrument and engine data)
2.2	Projection	Mercator
2.3	Usable area	85° latitude or below
2.4	Memory capacity	Track: 30,000 points, Point/MOB: 30,000 point
		Route: 200 courses w/500 points each
		ARPA: 30 targets, AIS: 100 targets
2.5	GPS receiver	
	Receiving frequency	1575.42 MHz
	Number of channel	GPS: 56 ch, SBAS: 1 ch
	Accuracy (approx.)	GPS: 10 m (2drms, HDOP<4),
		WAAS: 3 m (2drms, HDOP<4), MSAS: 7 m (2drms, HDOP<4)
	Ship's speed range	500 m/s max. (all satellites at -130dBm)
	Position fixing time	Cold start: 100 s typical
	Position update interval	1 s

3 RADAR FUNCTION

3.1	Orientation mode	Head-up, North-up (heading data required)

4 SOUNDER INDICATION

4.1	Output power	600 Wrms or 1 kWrms
4.2	Frequency	50/200 kHz alternative output
4.3	Display mode	ACCU-FISH^{TM}, A-scope, Auto (Fishing/ Cruising),
		Temperature graph, Estimation of bottom composition

5 OTHER FUNCTIONS

5.1	Instrument display	Instrument data required
5.2	Camera monitor	NTSC/PAL data required
5.3	Language	Chinese, Danish, English (USA/UK), Finnish, French, German, Greek, Italian, Japanese, Norwegian, Portuguese, Russian, Spanish, Swedish
5.4	AIS information	AIS receiver required
5.5	DSC display	Target data required
5.6	Alarm	School of fish*, School of fish for bottom lock*, Anchor Watch, XTE, Speed, Sea surface temperature*, Depth*, CPA/TCPA*, Hardware *: option

| 5.7 | Notification | DSC receiving, Waypoint crossing, End of route, AIS target count, NAVpilot engagement (NAVpilot series required) |

6   INTERFACE

6.1   Number of port

LAN	1 port, Ethernet 100Base-TX
NMEA2000	1 port (LEN=1), external power input required
USB	1 port, USB2.0
Video output	1 port, HDMI (720 p)
Video input	2 ports, NTSC/PAL
SD card slot	1 port, micro-SDXC
Contact closure	1 port, operator fitness signal (normal open)

6.2	Wireless LAN	IEEE802.11b/g/n
	Transmit frequency	2.412 to 2.462 GHz
	Output power	12 dBm max.

6.3   NMEA0183 sentences (V1.5/2.0/3.0)

| Output | AAM, APB, BOD, DBT, DPT, GGA, GLL, GNS, GSA, GSV, RMB, RMC, RTE, TTM, VDM, VTG, WPL, XTE, ZDA |

6.4   NMEA2000 PGN

Input	065280, 126992, 126993, 126996, 127237, 127245, 127250, 127251, 127257, 127488, 127489, 127505, 128259, 128267, 129025, 129026, 129029, 129033, 129038, 129039, 129040, 129041, 129291, 129538, 129540, 129793, 129794, 129798, 129801, 129802, 129808, 129809, 129810, 130306, 130310, 130311, 130312, 130313, 130314, 130316, 130577, 130578, 130817, 130818, 130820, 130822, 130823, 130826, 130827, 130828, 130880
Output	126992, 126993, 126996, 127250, 127251, 127257, 127258, 128259, 128267, 128275, 129025, 129026, 129029, 129033, 129283, 129284, 129285, 130306, 130310, 130311, 130312, 130313, 130314, 130316

7   POWER SUPPLY

7.1   Multi function display

| TZTL12F | 12-24 VDC (10.8-31.2 V): 3.0-1.5 A |
| TZTL15F | 12-24 VDC (10.8-31.2 V): 3.6-1.8 A |

| 7.2 | Rectifier (option) | 100-115/220-230 VAC, 1 phase, 50/60Hz |

8   ENVIRONMENTAL CONDITIONS

8.1	Ambient temperature	-15°C to +55°C
8.2	Relative humidity	95% or less at +40°C
8.3	Degree of protection	IP56

9   UNIT COLOR

N2.5 (fixed)

SPECIFICATIONS OF MULTI FUNCTION DISPLAY
TZT2BB

1   EXTERNAL MONITOR SPECIFICATIONS (REQUIRED)

1.1   Screen type   Color display with touch panel control, 1920 x 1080 (FHD),
                               1024 x 768 (XGA) or 1280 x 1024 (SXGA)

1.2   Signal interface
       Picture   HDMI
       Touch panel   USB2.0

2   PLOTTER FUNCTION

2.1   Display mode   Course plot, NAV data
2.2   Projection   Mercator
2.3   Usable area   80 latitude or below
2.4   Memory capacity   Track: 30,000 points (including MOB)
                               Route: 200 courses w/ 500 waypoints each
                               ARPA: 30 targets, AIS: 100 targets
2.5   Picture colors   16,770,000 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   64 colors

4   ECHO SOUNDER INDICATION

4.1   Transmit frequency   50/200 kHz alternative
4.2   Output power   600 W or 1 kW
4.3   Display mode   ACCU-FISH^{TM}, A-scope, ResBoost, Temperature graph,
                               Estimation of bottom composition
4.4   Echo colors   64 colors

5   OTHER FUNCTIONS

5.1   Instrument data display Weather sensor, engine monitoring sensor or other data required
5.2   Camera monitor   IP camera or NTSC/PAL data required
5.3   FAX/NAVTEX indication   A facsimile FAX-30 is required
5.4   Language   Chinese, Danish, Finnish, French, German, Greek, Italian,
                               Japanese, Norwegian, Portuguese, Russian, Spanish, Swedish,
                               UK/US
5.5   Alarms   Anchor watch, Cross track error, Proximity, CPA/TCPA*,
                               Ship's speed*, Sea surface temperature*, Depth*, Fish*, Hardware
                               *: External data required

6   INTERFACE

6.1   Number of port
       HDMI output   2 ports, type-A,
                               1920 x 1080 (FHD), 1024 x 768 (XGA) or 1280 x 1024 (SXGA)

SP - 3   E4496S01F
                                                                    201029

	HDMI input	1 port, 1920 x 1080p (FHD) or less, HDCP, non-interlace
	Composite video input	2 ports, RCA, NTSC/PAL
	USB	5 ports (type-A: 4 ports, micro B: 1 port), USB2.0
	LAN	3 ports, Ethernet 100Base-TX HUB
	NMEA0183 output	1 port
	NMEA2000	1 port
	SD card I/F	2 slots (SDXC)
6.2	Wireless LAN	IEEE802.11b/g/n
	Transmit frequency	2.412 to 2.462 GHz
	Output power	11 dBm max.
6.3	NMEA0183 sentences	
	Output	AAM, APB, BOD, DBT, DPT, GGA, GLL, GNS, GSA, GSV, RMB, RMC, RTE, TTM, VTG, WPL, XTE, ZDA

6.4 NMEA2000 PGN

Input	126992, 126996, 127237, 127245, 127250, 127251, 127257, 127488, 127489, 127493, 127503, 127505, 127506, 127508, 128259, 128267, 129025, 129026, 129029, 129033, 129038, 129039, 129040, 129041, 129291, 129538, 129540, 129793, 129794, 129795, 129797, 129798, 129801, 129802, 129808, 129809, 129810, 130306, 130310, 130311, 130312, 130313, 130314, 130316, 130577, 130578
Output	126992, 127250, 127251, 127257, 127258, 128259, 128267, 129025, 129026, 129029, 129033, 129283, 129284, 129285, 130306, 130310, 130312, 130313, 130314, 130316

7 POWER SUPPLY

7.1	Processor unit	12-24 VDC (10.8-31.2 V): 2.6-1.3 A (includes switch box)
7.2	Control unit (MCU-005, option)	
		48 VDC: 0.1 A or less, IEEE802.3af, Class 2 (PoE HUB required) Alternative A only
7.3	Rectifier (option)	100/110/115/220/230 VAC, 1 phase, 50/60Hz

8 ENVIRONMENTAL CONDITIONS

8.1	Ambient temperature	
	Processor unit	-15°C to +55°C
	Control unit	-15°C to +55°C
8.2	Relative humidity	93% or less at +40°C
8.3	Degree of protection	
	Processor unit	IP22
	Switch box	IP56 (front panel), IPX2 (chassis)
	Control unit	IP56 (front panel), IPX0 (chassis)
8.4	Vibration	IEC 60945 Ed.4

9 UNIT COLOR

9.1	Processor unit	N2.5
9.2	Switch box/ Control unit	N1.0 (front panel), N2.5 (chassis)

INDEX

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
[TZTL12F/TZTL15F/TZT2BB]

Bulgarian (BG)	С настоящото Furuno Electric Co., Ltd. декларира, че горепосоменат 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